This disclosure relates to glass setting devices and is a division of my pending application Serial No. 656,675, filed March 23, 1946, now Letter Patent No. 2,643,283. The nature of the sash construction illustrated are described and claimed in the parent case, and the subject matter of the case is specifically directed to the improved bracket or clip employed for drawing the removable sash member into firm but resilient engagement with the plate glass.

It has become more or less conventional practice to provide glass setting devices including an inner sash member or housing permanently mounted in the window opening, with a plurality of glass setting blocks enclosed within the sash to support the weight of the glass, and a removable outer sash member having some mechanism for drawing it inwardly to clamp the glass against a glass engaging flange on the inner wall of the housing. Various and sundry forms of brackets and clips have been devised for holding the outer sash member, yet, in actual use, those heretofore introduced to the trade have shown themselves to be unsatisfactory by reason of the fact that they either fail to provide the necessary resiliency in their clamping action and thus tend to impose unnecessary strains on the glass, or because they have insufficient strength to properly accomplish their function.

It is not the purpose of this writing to discuss the faults of prior types of clips at great length, but it is believed that in order to clearly demonstrate the practical advantages that a clip in accordance with the applicant's teachings brings about over the types previously used it is advisable to point out that a successful glass setting structure requires that the glass be gripped very firmly, for a large plate glass window is exceedingly heavy and is subjected to great strains by high winds, shock and vibrations; yet the grip must be very resilient in nature, or the glass is brittle and will fracture if held between rigid surfaces. These two requirements are difficult to reconcile, since if the parts of the sash are made strong enough for the purpose they are apt to be too rigid, while if constructed in a manner to be sufficiently resilient they usually have insufficient strength to give adequate support to the glass. This is particularly true in connection with modern glass setting structures wherein it is desirable to keep the sash members as small as possible, since space within the channel is so limited that the resilient clips must necessarily be quite small in size.

Another failing noted in types of clips previously offered has been that they fail to secure the outer sash tightly enough against the sill or other adjoining parts of the window frame, with the result that the outer sash member may pull away from the sill or trim, leaving an undesirable gap or crack.

It is accordingly the primary object of the present invention to provide a bracket for holding the outer sash member of a store front wherein the bracket is designed to connect with screw threaded clamping devices on the inner sash so that it not only draws the outer sash member inwardly against the outside surface of the glass but also holds the outer sash member in firm contact with the surfaces of the window sill or trim. In accomplishment of this function the present invention contemplates the clips having means to engage the lower edge of the bottom sash member and hold it down against the sill, while the outer edges of the top and side sash members are similarly urged upwardly and outwardly against the surfaces of the window opening.

It is a further object of the invention to provide a sash holding bracket so designed that the resilient glass clamping member has the strength requisite to support a heavy glass plate, yet nevertheless has sufficient resiliency to accomplish its purpose. In furtherance of this object this invention employs a glass clamping arm on the bracket of somewhat greater physical length than heretofore used, so that the arm may be of strong, stiff construction, but will nevertheless capable of yielding in a resilient manner. Moreover, the glass clamping arm is so mounted on the bracket that it may flex entirely independently of the operation of tightening devices employed. That is, the parts are so related to the tightening screw that the screw draws the bracket bodily inwardly but does not otherwise affect the flexing of the glass engaging arm.

The structure by which these objects are accomplished in the present teaching comprises a sash holding bracket formed of a single, integral piece of relatively thin but stiff sheet metal, having an inner portion comprising a base and an inclined cam united at their inner end by a reverse bend so that the base lies substantially above the base member, and having a glass engaging arm connected to the base and a sash holding arm formed as an extension of the cam surface. It will be seen that by this expedient the glass holding arm and sash holding arms of the bracket cross each other, so that any flexing action that the clamping screw may impart to the cam surface will not affect the pressure ex-
erted by the sash against the glass, but will merely press the outer edge of the sash member into firm engagement with the sill or trim of the window opening. The action of the tightening screw in the cam will, however, move the bracket bodily inwardly, to draw the upper edge of the outer sash member into very firm, yet resilient engagement with the glass.

The manner in which the teachings of this invention are commercially utilized will be best understood by reference to the drawings of the present specification in which:

Figure 1 is a sectional view through a typical glass setting employing a bracket as claimed herein, the view showing an upper sash assembly and a lower sash, both as contemplated by these teachings;

Figure 2 is a perspective view of one of the sash holding brackets; and

Figure 3 is a bottom plan view thereof.

