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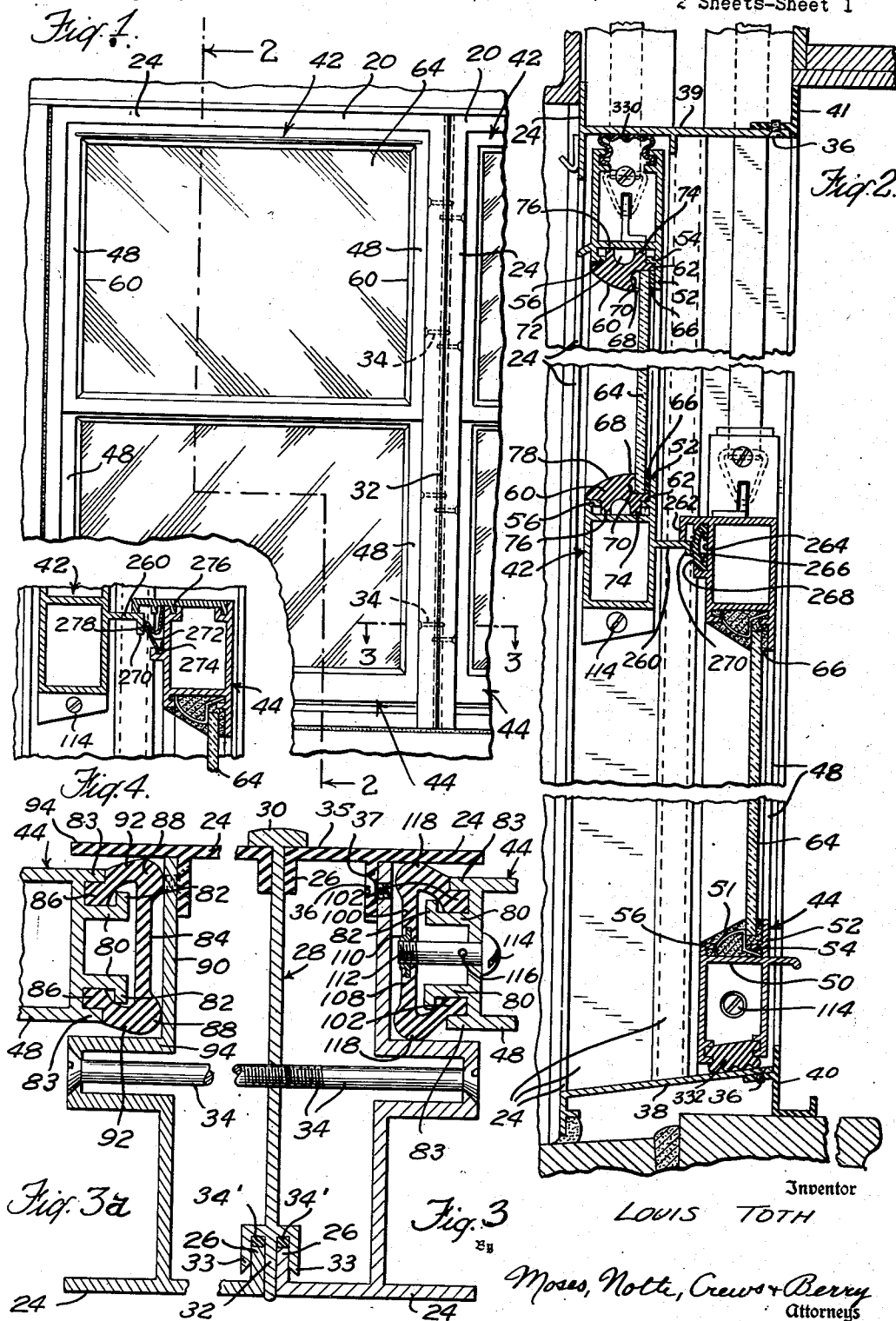
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WEATHER TIGHT WINDOW CONSTRUCTION

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WEATHER TIGHT WINDOW CONSTRUCTION

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This invention relates to window construction and particularly to windows having frames and sashes wholly of metal or of metal combined with plastic. Features of the invention, however, are applicable to frames and sashes made of wood, plastic or other materials.

The invention is especially applicable to sliding or double hung windows, although some features of the invention may be applied to windows of other types.

