G. H. FORSYTH.

METAL WINDOW CONSTRUCTION.

APPLICATION FILED OCT. 27, 1908.

1,113,157.

Patented Oct. 6, 1914.

2 SHEETS—SHEET 1.

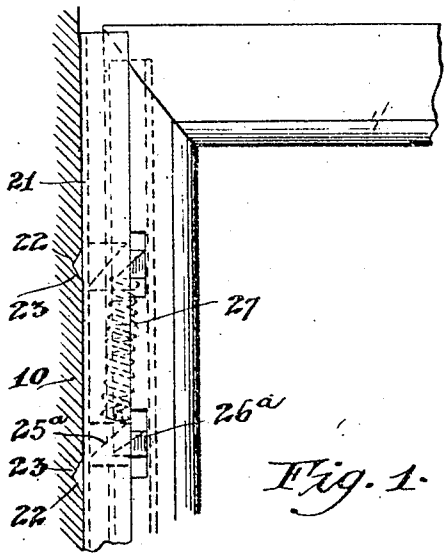


Fig. 1.

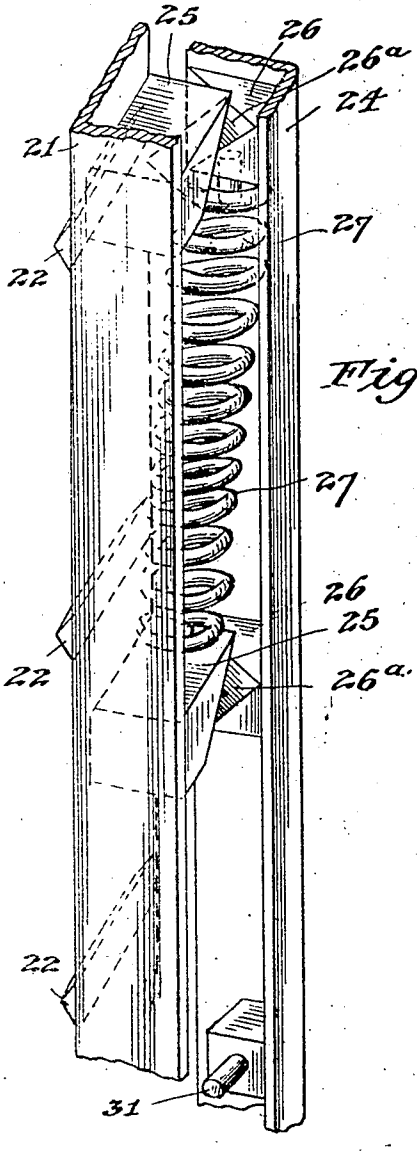
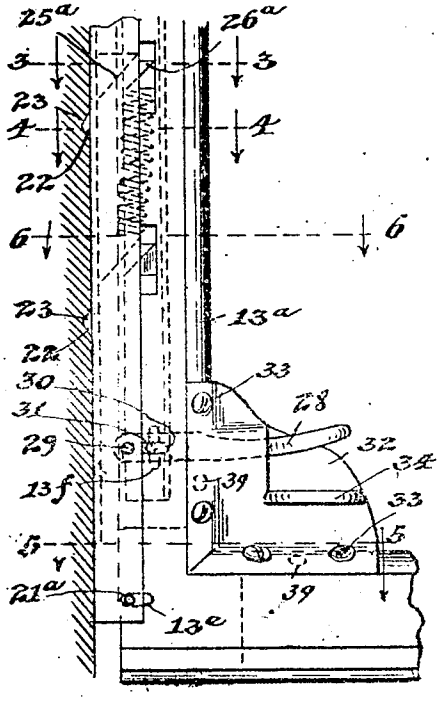


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

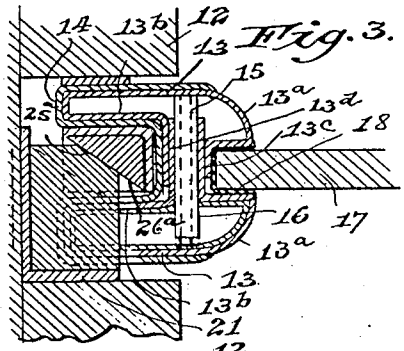


Fig. 7.

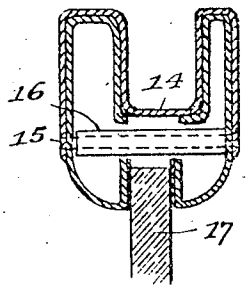


Fig. 4.

