March 2, 1937. A. HUTTGER 2,072,334

METAL WINDOW FRAME AND SASH CONSTRUCTION

Original Filed June 28, 1934 3 Sheets-Sheet 1

FIG. I.

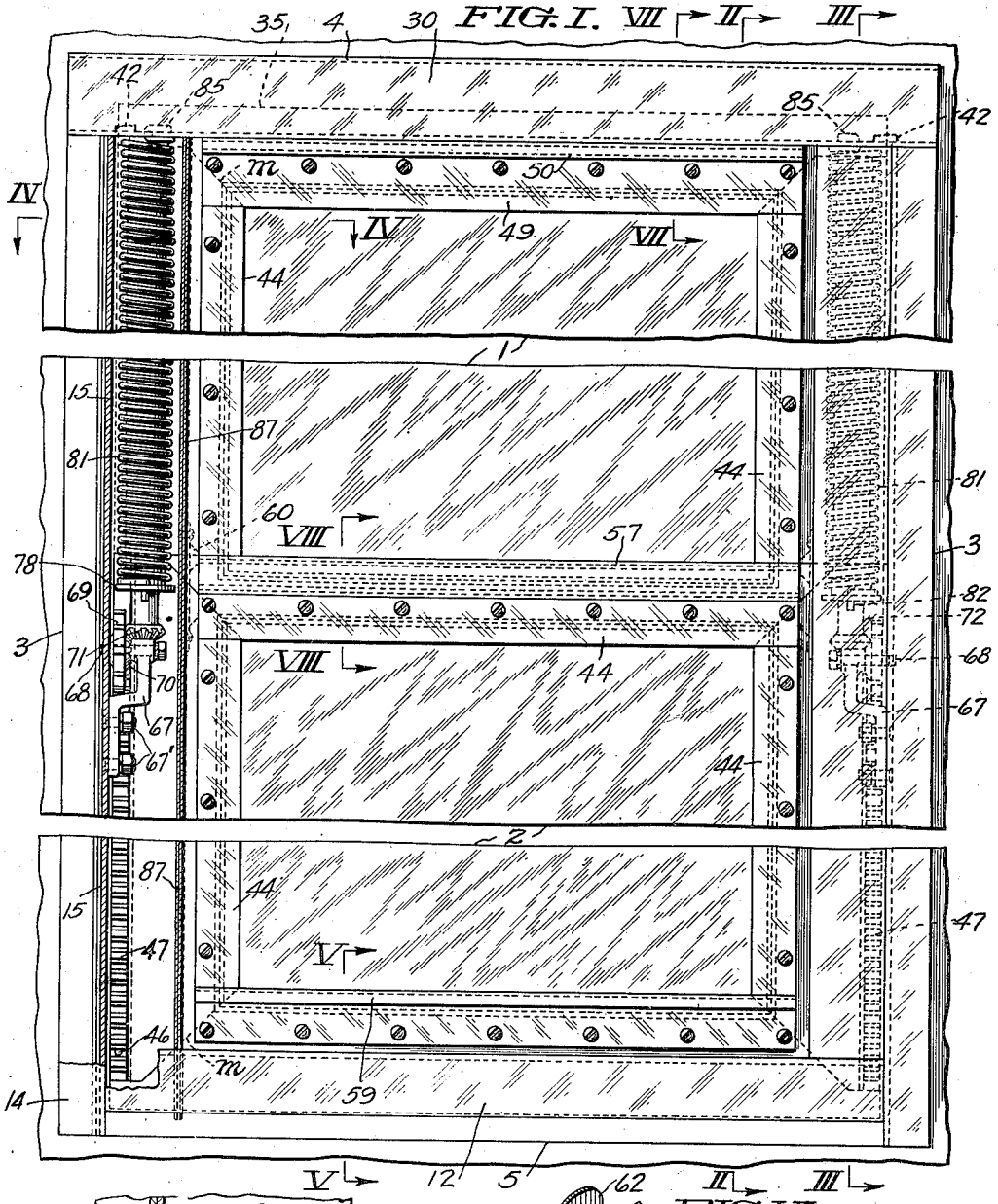


FIG. V.