The principal object of the invention is to provide a sliding sash construction in which the edges of the sashes which slide in channels in the window frame are provided with flexible or yielding weather stripping members enclosing the edges of the sash to constitute bearing means engaging both the inner and outer, as well as the side walls of the channel in which the sash is mounted to slide. The yielding sealing or weather stripping member thus forms the actual contact and guiding member for the sash, thereby insuring an effectual sealing on all sliding faces of the sash and preventing binding due to warpage or deformation of sash or frame, insuring that the sash shall be freely slidable at all times, and at the same time preventing rattling which might occur if the metallic surfaces of the sash and frame came into direct contact.

A further object of the invention is to provide sealing and guiding members of the character described which may be readily adjusted so as to regulate the tightness of the fit between the weather strip members and the frame channels. This enables satisfactory action to be obtained at all times and permits the metal parts of the sash and the frame to be made with wide tolerances, accurate fitting of such parts being unnecessary.

Another object of the invention is to provide a flexible guiding and sealing member on the edge of the sash having the characteristics referred to above, and formed of a plastic or rubber-like material, preferably synthetic plastic such as vinyl plastic. Such plastics are preferred to compounds including natural rubber, as they are more durable and less subject to deterioration due to time or the elements, and also have a lower coefficient of friction than compounds containing substantial amounts of natural rubber. The use of vinyl plastic therefore provides a sash which will slide much more readily than constructions using natural rubber sealing members. Natural rubber may be used under some circumstances, but is considered inferior to synthetic compounds for the reasons stated.

Another object of the invention is to provide an improved mullion construction by which two or more individual window frames may be combined to fill a single window opening. This construction eliminates making left and right hand windows, for either side of the window can be joined by another side of the window without the necessity of making special jambs. Therefore, greater economy is made possible in the manufacture and erection of the windows.

Another object of the invention is to provide sash and frame constructions in which free passage of heat from

the inside to the outside of the window and sash or vice versa is prevented. This is accomplished by making one side of the frame or of the sash of a material having heat insulated qualities, such, for example, as plastic, or, if both sides of the frame and sash are made of metal by providing an insulating layer between the sides which will prevent free heat transfer. Free heat transfer between the inside and outside portions of metal frames and sashes has been a serious objection to the use of metal windows because under certain relative conditions of temperature and humidity between the inside and outside condensation may be caused on the inside which may injure the interior finish of the room or be otherwise objectionable.

Another object of the invention is to provide an improved glazing strip construction made of plastic or rubber-like material which may be used in place of putty to retain the glass in the sash.

In the accompanying drawings in which I have shown certain preferred embodiments of the invention;

Fig. 1 is a front view of a window frame with double hung sashes therein, and part of an adjoining frame and sashes, the two frames being united by the improved mullion construction forming a feature of the present invention;

Fig. 2 is a vertical section of the frame and sashes taken on line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary horizontal section taken on line 3—3 of Fig. 1 showing the mullion construction and part of a sash embodying one form of sealing and guiding means; Fig. 3a is a similar section showing a jamb and part of a sash embodying another form of sealing and guiding means.

Fig. 4 is a vertical section through a pair of meeting rails showing a modified form of sealing strip;

Figs. 5, 5a, 6, 6a, 7, 7a, 8, 8a are each fragmentary horizontal sectional views on the same scale as Fig. 3, and each showing a part of the window jamb with a part of a sash mounted therein, each sash being provided with a modified form of adjustable sealing and guiding member.

Fig. 9 is a fragmentary view similar to Fig. 5a showing a modified form of sash sealing strip mounted in a recess in the jamb; and

Fig. 10 is a horizontal section of a two-part sash stile, the inner and outer sides of which are separated by layers of heat insulating material.

Referring to the drawings in detail and particularly to Figures 1, 2 and 3, Figure 1 shows a multiple window construction in which a plurality of window frames 20 are mounted side by side in the window opening, the adjoining jambs of adjacent frames being united to form a mullion, as shown most clearly in Fig. 3. As here shown the two jambs 24 are provided at their outer margins with flanges 26 which are placed close together with a little space between, sufficient to permit the reception between the jambs of a tie-plate 28. The plate 28 is provided with a head flange 30 fitting against the edges of the jamb at the inside of the windows and with flange portions forming a three-prong fork engaging it with the flanges 26 at the outer sides of the jamb members. The center flange portions 32 fits between the flanges 26 and extends all the way to the outer surface. The two outer fork flanges 33 embrace the flanges 26 at the inner side of the jambs. Bolts 34 connect the jambs with the plate 28 and with the flanges 33 which embrace the flanges 26 and hold them firmly together, thereby uniting the two jambs to form a substantially solid and strong mullion. The spaces between the flanges 26 and the insides of the clamp flanges 33 are filled with mastic or other caulking material 34' so as to seal the space within the mullion formed by the two adjoining jambs.

