

April 22, 1941.

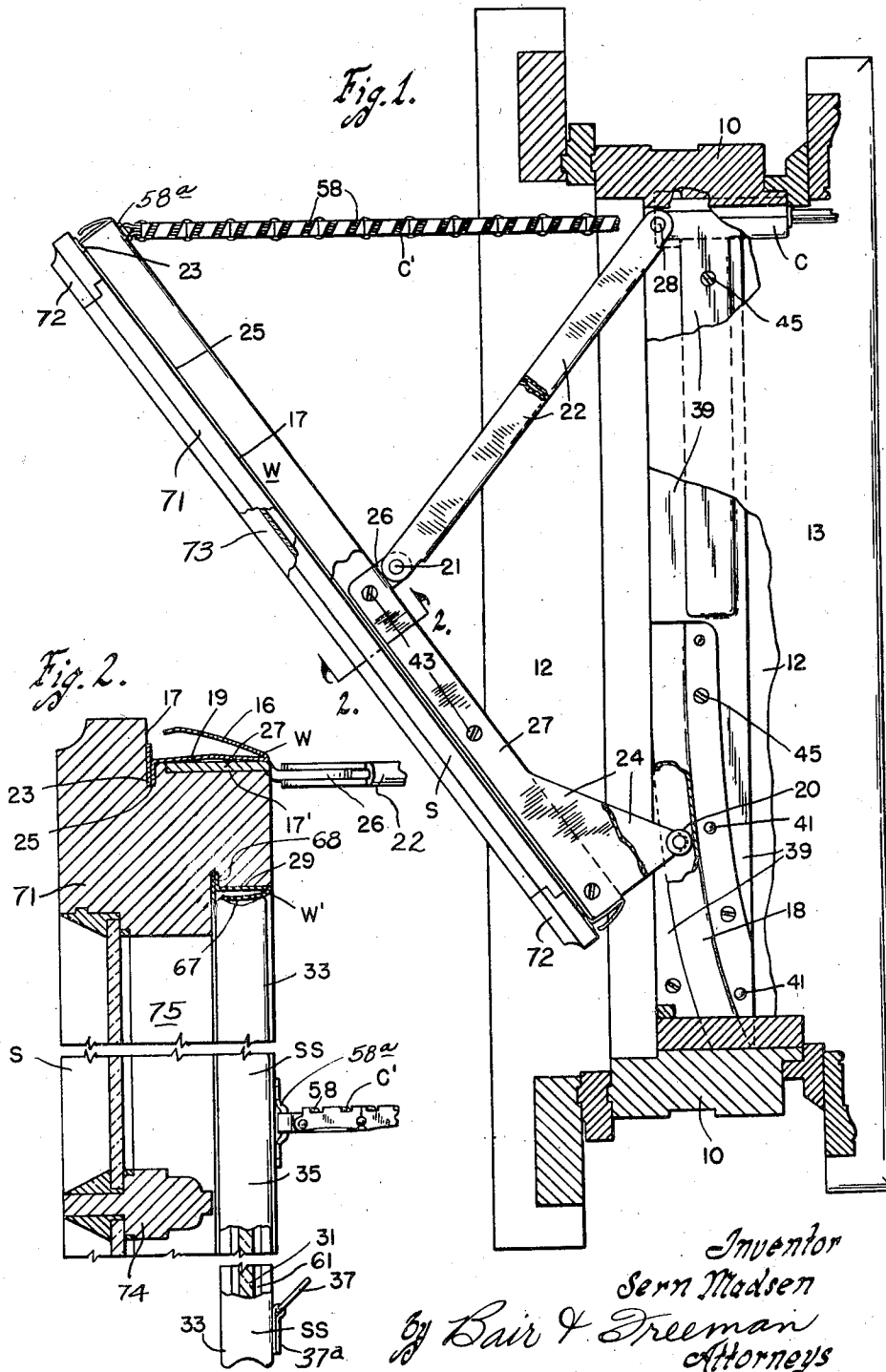
S. MADSEN

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DOUBLE GLAZED WINDOW STRUCTURE