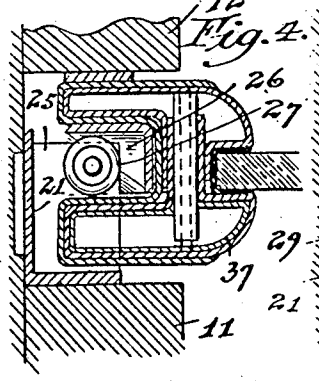


Fig. 6.

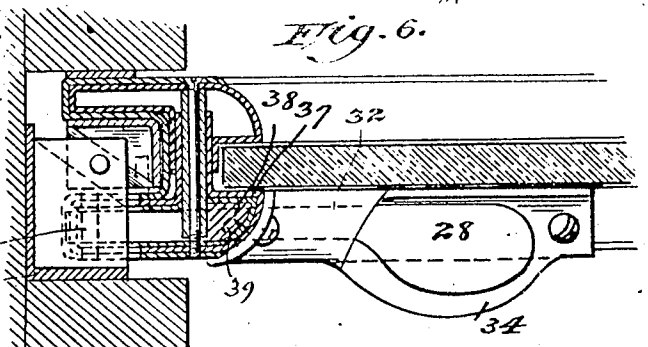


Fig. 5.

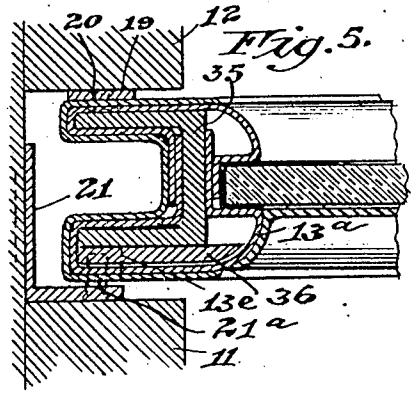
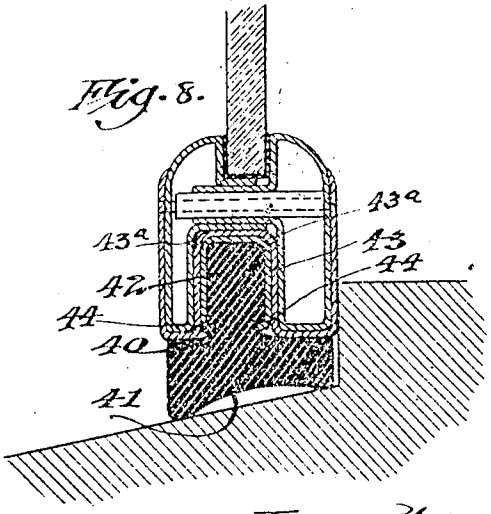


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE H. FORSYTH, OF CHICAGO, ILLINOIS.

METAL WINDOW CONSTRUCTION.

1,113,157. Specification of Letters Patent. Patented Oct. 6, 1914.

Application filed October 27, 1908. Serial No. 459,775.

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 Metal Window Constructions, of which the following is a specification.

This invention relates to metal window constructions, more particularly, although not exclusively, designed for use in railway cars, among the principal objects of the invention being to provide an improved mechanism for automatically maintaining a snug fit of the sash stiles in their guides, to automatically maintain the sash in various raised positions, to facilitate the work and cheapen the cost of manufacture, to facilitate the application of the glazing, and to adapt the sash to variations in the longitudinal and transverse inclinations of the sills.

The invention will be readily understood when considered in connection with the accompanying drawings, in which,—

Figure 1 is an elevational view of one side of a sash and sash-guide with the stop nearest the observer removed. Fig. 2 is a perspective elevation of the coöperating adjusting strips through which a snug fit of the sash is maintained and whereby also the sash is automatically maintained in raised position. Figs. 3, 4, 5 and 6 are cross-sectional details on an enlarged scale on the lines 3—3, 4—4, 5—5 and 6—6, respectively, of Fig. 1, looking downwardly. Fig. 7 is a cross-sectional detail, enlarged, through the top bar of the sash. Fig. 8 is a view similar to Fig. 7 through the lower bar of the sash.

