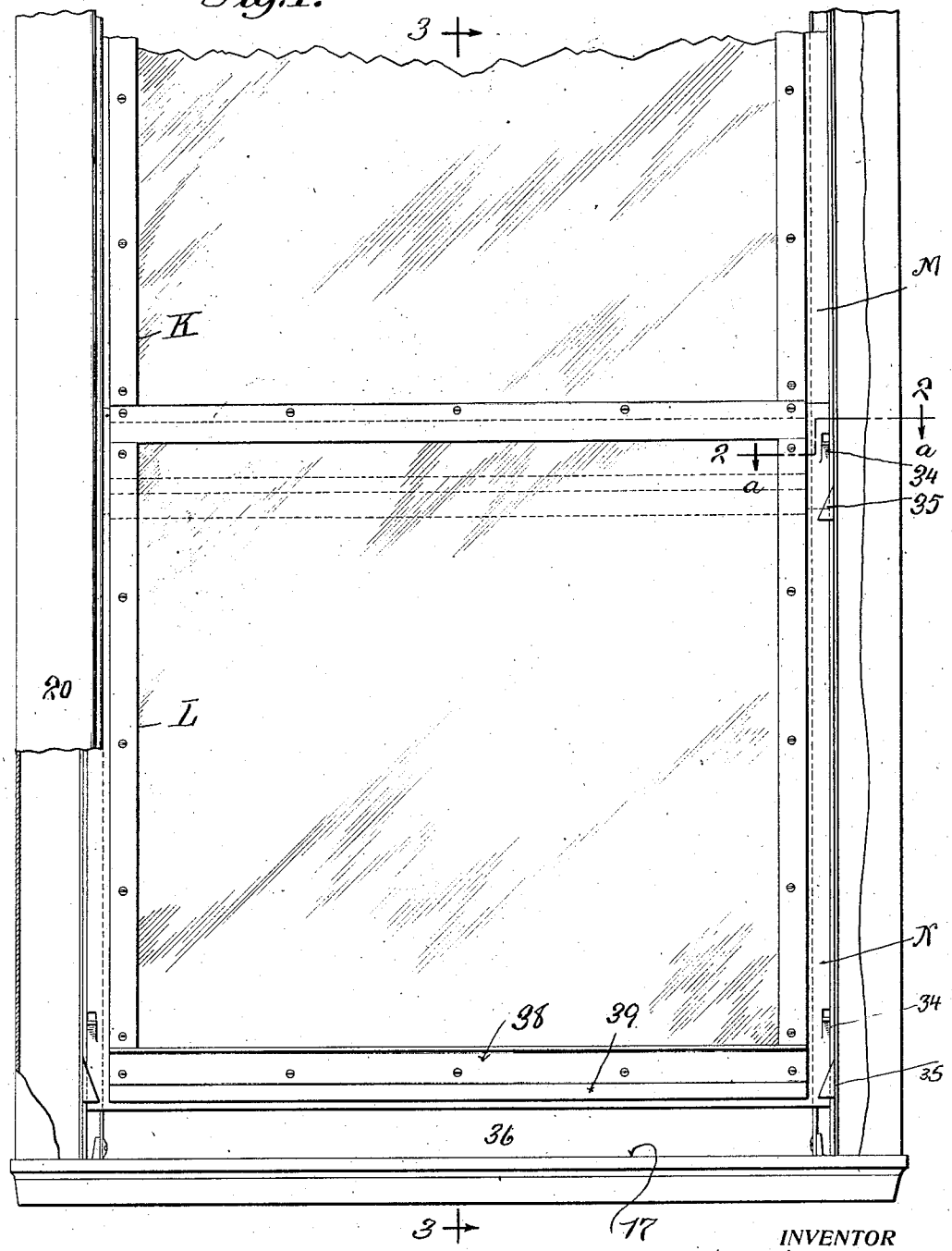
Aug. 25, 1925. 1,551,510

H. E. CAMPBELL

METAL WINDOW FRAME AND SASHES

Filed March 28, 1922 4 Sheets-Sheet 1

Fig. 1.