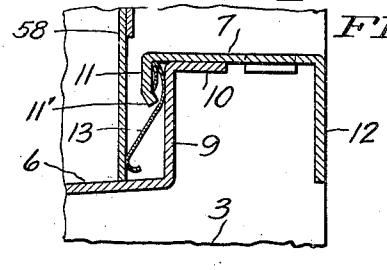
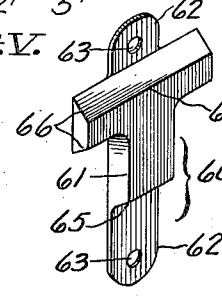


FIG. VI.



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METAL WINDOW FRAME AND SASH CONSTRUCTION

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FIG. II.

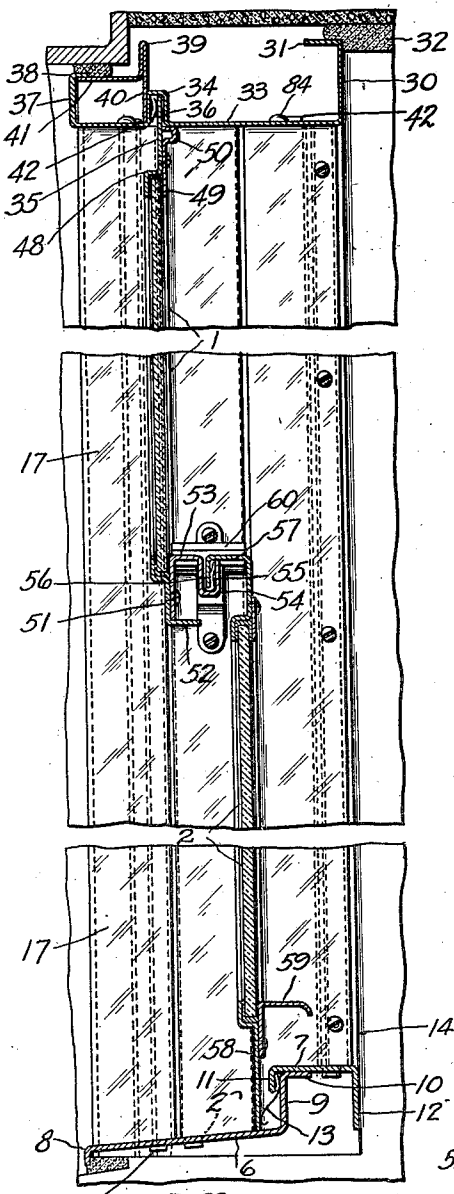


FIG. III.

