

Feb. 2, 1954

G. R. GALL
PAVE RETAINER

2,667,951

Filed June 10, 1950

2 Sheets-Sheet 1

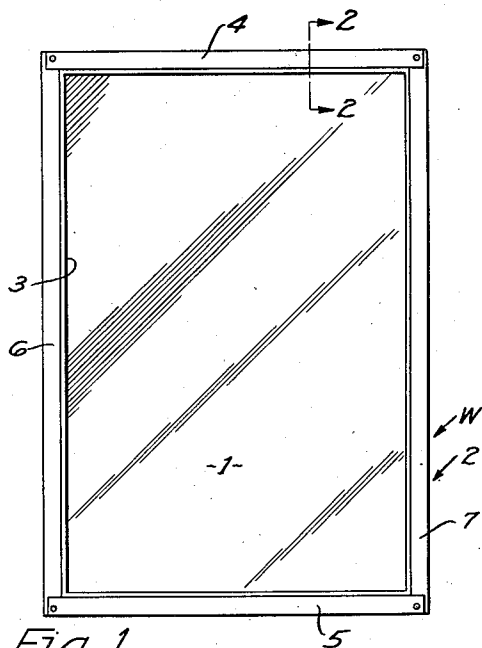


Fig. 1

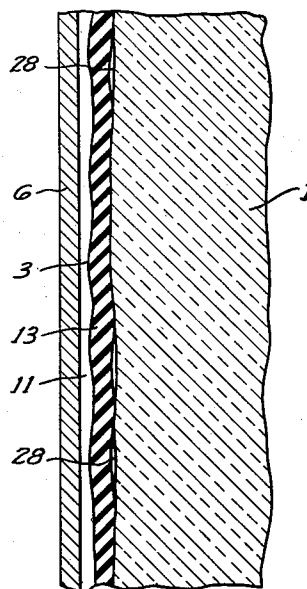


Fig. 5

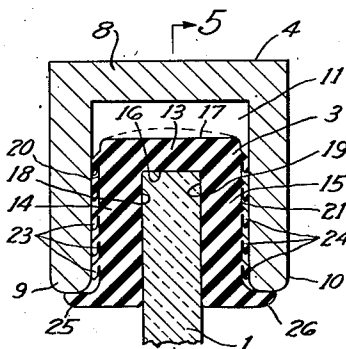


Fig. 2

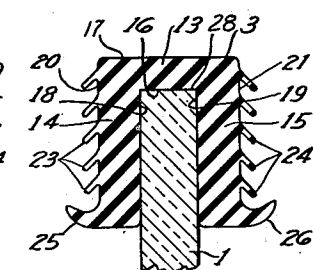


Fig. 3

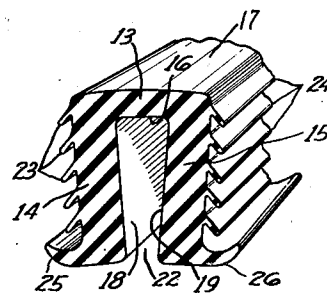


Fig. 4

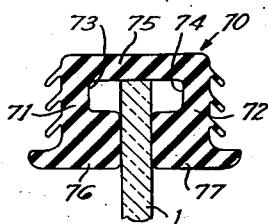


Fig. 9

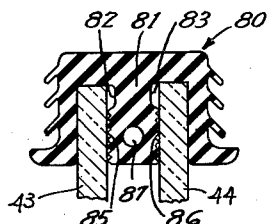


Fig. 10

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2 Sheets-Sheet 2

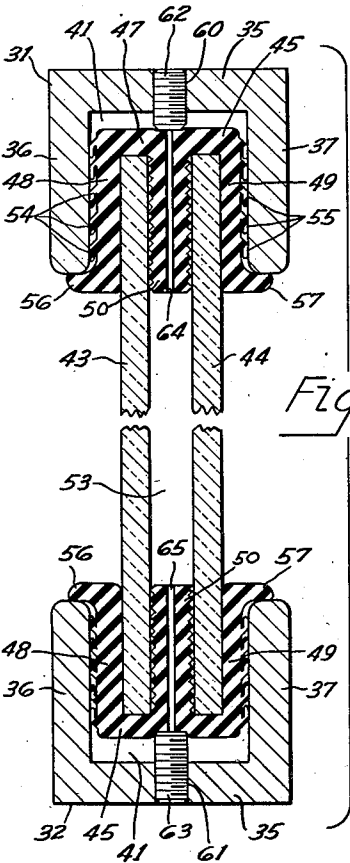
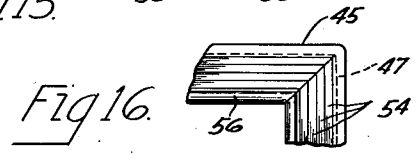
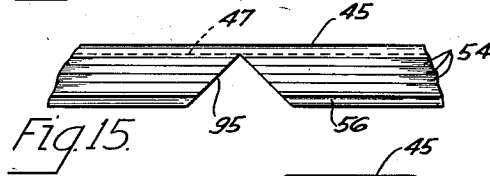
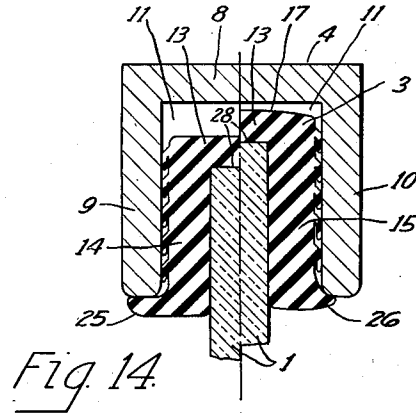
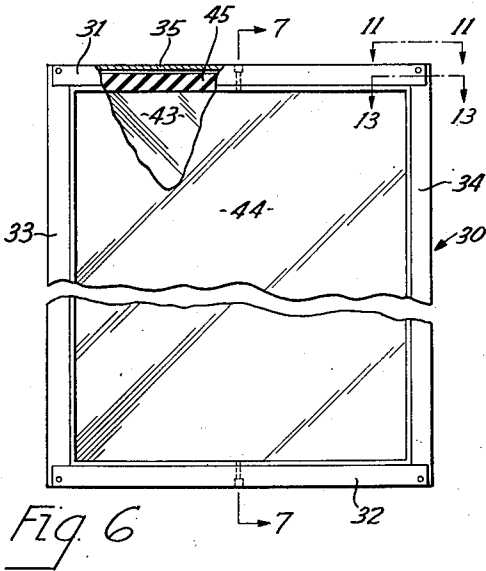


Fig. 7

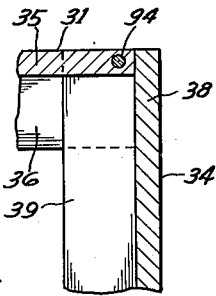


Fig. 12

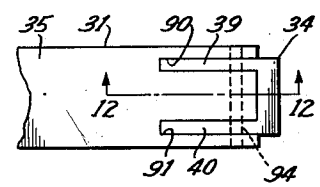


Fig. 11

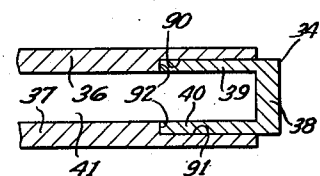


Fig. 13

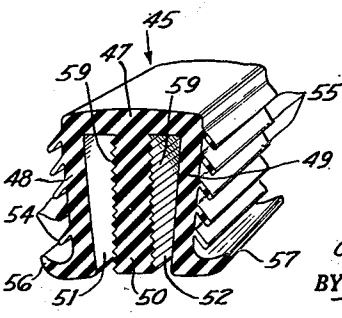


Fig. 8

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UNITED STATES PATENT OFFICE

2,667,951

PANE RETAINER

George R. Gall, Cleveland, Ohio

Application June 10, 1950, Serial No. 167,401

6 Claims. (Cl. 189—78)

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This invention relates to windows and in particular to an improved sash construction.

It is among the objects of my invention to provide a sash or styling for single or multiple glazed windows that is airtight and which readily accommodates and compensates for irregularities and variations in longitudinal and transverse dimensions of the glass window panel or panels as well as unevenness on the cut edges of the glazing. Other objects of my invention are to provide a sash for windows which securely binds the edges of the window panel and yet readily accommodates relative thermal expansion and