INVENTOR
Harry E. Campbell

BY Clark Benjamin
his ATTORNEY

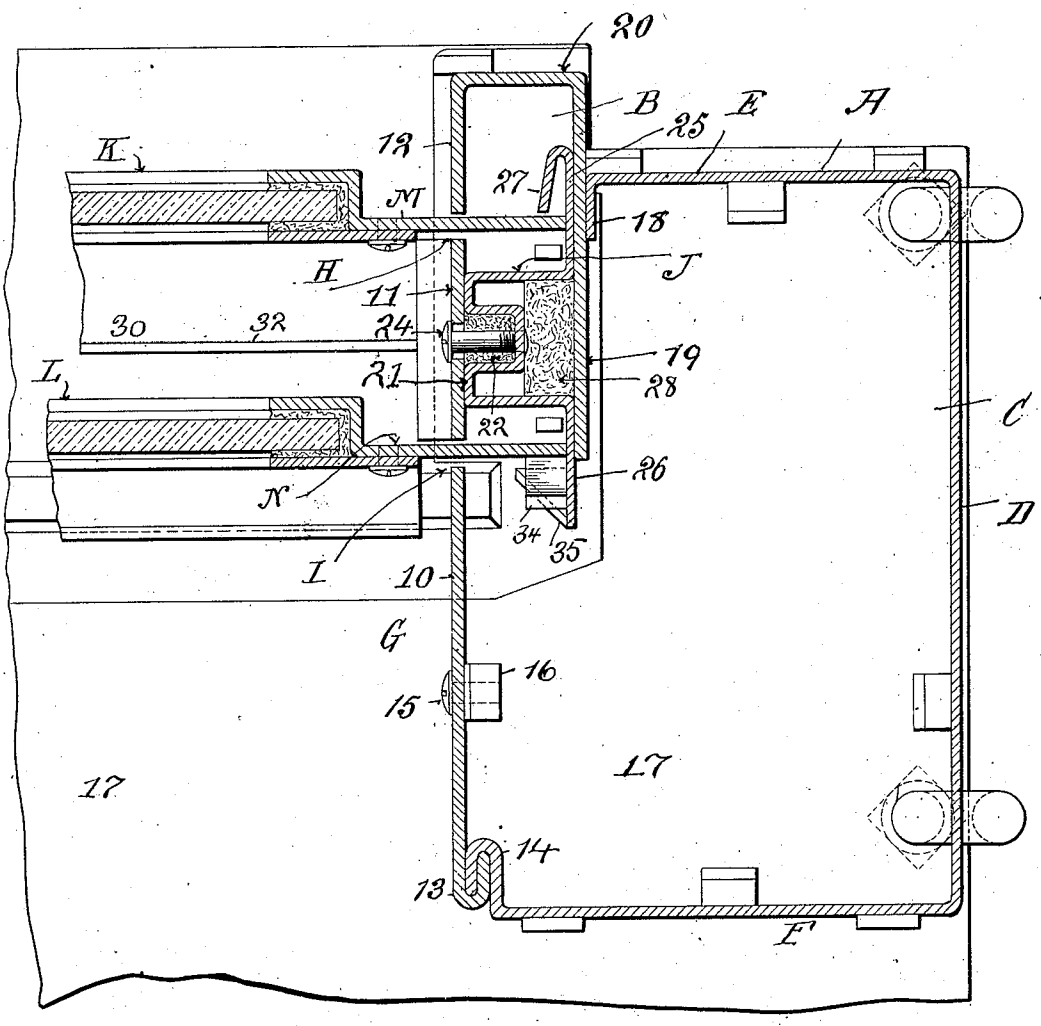
Aug. 25, 1925. 1,551,510

H. E. CAMPBELL

METAL WINDOW FRAME AND SASHES

Filed March 28, 1922 4 Sheets-Sheet 2

Fig. 2.