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In many cases it is desirable to provide a frame construction which will not readily transmit differences in temperature between the inside and the outside of the window, thereby avoiding heat losses and preventing objectionable condensation. This is accomplished in the construction shown in Figs. 1, 2, and 3 by making the jambs, heads and sills in two parts. The outer surface of the jamb and the main body are made of metal while the inner portion 35 is made of rigid plastic which may be secured to the metal part of the jamb in any suitable manner as by means of the screws 36 passing through flanges 37 formed on the plastic jamb portions. The window sill 38 and the header 39 have the inner parts 40 and 41 made of hard plastic and secured to the metal parts by screws 36. The resulting construction is a strong and, in effect, unitary frame in which, however, the inner part is heat insulating.

Mounted to slide between the jambs of each frame are sliding sashes. The construction illustrated is a double hung window, the upper sash 42 and lower sash 44 comprising top and bottom rails which may be of any suitable construction and side stiles 48 mounted to slide in the channels of the jambs.

The sash rails and stiles are shown as extruded sections of hollow angular shape each having a glass seat comprising a base wall 50 and an angular leg 52 lying in the plane of the window, the leg 52 forming a flange for supporting the pane of glass. Near the bottom of the leg 52 is a flange 54 for supporting the edge of glass and facing the flange 54 is a flange 56, these two flanges and the base 50 forming the dovetail channel for the seating of the glass holding means which may be of putty, but is preferably a glazing strip of plastic or rubber-like material. A spring clip 51 of sheet metal or wire stock may be used preparatory to the application of the putty which is shown fully embedded in Figs. 2 and 4.

An improved form of plastic glazing strip is shown in the upper sash in Fig. 2. This strip comprises a body portion 60 which has a flange 62 at one side thereof adapted to extend between the edge of the glass pane 64 and the glass supporting seat 54. The pane of glass is preferably laid against a layer or bed of putty 66 between it and the vertical glass supporting flange 52. The margin of the body 60 forms a glass retaining lip 68. The body is preferably slightly recessed between the flange 62 and the lip 68 as indicated at 70. This provides a slight clearance and insures that the lip 68 shall fit firmly against the surface of the glass. The base of the body 60 is divided by a groove 72 into two base flanges 74 and 76 which are fitted between the ends of flanges 54 and 56. Due to the groove 72, sufficient elasticity is provided to permit the portion of the strip comprising the flange 62 and the base flange 74 to be fitted into position, after which the flange 76 can be crowded into the groove in the sash rail or stile with sufficient pressure to cause the strip to retain its position and to cause the lip 68 to fit tightly against the surface of the glass in sealing relationship therewith. The upper or outer surface of the body 60 is preferably rounded and sloped away from the glass as shown at 78, so as to provide smooth and attractive finish. The glazing strip may be made of rubber, but is preferably made of vinyl plastic or the like, as that material is more weather-resistant than ordinary rubber. The glazing strip may be readily removed by use of a screw driver or a similar tool. When the plastic strip of the form shown is utilized, it is unnecessary to provide the undercut spaces in the sash member beneath the flanges 54 and 56 as the strip will retain its position without such undercuts. However, if such undercuts are provided, they are useful for holding putty as shown in the lower sash in Fig. 2, and they do not interfere with the proper functioning of a plastic glazing strip, so that either means for retaining the glass may be utilized.

The side stiles of the sashes are preferably provided with flexible or yielding sealing and guiding members run-

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ning in the jamb channels. In the construction shown in Fig. 3a these sealing and guiding members are not provided with means of adjustment. In the construction shown in Fig. 3 adjustment means are provided.