Filed Sept. 28, 1938

2 Sheets-Sheet 1



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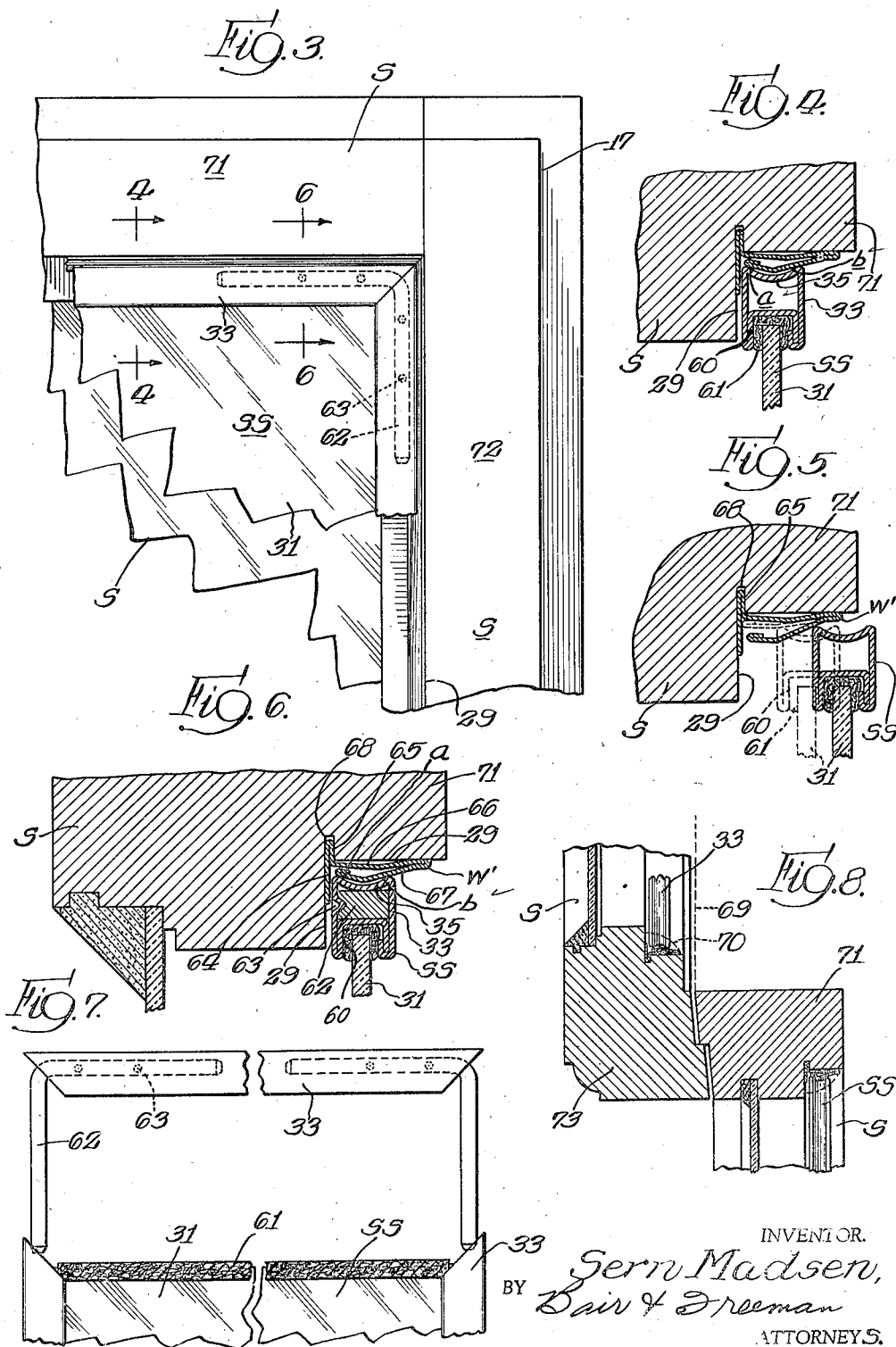
S. MADSEN

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INVENTOR.

