G. H. FORSYTH.

SASH CONSTRUCTION.

APPLICATION FILED SEPT. 13, 1915.

1,380,372.

Patented June 7, 1921.

2 SHEETS—SHEET 1.

Fig. 1

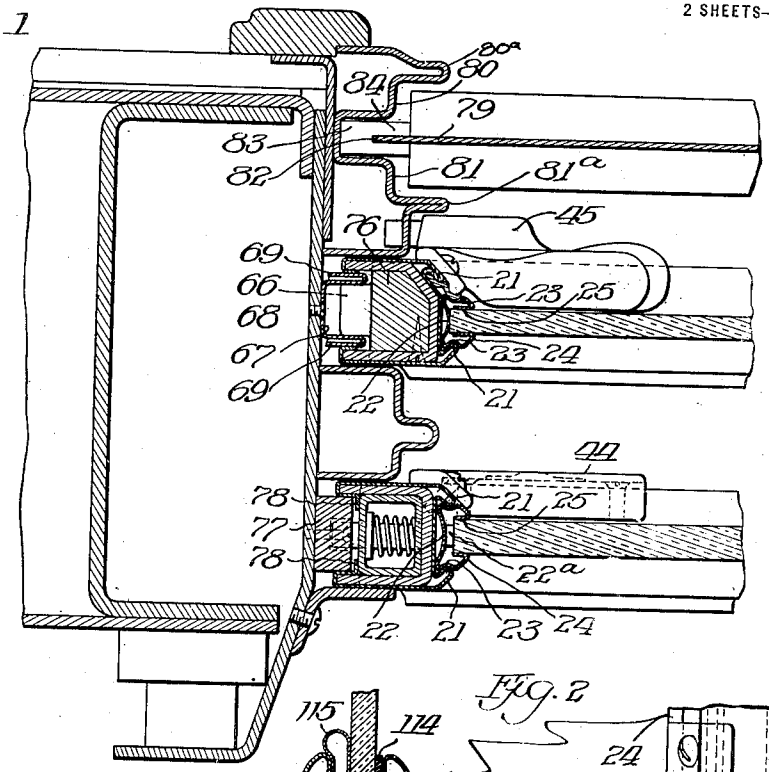
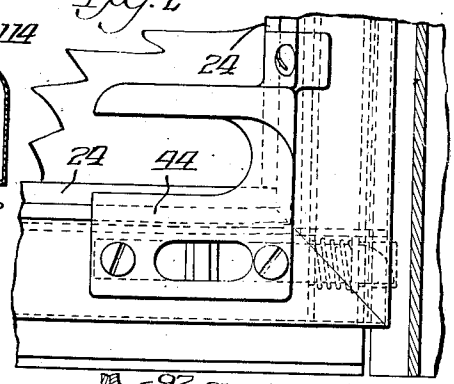


Fig. 2



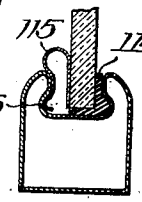


Fig. 17

Fig. 3

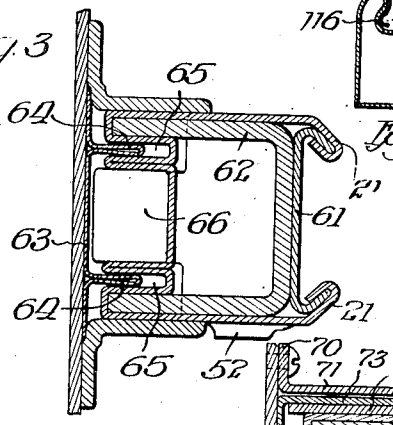


Fig. 5.

