Oct. 11, 1927. 1,644,814

S. U. BARR

DOUBLE HUNG WINDOW

Filed March 17, 1926 3 Sheets-Sheet 1

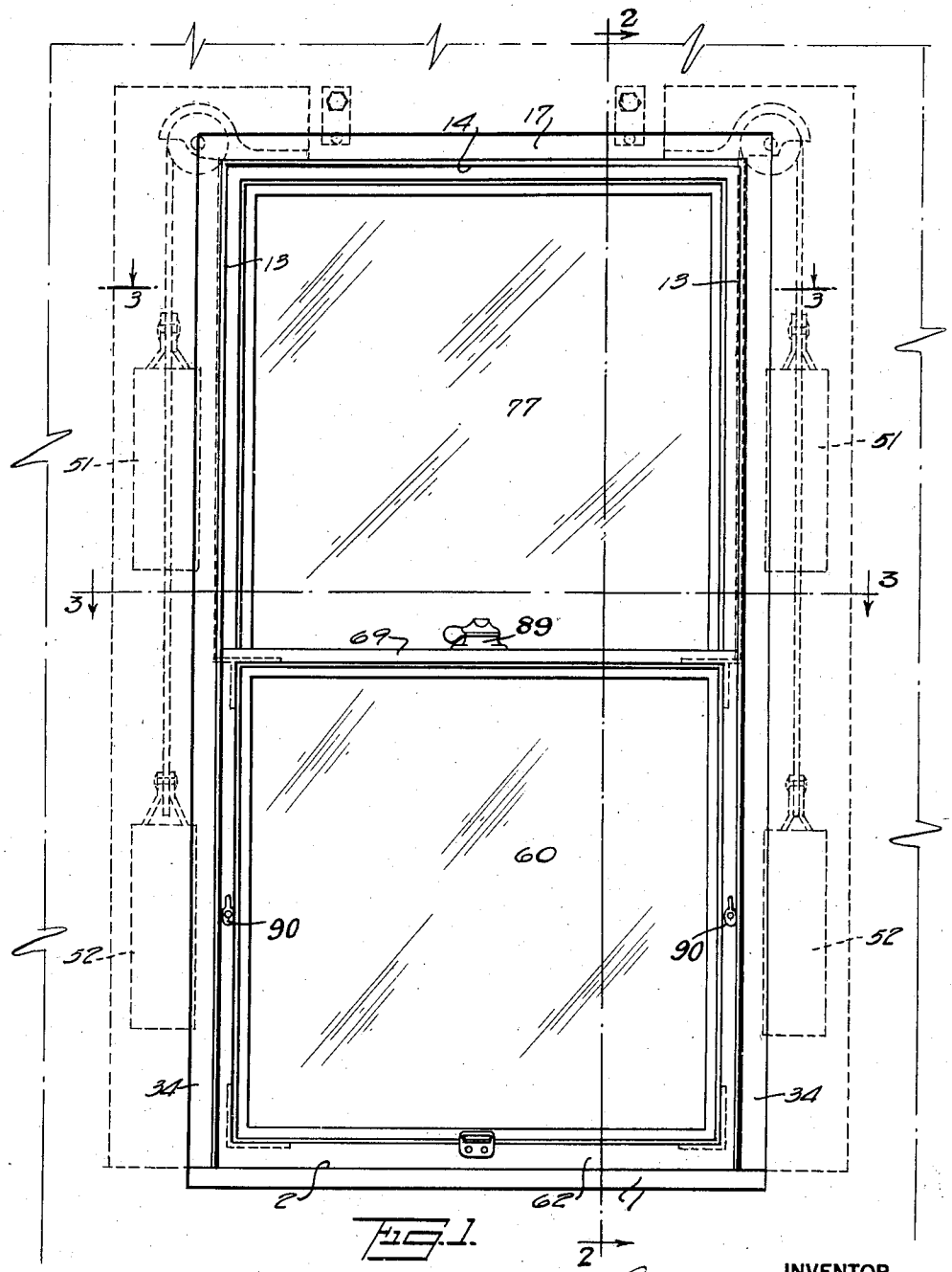

FIG. 1.