Referring to Fig. 3a, the sealing and guiding strip shown comprises a strip of rubber-like or plastic material, preferably of vinyl plastic, which is formed to interlock over flanges 80 projecting from the base 50 of the sash stile, the flanges 80 having outwardly turned lips 82. Preferably, the side walls of the stile extend slightly to form flanges 83. The plastic strips comprise bases 84 having hooked flanges 86 interlocking with the lips 82 of the flanges 80 and fitting inside of flanges 83. The flexibility of the plastic strip is such that it may be readily sprung over the flanges and lips 80 and 82 so as to interlock therewith and hold its position firmly on the stile. The base 84 of the sealing strip preferably has heavy corner ribs 88 thereon, the outer edges of which form the bearing members for engagement with the bottom wall 90 of the jamb channel. The side walls 92 of the ribs 88 are adapted to bear against the side walls 94 of the jamb channel. They should fit the channel with sufficient closeness to prevent too much lateral movement, but a slight clearance is permissible so as to make the sash slide freely in the jamb channel. The sealing strip should be slightly wider than the stile of the sash so that the side walls 92 of the ribs project beyond the adjacent faces of the stile. This prevents a metal to metal contact between the sash and the jamb and eliminates wear between these parts and noise due to rattling. The sealing strip is sufficiently yielding and flexible so that free sliding of the sash without binding is at all times secured. Relatively wide tolerances in the dimensions of the parts are also permissible. Certain plastics, such as the vinyl plastic, are preferred to rubber because of their better weather resistant properties and because they slide in the jamb channel with less friction than rubber. It is to be noted that the metal flanges 80 and 83 and lips 82 extend well into the jamb channel in the preferred construction illustrated, thereby providing a safety factor which prevents any possibility of the sash being displaced by excessive wind pressure. The plastic sealing and guiding member while normally being the only member actually engaging the jamb is thus not relied upon as the sole means of preventing such forcible displacement.

In some instances it is desirable to provide means for slightly adjusting the outer dimensions of the elastic sealing and guiding strip. The provision of such means permits the tightness of the fit of the strip within the jamb channel to be varied so that if it is too loose, it may be expanded to insure proper sealing and prevent undue freedom of movement of the sash in the channel, or it may be contracted in instances where the sash does not slide as freely as may be desired. One such adjustable construction is shown in Fig. 3. As here illustrated, the sealing strip comprises a base 100 having base flanges 102 to interlock between the flanges 80 and lips 83 and side lips 83 projecting outwardly from the stile. The sealing strip is also provided with a longitudinal recess 108. Mounted in the recess 108 and bearing against the face of the strip base 100 is a thin metal plate 110 which preferably extends throughout the entire or greater part of the length of the sealing strip. This metal plate has screw threaded holes therein near its ends in which engage the threads of adjusting screws 112. The screws 112 have slotted heads 114 or the like by which they may be turned, and are preferably mounted to rotate freely in holes in the base of the sash stile, being prevented from coming out of such holes by cross pins 116 which engage the face of the stile wall. By rotating the screws 114 so as to move the plate 110 away from the stile slightly, the pressure of the plate against the base 100 of the sealing member is relieved and the sealing member is permitted to take its normal or contracted shape which will ease the pressure between its side walls 118 and the walls of

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the jamb. By rotating the screws 114 so as to pull on the plate 110, the latter presses on the base of the sealing strip which will cause the sealing strip to expand laterally so as to make the side walls 118 fit more closely between the walls of the jamb channels.

Various modifications of the basic constructions of the sealing and guiding strips shown in Fig. 3 are shown in subsequent figures of the drawing. For example, the sash shown in Fig. 5 comprises a stile member having a base 120 with side lips or flanges 122. The sash stile, however, instead of being provided with flanges having angular lips is provided with upwardly and outwardly curved flanges 128. The form of sealing strip shown has a base 124 and flanges 126 shaped to fit behind the lips 122 and under curved flanges 128. A metal strip 110 engages the outer side of the base 124 and is adjustably held in position by screws 112 similar to those already described. This sealing strip is shown as provided with longitudinal bearing ribs 130. These provide a good weather-tight seal and also tend to reduce the sliding friction of the sash when moved in the jamb channel. The use of such ribs is optional in any of the constructions described or to be described below.

The sash shown in Fig. 5a embodies another modification of adjustable sealing and guiding strip which engages one side only of the jamb channel. The other side of the sash stile engages a resilient sealing and guiding member mounted on the jamb. At one side of the base of the stile is a flange 132. At the other side of the stile is a lip 134 and a hook-shaped flange 136. An adjustable resilient sealing and guiding strip 138 is provided which has an enlarged edge 139, which interlocks in the space between the lip 134 and flange 136 of the stile. The outer side 140 of the body of the resilient strip forms a curved apex or rib for sliding engagement with the side wall of the jamb channel. The body of the resilient strip then curves towards an outer rib portion 141 which may be adjusted to engage the bottom of the jamb channel with more or less pressure as desired. Beyond the rib portion 141 is a wall 142 extending towards the base of the sash stile and terminating in a strip 143 having a longitudinal slot extending through the same, in which is fitted an adjusting plate 144. The adjusting plate has threaded holes therethrough which receive the adjusting screws 112.