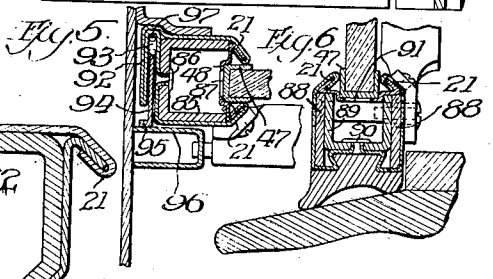


Fig. 6

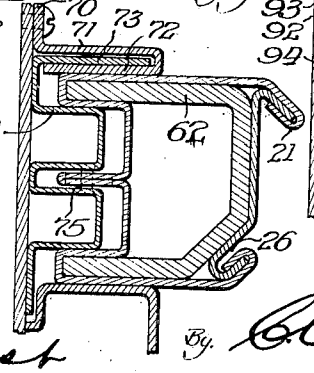


Fig. 4

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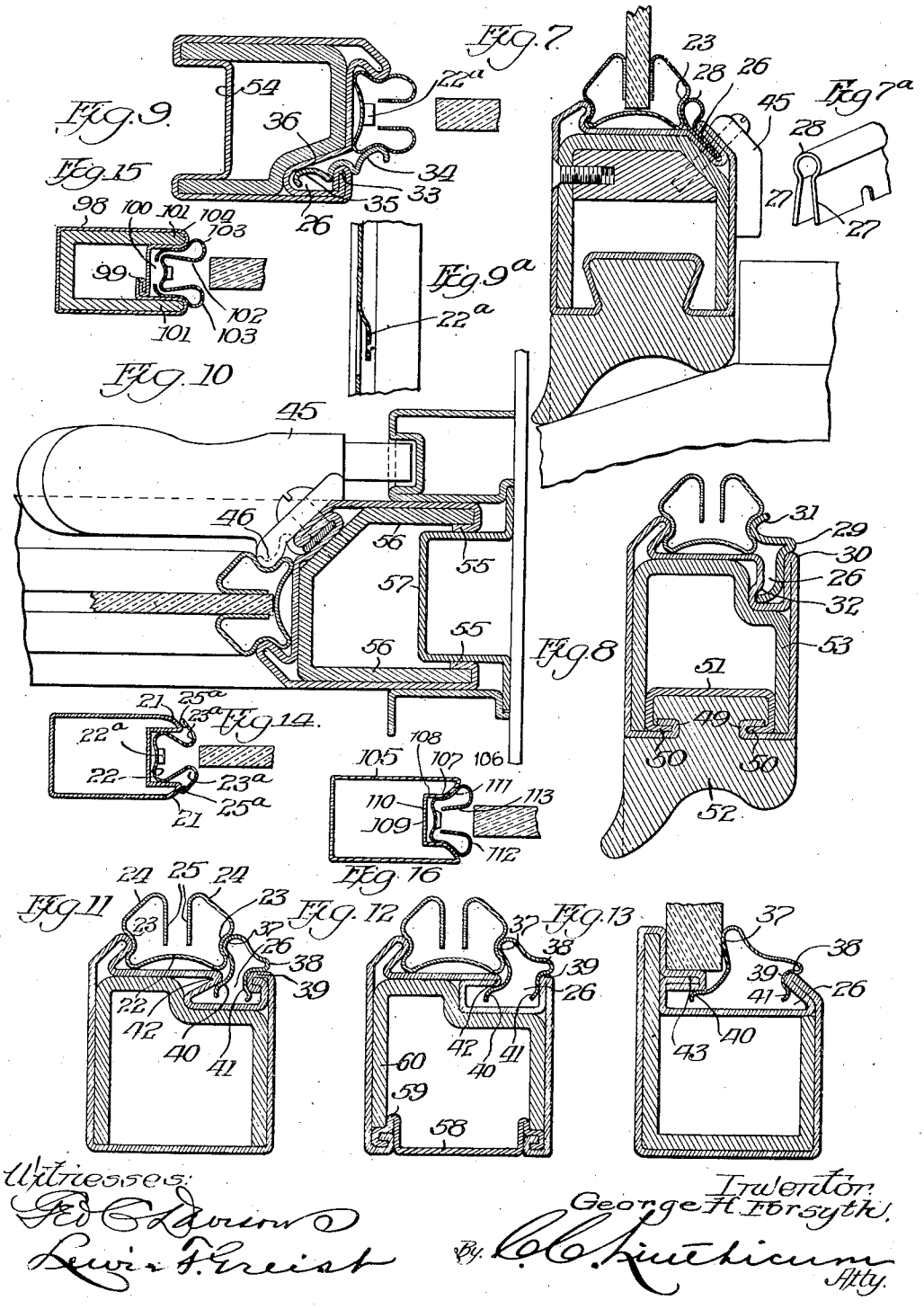
SASH CONSTRUCTION.