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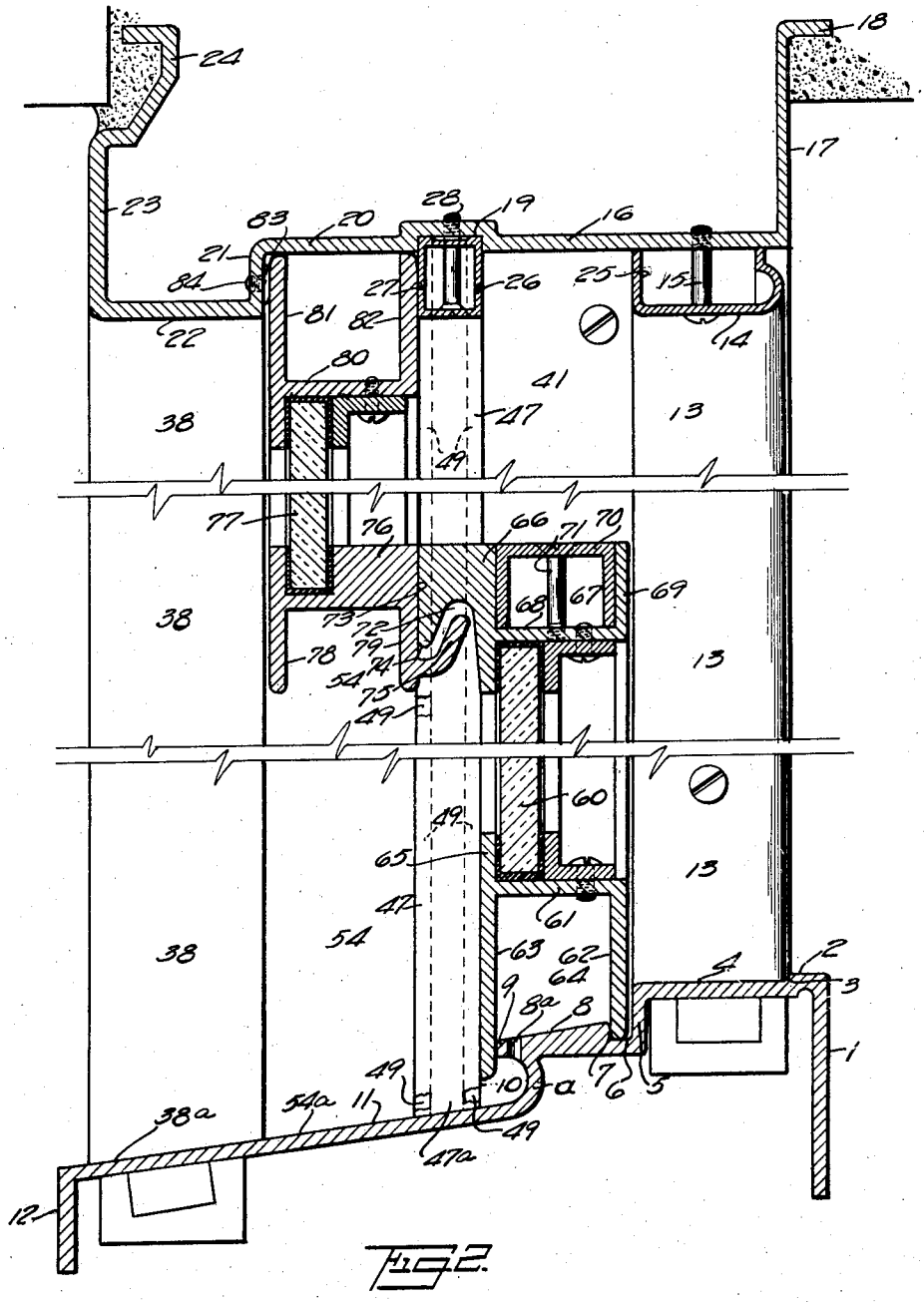

FIG. 2.