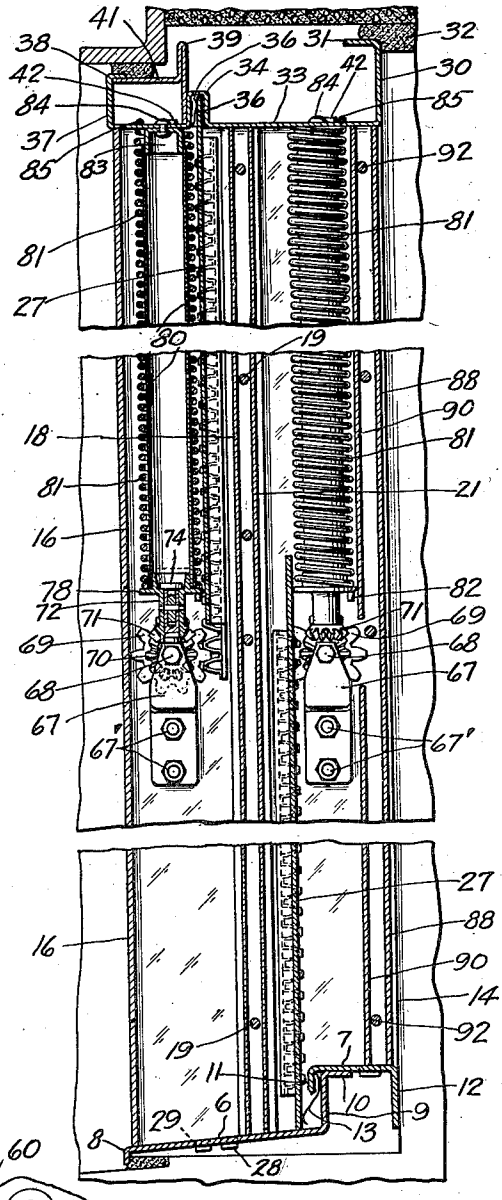


FIG. VII.

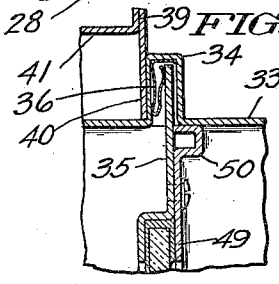
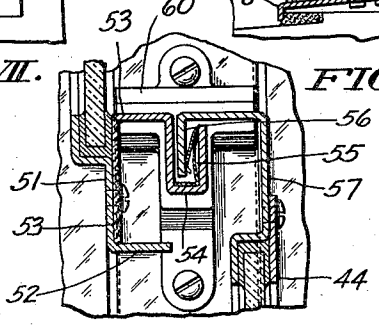


FIG. VIII.



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METAL WINDOW FRAME AND SASH CONSTRUCTION

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FIG. IV.

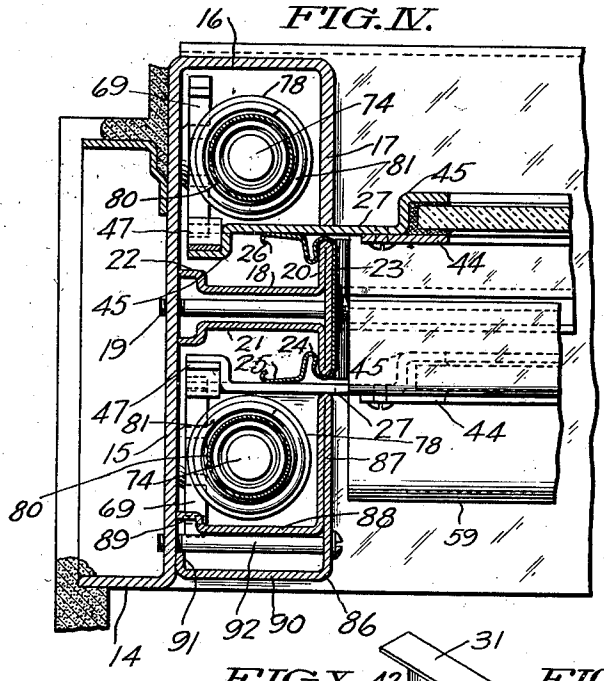


FIG. IX.

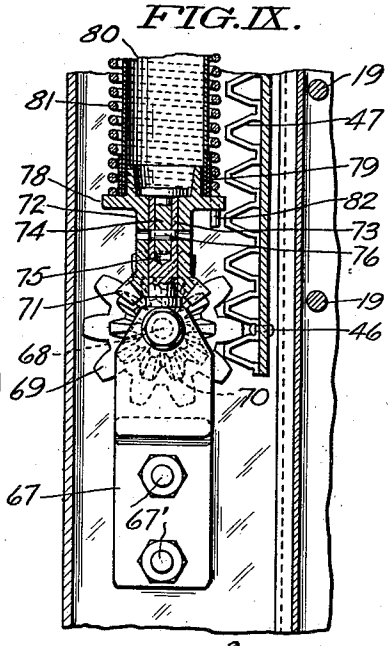


FIG. X.