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

GEORGE H. FORSYTH, OF CHICAGO, ILLINOIS.

SASH CONSTRUCTION.

1,380,372. Specification of Letters Patent. Patented June 7, 1921.

Application filed September 13, 1915. Serial No. 50,328.

To all whom it may concern:

Be it known that I, GEORGE H. FORSYTH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sash Constructions, of which the following is a specification.

The invention has to do with window construction generally and more particularly with the construction and arrangement of the sash and their respective elements whereby to effect an exclusion of dirt, wet and cold; also to preclude the entrance of light by reflection around the edges of the curtains; also to insure the tight fit of the sash within their grooves regardless of variations which are always found in the dimensions of the sash opening; also improved means for mounting the glass within the sash to provide for resiliency both laterally and in the plane of the glass; the various characteristic features of the construction being of particular value as employed in connection with metal sash of the "narrow" type wherein the limitations as to width are such as to render peculiarly difficult the attainment of the objects above recited. Other features of importance will be made apparent as the description proceeds.

To facilitate an understanding of the invention preferred and modified embodiments of the same are set forth in the accompanying drawings and in the following detailed description. Obviously the invention may be further modified as to its embodiment without departure from the essential characteristic features of the same, wherefore the drawings and description are to be taken in an illustrative rather than in an unnecessarily limiting sense. In the drawings—

Figure 1 is a horizontal section through one side of the window opening and sash and curtain;

Fig. 2 is a fragmentary side elevation of a corner of the outer sash;

Figs. 3 and 4 are horizontal sections through different forms of sash stiles and weather proof connection between the stiles and guides;

Figs. 5 and 6 are respectively horizontal and vertical sections through the sash stile and lower rail illustrating in particular the method of joining the same;

Fig. 7 is a vertical section through a sash rail illustrating one form of construction including a resilient glass support and glazing bead;

Fig. 7ª is a fragmentary view in perspective of the glazing bead prior to insertion shown in Fig. 7;

Fig. 8 is a view similar to Fig. 7 showing a modified construction;

Fig. 9 is a horizontal sectional view through the sash stile showing a slightly different form of glass support and glazing bead;

Fig. 9ª is a vertical section through the glass support shown in Fig. 9.

Fig. 10 is a horizontal section through another form of sash stile open at its outer edge;

Figs. 11, 12 and 13 are horizontal sections through different forms of sash stiles and glazing means of the same general type;

Fig. 14 is a similar section through yet another form of sash stile and glazing means;

Fig. 15 is a horizontal section through another form of sash stile and means for connecting the same with the glass;

Fig. 16 is a corresponding section showing a further modification of stile and means for connecting the same and the glass; and

Fig. 17 is a similar section showing a further modification.

Having reference to Fig. 1 and also to Figs. 3, 5 and 6 it will be seen that the outer sash has integral or permanent retaining beads 21 on both the outside and inside, the exterior location of the sash rendering it more feasible to provide for the insertion and removal of the glass by opening up the sash frame, after the latter has been removed from the sash opening. In this form of construction the glass may also be inserted before the sash members are assembled or, with the construction shown in Fig. 1, the spring glass support 22 may be snapped into position in the sash after the manner of a glove fastener. It will be observed that the spring support has an inwardly convex bottom portion from which extend side walls bent to provide longitudinally extending grooves 23 adapted to receive the permanent retaining bead of the sash, beyond which the walls extend inwardly as indicated at 24, and then parallel to each other in spaced relation, as indicated at 25, on each side of the glass which is

adapted to be accommodated between the spaced walls of the support and to rest with its edge against the inwardly convex bottom of the support or against a resilient tongue 22^a extending inwardly from the convex bottom as more clearly shown in Figs. 9 and 9^a. The glass support 22 is so proportioned and arranged with reference to the glass and to the beads of the sash that the glass is cushioned both laterally and in its own plane, the provision of a space between the side walls of the glass support and the sash beads at their bases permitting the expansion laterally of the support and the downward yielding of the convex bottom while the provision of the spring tongue 22^a permits of even greater yielding under edge pressure of the glass and permits the snapping of the glass support into the space between the beads.