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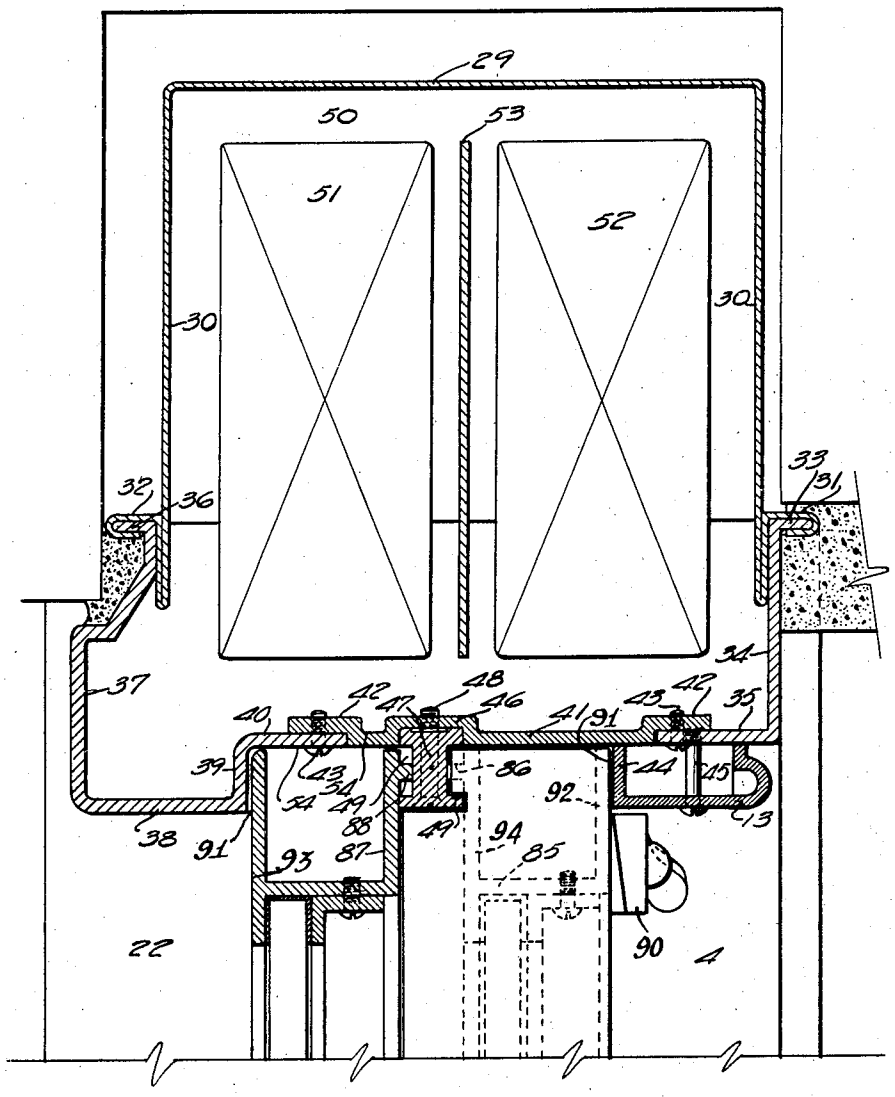

FIG. 3.

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Patented Oct. 11, 1927. 1,644,814

UNITED STATES PATENT OFFICE.

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DOUBLE-HUNG WINDOW.

Application filed March 17, 1926. Serial No. 95,251.

This invention relates to double hung windows and is in the nature of an improvement on the class of windows shown in my United States Patents No. 1,459,668 of June 19, 1923 and No. 1,512,741 of Oct. 21, 1924.

The present invention and improvements are directed to features of sill; lower sash stile; parting strip, and sliding sash members, as more fully described hereinafter.

In the accompanying drawings forming a part hereof and illustrating this invention,

Fig. 1 is an interior, elevational view of a metal window frame and metal sash assemblage embodying the present invention.