contraction between the glass panel and sash without affecting the airtight seal of the glass panel in the sash; to provide a sash having a sealing strip which permits easy installation and framing of the glass panel or panels in the sash but which strongly resists removal of the glass panel or panels and sealing strip or strips from the sash; to provide a window sash and one or more glass panels which may be assembled together as a unit structure without in some or many circumstances requiring the use of bolts, nuts, screws or other auxiliary retaining means; to provide a sash and sealing means therefor which will removably accommodate double or multiple glazing; to provide a sash that may be rapidly and easily installed around the edges of single, double or multiple glazing thereby facilitating shipping and handling of same without danger of breakage and/or chipping of the edges of the glazing, and to provide an economical, light, easily made, substantially breakage-proof, durable and quickly repairable assembly of single or multiple glazing or other panelling and sash for handling, shipping, storage and use in windows or the like. Another object of my invention is to provide a double or multiple glaze sash assembly in which the air or other gas or gases between the glazing may be conveniently evacuated, changed, dried or otherwise treated in situ or at any other time or place. Another object is to provide a sash with fixed external dimensions that is capable of receiving single or multiple glass or other glazing of varying dimensions in air tight, weather-proof and strong resiliently gripped relation. Another object is to provide a dry glazed single or multiple panel sash obviating the use of putty, adhesives or other wet or plastic sealing or caulking compounds, solders or materials.