Difficulties often encountered in the insertion and removal of sash from the sash opening render it advantageous to provide a removable glazing bead to permit the glazing of the sash while still in the sash opening. This can readily be done by removable means or glazing beads adapted to engage the sash and the glass support and to maintain the two in coöperative relation with each other and with the glass.

With this end in view one face of the sash is preferably provided with an integral permanent retaining bead 21 such as that described, while such an integral bead is omitted from the other face of the sash and the sheet metal of the sash is reversely bent upon itself to provide a pocket 26 below the plane of the inner edge of the sash so as to permit the sash support 22 to be inserted laterally alongside the permanent bead and to rest upon the inner edge of the sash, a removable glazing bead being then inserted into the pocket in such manner as to exert spring pressure upon the glass support and preferably along its grooved portion 23 above referred to.

Various forms of removable spring glazing beads may be used for this purpose, the prime essentials being security, ease of removal, and resiliency.

In Fig. 7 a form of glazing bead is shown having normally parallel or slightly diverging legs 27 and a rounded head 28, the legs 27 adapted to be compressed together and inserted within the pocket 26 wherein they will be held primarily by frictional engagement and the rounded head 28 will be slightly deformed by reason of its inward pressure against the side wall of the glass support 22. It will be observed that any pressure exerted transversely by the glass support will be yieldingly resisted by the head 28 of the glazing bead and the interlocking engagement of the legs 27 within the pocket 26 will be rendered more secure by such transverse pressure thus tending to prevent the accidental dislocation of the glazing bead.

In Fig. 8 a form of glazing bead is shown having its medial portion reversely bent at 29 and bearing upon a rib 30 adjoining and forming the inclosing outer wall of the pocket 26. From this fulcrumal bearing point one portion of the glazing bead extends laterally into the groove 23 of the glass support 22 and is then outwardly bent to form a hook 31 adapted for engagement by a suitable tool to facilitate the removal of the said bead, the other portion of the bead extending into the pocket and having its terminal edge interlockingly engaging within a groove 32 along one side of the bottom of the pocket. It must be evident that the glazing bead here shown and elsewhere can also be removed by making use of what for this purpose would correspond to the hook 31, namely the rib at 29, which also serves the important function of preventing the entrance of moisture into the pocket 26.

In Fig. 9 a glazing bead is shown as a symmetrically proportioned strip in cross section bearing at an intermediate point upon the rib 33 of the sash and having hooked portions 34 and 35 extending the one into the groove 23 of the glass support and the other into the pocket 26 where it bears inwardly against the inner wall of the pocket at 36.

In Figs. 11, 12 and 13 slightly different forms of glazing beads are shown which are of the same general type and comprise a head portion 37 adapted to bear within the groove 23, a nose portion 38 which overlies the rib 39 and two oppositely extending marginal wing portions 40 and 41 which extend into opposed lateral recesses of the pocket 26 and engage respectively with the ribs 42 and 39.

In Fig. 13 there is a further difference in that the glass support is entirely omitted, the edge of the glass resting upon an integral rib 43 of the sash and being held in position by the direct engagement therewith of the head 37 of the glazing bead. It will be noted in the case of these glazing beads, as well as elsewhere in the other figures, that they not only tend to retain the supports and glass as against lateral displacement, but also in engagement with the inner edge of the sash; also that by reason of the lateral spring expansion of the glazing beads due to their characteristic cross section, they have an automatically adjustable bearing relation to the glass to accommodate panes of varying thickness.