Fig. 2 is a vertical, elevational view partially in vertical cross section at line 2—2 of Fig. 1; and

Fig. 3 is a transverse, horizontal view partially in horizontal cross section at line 3—3 of Fig. 1.

In Fig. 2 the illustration is broken into three parts by waved lines. It is to be noted that the structure of the two opposed sides of the window frame are of identical construction and therefore that only one side as illustrated in Fig. 3 is described. Similarly the two vertical sides of each sash are of identical construction and only one side is described.

Referring to the drawings:

Window frame construction.—The metal window sill (Fig. 2) has a dependent, interior flange 1 the upper portion of which extends into a flat, horizontal ledge 2 at the outward side of which there is a downwardly extending shoulder 3 that merges into a horizontal sill portion 4. Following the structure outwardly in the direction of the outside of a building, sill portion 4 merges into a vertical wall 5 which forms the interior side of a trough 6 the outward wall of which is a joint wall 7. From this joint wall the upper surface of the sill slopes downwardly and outwardly at 8 and terminates in a shoulder 9 which overhangs a drift water receiving cove 10 formed by a forwardly projecting bend *a* of the metal below shoulder 9. From bend *a* the sill extends outwardly and downwardly at 11 and terminates in an outward or exterior, dependent flange 12. The sill is a one piece metal structure which extends transversely along the bottom of the window frame.

Each of the two front, interior, vertical stop moldings has its under end against an end portion of sill portion 4, and at their upper ends the stop moldings severally meet the interior, transverse, horizontal, top stop molding 14 which is of the same cross sectional contour as the vertical stop moldings 13. The latter and the top stop molding are held in place by screws 15, the molding 14 being held to the underside of a transverse, horizontal, top jamb 16 having a front, upwardly extending flange 17 which terminates in a horizontal flange 18 for engagement with structural material. Outwardly of flange 17, top jamb 16 is offset to form on its underside a three-walled, transverse recess 19 for reception of the upper portion of a transverse, horizontal parting strip. Outwardly of recess 19 the top jamb has a portion 20 the under surface of which forms an upper stop for the outside, upper sash. Portion 20 merges, in the outward direction, in a downwardly extending wall 21 which merges with a flat, horizontal portion 22 that outwardly merges with an upwardly extending portion 23 which terminates in a bent end 24 for engagement with structural material and forming a receptive space for caulking between metal jamb and the masonry and opposedly to the bent interior end 18.

The open side of the top stop molding 14 is next the under side of the top jamb 16, and has an outward vertical wall 25. The recess 19, along the under side of the top jamb 16, receives the upper end portion of a cross sectional, quadrangular, horizontal, top parting strip having an inward, horizontal, transverse wall 26 and a parallel back wall 27. This cross sectional, quadrangular parting strip is chambered, its upper end is entrant in recess 19 and it is clamped in place by a screw 28.

At each of its vertical sides, one of which is shown at Fig. 3, the window frame structure is provided with a vertical, three-sided, sheet metal, weight-pocket receiving member 29 having vertical parallel sides 30 one of which terminates in an inward hook 31. The outward or rearward side 30 terminates in a hook 32 The hooks serve as anchorages in structural material.

Hook 31 receives the forwardly turned, flange 33 of a vertical, right angular, side jamb member having a front portion 34 and a thereto right angularly, rearwardly extending portion 35.

Hook 32 receives the outwardly turned flange 36 of a vertical side jamb member which has an outside forming portion 37 parallel to portion 34. Portion 37 merges into a forwardly turned, straight portion 38 which merges into a portion 39 bent in the direction of the weight-receiving pocket. Portion 39 merges into a forward, turned, bent portion 40 which is transversely alined with the portion 35 of the front member. The opposed ends of said portions 35 and 40 are spaced apart and connected together by a vertical jamb plate 41. Each vertical edge of this plate is offset, the front offset, overlapping portion 35 and the rear offset portion 42 overlapping the portion 40. The offset ends are secured to the overlapping portions by screws 43 and the inward, vertical surfaces of the assemblages face towards the window frame opening.