These and other objects will become apparent from the following description of a preferred embodiment and certain modified forms of my in-

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vention, reference being had to the accompanying drawings in which Figure 1 is a front elevation of a window sash assembly embodying my invention; Figure 2 is an enlarged section taken substantially on the line 2—2 of Figure 1; Figure 3 is similar to Figure 2 but with the sash removed; Figure 4 is a perspective view of the sealing strip of Figures 2 and 3 dismounted from the sash and glazing; Figure 5 is a longitudinal section taken along the lines 5—5 of Figure 2; Figure 6 is an elevation of a double glazed sash construction with a portion cut away and in which a multiple form of sealing strip is used; Figure 7 is a vertical section taken substantially on the line 7—7 of Figure 6; Figure 8 is a perspective view of the modified sealing strip of Figure 6 dismounted from the glazing and sash; Figure 9 is a transverse section through a modified form of the sealing means for single glazed sash construction; Figure 10 is a transverse section through a modified form of the sealing means for double glazed sash construction; Figure 11 is a plan view of a corner of the sash showing the details of joining adjacent members with the sealing means and glazing removed and taken on the line 11—11 of Figure 6; Figure 12 is a vertical section of the sash corner taken on the line 12—12 of Figure 11; Figure 13 is a horizontal section of the sash corner taken on the line 13—13 of Figure 6; and Figure 14 is a composite view corresponding to Figure 2 showing the parts in different relations. Figures 15 and 16 illustrate a preferred form of notching and turning the sealing strip at the corners of the sash.

The present invention is illustrated in an improved sash construction for conventional windows. Figure 1 shows a window sash assembly W consisting of a glass sheet or panel 1, a sash frame 2 surrounding the edges of panel 1, and gripping and sealing means 3 disposed between the edges of panel 1 and the sash frame 2. My sash assembly may be used in any type of window construction, either and preferably as an independently operated and installed complete sash or may be "glazed" into or incorporated with existing sash frames or other fixed or movable apertures or openings.

The details of construction of the sash are shown in Figures 2, 3, 4, and 14. The sash, or more specifically the sash frame 2 is comprised of a top rail 4, a bottom rail 5, and side rails 6 and 7. For convenience and clarity in explaining the details of construction of my invention, reference will presently be made only to one rail, namely top rail 4 shown in Figure 2, since the

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top, bottom and side rails are substantially identical in form and coact with the seal and glazing in the same way. Rail 4 is preferably cut to proper length from suitable rigid material, such as aluminum, brass, steel or stainless steel, having a channel shaped cross section, and having an outer or base wall 8 and spaced parallel side walls 9 and 10 integral with and projecting inwardly from the base wall 8. The inner surfaces of walls 8, 9 and 10 define an open rectangular recess 11 in the rail which is adapted to receive the marginal and extreme edges of the glass or other panel 1. In order to seal and retain panel 1 in rail 4, resilient gripping and sealing means 3 comprising a channel-shaped rubber or rubber-like sealing member or strip is disposed in recess 11 between the edges of panel 1 and the rail.

The sealing member or strip 3 preferably is comprised of rubber or similar resilient material and may be formed by extrusion through a die. The strip preferably is cut to a length substantially equal to the periphery of panel 1 so as to form a continuous seal between the panel and sash frame. The strip is formed with a web 13 and spaced inwardly projecting legs 14 and 15 preferably formed integrally with web 13. Web 13 has an inner surface 16 and an outer surface 17, and legs 14 and 15 have inner surfaces 18 and 19, respectively, and outer surfaces 20 and 21, respectively. The inner surfaces 16, 18 and 19 of web 13 and legs 14 and 15, respectively, define a slot or groove 22 in the strip 3, see Figure 4, into which the outer marginal and extreme edges of panel 1 are adapted to fit closely when the strip and panel are joined. The strip 3 is formed so that in its relaxed dismounted state legs 14 and 15 preferably tend to converge toward each other as shown in Figure 4. In order to fit the marginal edges of glass panel 1 into slot 22 of the strip, legs 14 and 15 are sprung outwardly from each other and thus tend, pro tanto, to grip the edge of the panel. When the panel edge is positioned in the slot 22 legs 14 and 15 tend to converge toward each other and inner surfaces 18 and 19 of the legs snugly engage the marginal sides of the panel whereby to retain the strip 3 on the edge of the panel as shown in Figure 3 at least initially and to aid in handling and assembly with the sash frame.