At the point of attachment of the latch 44 and the lock 45 the former is shown as overlying the integral permanent bead of the sash and secured thereto by means of screws while the latter is shown as overlying the

offset portion of the sash inclosing the pocket and the spring glazing bead may be outwardly supported by the lock as shown in Fig. 1, or may be cut away for a portion of its length and its function performed by a specially formed portion 46 of the lock as shown in Fig. 10.

In Figs. 5 and 6 a construction is shown adapted for interchangeable use with either the spring glass support previously described, or with a rubber cushioning strip 47 which performs a similar function. Here the inner edge of the sash is longitudinally recessed, as shown at 48, within which the rubber strip 47 is seated, the beads, whether permanent or removable, bearing against sides of the glass supporting rubber strip. By reason of the fact that the longitudinal recess 48 is of less lateral dimensions than the bottom portion of the spring glazing bead the latter may be used with this form of sash, its bottom portion bridging the recess portion 48 and resting upon the inner edge of the sash on each side thereof.

In Fig. 14 a modified form of glass support is shown embodying some of the features of the support shown in Fig. 1, as for instance the convex base and spring tongue, but in this case the side walls instead of turning inwardly to form the vertical members 25 are turned outwardly to form the groove 23^a and the wing portions 25^a which are adapted to ride on the outer curved edges of the beads 21 and thus preclude the entrance of moisture or dirt between the support and beads, as well as to afford an additional cushion for the edge of the glass.

In all the forms of construction shown the glass supports are additionally held in place relative to the glass and sash by having the upper and lower supporting strips extend substantially the full width of the sash opening as indicated in Fig. 2, while the side supporting strips have their ends abutting against the top and bottom strips. This gives a much more substantial construction and one of easier application than would be the case were the meeting ends of the vertical and horizontal strips mitered. The glazing beads can be made of such length that their ends will meet without mitering of the latter, or the said glazing beads can be made of opposite corresponding lengths to the supports associated therewith, to wit, the ends of the vertical glazing beads would be long enough to overlap the cross supports and the ends of the horizontal glazing beads would be long enough to overlap the vertical supports, whereby there would be present a tendency to hold both the vertical and horizontal supports, as well as the glazing beads themselves in position.

Sheet metal sash may be formed in many different ways, either drawn as an integral structure, as shown in Fig. 7, or shaped and having the meeting edges provided with a seam in different places as shown in other figures of the drawings.

In Fig. 8 a form of sash is shown in which the inner edge and side walls of the sash are integral while the margins of the metal along the outer edge extend inwardly and are reversely bent at 49 and engaged by the marginal portions 50 of a bridging strip 51 whereby the separation of the bent margins 49 is prevented and at the same time, along the bottom rail, a dove-tail groove is provided for the reception and retention of the rubber cushion 52. It will also be noted in this figure as well as others, where locking means between the different members are employed that the same are constructed not only to prevent extension but also the compression or collapsing of the sash members. Within the sash rail, as shown in Fig. 8, an interior reinforcement 53 is arranged of heavier metal whose ends may extend clear into the sash grooves and following the general outline of the sash with its terminal portions extending into the space between the bridge member 51 and the side walls of the sash, and serving, therefore, not only to reinforce the sash members but also to lock the same together.

In Fig. 9 the margins of the metal forming the sash are interlocked to provide a seam constituting the rib 33 and serving as a fulcrumal point for the glazing bead. Here along the outer edge of the sash the metal extends inwardly at 54 to provide an outwardly facing groove for the accommodation of a member of the guide upon which the sash slides.

In Fig. 10 the metal of the sash along its margins extends inwardly for a slight distance at 55 along the outer edge of the sash and within the space thus formed extend the outer edges of the reinforcing member 56. In this form of construction the sash is entirely open along its outer edge to accommodate the sash guide 57 upon which it slides, and preferably to have a close slidable engagement therewith, as well as with the side walls of the sash guide groove.