The inward stop molding 13 is clamped to portion 35 by a screw 45 and offset margin 42 is similarly clamped to portion 40 by a screw 43. Each molding 13 has an inwardly and laterally projecting, vertical wall 44 which forms the front wall of a vertical, front sash receiving groove. Wall 44 is parallel to and spaced apart from the vertical wall portion 39 and wall 39 forms the outward vertical wall of an outer sash receiving groove.

Jamb plate 41, between its vertical margins, is offset to form a vertical groove 46 for reception of a side of a vertical parting strip 47 which is clamped in the groove by a screw 48. Each vertical parting strip 47 is oppositely formed, on its forward and backward sides, with a lengthwise extending, vertical groove 49 for reception of sash members. The under, forward sash is thus vertically movable between the stop molding wall 44 and the bottom of the forward groove 49, the upper and outward sash being movable between the rearward wall of the bottom of the rear groove 49 and the wall 39.

The weight receiving chamber is indicated by 50, the back weight for the upper sash by 51, the back weight for the under sash by 52 and a vertical weight separator by 53.

Looking at Fig. 2, it will be seen that the inward surface of vertical jamb plate 41 forms the bottom of the vertical groove in which the edge of the under, forward sash slides, while Fig. 3 shows that the inward and flush surfaces 54 of portion 40 and of plate 41 form the bottom of the groove in which an edge of the upper and outer sash slides.

The under end of parting strip 47 is beveled outwardly and downwardly at 47^a; the under end of portions 40, the inward side of which forms the surface 54, is also slanted outwardly and downwardly at 54^a, and the under end of the outer portion 38 is similarly slanted downwardly and outwardly at 38^a, so that these three members severally bottom on and bear against the downwardly and outwardly slanting sill portion 11.

Novel features of the window frame structure are the shoulder 3 to prevent water of condensation on the inside of the under sash from running out into the room over the front of the sill; the groove 6 with its wall 7 for receiving the under, front corner flange of the under sash and form contact between the sill and sash; the shoulder 9 above the drip or drift water cove 10 for contact with an under, rear corner flange of the under sash; the vertical parting strip 47 with its opposed side grooves, each for reception of a projecting sash member whereby, when in operative installation, there will be an air chamber on each side of the sash projection, forming pockets between the sash projection and the outward edges of the grooves of the upper and of the vertical parting strips.

The vertical grooves 49 at the outer side of the parting strips 47 serve in an important way to receive driving water from storms and to prevent it from leaking inwardly past the lower sash in its closed position, because such water is conducted downwardly and discharged on the sill portion 11 by such grooves. The grooves 49, both front and back, discharge downwardly and outwardly on the sill portion 11. Sill portion 8 is preferably formed with weep holes 8^a communicating with drift-water cove 10.

Lower sash construction.—The lower and interior sash for glass 60 comprises a three flanged, chambered bottom frame the upper wall 61 of which has a front, vertically dependent, transversely extending flange 62 the under end of which, as the sash is lowered, contacts with wall 7 of groove 6 and makes a weather tight joint between the cam wall 7 and the sill. Upper wall 61 also has a dependent, vertical, transverse flange 63 which, when the window is closed down, contacts with the shoulder 9 and makes a weather tight joint by such contact, coming into contact with shoulder 9 before flange 62 contacts with wall 7 and drawing flange 62 into hard contact with wall 7. The flanges 62 and 63 are so spaced apart that weather tight joints are formed by the two lines of close contact at shoulder 9 and wall 7. The bottom of chamber 64 is formed by the downwardly and outwardly inclined, sill portion 8. Wall 61 also has an upwardly extending, vertical transverse flange 65 which serves as an abutment for the outer side of glass 60. The glass holding means are old and need not be described.