In order to create and maintain an air tight seal and a strong mechanical grip between the strip 3, the panel and sash and to positively and effectively bind the window panel and sash together, a plurality of ribs 23 and 24 are formed integrally with legs 14 and 15 on their outer surfaces 20 and 21 respectively. In an exemplary strip measuring about $\frac{1}{8}$ " wide by $\frac{1}{16}$ " deep overall in the condition shown in Figure 3, these ribs may be relatively small in size being about $\frac{1}{16}$ " long from root to tip and about $\frac{1}{32}$ " mean thickness and are preferably spaced on the surfaces 20 and 21 in the order of about 6 to 12 to an inch. Ribs 23 and 24 extend longitudinally of the strip and project from the respective legs 14 and 15 in an inclined direction away from the web 13, i. e., inclined to yield easily during entry of the strip into the recess of the rail and strongly resist removal of the strip from the rail. This construction permits the ribs to be pressed and folded inwardly toward or against the surfaces 20 and 21 of the strip under relatively small manual pressure when the sash rail is forced over and upon the sealing member as to the position shown in Figure 2, although the ribs

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when so folded or bent inwardly exert an outward resilient pressure back against the inner surfaces of the legs of the rail because of their resiliency. The overall width of strip 3 when mounted on the panel edge, that is, the distance between tips of ribs 23 and 24 as shown in Figure 3, is about $\frac{1}{8}$ " in the exemplary form mentioned above and is about $\frac{1}{16}$ " greater than the corresponding distance between inner surfaces of side walls 9 and 10 respectively of the rail, that is, the width of recess 11. When strip 3 is telescopically fitted into recess 11, ribs 23 and 24 will engage side walls 9 and 10 respectively and will be folded or displaced inwardly toward or against the outer surfaces 20 and 21 of legs 14 and 15 as the strip and panel are moved into the recess and at the same time will press outwardly against the inner side walls 9 and 10 of rail 4 as shown in Figure 2.

When the strip 3 with panel 1 mounted therein is inserted into recess 11, frictional resistance to sliding between the engaging surfaces of the rail and the ribs is compensated by the inwardly yielding folding action of ribs toward or against the outer surfaces 20 and 21 of the legs 14 and 15, respectively. Thus, insertion of the strip into the recess of rail 4 during assembly of the sash and glass panel is but lightly resisted. However, once the glass panel, sealing strip and rail have been joined as shown in Figure 2, frictional forces opposing removal of the strip and panel from the rail become exceedingly high. The reason for this action is that intended movement of the panel in a direction away from the rail and out of recess 11 causes the ribs 23 and 24 to tend to unfold or expand outwardly and correspondingly increase the effective thickness of the rubber and multiply the frictional grip between the sealing and gripping member 3 and the rail and the panel. Thus, high frictional resistance which increases with the force tending to remove the panel from the rail substantially prevents disassociation of the panel, strip and rail and the window panel is securely and tightly locked and sealed in the rails of the sash frame.

As previously mentioned, legs 14 and 15 of the strip 3 converge toward each other when the strip is dismounted from the panel 1. This preliminary engagement of the legs of the strip against the peripheral margin of the window panel is increased when the strip and panel edge are inserted into the recess 11 of rail 4, and when the panel is sought to be separated from the rail the compressive engagement and frictional bond between all the parts is mightily increased as described above. When it is desired to remove the glass panel from the sash, as for example, in the event of window breakage, a small amount of kerosene or other light penetrating oil may be deposited on each side of the glass panel at the junction thereto with the strip 3. The oil penetrates between the surfaces of the glass panel and the inner surfaces 18 and 19 until the coefficient of friction between the strip and panel is loosened sufficiently to permit the glass to be withdrawn from the strip. If the strip 3 is composed of natural rubber the application of kerosene or the like may be detrimental to the structure of the material; in which case the rubber strip may be replaced with a new one before reassembling the sash frame and panel. Often a prompt wiping off of the kerosene will preserve the strip for repeated use. However, if the strip is composed of such material as synthetic rubber

and the like, deterioration from kerosene is less likely and it is only necessary that the strip be wiped clean of the oil in order to restore its coefficient of friction for use again in the sash frame.