Fig. 11 shows a construction in which the marginal edges of the metal are interlocked at the rib 39 but do not extend inwardly along the outer edge as in Fig. 9 but form a plain outer edge adapted to be used for instance in the top rail of the sash.

In Fig. 12 is shown a form of construction of the same type as that shown in Fig. 10, but in this case a bridging strip 58 is interlocked with the marginal portion at the edges of the side walls and has an upstanding portion 59 which serves as a retainer for the lower edges of the reinforcement 60. It will be noted in this construction as well that the construction of the interlocking

seam is such as to prevent not only extension but also collapse of the structure.

In Fig. 13 the marginal portions of the metal are interlocked to form the rib 43 previously referred to. In Fig. 3 the marginal portions of the sash along the inner edges are inwardly bent to form the permanent beads 21 and are interlocked with a bridging strip 61 in such manner as to prevent lateral separation of the side walls and inward movement of the bridging strip 61 even though the reinforcing member 62 were omitted. A similar form of construction is shown in Fig. 4 as applied to a sash having a pocket 26 for the accommodation of a removable glazing bead. It must be evident that the reinforcing member 62 serves not only to increase the strength of the interlocking engagement between the inner edges of the sash stile and the bridging strip 61 but also coöperates to resist any jars imparted by the edge of the glass.

In order to insure an intimate connection between the sash and sash groove to preclude the entrance of dust or moisture, provision is made, as shown in Fig. 3, by the weather strip 63 attached to the bottom of the guide groove and having upstanding ribbed portions 64 extending into the grooves 65 formed along the outer edge of the sash. These ribbed portions 64 may be resilient and therefore have spring engagement with the walls of the grooves 65. In the space between the ribs 64 of the weather strip may extend the end portion 66 of the bottom cushion 52. This is also shown in slightly modified form in Fig. 1 where the weather strip 67 is shown as secured to the bottom of the sash groove at 68 and having laterally resilient ribbed portions 69 extending into the grooves of the sash.

In Fig. 4 a retaining strip 70 is shown as attached to the window casing and bent upon itself to form spaced walls 71 and 72 within which is adapted to slide the wing portion 73 of a weather strip 74 which has a pin and slot connection at 75 with the sash so as to slide up and down with the sash but to provide for lateral movement in order to compensate for differences in the dimensions of the window opening and of the sash. The wing portion 73 may have spring contact engagement with the retaining strip 70.

It is not infrequently the case that there is sufficient variation in the size of the window opening or of the sash that a tight fit is difficult of attainment and the variation may be of such extent as to even permit the sash to become dislodged from its groove at one edge when pushed entirely into the groove on the opposite edge. In the case of wooden sash the stiles may be dressed to adapt them to the opening, and I have provided herein means by which the effective width of a metal sash may also be varied to adapt it to different openings. This is done in the form of construction shown in Fig. 1 by inserting in the sash having an outwardly open stile a wooden filler strip 76 which may be dressed along its outer edge to a suitable thickness to provide slight play between its outer edge and the weather strip 69 so that the sash cannot be moved to the left, as shown in said figure for instance, sufficiently to permit the same to clear the sash guides at the opposite side. In the same figure, is shown with reference to the outer sash, another arrangement of means for accomplishing this same result which consists in attaching the filler strip 77 to the bottom of the sash groove in which case the face of the strip may be dressed to a greater or less extent to provide the proper clearance between said strip and the inwardly extending wings 78 of the sash. While I have only shown the dressing of coöperating wood strips to produce the result desired the same may be accomplished in a variety of ways and therefore I do not wish to limit myself to the particular method shown.

It is a common complaint especially with reference to sleeping cars that the light enters around the edges of the curtain. Overlapping of the guide stops and curtain may prevent the entrance of the light in a direct line, but the light rays are caught and reflected by side walls of the sash stops in such manner as to transmit the same to the interior of the car. I have overcome this difficulty by not only extending the edge of the curtain at 82 into a narrow groove 83, which is in line with the tip of the curtain fixture 84, but also by providing the sash stops 80, 81 with projecting guard lips 80^a and 81^a so that any light passing the lip 81^a and striking the stops 80 and 81 shall be prevented from being reflected into the car by the guard lip 80^a.