Referring to the drawings, 10 designates the usual post or upright of the window casing to which are secured the usual inner and outer stops 11and 12 forming a guide-groove for the stile of the sash. This latter, as herein shown, is made as follows: In making up the stile I take a pair of sheet metal strips that are bent longitudinally to the substantially duplicate cross-sectional form shown in Figs. 3 to 6, inclusive, each member forming an outer side wall 13 of the stile, a glazing bead 13^a, and the side walls 13^b of a reëntrant groove in the outer edge of the stile, the meeting margins of the strips being overlapped as shown, to form transverse walls of double thickness for the bottoms 13^c and 13^d of the glass-receiving groove and the said reëntrant groove, respectively. The two longitudinal halves of the stile thus formed and joined are secured together by a longitudinally bent clamp-strip 14 which is so shaped as to embrace the side walls 13 preferably under tension and also enter and fit the reëntrant groove in the outer edge of the stile; and the side walls 13, together with the margins of the clamp-strip 14 are securely united by transverse pins 15 that are surrounded by spacing sleeves 16, which latter are somewhat less in length than the distance between the inner sides of the walls 13, thereby permitting the latter to be drawn together to cause the beads 13^a to snugly grip the glass indicated at 17, a rubber or other cushioning strip 18 being fitted to the edge of the glass. To reduce wear on the outer side wall of the stile, I preferably utilize a wear-strip 19 which may be secured thereto by short studs 20 projecting at intervals into apertures formed through the members 13 and 14.

Referring now to the adjusting and locking devices for the sash, which are best shown in Figs. 1 and 2, 21 designates a vertically disposed angle-strip which slidably engages one corner of the guide-groove (Figs. 3 to 6), and at its lower end is secured to the sash stile by a pin 21^a engaging a transverse slot 13^e in the side of the sash-stile (Fig. 5). The base wall of this angle-strip is provided at intervals with projections 22 having oppositely beveled outer faces adapted to engage correspondingly shaped depressions 23 formed in the bottom wall of the guide-groove. Slidably fitting the diagonally opposite corner of the reentrant groove of the sash is a coöperating angle-strip 24. The angle-strips 21 and 24 are equipped at intervals with blocks 25 and 26, respectively, that have similarly inclined proximate cam faces 25^a and 26^a which operate, under an upward movement of the strip 24 relatively to the strip 21 to force said strips apart; and this action is normally maintained by means of compression springs 27 interposed between the upper face of the block 25 of one pair of blocks and the lower face of the block 26 of the next upper pair of blocks, the springs lying obliquely between said blocks. These springs being applied under compression, it will be evident that their expansive effort tends to move the angle-strips longitudinally in op-

posite directions, and, the strip 21 being held from downward movement relatively to the sash by the pin 21ª, the coöperative effect of the inclined surfaces of the blocks is to force the strip 21 into locking engagement with the guide and at the same time force strip 24 diagonally away from the strip 21, which force is transmitted to the sash stile, tending to crowd the same against the outer stop 12 and also to adjust the sash edgewise or in its own plane.

When the sash is to be raised or lowered, it is necessary to relieve the above-described tension existing between the angle-strips so as to permit the locking projections 22 to travel upwardly or downwardly relatively to their coöperating sockets 23. This is accomplished, in the construction shown, by means of a thumb lever 28 that is pivoted on a pin 29 to that wall of the angle-strip 21 which is parallel to the plane of the sash and has an elongated slot 30 engaging a pin 31 (Fig. 2) secured to and projecting outwardly from the coöperating angle-strip 24 through a vertical slot 13ᶜ in the wall of the reëntrant groove. This lever 28 projects through the inner glazing bead 13ª, which is slotted for that purpose, and also through a plate 32 that is secured to the beads of the stile and lower sash-bar as by screws 33, and carries a stationary finger-piece 34. By clamping the lock members, that is to say the lever 28 and finger-piece 34 together, a downward movement of the angle-bar 24 is effected in opposition to the springs 27, which releases the locking effect of the projections 22 in the sockets 23, and permits said angle-bars to be raised with the sash. Upon the release of the lever 28, the projections 22 snap into the next series of sockets which they meet and automatically lock the sash in its raised position. The sash is reinforced at its corners by an L-shaped reinforcement 35 of channel-shaped cross-section, clearly shown in Fig. 5, fitting within the meeting ends of the hollow stile and bar. Where one side of the stile is, as shown, made somewhat wider than the other, an auxiliary filling strip 36 is employed to avoid the necessity of a special construction of channel reinforcement, and this latter may and preferably does extend within the bead 13ª, also reinforcing the latter. The filling member 36 is made slightly narrower than the space in which it is inserted, in order to not interfere with the compressive action of the clamping member 14 on the stile. To reinforce the inner half of the hollow stile, which is necessarily cut away transversely at intervals in the region of the cam-blocks 25 to accommodate the latter, I insert an internally bent metal sheathing strip 37; and to further reinforce the bead 13ª where slotted for the passage of the lever 28, I insert therein a block 38 which is, of course, slotted to accommodate the lever 28, and which also forms an anchorage for the screws 33 that secure the plate 32 in place. In addition to the fastening screws 33, and to relieve the latter of strains, the lift 32 is provided with inwardly projecting lugs 39 which pass through the bead and into the reinforcing parts 37 and 38 of the stile.