As shown in Figures 2, 3 and 4, I prefer to form the sealing strip 3 with outer integral flanges 25 and 26 on the free ends of legs 14 and 15 respectively. These flanges project outwardly from the ends of the legs and are adapted to overlay the inner portions of the ends of the legs 9 and 10 of the rails and effect engagement therewith as the strip and/or strip and panel are inserted into the recess 11 of the sash rails. Thus, flanges 25 and 26 act as yieldable stops to limit the movement of the strip into the recess of the rail and to locate the strip in the sash. In addition, flanges 25 and 26 facilitate the weather-proofness of the seal and are preferably tapered at their outer ends to merge with the curves of the ends of the legs to spill rain, wash water, etc., from the glass out over the exterior of the rails. As also shown in Figure 14 the free ends of the legs 9 and 10 are rounded at their inner and outer corners; the former facilitating smooth entry of the strip and panel into the recess 11, wiping and folding or bending the ribs 23 and 24 without tending to shear or sever the same from the strip during its entering movement into the recess, and the latter merging in contour with the tapered ends of the flanges 25 and 26 through a wide range of positions of the flanges according to the depth of entry of the strip into the recess, as suggested by the contrasting positions shown in the right and left parts of Figure 14.

Referring now more specifically to Figures 2, 5 and 14 the facility with which my sash accommodates irregularities in the shape and contour of the panel 1 within fixed sash dimensions is suggested. In Figures 2 and 5, the extreme outer edge 28 of the panel 1 is shown as having detailed irregularities departing from straightness as often occurs in the cutting of glass. Here the "high" parts have merely flexed the web 13 of the strip 3, see also the dotted lines in Figure 2, toward the base wall 8 of the rail without substantially drawing or urging the legs 14 and 15 of the strip inwardly beyond their "normal" position in the recess as suggested by the full overlap of the flanges 25 and 26 with respect to the rounded ends of the legs 9 and 10. The "low" points of the irregular edge 28 need not necessarily touch the web 13 of the strip; the essential grip and seal between the strip and panel being made on the marginal edges of the panel between the surfaces 18 and 19 and the yieldability of the web 13 taken with its spacing from the base 8 of the rail accommodating these irregularities in the edge 28 without bottoming the strip or edge, thereby preserving the edge in the first instance and accommodating relative thermal expansion and contraction between the parts in use.

Since it rarely happens that the panel 1 is cut truly square it will often happen that the edge of the panel will extend more deeply into one rail or one part of a rail than another. As suggested in Figure 14 the strip 3 accommodates this kind of irregularity without loss of gripping or sealing efficiency and without substantial change in finish or appearance. On the left side of Figure 14 the parts are shown in the mean or normal relation similar to that of Figure 2 with the flange making full contact with the end of the leg of the rail but not being substantially

flexed thereby. Here the edge 28 is shown just contacting the web 13 and the web in turn is well spaced from the base of the rail as by about $\frac{1}{4}$ " where the other dimensions are as given above and the panel is normally proportioned in respect to the rail. The right side of Figure 14 shows how my invention accommodates an oversize panel or a panel having an oversize dimension. Here the whole strip enters the recess 11 more deeply carrying the web and legs thereof deeper into the recess and drawing the inner portion of the flanges, as illustrated by the flange 26, partly into the recess. The outer part of the flange with its tapered extremity still makes smooth tight contact with the rounded end of the leg of the rail and presents the same finished appearance and substantially the same contour or the so-called normal condition. Again the web of the strip is still spaced from the bottom of the recess with the advantages above mentioned, the same being accomplished by making the recess enough deeper than the normal depth of the strip, as measured from the flanges to the exterior of the web, to accommodate all reasonable errors in panel size and shape and still have a space between the bottom of the recess and the bottom of the strip.

One exception to this latter teaching has occurred in my experience, namely, when the glazing or panelling is heavy as in a large multiple glazed sash the glazing and strip may tend to work down into the bottom rail under the influence of gravity and use of the window more than I desire. Against such contingencies I have found it practicable and advantageous to insert a pad or cushion in the bottom of the recess of the bottom rail of depth approximately equal to the "normal" space between the webs 8 and 13 as shown at the left of Figure 14 so that the web 13 of the strip and the glazing may have soft somewhat yielding support distributed between the high and low parts of the bottom edge of the glazing equally enough to resist cracking of the glass and cutting of the strip. I have found a soft wood pad practicable; the rubber of the web 13 of the strip tending to cold-flow and distribute the load from the "high" parts to the "low" parts of the glazing satisfactorily.