This under sash comprises at its upper end a top sash member 66 which is formed at its upper, front corner portion, forwardly of the plane of the rear side of glass 60 with a transversely extending, open top trough 67. The bottom wall of the trough is formed by

a horizontal, transversely projecting flange 68 that terminates in an upstanding flange 69 which forms the front wall of the trough. The back wall of the trough is formed by the front side of sash member 66 above the bottom trough wall 68.

A three sided channel bar 70 has its under, open side opposed to bottom wall 68 and is located between the front and back walls of the trough and clamped in the trough by a screw 71 through the upper wall of the channel bar and entrant in the bottom trough wall 68. Sash member 66, outwardly of the trough wall 68, has considerable thickness. Its under side has a lengthwise extending groove 72. The back surface 73 of the sash member 66 is vertical from the under edge 74 of the rear wall of groove 72, the latter being for reception of a non-contacting, transverse flange 75 which extends upwardly and forwardly from the transverse under member 76 of the upper sash along the bottom of the upper and outward sash, holding glass 77. In consequence of the non-contact between the flange 75 and walls of the groove 72, an air pocket is formed between them. Said sash member 76 has a front, flat wall making a tight joint with surface 73 when the upper and under sashes are closed. Member 76 has a rear, dependent flange 78 which is parallel to its forward, downwardly projecting flange 79 from which the upwardly, forwardly extending flange 75 extends.

The upper and outward sash is provided with a three walled, open sided, rectangular air chamber forming member the bottom wall of which is indicated by 80. It has spaced apart, vertical, upwardly extending sides 81 and 82. Side 82, when the sash is up, contacts with the back wall 27 of the upper, transverse parting strip. The rear wall 81 then contacts with screws or other splayed shape against portion 21 of the jamb plae 16, being a means of pressing the sash 80 against portion 21 to make an air-tight joint.

Each vertical edge (Fig. 3) of the under sash is provided with a vertical, three sided sash member 85 provided with a vertical, rearwardly projecting rib 86 which moves freely in the front slot 49 of a vertical parting strip 47. Each vertical side of the upper, outward sash is provided with a vertical, three walled, sash member 87 having a forwardly extending rib 88 that works freely in the rear groove 49 of vertical parting strip 47. Thus the two chambers referred to are formed on each side of each of the two parting strips 47.

Important features of the sash structure are: the flange 62 that closes down into the groove 6 to make a weather tight joint thereat, and the flange 63 which is longer than the therewith parallel, front flange 62; the projecting ribs 86 and 88 that slide in the recesses 49 with their exposed edges in contact with the bottom walls of the recesses and their sides out of contact with the side walls of the recesses, thereby forming at the front and back sides of each vertical parting strip, a vertical air pocket and water guideway. Such water guideways are of special importance because when driving rain strikes against the under closed sash, when the upper sash is closed, water cannot pass between the sides of the under sash and opposed frame members, but being arrested in the inward direction by the break joint construction, arising from the rib and groove wall construction, flows downwardly and is discharged from the front and back open sides of the groove 49 on the outwardly and downwardly sloping sill portion 11.

The sash members (Fig. 2) 66 and 76 with the air pocket at 72 form a water-tight and weather-tight joint when the sashes are in closed position. The members 85 and 87 form air pocketed, weather-tight means cooperative with vertically opposed portions of the window frame, at both vertical sides of the sash. The lengthwise extending cove 10 insures the outward discharge of rain driving from the outside against the sashes and the downwardly and rearwardly sloping sill portion 11; and the weather and water tight joints at 7 and 9 prevent the drift of driven rain from passing the closed under sash onto the interior portion of the window sill. Thus the construction insures perfect wind and water-tightness around all four edges of the sashes and also at contact of the members 66 and 76; the transverse rearwardly facing shoulder 3 also preventing flow into the room of interior, water condensation.