To provide for ample clearance between the curtain fixture tube and the sash stops 80, 81 so that the curtain apron shall at no time rub against and be chafed thereby the guard lips 80^a and 81^a are positioned at a distance from the curtain apron in excess of the play allowed between the tip of the curtain fixture and its bearing.

In Figs. 5 and 6 is shown an improved means for joining the sash members at the corner. Within the sash stile (Fig. 5) is slipped one end 85 of an L-shaped reinforcement, such end being of inwardly opening U-cross section, said reinforcement being riveted at 86 to the outer edge of the stile and access being had to the rivet for the purpose of upsetting the same through an aperture 87 in the bottom of the longitudinal recess 48 of the sash prior to the glazing of the same. The other end of the

L-shaped reinforcement is cut away at the bottom to provide clearance for the cushion-receiving dove-tail of the bottom sash rail leaving two side members 88 which extend into the space on each side of the dove-tail. A smaller reinforcing member 89 of inwardly opening U-cross section is fitted between the two side members 88 and suitably secured thereto as by spot-welding or sweating. The reinforcement 89 is secured to the rail by the rivet 90 to which access is had through the aperture 91 in the bottom of the longitudinal recess 48 of the sash. In Fig. 5 I have also shown a modified form of making tight contact between the sash stile and sash guide, the same consisting of a reverse fold 92 in the outer edge of the sash stile, providing a pocket 93, which is adapted to receive a weather stripping member 94 traveling with the sash but capable of transverse movement relative thereto. The member 94 is preferably provided with a lip 95 which is normally maintained under spring contact with the inner wall of the sash guide stop 96 under the outward thrust of the bow spring 97.

In Fig. 15 I have shown a further modification of the stile and connecting means therewith for the glass. In this construction the stile 98 comprises a sheet of metal whose meeting edges are formed into a locked seam of the sash lying within the vertical planes of the groove along the inner edge of the stile as shown at 99. It will be noted that this seam is of such design as will prevent both the transverse compression or extension of the sash stile. It is a very decided advantage to have this locked seam located as described so that it will not interfere with the groove 100 or the interior of the marginal beads 101. The support 102 for the glass comprises a spring U section with its side walls turned outwardly and back upon themselves to form generously large beads 103, said outer walls 104 extending clear back and their inner edges being inwardly turned beneath the back wall of the support whereby to enable the latter to be readily introduced in the stile groove 100.

It will be noted that the beads of this support have a gradual bearing with the rounded marginal lips of the stile against which they tend to have an inwardly sliding movement before the support bottoms against the transverse wall of the stile groove 100, whereby there is a tendency to increase the tension between the support and the edge of the glass, as well as to cushion the latter. The interior side walls of this support are inclined inwardly to have a spring engagement with the edge of the glass and in addition there is a tendency to force the same inwardly under the inward spring thrust of the outer reversely bent side walls of the support against the marginal beads of the stile. The bottom cross wall of the support can be also provided with the resilient tongue 104 similar to 22^a.

Fig. 16 shows a further modification of the sash stile including the connection between same and the glass. The stile 105 is provided with marginal beads 106 which are inwardly inclined or curved as shown in 107, following which they extend inwardly in substantially parallel planes 108, until they reach the bottom transverse wall 109, thereby forming the groove in the stile 110. The glass support 111 in this case comprises side walls which are inwardly turned to form generously large beads 112 and thence in inwardly tapered interior walls 113 which serve to engage the edge of the glass in the spring tension, the bottom wall of this support being likewise preferably provided with resilient tongue.