INVENTOR
Harry E. Campbell
BY Park Benjamin
his ATTORNEY

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H. E. CAMPBELL

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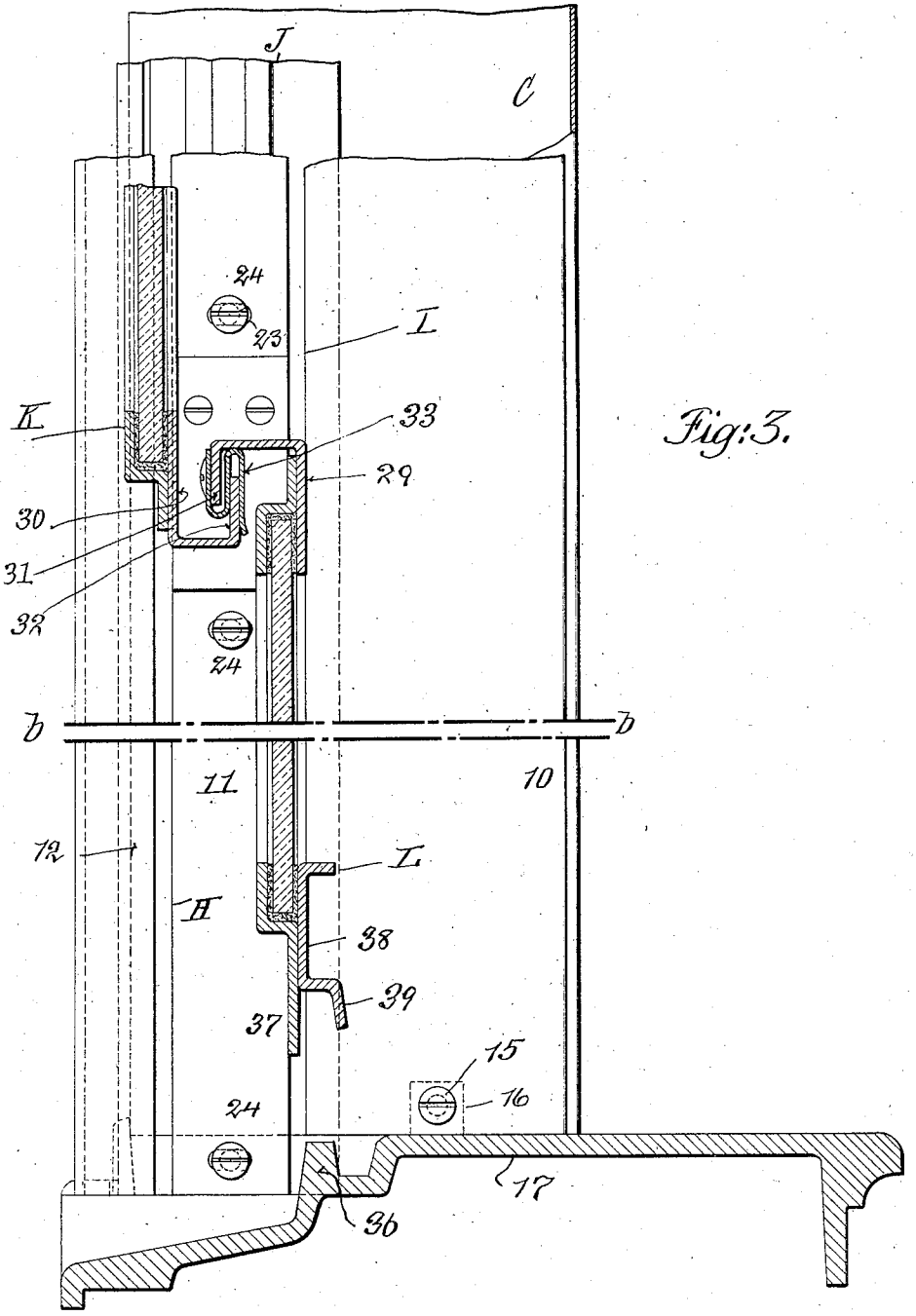

Fig: 3.