As the resilient sealing strip attached to the sash stile shown in Fig. 5a does not extend the full width of the jamb channel, means are provided forming a resilient sealing and guiding strip for engagement with the stile flange 132. In the construction shown, these means are mounted in an undercut recess 145 in the side of the jamb parting strip. As shown in Fig. 5a, a resilient metal strip of spring metal, such as stainless steel is mounted in the recess. The spring strip comprises a body 146 having a bead 147 engaging in an undercut part of the recess 145, the body of the strip being bent back upon itself to form a resilient rib 148 engaging the flange 132, the end of the strip being bent into a hook portion 149 engaging in the other undercut side of the recess 145.

Fig. 6 shows a modification of the invention in which a sealing and guiding strip of resilient metal is used in place of a plastic sealing strip. In this form of the invention, the base of the sash stile has outwardly projecting side flanges 150 terminating in inwardly turned lips 152. The sealing and guiding members comprise metal strips 154 having outwardly turned flanges 156 which merge into curved spring portions 158, the outer side walls 160 of which form guiding and sealing members for sliding between the side walls of the jamb channel. At the edges of the walls 160 are reversely curved spring portions 162 which bear against the outer walls of the stile flanges. The metal is then curved to form channel portions 164, into which the ends of the flanges 150 extend, the channel portions 164 finally terminating in hooked portions 166 which engage beneath the lips 152.

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The ends of the flanges 150 and lips 152 are thus firmly gripped by these portions of the resilient metal sealing strips. The central portion of the strip 154 is provided at its ends with threaded holes which are engaged by the adjusting screws 112, similar to those already described. By rotating the screws 112 so as to force the portion of the strip 154 outwardly towards the base of the jamb channel, the resilient strip is expanded so as to increase the tightness of fit between the strip portions 160 and the side walls of the jamb channel. The resilient strip may be made of any suitable material, stainless steel being preferred.

In Fig. 6a a modified form of metallic sealing and guiding strip is shown. In this construction the sash stile is of the form shown in Fig. 3 and is provided with side lips 83 and with flanges 80 provided with lips 82. The sealing strip comprises a resilient metal member having a central part or base 170 from which project two curved spring flange 172 terminating in reversely curved margins 174 which fit in the spaces between the lips 83 and flanges 80 and lips 82 of the sash stile. The outer portions 176 of the spring members 172 form the bearing surfaces for engagement with the sides of the jamb channel. Adjusting screws 112 are provided by adjustment of which the bearing surfaces 176 may be caused to spread apart or be drawn together so as to vary the closeness of the fit with the walls of the jamb channel.

Fig. 7 shows a jamb formed of a folded sheet metal section as distinguished from a jamb of extruded metal section, as illustrated in previous figures. Fig. 7 also shows the sash stile as formed of folded sheet metal. It will be understood that folded sheet metal sections may be used in place of extruded sections, or vice-versa, in any of the constructions shown, as may be found most economical and satisfactory. In Fig. 7 a modified form of resilient plastic sealing and guiding strip is illustrated. This strip is shown as having base flanges 180 fitting between side flanges 182 of the sash stile. The flanges 182 terminate in inwardly inclined lips 184 which interlock with the flanges 180 of the resilient strip and retain the strip in position. The outer body of the resilient strip 186 is of triangular form and is provided with lateral ribs 188 which form the bearing surfaces with the side walls of the jamb channel. The apex 190 of the body 186 is adapted to engage the bottom of the jamb channel whenever the sash is moved laterally to a point where such contact occurs. There is thus at most a three-line contact between the resilient sealing and guiding strip and the jamb channel, which results in a minimum of sliding friction when the sash is moved. The resilient strip is shown as having a longitudinal recess 192 therein which is partially closed by flanges 194. These flanges support a metal strip 196 within the recess 192. The metal strip is provided with screw-threaded holes which are engaged by the adjusting screw 112.

In Fig. 7a a form of resilient metal guiding and sliding strip is illustrated. In this construction the sash stile is provided with side flanges 200 terminating in hooked edges 202. Beneath these hooked edges engage the hooked marginal portions 204 of the resilient sealing strip. The resilient sealing strip has the outwardly curved spring portions 206 which form the parts of the strip bearing against the walls of the jamb channel. The center part 208 of the resilient strip has threaded holes therein engaged by the adjusting screws 112. The action is somewhat similar to that of the constructions shown in Figs. 6 and 6a.