The rib 86 is extruded from the back side of the vertical member 85 or stile of the under, sash rib 88 being similarly extended from the front side of the vertical member 87 or stile of the upper sash. The free edge of each vertical rib 86 and 88 contacts with the bottom of its receiving groove in the parting strip only when the sashes are drawn together by locking the sash drawing and locking device 89. In Fig. 1, the device 89 is shown in sash drawing and locking position for the upper and lower sash which are shown closed. The sash binders 90, also shown in Fig. 1, are in sash binding position; and one of them is shown in the same position in Fig. 3. When the two sashes are drawn and locked together, with the ribs 86 each in contact with a bottom wall of a groove 49 in the parting strip, and a vertical air pocket and water way 49 is formed at each side of each rib. Moreover, an air and water-tight joint is formed between the free edges of each rib and the bottom wall of the groove with which it is thus drawn into contact. In this position,

there are clearances at 91; there being a vertical front clearance 91 between the back wall 44 of molding 13 and the front wall 92 of the member or stile 85; and a rear clearance between the back wall 93 of the upper sash member or stile 87. It is now to be noted that when the sash devices 89 and 90 are in unlocked positions, the sash naturally moves back slightly; the clearances at 91 are partially reduced, the contacts of the ribs 86 and 88 relieved, and slight clearances established between the parting strip and the walls 87 and 94 of the two vertical stiles 85 and 87. In such loose positions, both sashes are freely raisable and lowerable and friction joints, during sash raising and lowering movements, between the parting strips and sash stiles are avoided. This obviates sticking of the sashes in their guideways and renders it easy to raise and lower these heavy, metal sashes without strain on the person lifting or lowering the sashes.

The sash drawing and locking device 89 and the sash binders 90 are described in my Patent No. 1,459,668 of June 19, 1923, in which a double hung window is shown.

It is also to be noted that the upper wall 61 between the transverse flange 63 and flange 62 has a length which is substantially less than the distance between the front wall 7 of the sill groove 6 and the back, free edge of the shoulder 9 whereby, when the back flange 63 partially contacts, on a closing movement of the under sash, with the upper corner portion of shoulder 9, and the flange 63 travels past the back, free edge of shoulder 9, the two flanges 62 and 63 are sprung apart, slightly, by the socketing of the under portion of flange 62 in sill groove 6, thereby tightly binding the flange 63 against the free edge of shoulder 9 and making a transverse, weather-tight joint between the flange 63 and said shoulder 9; and also forming a tight joint between the under edge portion of flange portion 62 and the sill groove wall 7. It is also to be noted that the back flange 63 is longer than the front flange 62.

What I claim is:

1. As a new article of manufacture, a metal window frame sill having adjacent its inward edge a lengthwise and downwardly extending shoulder; rearwardly thereof, a lengthwise and downwardly extending groove; rearwardly of the groove, a downwardly and outwardly slanting portion terminating in a lengthwise extending shoulder overhanging and forming the top wall of a lengthwise extending drift water receiving cove; the under wall of the cove merging into a continuously flat rearwardly and continuous downwardly slanting portion of the sill; said top wall being formed with a weep-hole.

2. In double hung, metallic sash and window frame structure, the combination of an upper and a lower sash; a window frame provided with sash guideway; a sash locking and drawing device; a vertical parting strip projecting into each sash guideway between the guideway sides, the parting strip being formed on its front face and also on its rear face with a lengthwise extending, wide, rib-receiving groove, and each sash being provided with a vertical, narrow lengthwise extending, joint forming rib on each side of its side member, each narrow rib projecting into one of said wide grooves between the sides of the latter; the guideways being wider than the thickness of the side members to afford clearances; the sashes running freely in their guideways with the free edges of said ribs out of positive contact with the bottoms of said grooves; said ribs forming lengthwise extending, weather-excluding pockets of substantial cross-sectional dimensions, in each guideway, at each side of each rib; and said sash locking and drawing device being operative to force the free edges of said ribs into tight, joint-forming contact with the groove bottoms when the device is locked and in sash locking and drawing position; and a sill; the rearward pockets opening exteriorly and the forward pockets opening inwardly, above the sill for discharge of water thereon.

Signed at Brooklyn in the county of Kings and State of New York this 10th day of March, A. D. 1926.

SIDNEY U. BARR.