INVENTOR
Harry E. Campbell
BY Park & Benjamin
his ATTORNEY

Aug. 25, 1925. 1,551,510

H. E. CAMPBELL

METAL WINDOW FRAME AND SASHES

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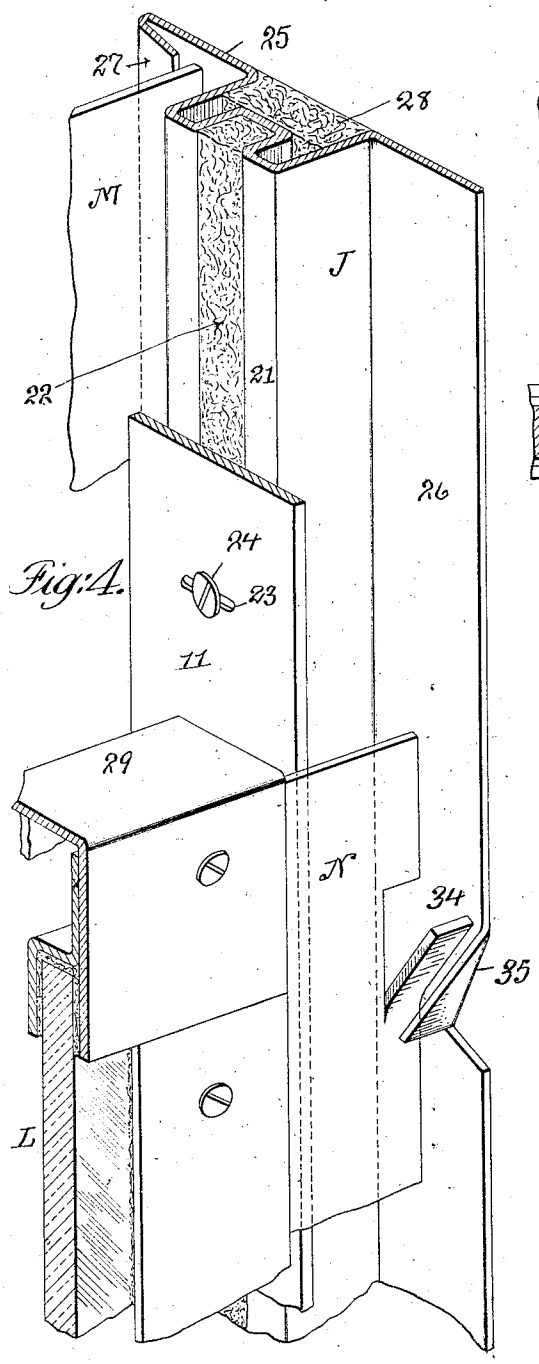

Fig. 4.

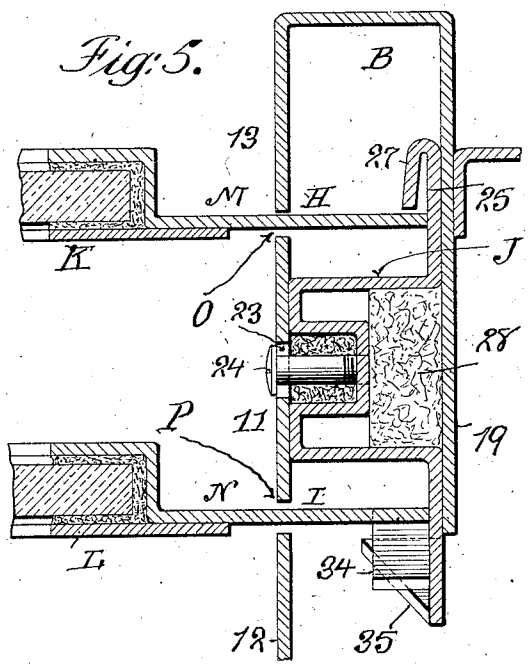

Fig. 5.

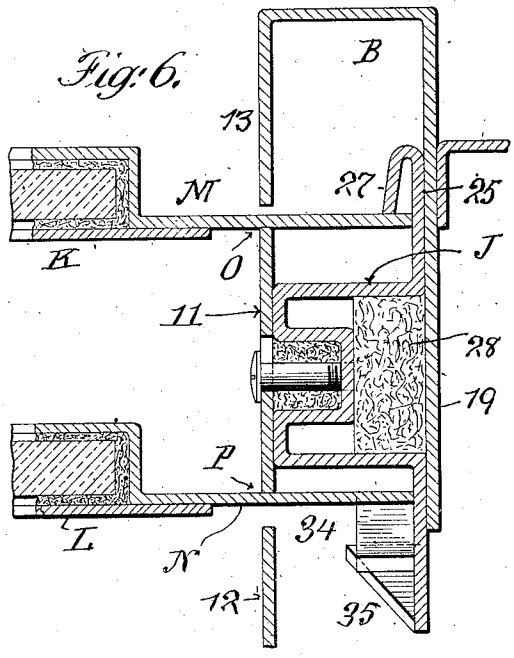

Fig. 6.