Figs. 8 and 8a show a modified form of jamb comprising a base plate 210 having a T-shaped flange 212 at one edge thereof. The leg 214 of this flange constitutes the outer side wall of one of the jamb channels. At the other edge of the base plate 210, a removable T-shaped head 216 is provided which has a leg 218 constituting the outer flange of the second jamb channel. Suitable means such as fastening screws 220 are used to attach the head

216 to the plate 210. Heat insulating material such as a layer 221 of asbestos board or the like may be interposed between the head 216 and the plate 210 so as to reduce heat losses through the jamb and condensation. A removable parting strip in the form of a channel 222 is provided, this channel being secured to the plate 210 in any suitable manner, as by screws 224. To properly locate the parting strip, the plate 210 is shown as provided with ridges 226 which are engaged by grooves in the edges of the legs of the channel 222.

In Fig. 8 another modified form of sash stile and resilient guiding and sealing strip is shown. This guiding and sealing strip has bulbous attaching flanges 230 which are received in similarly shaped recesses formed between the flanges 232 and 234 projecting from the base of the stile. The body 236 of the sealing strip is of somewhat similar shape to that shown at the top of Fig. 7 and is provided with a longitudinal recess 192 to receive the adjusting plate 196 which is engaged by the adjusting screws 112. It will be observed that the projecting rib portions of the guiding and sealing strip prevent direct metal to metal contact between the stile and the channel walls, and thereby serve to retard leakage of heat from one side of the channel to the other by way of the sash stile which would occur if the metal sash stile were fitted closely between the metal channel walls.

Another form of resilient sealing strip is shown in Fig. 8a. In this case the base of the sash stile is provided with side flanges 240 which have inwardly projecting angular ribs 242 thereon. The base also has outwardly projecting flanges 244. The flanges 240 with the ribs thereon and the flanges 244 thus provide recesses in which are held the grooved side walls 246 of the resilient sealing and guiding member. The body 248 of the resilient member is shown as shaped similarly to the construction shown in Figs. 7 and 8. An adjusting plate 196 is provided engaged by adjusting screws 112.

Fig. 9 shows a construction similar to that shown in Fig. 5a, but in which a different form of guiding and sealing strip is mounted in the side of the jamb channel for engagement with the side flange of the stile. The sash construction is the same as that shown in Fig. 5a. The flange 132 of the stile engages a strip of pliable plastic or other resilient material 250 mounted in the undercut recess 145 in the side wall of the jamb parting strip. The resilient strip 250 may be provided with ribs on its surface as indicated at 252, if desired.

Fig. 10 shows a sash constructed in two parts separated by heat insulating material so as to reduce heat losses and prevent objectionable condensation. Such a sash is particularly useful in connection with a frame construction designed to prevent free transmission of heat, such as the construction shown in Figs 2 and 3, or that shown in Fig. 8. As illustrated, the jamb comprises an outer portion 300 having flanges 302 and 304 and an inner part 306 having flanges 308 and 310 interfitting with the flanges on the outer part. The two parts of the sash are firmly attached in any suitable manner as by means of fastening screws. Interposed between the flanges of the two parts are layers of heat insulating material 312 and 314 which may be of asbestos board or other suitable insulator. In some instances one part of the sash, preferably the inner part, may be made of rigid plastic. Where the sash is provided with means to prevent free transmission of heat between the inside and outside thereof, as described, it will be seen that the plastic guide and sealing strips thereon, such for example as shown in Figs. 5, 3A or 8, prevent metal to metal contact between the sash stile and the walls of the frame channel, thereby preventing direct passage of heat around the edge of the stile through the frame channel and rendering the insulation of the window more effective. As shown in Fig. 2 the top rail of the upper sash may be provided with a sealing member 330 and the bottom rail of the lower sash may be provided with a sealing member 332.

Fig. 10 also shows a modified form of plastic glazing strip 320. This strip is similar to the strip shown in the upper sash of Fig. 2 except that it is provided with a base flange 322 adapted to lie between the glass and the supporting flange 52 of the sash. With this form of sealing strip no putty base similar to that shown at 66 in Fig. 2 is required.

Fig. 2 shows an improved meeting rail construction by which the joint between the upper and lower sashes is sealed when the sashes are closed. As shown in this figure, the lower rail of the upper sash is provided with laterally-extending flange 260 which is engaged on its upper surface by a downwardly-hooked flange 262 on the meeting rail of the lower sash. The side of the meeting rail of the lower sash is provided with an undercut recess 264 which is adapted to receive a resilient sealing strip 266 having a ribbed surface 268 which engages the side of a lip 270 formed on the edge of the flange 260.