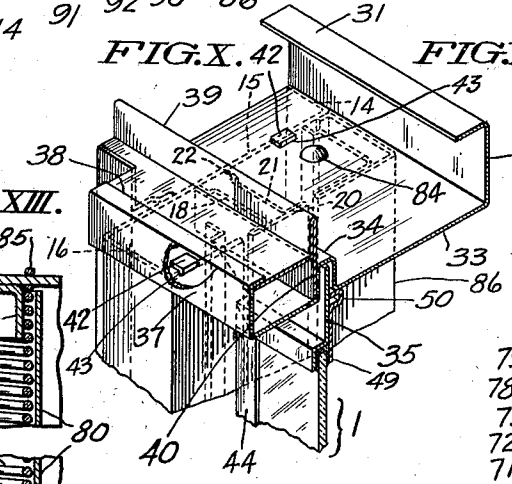


FIG. XII.

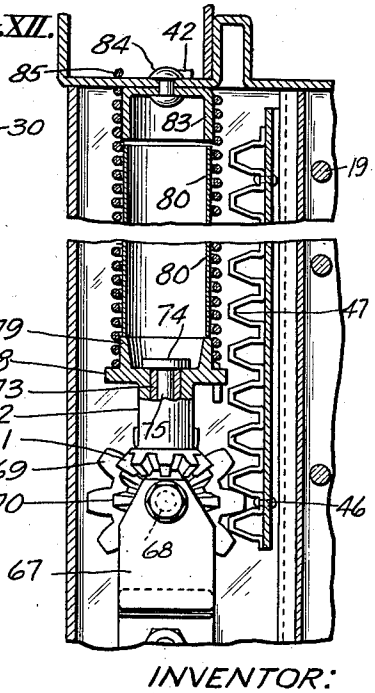


FIG. XIII.

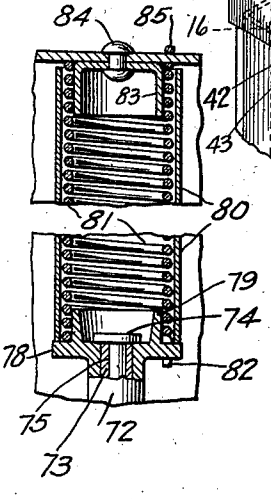
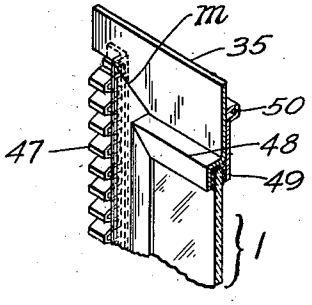


FIG. XI.



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UNITED STATES PATENT OFFICE

2,072,334

METAL WINDOW FRAME AND SASH CONSTRUCTION

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Application June 28, 1934, Serial No. 732,891
Renewed September 24, 1936

3 Claims. (Cl. 189—65)

This invention relates to metal window frame and sash construction, and it has more particular reference to that type of windows in which the weight of the sash is counterbalanced by a torsional spring put under strain when the sash is closed, and when opened which exerts its force upon connected mechanism to aid the opening operation and to hold the same in the desired position.

The primary object of this invention is to provide a window frame and sash assembly which is of minimum weight while of very durable construction.

Another object is to reduce air-infiltration to the minimum with incidental resistance to leakage from the out to the in side of the window in stormy weather.

A further object is to provide a window frame and sash construction which can be completely assembled in the shop, with resultant economy in field work and thereby saving time and labor.

With the foregoing and other objects in view as will hereinafter be apparent, or be specifically referred to, this invention consists in the features of construction, combinations and arrangements of parts, all as hereinafter particularly set forth and more specifically pointed out in the claims.

In the drawings:

Fig. I is a broken face view of a window frame and sash construction, in accordance with this invention, looking from the in side outwards, and having the left-hand frame jamb in lateral section to better disclose underlying parts.