Sern Madsen,  
BY Dair & Dreeman  
ATTORNEYS.

## UNITED STATES PATENT OFFICE

2,239,173

## DOUBLE GLAZED WINDOW STRUCTURE

Sern Madsen, Clinton, Iowa, assignor to Curtis Companies Incorporated, Clinton, Iowa, a corporation of Iowa

Application September 28, 1938, Serial No. 232,120

2 Claims. (Cl. 20—56.5)

An object of my present invention is to provide a double glazed window structure of simple and inexpensive construction, the present application being a continuation in part of my co-pending application Serial No. 127,148, filed February 23, 1937.

A further object is to provide a storm sash readily mountable on or demountable from a window sash and effectively held in place by weather strips which serve the double purpose of retaining the sash in supported position and sealing its periphery in a weather-tight manner relative to the window sash.

Another object is to provide a storm sash consisting of an insert glass and a metallic banding which is small and neat in appearance, thereby permitting the storm sash to be retained entirely within a small rabbet cut in the sash with the storm sash so countersunk therein that there are no projecting parts to interfere with movability of a double hung sash adjacent Venetian blinds, screens or the like when installed, being thereby free of interference of the storm sash therewith.

Another object is to provide a storm sash consisting of an insert glass and a metal banding therefor which is symmetrical in cross-section to make it easy to manufacture and fabricate and to make it inexpensive to form of stainless steel or other non-corrosive sheet materials, as distinguished from specially rolled or extruded sections.

Still another object is to provide a metal banding on the insert glass so constructed that the joints at the corners of the banding frame may be properly reinforced and connected without the necessity of using processes involving heat, such as soldering, brazing or welding, which of course are always detrimental to a breakable material such as glass, of which the insert is formed.

Still a further object is to provide an insert glass with a metal frame or banding supported by weather strips carried in a rabbet of the main sash so that metal-to-metal contact is had when removing or replacing the storm sash and the weather strips serve effectively the double purpose of retaining the storm sash in position and weather-sealing the edge thereof relative to the main sash.

Still another object is to provide a double glazed window structure from which the storm sash may be removed and the weather strips remain in the main sash so that they are not subject to damage as when carried by the edges of

a stored storm sash, and also the weather strips present a neat finished appearance to the main sash when the storm sash is removed therefrom.

Another object is to provide a main sash rabbeted to receive weather stripping and which is adapted to have associated therewith a fill-in mold in the event that the weather strips are not used.

The foregoing, other and further objects will be apparent from the following description, accompanying drawings and appended claims. Embodiments of the invention are illustrated in the accompanying drawings, in which the views thereof are as follows:

Figure 1 is a horizontal sectional view through a window frame showing a plan view of a case-ment type of sash associated therewith and supported relative thereto by supporting hardware of the kind shown in my above mentioned co-pending application;

Figure 2 is an enlarged sectional view on the line 2—2 of Figure 1, this figure being substantially full size;

Figure 3 is a full sized front elevation of one corner of the sash showing constructional details of the double glazing thereof and construction of the storm sash or insert glass and its frame;

Figure 4 is an enlarged sectional view on the line 4—4 of Figure 3 showing the storm sash installed in position;

Figure 5 is a similar sectional view showing it being placed in position and the parts assuming successive positions as illustrated by solid and dotted lines respectively;

Figure 6 is a sectional view on the line 6—6 of Figure 3 showing a reinforcing insert at the corner of the storm sash frame;

Figure 7 is a front elevation of the storm sash showing the frame thereof being assembled, and

Figure 8 is a sectional view on a reduced scale through the meeting rails of a double hung window, with my double glazed sash being illustrated.

On the accompanying drawings I have used the reference numeral 10 to indicate a side jamb. A sill is indicated at 12 and the stool thereon at 13. A sash S is openable and closable relative to the window frame. It is engageable with the outer edge of the stool 13 when in closed position.