In the preferred embodiment as illustrated in the drawings, the upper sash assembly consists of an inner sash member 19 in the form of an upwardly extending base 11 and a glass engaging flange 12, with an inside side wall 13 abutting against the trim 14, and a forward wall 15 abutting against the outside trim 16. The base 11 of the sash channel is suitably secured to the sill 17. This sash member thus provides a relatively wide channel for receiving an edge 18 of a pane of plate glass 15.

The lower sash assembly includes a channel 21 having a glass engaging flange 22, a side wall 23 abutting against the inside trim 24, and a base 25 suitably secured to the sill 26. A thin glass engaging strip 27 is ordinarily provided between the sash channel and the sill.

The lower edge 18 of the glass plate 15 rests on pads 28 on the setting blocks 29, and the glass is clamped against the flange 22 by a removable outer sash member 31 which comprises a flat face portion 32 having a glass engaging flange 33, and a forward portion 34 extending down to a rearwardly extending base 35. The base 35 has its inner edge contoured to provide a pair of upwardly extending flanges 36 and 37 defining an upwardly disposed groove.

The sash retaining brackets contemplated by the present disclosure are carried at suitable spaced intervals in the sash channel members 21, and each bracket includes a curved glass holding arm 39 having a hook portion 43 at its extreme end. The hook 33 is adapted to seat in the downwardly disposed groove defined by the glass engaging flange 33 of the sash member 31, and to press this flange into resilient but firm contact with the exterior face of the glass. The other end of each lug is provided with a head portion comprising a flat base 41 adapted to rest on the ledge 40 in the channel 21, and an inclined cam 42 joined to the base portion by a reverse bend 43 at the extreme inner end of the bracket. The bracket is preferably cut away or notched out at 44 so that the sash holding arm may consist of two opposite sections 45, each having a hook portion 43 extending downwardly into the groove between flanges 36 and 37 of the outer sash member.

In order to retract the brackets and draw the outer sash member 31 into firm pressure relation with the glass, lugs or clips 51 are mounted at regularly spaced intervals within the inner sash member 21. Each lug is threaded to receive an adjusting screw 52 having its lower end rounded to engage the inclined cam faces 42 of the brackets, and spaced openings are provided in the inner sash member 21 to permit access to the screws, so that by tightening the screws down on these cams the sash holding brackets are drawn rearwardly to bring the outer sash member inwardly until the flange 33 of the latter engages the exterior of the glass with sufficient pressure to firmly and resiliently retain this glass in its proper setting with relation to the inner sash member.

The outer sash member of the upper sash consists of a relatively broad, flat closure plate 53 having a glass engaging flange 54 at its inner end and an outer edge 55 adapted to overlap the outer wall 51 of the sash channel 11 so that it lies substantially in the plane of the outside trim 16. The closure plate shows a lug portion 56 extending into the channel 10 and terminating in a reverse bend 57 so that the glass engaging flange 54 and the reverse bend 57 coat to define an oppositely disposed groove. Thus the hook portion 39 of the glass holding arm 38 of the glass holding brackets may be inserted behind the flange 54 to hold the closure member in firm engagement with the surface of the glass while the hook portions 46 of the sash holding arms 45 are inserted in the groove formed by the reverse bend 57 to hold the edge 55 of the closure plate firmly against the trim 13 and edge of the channel wall 15.

It is to be understood, of course, that the upper sash channel 10 is provided with lugs 51 and tightening screws 52 in the same manner as employed in the lower sash.

From the foregoing it will be seen that a sash holding bracket according to these teachings consists of an inner portion comprising a flat base adapted to slide on the ledge 40 of the sash member with an inclined cam surface united to the base by a reverse bend so that the action of the tightening screws will draw the brackets and sash members inwardly against the glass.

It is to be noted, however, that the invention departs from prior teachings in that the glass holding arm 38 is not joined to the upper portion of the bracket nor to the cam surface thereon, but is instead formed as an integral extension of the base 41. Similarly, the sash holding arms 45 are not formed as a part of the base; instead, the bracket is notched out so that this arm of the bracket is in two sections on opposite sides of the arm 38. The two sections 45 of the sash holding arm cross the glass holding arm so that any flexing of the sash portion of the bracket due to the pressure of the tightening screw cannot impair the resiliency of the glass holding arm, but merely presses the outer sash member into tight engagement with the sill or trim. Thus the bracket constructed in accordance with these teachings differs in function from any previously designed types in two principal respects.