INVENTOR
Harry E. Campbell
BY
Ralph Benjamin
his ATTORNEY

Patented Aug. 25, 1925. 1,551,510

UNITED STATES PATENT OFFICE.

HARRY E. CAMPBELL, OF NEW YORK, N. Y., ASSIGNOR TO CAMPBELL METAL WINDOW CORPORATION, OF BALTIMORE, MARYLAND, A CORPORATION OF MARYLAND.

METAL WINDOW FRAME AND SASHES.

Application filed March 28, 1922. Serial No. 547,429.

To all whom it may concern:

Be it known that I, HARRY E. CAMPBELL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Metal Window Frames and Sashes, of which the following is a specification.

This invention relates to a window frame and sash construction in which the sashes slide vertically past each other. The object of my invention is to make a device in which positive sealing of the joints between the sashes and the jambs is obtained when the window is closed and in the specific embodiment of my invention, illustrated in this specification, I accomplish this by causing the final closing movement of the lower sash to wedge both the upper and lower sashes tightly against jamb members for substantially the height of each sash. Other advantages of my construction will be apparent from the following description.

In the accompanying drawings—

Fig. 1 is a front elevation of my window-frame and sashes, showing the lower sash raised for a short distance. In this figure the following parts are shown broken away, namely: the upper portion of the upper sash and frame, and the lower portion of the rear wall of the jamb on the left hand side of the drawing. A vertical portion of the inner wall of the jamb on the right hand side of the drawing is removed to show the parts otherwise covered.

Fig. 2 is an enlarged section on the line 2, 2 of Fig. 1 viewed in the direction of the arrows *a*, *a*, of Fig. 1.

Fig. 3 is an enlarged vertical section on the line 3, 3 of Fig. 1 of the frame and sashes, the lower sash here being shown partly raised. In this figure the upper portion of the upper sash and of the jamb shown is broken away, and a break is made at *b* in order to reduce the height of the figure on the sheet.

Fig. 4 is an enlarged perspective view, showing a portion of the middle section 11 of the inner wall of one of the jambs, the member J carrying said section, a portion of the lower sash, the lateral sash plates M, N and the inclined projections 34 and 35.

Figs. 5 and 6 are horizontal diagrammatic views similar to the section shown in Fig. 2, and are here introduced to show the relative positions of the parts when the joints O, P are open (Fig. 5) and when closed (Fig. 6).

Similar letters and numbers of reference indicate like parts.

The jambs of the window-frame, generally designated by A, are divided internally into two compartments, in one of which —B— the sash extension plates, hereinafter described, enter, while the other —C— receives the counterweights for the sashes. For purposes of clearness, said counterweights, together with the suspension chains by which they are connected to the sashes, the lintel and the sash pulleys within said lintel over which said chains pass, are all omitted, since their general arrangement will be substantially the same as shown in my Patent No. 1,222,357, dated April 10, 1917.

The jamb A, as here shown, is formed of sheet metal and comprises an outer wall D, a front wall E, a rear wall F and an inner wall G. The inner wall G is made in three sections 10, 11, 12, separated by the vertical gaps H, I which extend from top to bottom of said wall. The section 10 of wall G is hooked over at its rear edge at 13 to receive the bent and hooked over edge 14 of wall F. Section 10 is held in place by a bolt 15 which passes through section 10 and is seated in a lug 16 on the sill 17.

The front wall E is of less transverse width than wall G and is flanged at its edge 18, where it is united to the partition or wall 19 which separates the jamb compartments B, C. Said wall 19 extends beyond the jamb wall E and is bent parallel thereto at 20, and then again bent at a right angle to form section 12 of the inner wall G of the jamb.

The middle section 11 of wall G registers with the sections 10 and 12 and is separated from both, so that the vertical gaps H and I are formed between the edges of said middle section 11 and the oppositely placed edges of sections 10 and 12. Said middle section is supported upon a barrier member J constructed of sheet metal, as follows: The front and rear sides are parallel. The inner side 21 is channeled to receive any suitable packing material 22. In the sec-

tion 11 are elongated slots 23, through which pass the fastening screw bolts 24 which engage in the bottom of the channel. On the member J are flanges 25 and 26 which bear against the wall 19. Flange 25 is bent over, as shown at 27. The other flange 26 extends beyond wall 19. Within member J may be packing 28 which bears on wall 19.