Fig. II is a vertical section on the plane designated by, and looking in the direction of, the arrows II—II on Fig. I.

Fig. III is a similar section taken on the plane III—III of Fig. I.

Fig. IV is a horizontal section taken as designated by the arrows IV—IV on Fig. I, and drawn to an enlarged scale.

Fig. V is a fragmentary section of the sill and lower sash stile showing the means preventive of air-infiltration, and taken approximately as indicated at V—V on Fig. I.

Fig. VI is a perspective view of the meeting rail air sealing block.

Fig. VII is an enlarged fragmentary sectional detail of the upper sash stile and window frame head.

Fig. VIII is an enlarged sectional view of the meeting rail and associated parts, as viewed in the direction of the arrows VIII—VIII on Fig. I.

Fig. IX is an enlarged detail view, partly in section, of the upper sash operating means.

Fig. X is a fragmentary perspective view of the upper end of the right-hand frame jamb, top sash and head.

Fig. XI is a fragmentary perspective view of a top corner of the upper sash and also showing a portion of the attached operating rack.

Fig. XII is a sectional view corresponding in the main with Fig. IX but illustrating a modified form of the operating-spring stabilizing means; and,

Fig. XIII is a somewhat similar section view of a further form of spring stabilizer.

Like characters of reference are applied to corresponding parts in all the views.

Referring more in detail to the drawings the window frame and sash construction illustrated comprises upper and lower sash 1, 2 respectively; and a frame embodying left and right jambs or jamb-boxes 3, with a head 4 and sill 5.

The sill 5, as best understood from Figs. II, III, and V, comprises outer and inner components 6, 7, respectively, of sheet metal, the former 6 having a downward lip at 8, and an inner vertical portion 9, finished-off with a horizontal flange 10. The inner sill component 7 is of inverted channel-formation with flanges 11, 12 of different depth, the former or shorter one 11 being located in parallel relation with the sill vertical 9 to provide a groove in which a suitable weathering strip 13 is appropriately secured; while the longer flange 12 constitutes the inside lower facing of the window frame. In order to prevent accidental removal or displacement of the weathering strip 13, the flange 11 has its free edge—Fig. V—inwardly bent at 11.

The frame jamb boxes 3 being counterparts, or a "right" and a "left", the following description will be limited to the singular, inasmuch as those conversant with the art will readily understand their formation; accordingly I will proceed to explain the left-hand jamb box 3 in detail. This jamb box 3, it will be readily seen from Fig. IV, more particularly, is fashioned from sheet metal to provide an inner facing flange 14 at right-angles to the main lateral wall or back 15, an outer facing 16, and an inner flange or lateral 17 at right angles to the facing 16, the free edge of said lateral 17 serving, as later on explained, to guide the sash 1, 2 during the raising and lowering operations.

Medially vertical of the jamb main lateral wall or back 15, I attach the parting strip 18, as by screw-bolts 19. This parting strip 18, as best shown in Fig. IV, is of channel-leg or T-formation in cross-section, and consists of a length of sheet metal having retroversions 20, longitudinal-

ly spaced webs 21, and relatively angled or stepped edges 22 for stiffening purposes. Thus it will be seen that the spaced webs 21 afford protective housing for the screw-bolts 19, while the retroversions 20 form a substantial support for suitable weathering. 23. This weathering 23 is approximately fashioned with beadings 24 that grip the parting strip retroversions 20, and opposed outwardly-flexed flanges 25 having their free edges rolled inwardly at 26 for coaction with the respective vertical sash rails 27, and said weathering 23 is conveniently slid along the parting strip 18 with suitable clearances therein for passage of the heads of the screw-bolts 19 aforesaid, in an obvious manner.

The window frame jambs 3 are attached to the sill 5 by integral tongues 28 passed through registering slots 29 in said sill and being then clinched-over.