The sash S is composed of top rail 71, stiles 72 and bottom rail 73. The rails and stiles are provided with a rabbet 17 extending completely around the edge of the sash and weather stripping W is provided around the entire periphery

of the sash. The weather stripping W comprises a pair of leaves 19 and 16 and a flange 23. The flange 23 is frictionally received in a groove 25 around the sash S. The leaf 19 lies against the widest face of the rabbet 17 and against the outer faces of sash plates 27, which are part of the supporting hardware above referred to. The rabbets 17 are countersunk as at 17' to accommodate the thickness of the sash plates 27.

The sash S has an inner rabbet 29 for a second weatherstrip W', the rabbet 29 being provided for a storm sash SS. The bars 74 and muntins 75 of the sash S are thinner than the rails 71 and 73 and the stiles 72 so as to lie entirely outward of the plane of the bottom of the rabbet 29.

The storm sash SS comprises an insert glass 31 and a frame 33 of zinc, stainless steel or other suitable non-rusting metal. The periphery of the frame 33 is concave, as indicated at 35, to engage the weather strip W' with the weather strip under tension when the storm sash is in position as will hereinafter appear.

The storm sash may have a suitable handle such as a loop 37 at its lower end to remove and position it readily relative to the sash S.

The supporting hardware for the sash S includes a curved track 18 and a roller 20 for traveling therein. The roller 20 is supported by a bracket 24 and arms 22 are pivoted at 21 and 28. The pivots 21 are carried by extensions 25 from the sash plates 27 while the pivots 28 are carried by frame plates 39. The parts 18, 20, 24, 27, 21, 26, 22, 28 and 39 are arranged in pairs, one at the top and one at the bottom of the window. The plates 27 and 39 are retained in position by screws 43 and 45. The tracks 18 are riveted to the plates 39 by rivets 41.

An operator case C is mounted on one of the side jambs 10 and a chain element C' extends therefrom. The chain element C' is formed of links 58 and connects at one end as shown in Figure 2 with a bracket 58<sup>a</sup> of the sash S. The foregoing described mechanism for supporting the sash S forms no part of my present invention, but is fully described in my copending application, Serial No. 127,148.

The storm sash frame or metal banding 33 is formed of sheet metal in the cross-section shape shown in Figure 4. This provides a channel 60 adapted to receive the edge of the insert glass 31 with sealing material 61, such as felt or a suitable plastic, interposed between the channel and the edge of the insert glass.

The cross-sectional shape shown provides a rectangular, tubular space in the frame 33 adaptable for receiving the leg of an L-shaped reinforcing member 62 which serves to connect the mitered ends of the frame members 33 together. During assembly, two of the frame members 33 may be placed in position on opposite edges of the glass insert 31 as shown in Figure 7. A sealing strip 61 is then placed on the upper edge of the glass insert and the upper frame member 33 with its L-shaped reinforcing members 62 mounted as illustrated is then forced downwardly to the position of Figure 3. After the mitered ends engage each other, the various elements 33 of the insert glass banding may then be permanently retained relative to each other by forming indentations 63 as shown in Figure 6 by the aid of a punch which deforms a portion of the banding and the corner insert, so that they are thereafter prevented from pulling apart telescopically.

The weather stripping W' has a plurality of leaves 64, 65, 66 and 67. The leaves 64 and 65 are

folded relative to each other and are frictionally held in a groove 68 formed at the meeting of the vertical and horizontal surfaces of the rabbet 29. Such mounting of the weather strips eliminates the necessity of using spaced tacks or the like and the attendant distortion of the weather strips thereby.

The resilient leaves 67 of the weather strips W' are convexed on their inner surfaces so that they fit in the concaved outer surfaces of the banding frame 33, as shown in Figures 4 and 6. The relative shapes of the parts 35 and 67 are such that the curvature of the part 67 is greater than the curvature of the part 35. Accordingly, as the storm sash SS is inserted in position as in Figure 5, the outer edge of the banding will first engage the weather strip W' in its normal position, shown by solid lines, and spring it to its dotted position as the storm sash is moved outwardly from the full line to the dotted position illustrated. The weather strip leaves 67 will then be sprung outwardly to their maximum extent, after which they spring back into the concaved surfaces 35 as shown in Figures 4 and 6 with double line contact between the parts 35 and 67 as indicated at a and b. This causes the convexed surfaces of the weather strips W' to seat in the concave periphery of the storm sash or insert glass and permit removal of the storm sash only by considerable pressure applied, as when the operator pulls on the ring 37. Normally, however, during swinging of the casement sash or raising and lowering of a double hung sash, as shown in Figure 8 the storm sash unit will remain in mounted position with its surface substantially countersunk relative to the sash so that there is no interference of the storm sash with Venetian blinds, screens or the like. Also there is no interference between sliding sashes of a double hung sash as shown in Figure 8, wherein the clearance line of the lower sash is indicated at 69.