Fig. 4 shows a meeting rail construction similar to that shown in Fig. 2 except that a resilient metal sealing strip 272 is provided in place of the resilient plastic strip shown in Fig. 2. The strip 272 has a bead 274 at one edge engaging in one side of the undercut recess 264 and a flange 276 at the other edge engaging the other side of the undercut recess. The middle part of the strip 272 is formed into a resilient fold 278 which engages the side of the lip 270. The metal strip is of similar formation to the metal strip 146 shown in Fig. 5. The same formation of strip may be used interchangeably for the purposes shown in either of these figures.

Certain subject matter shown in this case including particularly the forms of the invention shown in Figs. 5a and 9 are not claimed herein specifically as they form the subject matter of a continuation in part application, filed November 22, 1954, Serial No. 470,287.

While I have illustrated and described in detail certain preferred forms of my invention, it is to be understood that changes may be made therein and the invention embodied in other structures. I do not, therefore, desire to limit myself to the specific constructions illustrated, but intend to cover my invention broadly in whatever form its principle may be embodied.

What I claim is:

1. In a sliding window, a frame including jambs having channels therein, and a sash mounted in said frame, said sash having yielding elastic plastic jamb engaging members mounted on the stiles thereof, said yielding members having surfaces for engagement with the side and bottom walls of said jamb channels, and means engaging intermediate sections of the yielding members for deforming and adjustably spreading said yielding members laterally so as to vary the closeness of the engagement of said members with said side walls, said yielding members being wider than said sash stiles so as to prevent direct engagement between said stiles and the side walls of the jamb channels.
2. In a sliding window, a frame including jambs having channels therein, and a sash mounted in said frame, said sash having stiles provided with flanges having outwardly turned lips, resilient plastic jamb engaging strips of greater width than said stiles, said strips having portions interlocking under the lips on the flanges on said stiles and having surfaces for sliding engagement with the side and bottom walls of said jamb channels, longitudinally extending metal adjusting strips mounted on said resilient plastic strips and adjusting screws engaging said metal strips for moving said strips towards and away from the outer surfaces of said sash rails.
3. In a sliding window, a frame including jambs having channels therein, and a sash mounted in said frame, said sash including side rails having flanges projecting from the outer faces thereof between the planes of the sides of said sash, said flanges having outwardly turned lips at their margins, said lips also terminating between

the planes of the sides of said sash, said sash flanges projecting part way into said jamb channels, resilient plastic strips enclosing said flanges and lips on said sash rails and extending into proximity with the bottoms of the jamb channels, the side walls of said strips extending beyond the planes of the sides of said sash and into proximity with the side walls of said channels, said resilient strips being slidable in said jamb channels, metal strips extending longitudinally of said resilient strips and carried thereby, and adjusting screws at the upper and lower corners of the sash stiles, passing through openings in said stiles and having screw threaded engagement with said metal strips.

4. In a sliding window, a frame including jambs having channels therein, and a sash mounted in said frame, said sash having stiles provided with interlocking formations projecting from the outer faces thereof, and resilient plastic channel shaped jamb engaging strips enclosing and interlocking with said interlocking formations, said resilient jamb engaging strips being wider than the sash stiles, so as to prevent direct engagement between the said stiles and the side walls of the jamb channels, and being laterally deformable so as to permit of adjustment of closeness of fit in said channels, and means for forcing the central parts of said resilient plastic strips away from the sash stiles or drawing the same towards the stiles without displacing the interlocked formations between the strips and the sash stiles so as to produce such adjustment.

5. In a sliding window, a frame including jambs having channels therein, and a sash mounted to slide in said frame, the sash stiles and channel walls having interengaging formations permitting the sash to slide longitudinally and yield laterally with respect to the jamb channels, the interengaging formations between at least one face of a stile and the adjacent channel wall comprising a yielding elastic plastic strip attached to the stile extending throughout the length thereof, and engaging the bottom and at least one side wall of the channel, said elastic plastic strip presenting a narrow bearing surface projecting beyond the face of the sash for contact with the wall of the channel, the portion of the strip carrying said narrow bearing surface being of sufficient thickness and body as to positively space the face of the sash from the channel wall and effectively prevent direct contact between the two, and adjustable means mounted on the stile and strip for deforming said elastic strip so as to vary the closeness of the engagement of said formations in the jamb channels.