First, it accomplishes a firmer grip on the glass, yet does so without sacrifice of the resilient nature of the grip. This is because the glass holding arm 38 (which is the arm by which the outer sash member is pressed against the surface of the glass) is not greatly affected by any flexing of the cam surface 42 which might be occasioned by tightened or loosening of the clamping screw 52, the action of the cam will only draw the bracket inwardly and will not have any tendency to move the hook 39 upwardly or downwardly or to flex the arm 39 in such a manner.
as to cause unpredictable variations in the pressure it exerts. In addition, it is to be noted that with the parts of the bracket designed as here disclosed, the arm 38 has a relatively long unsupported span from the ledge 40 to the flange 33, with the result that it can be made very strong and comparatively stiff without losing the resilient quality necessary to hold the glass firmly but safely. In the form of the invention chosen as illustrative of these principles the strength of the glass holding arm is increased by providing flanges 58 to thicken the outer end of the arm and a formed channel 59 to thicken and stiffen the inner portion of the arm and the base. The second function of the improved sash holding clip is to urge the outer sash member into firm engagement with the sill or trim of the window. The manner in which this is accomplished is shown in Figure 1, where it will be seen that a bracket according to these teachings performs this function in an identical manner in both the upper and lower sash constructions. The flush glazing closure member of the upper sash will be firmly held against the trim, since the inner edge of flange 54 of the sash closure member 53 is held in firm contact with the glass and the sash holding arms 45 of the clips exert an upward force on the leg 56 of the closure member, these two forces will cause to cause the outer edge 55 of the closure member to be pressed upwardly into firm engagement with the trim 16 of the window opening. In short, the clip functions not only to draw the inner edge of the closure member inwardly in a direction perpendicular to the surface of the glass so that the glass is firmly held, but also exerts a force pressing the outer edge of the closure member upwardly into tight contact with the outer vertical wall 15 of the sash channel 10. The function is the same in the lower sash member, since it will be seen that while the hooks 39 of the arms 38 engage the flange 32 of the front sash molding and draw this flange into tight but resilient engagement with the glass, the sash must be set in the upwardly disposed groove 36 between the flanges 36 and 37 so that the force of the screw 52 pressing down on the cam surface 42 urges the hooks downwardly and presses the lower surface of the sash molding into firm engagement with the sill 28. This departure from prior teachings results in improved performance, since it eliminates the danger of deforming the glass holding arm by over tightening the set screw 52 and in addition because it provides a positive means of holding the outer sash member in firm surface-to-surface contact with the sill or trim, so that these parts cannot pull apart and allow cracks to form at their joints.

Having thus described the invention, what I claim as new and desire to secure by United States Letters Patent is:

1. An article of manufacture, a holding bracket for a metal window sash, the bracket comprising a single integral piece of relatively thin, stiff metal having an inner end portion consisting of a base and an inclined cam, with a reverse bend interconnecting the base and cam at their inner end, a glass holding arm attached to the base and extending outwardly and away from the plane of the base and terminating in a hook adapted to engage the sash a point remote from the aforesaid inner edge thereof.

2. As an article of manufacture, a holding bracket for a metal window sash, the bracket comprising a single integral piece of relatively thin, stiff metal having an inner end portion consisting of a base and an inclined cam, with a reverse bend interconnecting the base and cam at their inner end, a glass holding arm attached to the inclined cam and extending from the inclined cam outwardly and toward the plane of the base and passing across the glass holding arm, with each portion of said sash holding arm terminating in a hook adapted to engage the sash at a point remote from the aforesaid inner edge thereof.

3. As an article of manufacture, a holding bracket for a metal window sash, the bracket comprising a single integral piece of relatively thin, stiff metal having an inner end portion consisting of a base and an inclined cam, with a reverse bend interconnecting the base and cam at their inner end, a glass holding arm comprising a curved spring portion attached to the base and extending from the base and terminating in a hook adapted to engage an inner edge of the sash and press it into firm but resilient contact with the glass; and a sash holding arm attached to the inclined cam and extending outwardly from the inclined cam and terminating in a hook adapted to engage and hold the sash at a point remote from the aforesaid inner edge thereof.

4. As an article of manufacture, a holding bracket for a metal window sash, the bracket comprising a single integral piece of relatively thin, stiff metal having an inner end portion consisting of a base adapted to be slidably positioned on a mounting surface of the sash and an inclined cam joined to the base by a reverse bend at one side and adapted to be engaged by a clamping screw to shift the bracket bodily responsive to movement of the screw; a glass holding arm attached to the base and terminating in a hook adapted to engage an inner edge of the sash and press it into firm but resilient contact with the glass, said arm extending directly from the base at a point remote from, and on the opposite side of the base from the reverse bend whereby the arm may flex independently of flexing of the cam.

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