There yet remains the accommodation of variations in thickness of the panel in relation to the desired constant width of the recess 11. In single glazed sash the variation is ordinarily small enough to be compensated for in the extent of the bending and flattening of the ribs 23 and 24; their functions and effects not being deleteriously impaired in the range between substantial flexing on the one hand and complete bending to "bottom" against the surfaces 20 and 21 on the other hand. Where greater accommodation is desired the inner surfaces 13 and 19 may be grooved, serrated or corrugated as shown at 59 in Figure 8 so that the flattening of the ridges of the serrations will facilitate greater tolerance of variations in panel thickness.

Figures 6, 7 and 8 show a modification of my improved sash for accommodating double glazing. Sash 30 is comprised of top rail 31, bottom rail 32, and side rails 33 and 34, all of which rails are substantially similar in form and shape. Each of the rails 31 and 32 has an outer wall 35 and side walls 36 and 37 projecting inwardly from wall 35. The inner surfaces of these walls define rectangular recesses 41 in rails, corresponding to the recess 11 except in size, which are adapted to receive the edges of spaced paral-

lel glass panels 43 and 44. In order to seal, space and securely hold the panels 43 and 44 in the rail recesses and to space the panels from each other, a sealing member or strip 45 of rubber or rubber-like material corresponding generally to the strip 3 adapted to be inserted in the recesses of the rails is provided. This sealing member preferably is a single strip designed to extend around the entire peripheries of panels 43 and 44. Although I prefer to use a single sealing strip, it will be understood that individual strips cut to the length of each rail member, respectively, may be employed without departing from the spirit of my invention.

Sealing strip 45 consists of a web 47, inwardly extending side legs 48 and 49, and an intermediate leg or dividing partition 50. Legs 48, 49 and 50 are preferably formed integral with web 47. The intermediate leg 50 is spaced from the side legs 48 and 49 thereby defining slots 51 and 52 between the side legs and leg 50 for receiving the extreme and marginal edges of panels 43 and 44, respectively, which extend longitudinally of the strip. When panels 43 and 44 are mounted in the strip with their edges disposed in slots 51 and 52, respectively, as shown in Figure 7, intermediate leg 50 serves to separate the panels so that a space 53 exists between them. It is well known that provision of a space, commonly known as "dead air" space, between the panels of a window assembly greatly increases the insulating characteristics of the window and reduces heat loss therethrough.

As described in connection with the sealing strip 3 shown in Figures 2, 3 and 4, legs 48 and 49 of the strip 45 are provided with sets of external integrally formed longitudinally extending ribs 54 and 55, respectively, which project outwardly from the legs and away from the web 47 and perform the function of the ribs 23 and 24 of the strip 3. Flanges 56 and 57 are formed on the free ends of legs 48 and 49, respectively, which flanges cooperate with the rail into which the sealing strip is inserted to properly position the strip therein and to perform the other functions ascribed to the flanges 25 and 26. The surfaces on intermediate leg 50 adjacent the slots 51 and 52 are preferably formed with a plurality of longitudinally extending serrations 59 adapted to contact the inner surfaces of panels 43 and 44 and which provide leg 50 with sufficient resilient effective compressibility to help accommodate for variations in thickness of the panels and relative thermal expansion and contraction of the panels and the sash.

As shown in Figure 8, strip 45 is formed so that in its relaxed state when dismounted from the edges of the window panels, side legs 48 and 49 converge or tend to converge inwardly toward leg 50. This construction affords a gripping action tendency of the strip on the edges of the panels whereby to retain the panels in the slots 51 and 52 in the manner described previously and/or to hold the strip on the edges of the panels preliminary to assembly in the sash rails.

In the assembly of the double glazed window unit, the sealing member or strip 45 is first mounted on the edges of panels 43 and 44 so that the edges of the panels are disposed in slots 51 and 52 of the strip. It is not necessary that the edges of both panels set tight against the inner surfaces of web 47 as pointed out heretofore in connection with the single glazed window, nor that the panels be identical or precisely

the same shape as the sash or as each other; the nature of the strip making the accommodations discussed above and also accommodating differences between the panels. Thereafter the strips embracing the marginal edges of the panels are telescopically joined with the rails as more fully described above so that the strip is disposed within the recess in the rail with flanges 56 and 57 on the strip in engagement with the rounded top edges of side walls 36 and 37 of the rail. When the panel and sealing strip are moved into the recesses in the rails, ribs 54 and 55 engage the side of the rails and bend or fold inwardly against legs 48 and 49 of the strip and thus offer little resistance to this movement. However, if a force is applied which tends to separate the rails from the panels the ribs 54 and 55 will tend to unfold and expand outwardly against side walls 36 and 37 of the rail and resist this movement. Thus, the panels 43 and 44 are securely sealed, spaced, resiliently supported and retained in the sash.