By using a metal banding of the kind disclosed for the storm sash or insert glass of the main sash, it is possible to have the storm sash unit very neat in appearance and without any portions projecting out of the rabbet in the main sash to interfere with clearance between movable sashes or with window accessories and the like. The banding 33 is economical to manufacture and fabricated and the L-shaped inserts 62 at the corners of the frame serve both as a reinforcing and as a connecting means. The banding being mounted on the insert glass and the weather strip W' being carried by the main sash, give a metal-to-metal, long-wearing contact between the sliding parts of the main sash and its storm sash insert. The weather stripping for the banding permits a continuous joint seal around the full periphery of the insert glass and also permits each unit of length to have the same contact and pressure, so as to insure the best possible weather-tight joint between the main sash and the storm sash. The insert equalizes itself in a neutral position without stress or strain when mounted in position relative to the main sash. This minimizes glass breakage and also gives equalized weather stripping properties to the joint between the storm sash and the weather sash.

In case a window sash is to be installed where it is undesirable to have the weather stripping W' and storm sash SS, the weather strip can be omitted and a quarter round molding substituted, as indicated at 70 in Figure 3, thus giving a conventional finished appearance to the window sash. This is desirable from the standpoint of

variation in types of sashes with the use of the same machines for manufacturing both types.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention together with embodiments thereof which I consider as representative, but I do not desire that the embodiments disclosed limit the protection afforded by the appended claims. Instead, the drawings and description are only illustrative and the invention may be carried out by other means coming within their scope.

What I claim and desire to secure by Letters Patent of the United States is:

1. In a double glazed window structure, a sash having a main frame provided with a rabbet having an inner corner groove, a storm sash having a frame of banding material, said storm sash and its frame removably fitting within said rabbet of said main sash frame, weather stripping for retaining said storm sash frame within said rabbet of said main sash frame, said weather stripping along each side of said main sash frame having an anchorage flange received in said inner corner groove of said main sash frame and a leaf slightly bowed toward the storm sash frame, said storm sash frame being provided with a shallow concave groove spanned by said bowed leaf of said weather stripping, the curvature of said groove being greater than the curvature of said leaf to provide double line contact between said leaf and said frame of banding material, said flange of said weather stripping having a portion extending out of said inner corner groove to line the bottom of said rabbet and act as a shoulder against which the face of said storm sash is positioned when

in said main sash frame, said storm sash frame being normally retained in said main sash frame by said bowed leaves of said weather stripping and removable from said main sash frame and from said weather stripping by compression of the leaves of said weather stripping in a direction substantially parallel to the plane of the main sash frame and outwardly from the center thereof.

2. In a double glazed window structure, a sash having a main frame provided with a rabbet, a storm sash having a frame of banding material, said storm sash and its frame removably fitting within said rabbet of said main sash frame, weather stripping for retaining said storm sash frame within said rabbet of said main sash frame, said weather stripping along each side of said main sash frame having a leaf slightly bowed toward the storm sash frame, said storm sash frame being provided with a shallow concave groove spanned by said bowed leaf of said weather stripping, the curvature of said groove being greater than the curvature of said leaf to provide double line contact between said leaf and said frame of banding material, said storm sash frame being normally retained in said main sash frame by said bowed leaves of said weather stripping and removable from said main sash frame and from said weather stripping by compression of the leaves of said weather stripping in a direction substantially parallel to the plane of the main sash frame and outwardly from the center thereof.

SERN MADSEN.