K is the upper and L the lower sash. Their frames are of sheet metal having meeting rails 29, 30. As best shown in Fig. 3, the meeting rail 29 of the lower sash is bent horizontally at a right angle and then vertically downward at 31. The meeting rail 30 of the upper sash is bent horizontally at a right angle and then vertically upward at 32. Said vertical portions interlock when the meeting rails come together. On the vertical portion 31 of meeting rail 29 is secured a strip 33 of spring metal which is bent to enter between the portions 31, 32 when the said meeting rails interlock, and to extend over the top of portion 32. When both sashes are in closed position, said spring strip closes the joint between the meeting rails, and so prevents entrance of air or rattling at said joint.

Laterally extending from the sheet metal side rails of the sashes, and, as here shown, made integral therewith, are plates M and N which enter the jambs through the gaps H and I and travel therein when the sashes are moved.

Referring now to Figs. 5 and 6: It will be obvious that in order that the sash plates M, N may be moved freely in the gaps H, I, sufficient clearance must be present. When the upper sash is seated in closed position, the portion of gap H which is below said sash will be wholly open to the external air. Said air then entering the compartment B through said open portion of the gap will be free to pass through the joint O, Fig. 5, between the sash plate M and the edge of middle section 11, and so into the building or room. Clearly, closing the joint O will prevent this draft.

When the lower sash is seated in closed position on the sill, the portion of gap I which is above said sash will be open and in communication with the room. External air entering the compartment B at the joint P between the edge of sash plate N and middle section 11 will then pass into the room through said joint P and thence to the said open portion of gap I. Clearly, therefore, closing joint P will prevent this draft.

Now I close both of these joints simultaneously by the movement of the lower sash as it reaches its shut or seated position on the sill. Or, in other words, although at all times while the sashes are being raised or lowered, abundant clearance exists in the gaps H, I to permit of the free movement of said sashes, the simple pushing down of the lower sash into its shut position closes the clearance at the joints through which air can enter. After the window is installed, no adjustment of parts to close these joints is necessary, nor is any special manipulation of the sashes required. The operator opens and closes the sashes just as he would any ordinary vertically sliding sashes, and, without any necessary knowledge of how the result is obtained, causes the proper joints above noted to become closed.

Referring first to Fig. 4, this is how it is done:

In the vertical edge of extension plate N of the lower sash is an upwardly extending inclined projection 34, here shown as formed by cutting a tongue from the material of said plate. On the edge of the flange 26 of barrier member J is another but upwardly inclined projection 35, also here formed by cutting a tongue on said edge. The inclined surfaces of the two projections 34, 35 are parallel, and the projection 34 is directly above the projection 35. The parts being in the positions shown in Fig. 5, the clearance then allowing free movement of the plates M, N in the gaps H, I, when the lower sash is moved downwardly to close it and shortly before it reaches its seated position, the projection 34 meets the projection 35, and as the sash continues its downward movement, two results occur, namely: as the projection 34 rides over the projection 35, the sash plate N is moved toward middle section 11 of jamb wall G, Fig. 5, until it closes tightly the joint P, Fig. 6. At the same time, the projection 35 is moved by the same means to cause the barrier member J to slide on wall 19, this movement being permitted by the slot and bolt connections of said member J with section 11, as shown at 24. By reason of this movement, the turned over end 27 of flange 25 acting upon extension plate M of the upper sash forces said extension plate M into contact with section 11, and so closes the joint at O. Both joints O and P are thus closed simultaneously with and by reason of closing movement of the lower sash.

In practice I prefer to use two pairs of projections 34, 35, just alike and similarly disposed relatively to one another but located at different heights on the extension plate N, as shown in Fig. 1. The operation of both pairs is simultaneous and the same as has been described with reference to but one pair. The object is simply to distribute the application of the moving force more uniformly along the elongated parts affected, and since two points determine a line the fact that there are two pairs of projections, 34, 35, insures pressure being exerted against plate M at the top as well as at the bottom so that this plate, throughout its

height, is drawn against an edge of section 11.

It is to be noted that middle section 11 is itself loose or floating. Hence it is self-adjusting to the opposing contact pressures of the plates M and N, so that if through any irregularity of construction, for example, one joint O or P becomes closed before the other, section 11 being loose will yield in one direction upon the closing of the first joint, and then will yield in the opposite direction and so readjust itself upon the closing of the second joint. Or, in other words, it finds its own position with respect to the plates M, N bearing against its edges, in which position both joints O and P will be tight.