In order to afford and control communication with the space 53 between panels 43 and 44, apertures 60 and 61 are drilled and tapped in the outer walls, such as 35 of the sash rails, and are adapted to receive smooth-ended screws 62 and 63 which are aligned with apertures 64 and 65 formed in the intermediate leg 50 of the strip opposite the apertures 60 and 61, respectively. Preferably the rounded ends of the screws seat on and at the marginal edges of the apertures 64 and 65 and close these apertures in the innermost position of the screws and open these apertures when the screws are backed out and/or removed from the threaded apertures 60 and 61. As shown in Figure 7 the screws are short enough to have their heads flush with the exterior surface of the rails when they are screwed into their seated positions closing the apertures 64 and 65. When air or other gas or vapor is to be moved to and/or from the space 53, screws 62 and 63 are removed and approximate pump, pressure or vacuum means applied to one or both of the apertures 60 or 61 for the movement, treatment or change of the contents of the space 53. If, for example, a dehumidified gas is to be admitted to the space 53, the source of such gas is connected to the aperture opposite a vacuum pump means and the space 53 filled therewith as the original gas is removed. After the operation is completed, the screws 62 and 63 are screwed down tightly against the rubber strip thereby sealing the holes 64 and 65. Similarly dehumidifying agents may be injected into the space 53 through either or both apertures.

In order to adapt one sash or window frame so that it will accommodate either single or double glazing, the single glazing strip 3 and the double glazing strip 45 of my invention may be formed with the same gross exterior dimensions so that either strip will fit tightly into the same recess in the same sash rails. Essentially this may be accomplished by thickening the legs of the single glazing strip 3 by an amount corresponding to the thickness of one panel of the double glazed strip; a specific example of one way of so doing being illustrated in Figures 9 and 10 and discussed below. The window, therefore, may be converted readily from single glazing construction to double glazing construction or vice versa by merely selecting a single or double glazing sealing strip for assembly in the sash. This feature of my invention permits conversion from single glazing construction to double glazing

construction by mere replacement of the sealing strip without necessitating replacement of the sash. Since the cost of the sealing strip is small compared to the cost of the sash, substantial savings are effected.

Figures 9 and 10 show particular modified forms of a single glazing strip 70 and a double glazing strip 80 of like external conformation and size. In this case, strip 70 is substantially the same as strip 3 described above except that legs 71 and 72 have greater effective width and are, however, preferably undercut as indicated at 73 and 74, respectively, adjacent the web portion 75. The purpose of undercutting the legs is to effect economy in fabrication of the strip by reducing the amount of rubber or other material used in the strip. The thickened portions 76 and 77 of the legs serve to engage and tightly grip the panel 1 disposed therebetween in the manner described above. The intermediate leg 81 of strip 80 shown in Figure 10 is likewise undercut adjacent the web 84 as indicated at 82 and 83 while serrated thickened portions 85 and 86 at the far end of leg 81 engage and grip the panels 43 and 44. Preferably the thicker far end of leg 81 has a longitudinal aperture 87 which with the serrations lends greater effective lateral resilient compressibility to accommodate variations in panel thickness and maintain an efficient grip and seal withall when the sash is assembled. In other respects, strips 70 and 80 function in the manner described above.

Whether in single or multi-glazed form the seal and bond established through the strip between the sash rails and the panel or panels of the glazing is such as to hold the several parts together in tight and secure assembled relation. In fact the bond is such that for many purposes no other means are necessary to secure the sash rails in the desired relation to each other and to the glazing. For example, in windows where the sash are pivotally supported in the middle of the bottom rail the mechanical bond afforded by the strip more than suffices for all manner of shipping, storing, handling and use of such rails. On the other hand where the sash are to be suspended from the top rail and particularly where the glazing is large and heavy, I prefer to augment the strength of the sash by connecting the ends of the rails together as by the means suggested in Figures 11, 12 and 13 of the drawings. Thus the ends of adjacent sash rail members are joined together in an overlapping relationship to form a tight, strong, light proof joint. As shown in Figures 11 and 13, slots 90 and 91 are milled in top rail 31 to a depth substantially the same as the depth of the recess in the sash. Alternate rails, the vertical rails 33 and 34 in this instance, while having the same internal recess, size and shape as the top and bottom rails, are of lesser width by virtue of having thinner side walls or legs 39 and 40 which leave a snug sliding fit in the slots 90 and 91. When the side rail 34 is joined to the top rail 31, side walls 39 and 40 of the side rail fit into the slots 90 and 91 until the outer wall 38 of the side rails 34 abuts the end of the outer wall 35 of the top rail 31 as shown in Figure 12. The ends of the outer and side walls of the side rail lie flush with the exterior surface of the outer wall 35 of the top rail as also shown in Figure 12. The slots 90 and 91 cut through the outer wall 35 of the top rail, Figures 11 and 12, and cut away the inward parts of the ends of the side walls 36 and 37 of the top rail to a depth corresponding to the