In Fig. 17 is shown a modification somewhat similar to that of Fig. 13, in that the glass bears at the edge directly on the bottom of the sash groove and at one side directly against the permanent bead of the sash, or upon an interposed rubber packing strip 114, while it is at the other side resiliently held in place by the glazing bead 115 which is in effect one-half of the glass support of the other views. In this case, also, the glazing bead 115 affords a yielding lateral support for the glass and is frictionally held in place by the engagement of its lower outer edge 116 within a groove of the sash bead and by the engagement of the head of the sash bead within a longitudinal groove of the glazing bead. This form of construction affords a high degree of resiliency and of efficiency in the exclusion of the elements around the edge of the glass.

It will thus be observed that I have provided a window construction in which the objects above set forth are obtained in a thoroughly efficient manner so as to constitute a window construction particularly adapted to the rigid requirements of railway travel.

I claim:

1. In sash construction, the combination of a metal sash formed to provide a permanent retaining bead, a resilient glass support, and a pocket at that side of the support opposite the permanent bead, and a removable glazing bead seated in the pocket and having a self-adjustable bearing relation to the glass to accommodate panes of varying thickness.

2. In sash construction, the combination of a metal sash formed to provide a permanent retaining bead, and a pocket at that side of the sash opposite the permanent bead, and a removable glazing bead seated in the pocket and having a self-adjustable bearing relation to the glass to accommo-

date panes of varying thickness, said removable glazing bead also having a portion overlying the exterior wall of the pocket to prevent the entrance of moisture thereto and to facilitate the removal of said bead.

3. In sash construction, the combination of a metal sash bent to provide an integral retaining bead, a spring glass support, and a pocket at that side of the support opposite the integral bead, and a removable spring glazing bead seated in the pocket and having a self-adjustable bearing relation to the glass to accommodate panes of varying thickness.

4. In sash construction, the combination of a metal sash formed to provide a permanent retaining bead, a resilient glass support, and a pocket at that side of the support opposite the permanent bead and below the level of the support, and a removable spring glazing bead seated in the pocket and having an interlocked engagement within the pocket, the said removable glazing bead having a self-adjustable bearing relation to the glass to accommodate panes of varying thickness.

5. In sash construction, the combination of a metal sash formed to provide a permanent retaining bead, a glass support and a pocket at that side of the support opposite the permanent bead and below the level of the support, and a removable spring glazing bead seated in the pocket and having an interlocked engagement within the pocket, the said removable glazing bead having a self-adjustable bearing relation to the glass to accommodate panes of varying thickness, said removable glazing bead also having a portion overlying the exterior wall of the pocket to shed moisture therefrom and to facilitate the removal of the bead.

6. In sash construction, the combination of a metal sash formed to provide a permanent retaining bead, a resilient glass support, and a pocket at that side of the support opposite the permanent bead, and a removable spring glazing bead seated in the pocket and having an interlocked engagement therein and a self-adjustable bearing relation to the glass to accommodate panes of varying thickness.

7. In sash construction, the combination of a metal sash formed to provide a permanent retaining bead, a resilient glass support, and a pocket at that side of the support opposite the permanent bead, the side walls of the pocket having opposed lateral recesses, and a removable spring glazing bead seated in the pocket and having oppositely extending marginal portions engaging within the lateral recesses.

8. In sash construction, the combination of a metal sash formed to provide a permanent retaining bead, a glass support, and a pocket at that side of the support opposite the permanent bead, the side walls of the pocket having opposed lateral recesses, and a removable spring glazing bead seated in the pocket and having oppositely extending marginal portions engaging within the lateral recesses, said removable glazing bead also having a portion overlying the exterior walls of the pocket to prevent the entrance of moisture thereto and to facilitate removal of the bead.

9. In sash construction, the combination of a metal sash bent to provide an integral retaining bead, a spring glass support, and a pocket at that side of the support opposite the integral bead and below the level of the support, the side walls of the pocket having opposed lateral recesses, and a removable spring glazing bead seated in the pocket and having oppositely extending marginal portions engaging within the lateral recesses with the upper portion of the bead having an inward bearing against the glass, said removable glazing bead also having a portion overlying the exterior wall of the pocket to shed the moisture therefrom and to facilitate the removal of the bead.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE H. FORSYTH.

Witnesses:
MARY C. BROWER,
T. D. BUTLER.