My improved construction also provides a means for inserting the glass 17 through one edge of the sash, preferably the top edge. In this case the transverse overlapping margins of the bent metal halves of the sash member are cut away, so that the glass may be entered between them through the reentrant groove in the outer edge of the sash-member, as clearly shown in Fig. 7. After the glass has been inserted, the clamp 14 is applied, its inner transverse member closing the opening through which the glass has been inserted, and its fastening pin 15 securely uniting the opposite sides of the sash member at the corners beyond the ends of the opening.

In Fig. 8 I show a novel cushioning member for the lower edge of the sash, the same consisting of a strip 40 of yielding material, preferably rubber, which preferably is formed with a transversely concave lower face 41 which adapts the same to a close fit on sills having different degrees of transverse inclination, and also adapts the cushion to variations from a straight line which are sometimes found in the longitudinal dimension of the sill, owing to the camber of the car-body. The cushion is secured to the lower edge of the sash-bar by means of an integral upwardly projecting tongue 42 which lies within the reëntrant groove of the sash-bar and is preferably embraced by a channel-shaped metal strip 43 having inwardly turned margins 44 which bite into the neck of the tongue and securely grip the latter. The upper corners of the strip 43 are rounded, as shown at 43ª, opposite the corners of the reëntrant groove in order to avoid any interference with the transverse compressibility of the sash-bar.

In view of the fact that the cam blocks 25 carried by the angle-strip 21 project partially across the region of the inner half of the stile, the latter is suitably cut away at points opposite the blocks 25 for a sufficient extent to avoid interference with the latter in the operation of the parts, as will be evident from Fig. 6.

I claim:

1. The combination with a sash and sash-guide, of a pair of adjusting strips carried by the sash, and means tending to separate said strips in a direction oblique to the plane of the sash.

2. The combination with a sash and sash guide, of a pair of adjusting strips disposed

therebetween, one engaging the sash and the other the guide, said adjusting strips relatively movable one to the other in a direction oblique to the plane of the sash, and spring means acting to separate said strips, substantially as described.

3. The combination with a sash and sash guide, of a pair of adjusting strips disposed therebetween, one engaging the sash and the other the guide, said adjusting strips relatively movable one to the other in a direction oblique to the plane of the sash, spring means acting to separate said strips, and manually operable means to neutralize the action of the separating means, substantially as described.

4. The combination with a sash and sash guide, of a pair of adjusting strips carried by the sash and one engaging the sash and the other the guide, and spring means tending to separate said strips in a direction oblique to the plane of the sash and guide.

5. The combination with a sash and sash guide of a pair of adjusting strips carried by the sash and movable bodily relative thereto, one of the strips operating against the sash and the other against the guide, spring means tending to separate said strips in a direction oblique to the plane of the sash and guide.

6. The combination with a sash and sash guide, of a pair of adjusting strips carried by the sash and movable bodily relative thereto, one of the strips bearing against the sash and the other against the guide, spring means tending to separate said strips in a direction oblique to the plane of the sash and guide, and manually operable means to neutralize the action of the spring means.

7. The combination with a sash and sash guide, of a pair of adjusting strips, one engaging the sash and the other the guide, the two strips having co-acting wedge members tending to separate the strips in a line oblique to the plane of the sash and guide, and a spring acting upon the wedge members.

8. The combination with a sash and a sash guide, of a pair of adjusting strips, one engaging the sash and the other the guide, the two strips having co-acting wedge members tending to separate the strips in a line oblique to the plane of the sash and guide, a spring acting upon the wedge members, and manually operable means to neutralize the action of the spring.

9. The combination with a sash and sash guide, of a pair of adjusting strips, one engaging the sash and the other the guide, the two strips having co-acting wedge members tending to separate the strips in a line oblique to the plane of the sash and guide, a spring acting upon the wedge members, co-acting projections and recesses formed on the opposed faces of the guide and one of the strips, and manually operable means to neutralize the action of the separating means whereby to effect the disengagement of the projections and recesses.

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