thickness of the legs 39 and 40 of the side rail so that the inner surfaces of the legs of the side rail and the inner surfaces of the legs of the top and bottom rails lie flush as at 92. Thus the recess 41 is common to all rails and identical throughout the whole sash. A pin 94 or other suitable fastening means may be inserted through aligned apertures drilled transversely through the ends of the side walls of the side rail and the outer wall of the top rail, Figures 11 and 12, to secure the rails together. The connection between rails ends described with particular reference to Figure 6 also applies to Figure 1.

I have mentioned my preference for using a single sealing strip to be carried around the whole periphery of the panel or glazing. In such event I prefer to cut V notches 95 through the side walls of the strip as shown in Figure 15 to turn the corners of the strip around the corners of the glazing as shown in Figure 16.

While I have illustrated and described preferred and certain modified forms of my invention, changes, improvements and further modifications will occur to those skilled in the art who come to understand the principles and advantages of my invention, and I do not care to be limited in the scope of my patent to the forms herein specifically illustrated and described nor in any way inconsistent with the advance I have made over the prior art.

I claim:

1. A window comprising a sash having side walls spaced apart and defining therebetween a fixed recess for receiving a panel means, resilient means for sealing and retaining an edge portion of said panel means within said recess comprising an elongated strip having a web portion and spaced leg portions integral with and projecting from said web portion, the inner surfaces of said web and leg portions defining a slot into which the edge portion of said panel means is disposed, said edge portion of said panel being also disposed within said sash recess, the outer surfaces of said leg portions of said strip having a plurality of flexible resilient longitudinally extending spaced ribs frictionally engaging the side walls of said sash and tending to increase the effective width of said strip when said panel is sought to be removed from said sash recess and resisting such movement thereby.

2. The combination of a rigid channel member, a sheet member, and means for holding the edge of said sheet member within the channel of the rigid channel member comprising a rubber-like strip closely embracing the edge of said sheet member and closely embraced within the channel of said rigid channel member, said strip having a plurality of ribs on opposite sides thereof deflected against said channel member in the direction of entering motion of said strip relative to said channel member.

3. A sash for a window panel member, comprising a rigid member having a longitudinally extending recess, an edge of said window panel member being disposed within said recess of said rigid member, and resilient means engaging the edge portion of said panel member and sealing same within the recess of said rigid member, said resilient means having parts lying between the sides of said recess and the edge portion of said panel member, said parts of said resilient means having integral ribs spaced apart therealong and projecting therefrom, said ribs being deflected against said rigid member in the di-

recession of entering movement of said panel member into said recess whereby to resist movement of said panel member out of said recess.

4. The sash according to claim 3 in which the spacing between said ribs is equal to or greater than the root to tip length of said ribs whereby said ribs are foldable inwardly against said parts, said ribs projecting from said parts at an acute angle facing away from the direction of entering movement of the panel into said rigid member.

5. The sash according to claim 3 in which said resilient means has a web portion, said parts being integral with and projecting from said web portion and having flanges on their respective ends opposite said web portion for engaging said rigid member adjacent the mouth of said recess, said flanges being spaced from said web portion by an amount less than the depth of said recess in said rigid member whereby to limit movement of said resilient means into said recess.

6. In a window sash having a fixed recess for receiving the edge portions of two spaced panels, resilient means for sealing and retaining the edge portions of said panels within the recess of said sash, said resilient means comprising an elongated strip of flexible material having a web portion, side leg portions and an intermediate leg portion, said intermediate and side leg por-

tions being integral with and projecting from said web portion and said intermediate and said leg portions defining longitudinally extending slots for embracing the edge portions of said panels, said intermediate leg portion spacing said panels and sealing the space therebetween, said side leg portions having spaced bendable ribs projecting from the outer surfaces thereof engaging and being deflected by said sash in the direction of entering movement of the panels and strip into said recess, and resisting movement of said panels out of said recess.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,982,351	Phillips	Nov. 27, 1934
2,009,142	Marsh, Jr.	July 23, 1935
2,125,397	Owen	Aug. 2, 1938
2,141,039	Hamm	Dec. 20, 1938
2,208,836	Edwards	July 23, 1940
2,214,222	Chaffee	Sept. 10, 1940
2,278,360	Owen	Mar. 31, 1942
2,386,151	Trautvetter	Oct. 2, 1945
2,402,105	Verhagen	June 11, 1946
2,583,343	Rodman	Jan. 22, 1952