In windows of this type hitherto made, the clearance of the sash plates M, N in the gaps H, I has been kept as small as possible in order to reduce the area of possible air entrance around the closed sashes. But since, through my present invention, the joints O, P are always closed when the sashes are shut, said clearance may be made of any desired width, and may even be made so that said plates will be suspended clear of the gap edges. This does away with frictional contact at said edges, permits of the sashes being very easily raised or lowered, and if the parts be painted affords ample space for any irregularities of paint surface, while also protecting the paint from being removed by the rubbing together of said parts.

On the sill 17, Fig. 3, is formed a transverse rib 36 of upwardly tapering cross section. The lower rail of the lower sash is formed of two sheet metal strips 37 and 38. The strip 37 on the front side of the rail extends vertically downward below the same, while the strip 38 on the rear side of the rail is bent at a right angle and then turned downwardly at 39. The channel-shaped rail thus formed fits upon the rib 36 when the sash is shut. Hitherto it has been necessary in order to compensate for manufacturing irregularities to allow a considerable clearance between the rail and the rib, so that even after these parts had become seated there was opportunity for air entrance at the joint. But with the now possible wide clearance in the gap I and the consequent suspension of the lower sash therein, as described, it will be obvious that the rail has ample space to swing transversely and so adjust itself upon the rib 36 and seat itself firmly down upon the inclined sides thereof so as completely to close the joints at the places of contact, and thus cut off any possible passage of air drafts through said joints.

While I have herein shown a jamb having a large counterweight compartment C, it is to be understood that I do not limit myself to a jamb thus provided. Vertically sliding window-sashes, as is well known, may have no counterweights and be held in any desired position by means of clamps, bolts, catches or various other analogous devices; and such sashes may also be arranged in suspension devices whereby they mutually counterweight one another. As my present invention is applicable to windows thus constructed, it will be obvious in such event that a special compartment in the jamb to receive sash counterweights will not be necessary.

I claim:

1. A window frame and sash construction comprising jambs having their inner walls formed in three vertical sections with gaps between the sections, sashes extending into such gaps, and means within the jambs operated by the closing movement of the lower sash adapted automatically to cause both the upper and lower sash to be pressed against the middle vertical jamb sections when the window is closed.

2. A construction is defined in claim 1 in which the means for pressing the sashes against the middle vertical jamb sections comprises a movable clamping member adapted to be operated by the lower sash.

3. A window frame comprising jambs, two sashes sliding in said jambs, a pair of auxiliary members, one forming a part of each jamb, and means for causing such members, as the window is finally closed, to move to hold a face of each sash against a guide portion of the jamb for substantially the height of each such sash.

4. A window frame comprising jambs, two sashes sliding in said jambs, a pair of auxiliary members, one forming a part of each jamb, and means controlled by the final closing and initial opening movement of the lower sash adapted automatically to cause such members to move as the window is finally closed, to hold a face of each sash against a guide portion of the jamb for substantially the height of each sash, and adapted automatically to permit such members to move as the lower sash is initially opened to allow the lower sash to slide with space between it and such fixed jamb portion.

5. A window frame and sashes, comprising jambs having their inner walls formed in three vertical sections with gaps between the sections for receiving the sashes, sashes slidable in such gaps, and having the middle vertical sections movable in relation to the portion of the jambs which support them, and auxiliary sealing means forming part of each jamb adapted to cause a face of one sash to press against such middle sections for substantially the entire height of such sash so that such middle sections are moved in relation to the portion of the jamb which

supports them and are pressed against a face of the other sash for substantially the entire height of such other sash.

6. A window frame and sashes, comprising jambs having their inner walls formed in three vertical sections with gaps between the sections for receiving the sashes, sashes slidable in such gaps, a cam member in each jamb, means for permitting relative movement between the middle jamb sections and such cam members, and complementary cam members carried by the lower sash and adapted, as the lower sash is closed, to cooperate with such first mentioned cam members to press the lower sash against such middle sections and to cause such middle sections to be pressed against the upper sash.

In testimony whereof I have affixed by signature.

HARRY E. CAMPBELL.