The window frame head, Figs. II, VII, and X more particularly, comprises a main component, of somewhat channel-formation; that is to say, it embodies an inner vertical wall or facing portion 30 having its free edge horizontally angled at 31, to afford support for suitable caulking or plaster 32. The main portion or web 33 of the frame head is longitudinally grooved at 34 for reception of the upper sash top rail 35, and suitable weathering 36; and it has its outer portion upwardly-angled to provide an outer facing 37, with the free edge inwardly-turned horizontal at 38. Intermediate the facing 37 and grooving 34 is a reinforce consisting of a length of sheet metal retroverted at 39 to provide a vertical wall 40 and a horizontal flange 41, respectively secured to the grooving 34 and horizontal 38 in approved manner; while the window frame head, just described, is secured to the jambs 3 by clinched over tongues, 42 on the latter engaged through slots 43 in the former; as previously set forth in connection with the parts 28, 29.

The sashes 1, 2 are substantially of similar construction, or comprise the spaced vertical or side rails 27, Fig. IV, hereinbefore referred to, and conventional flat glazing strips 44; said vertical side rails 27 extending sidewise into close proximity with the lateral or back walls 15 of the window frame jamb boxes 3, and being inwardly stepped at 45, or towards each other, for attachment, as by rivets 46, of toothed racks 47, preferably made from strip metal. The top rail 48, of the upper sash 1, is of similar construction to the side rails 27, excepting that its glazing strip 49, Figs. II and XI, is extended upwardly and channeled at 50 to abut the top frame horizontal flange 33, and thereby more effectively prevent air-infiltration past the weathering 36 in the grooving 34 aforesaid. The upper sash bottom rail 51, Fig. VIII, is also of somewhat corresponding formation with the lower edge inwardly angled at 52, or turned horizontal, while the associated glazing strip 53 has its inner edge formed of somewhat U-section or channeled at 54, for reception of suitable weathering 55, for coaction with the downwardly-angled lip 56 of the lower sash top rail 57. The lower sash bottom rail 58, Fig. II, is of conventional formation, and of a depth to seat snugly on the sill component 6 when lowered, and it is either fitted or formed with appropriate spaced-lifts, or a continuous lift projection 59. It is to be here noted that all of the weatherings 13, 23, 36, and 55 are preferably fabricated from thin springy strip-metal so as to form effective seals at the respective closures; and that all of the sash side, top and bottom, rails are miter-jointed as indicated at *m* in Fig. XI.

At the meeting rails 51, 57 of the upper and lower sash 1, 2, and at the ends thereof I fit in the side jamb boxes 3, air sealing blocks 60, such as best shown in Fig. VI, each such block being substantially cruciform or of T-configuration, that is to say the leg portion 61 is provided with longitudinally extending lugs 62, apertured at 63 for passage of attaching means, such as a spaced pair of the parting strip 18 securing screw-bolts 19; while the lower end of the leg 61 and the top and bottom edges of the sealing block cross-portion 64 are beveled at 65, 66, respectively, see Figs. II and VI more particularly, so as to accommodate any side play in the sashes 1, 2.

Referring now to the means for controlling the respective sash 1, 2, I attach within each frame jamb-box 3, a stepped bracket 67, as by screw bolts 67; Figs. I, III, IX, and XII, having a bearing pin 68 on which is freely journaled an integral gear 69 and miter pinion 70, the former of which meshes with the associated sash rack 47, as clearly understandable from Fig. III more particularly. The respective miter pinions 70, on the other hand, mesh with corresponding pinions 71 integral with the lower ends of sleeve-like members 72, freely supported on vertical extensions 73 integral with the associated brackets 67. Each such sleeve-like number 72 is prevented from vertical lifting, or axial displacement, by means of a headed pin 74, fitted into an axial boring 75 of the bracket extension 73, and a diametric cotter pin 76, as best shown in Fig. IX; while diametrically-opposed holes 77 are provided in the sleeve 72 for ease in assembling or disassembling said parts.