6. In a sliding window, a frame including jambs having metal jamb channels and a sash mounted to slide in said frame, said sash having rigid metal stiles extending part way within the jamb channels, said stiles being narrower than the channels, and elastic vinyl plastic guide and sealing strips enclosing and interlocked with and supported against collapse by outer portions of the stiles and having broad based ribs presenting spaced surfaces of small area relative to the dimensions of the channels forming bearing surfaces engaging the side walls and bottoms of the jamb channels respectively with approximately line contact and sliding freely therein but preventing rattling and sealing the window against the weather, the bearing surfaces engaging the side walls of the channels projecting beyond the side walls of the stiles, the elastic plastic formations providing such bearing surfaces being of sufficient thickness and body to effectively prevent said stiles from directly contacting the channel walls during normal operation of the window.

7. In a sliding window, a frame including jambs having aluminum jamb channels rectangular in shape and a sash mounted to slide in said channels, said sash having rigid metal stiles extending part way within the jamb channels, said stiles being narrower than the channels, and elastic vinyl plastic guide and sealing strips enclosing and interlocked with and supported against collapse

by outer portions of the stiles and having ribs adapted to project into the corners of the jamb channels, said ribs being broad based but having surfaces of small area relative to the dimensions of the channels forming bearing surfaces engaging the side walls and bottoms of the jamb channels respectively and sliding freely therein but preventing rattling and sealing the window against the weather, the bearing surfaces engaging the side walls of the channels projecting beyond the side walls of the stiles, the elastic plastic formations providing such bearing surfaces being of sufficient thickness and body to effectively prevent said stiles from directly contacting the channel walls during normal operation of the window.

8. In a sliding window, a frame including jambs having metal jamb channels rectangular in shape, and a sash mounted to slide in said frame, said sash having rigid metal stiles extending part way within the jamb channels, said stiles being narrower than the jamb channels and having flange portions defining recesses extending along longitudinal outer corners of the stiles, and elastic plastic guide and sealing strips of channel shape at least partially enclosing and supported by certain of said flange portions, and having formations at the edges of the legs of the channels adapted to be slid endwise into the longitudinal recesses in the stiles so as to interlock therewith and hold the plastic strips to the stiles, said strips having ribs at their corner presenting at each corner spaced surfaces of small area relative to the dimensions of the channels forming bearing surfaces engaging the side walls and bottoms of the jamb channels respectively with approximately line contact and sliding freely therein but preventing rattling and sealing the window against the weather, the bearing surfaces engaging the side walls of the channels projecting beyond the side walls of the stiles, the elastic plastic formations providing such bearing surfaces being of sufficient thickness and body to effectively prevent said stiles from directly contacting the channel walls during normal operation of the window.

9. In a sliding window, a frame including jambs having metal jamb channels and a sash mounted to slide in said frame, said sash having rigid metal stiles extending part way within the jamb channels, said stiles being narrower than the jamb channels and comprising side walls and a transverse web, the side walls extending slightly beyond the web so as to provide outer flanges, said web carrying outwardly projecting hooked flanges spaced inwardly from the outer flanges so as to provide pockets extending along longitudinal outer corners of the stiles, and elastic plastic guide and sealing strips of channel shape having beads fitting in said pockets and shoulders seating on the outer edges of said outer flanges, said plastic strips having longitudinally extending ribs at their outer corners providing narrow longitudinal bearing surfaces engaging the side walls and bottoms of the channels respectively, the elastic plastic strips being of sufficient thickness and body to effectively prevent the stiles from directly contacting the channel walls during normal use of the window.

10. In a sliding window, a frame including jambs having metal jamb channels of generally rectangular shape and a sash mounted to slide in said frame, said sash having metal stiles extending part way within the jamb channels, said stiles being narrower than the jamb channels and comprising side walls, and a transverse web, the side walls extending slightly beyond the web so as to provide outer flanges, said web carrying outwardly projecting hooked flanges spaced inwardly from the outer flanges so as to provide pockets extending along longitudinal outer corners of the stiles, said stiles including said side walls, and web and flanges being of rigid construction, and elastic plastic guide and sealing strips of channel shape having beads fitting in said pockets, said plastic strips having longitudinally extending thickened ribs of generally rounded form at their outer corners providing narrow longitudinal bearing surfaces engaging the side walls and bottoms of the channels respectively, the elastic plastic

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strips and ribs being of sufficient thickness and body to effectively prevent deformation thereof to an extent permitting metal to metal contact between the side walls of the stiles and channel walls during normal use of the window.

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