Each sleeve-like member 72 is formed at the upper end with a lateral flange 78 and a vertically-directed annular portion 79, both concentric with the axis thereof and jointly affording bearing for a thin tube 80, functional as a stabilizer for a torsional spring 81, said spring having its lower end 82 passed through a suitable hole in the lateral flange 78. The tube 80 extends coaxially of the spring 81, and its upper end slidingly cooperates with an inverted cup 83 securely attached, as by a rivet 84 Figs. III, XII, and XIII, to the horizontally-flanged portion 33 of the window frame head 4; while the torsional spring 81 has its upper end passed through a hole therein and clinched over at 85, in an obvious manner. Thus it will be readily seen that each tube 80 functions as a floating-support or centralizing-stabilizer to retain the associated spring 81 in correct operating alignment.

Instead of the tube 80 being slidably-fitted internally of the associated spring 81, as shown in Figs. I, III, IV, and IX, it may be floatingly-supported intermediate the sleeve member annular portion 79 and the inverted cup member 83, as indicated in Fig. XII; or, it may be similarly supported by the sleeve member lateral flange 78, and located outside the spring 81, as indicated in Fig. XIII, when so requisitioned or deemed advisable.

To close in the window frame jamb boxes 3 on the inside I make use of angle-section elements 86, Fig. IV, which are fabricated from sheet metal lengths, adapted to snugly fit between the frame top 4 and sill 5. Each said element 86 is retroverted at 87 for stiffening purposes and the inner portion is turned at right angles thereto, as at 88, and stepped along its free edge, as at 89; while the outer portion 90 of said element is cor-

respondingly-angled in spaced parallelism with the inner angling 88 to provide a facing, with its free edge inwardly turned at 91 to engage the frame jamb-box lateral or back wall 15. These closure elements 86 are secured in place by screw-bolts 92 passed through the spacing afforded by the parts 88, 90, and threadedly engaged into the jamb-box lateral or back wall 15.

In assembling the improved window of my invention, and assuming the frame and sashes 1, 2, are completed, with the jamb closures 86 detached, it will be readily understood that the outer or upper sash 1 is first slid into position in the frame, whereupon the inner or lower sash 2 is correspondingly located, when the jamb closures 86 are placed in position and secured by the screw bolts 92. The assembled window is now complete for installation where and when desired. It will also be readily appreciated from the foregoing that windows constructed as hefeinbefore set forth can be cheaply manufactured with a minimum of material, time and labor, costs; while they are adapted for compact transportation and setting-up in the field with a minimum of time and labor expense.

While it will be apparent that the illustrated embodiments of my invention herein disclosed are well calculated to adequately fulfil the objects and advantages previously stated, it is to be understood that said invention is susceptible of variation, modification and changes, within the spirit and scope of the following claims and as the prior art proscribes.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is:—

1. A sheet metal window frame comprising opposed jambs defining spaced chambers for receiving sash balancing devices, sashes having rails, a parting strip between the chambers, said strip including flanges, a sheet metal weather strip including resilient beads adapted to yieldably engage the flanges of the parting strip throughout their length, said beads terminating in outwardly flexed flanges adapted to yieldably engage the sash rails.

2. A sheet metal window frame comprising opposed jambs including a back wall and angularly disposed flanges forming in conjunction with the back wall spaced chambers for receiving sash balancing devices, the sashes having rails slidable between the chambers, a parting strip between the sash rails and chambers, said strip comprising spaced webs and flanges, a sheet metal weather strip having beads on its longitudinal edges for yieldably engaging the flanges of the parting strip throughout their length, said bead terminating in outwardly flexed flanges to yieldably engage the opposed faces of the rails.

3. A sheet metal window frame comprising opposing jambs, each said jamb including two isolated chambers, said chambers being adapted for the reception of individual sash operating and balancing means, sashes having side rails, and a parting strip between the isolated chambers including flanges yieldably coactive with the sash side rails throughout their length, whereby air infiltration from one chamber to the other through the window frame is prevented.

AUGUST HUTTGER.