No. 811,072. PATENTED JAN. 30, 1906.

R. C. LIEB.

FIREPROOF METAL WINDOW.

APPLICATION FILED SEPT. 18, 1905.

4 SHEETS—SHEET 1.

Fig. 1.

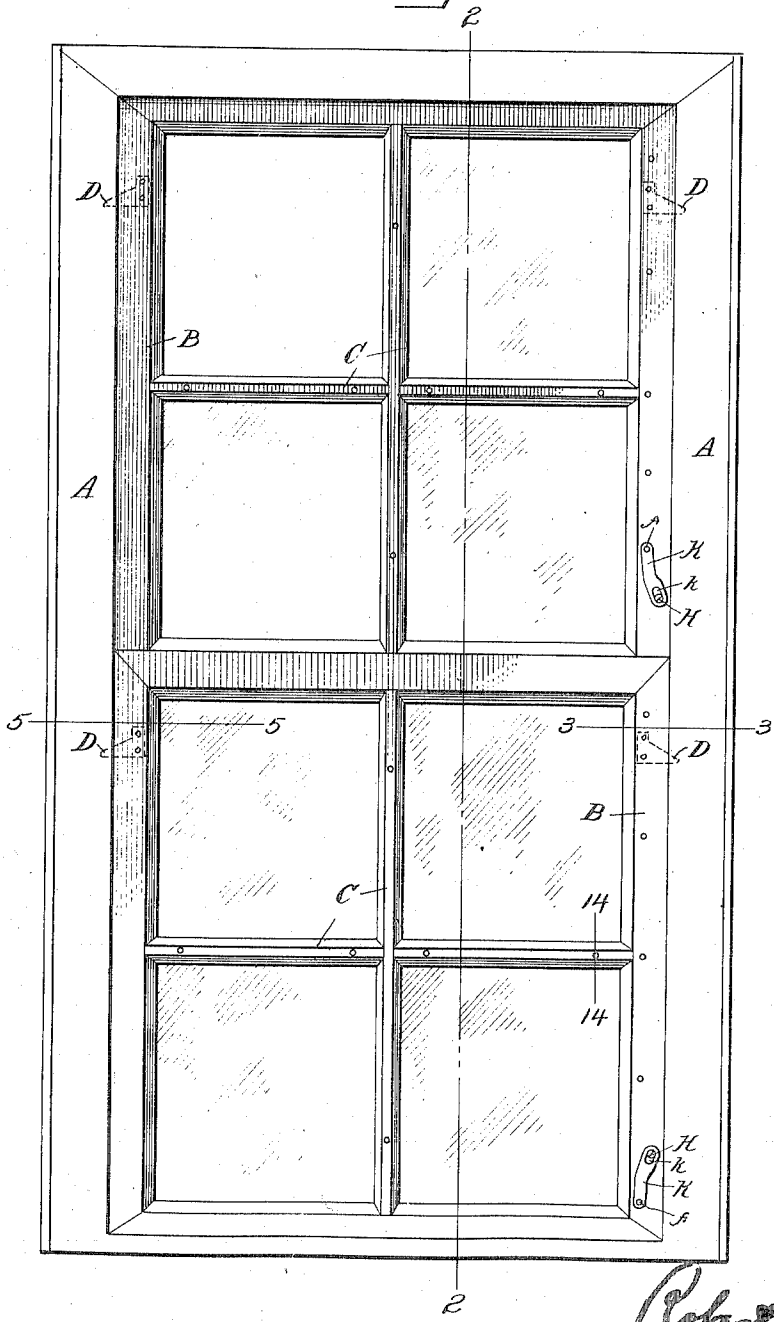
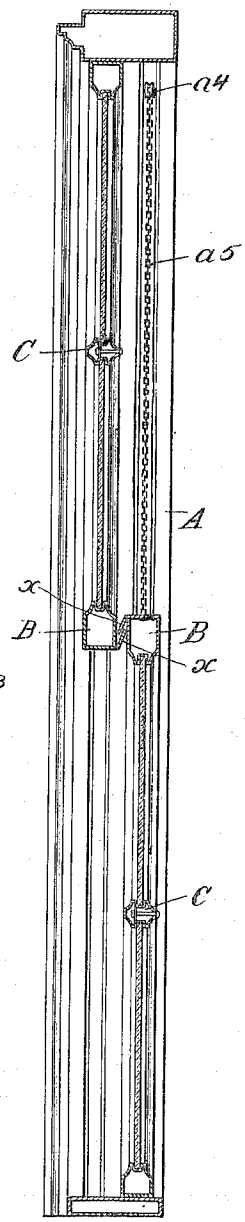


Fig. 2.



Witnesses

F. L. Gibson.

L. B. Bridges

Inventor

Robert C. Lieb

By Davis & Davis

Attorneys

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4 SHEETS—SHEET 2.

Fig. 6.

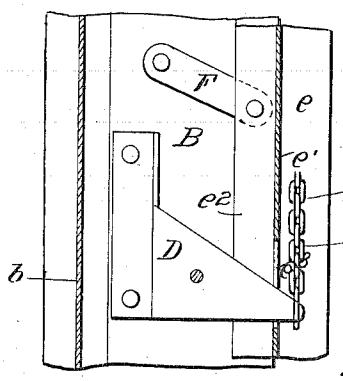


Fig. 3.

Fig. 15.

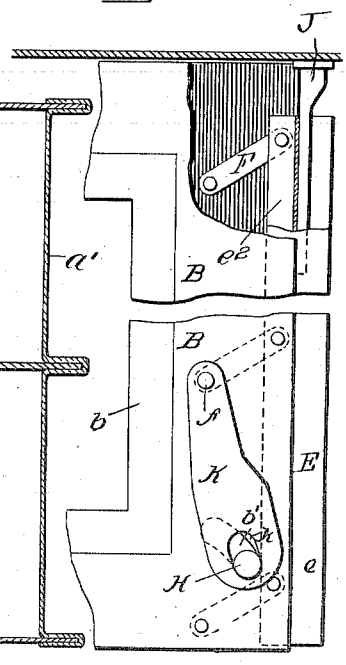


Fig. 4.

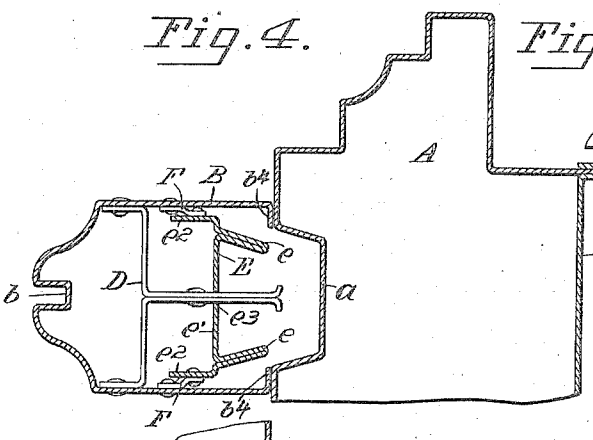


Fig. 16.

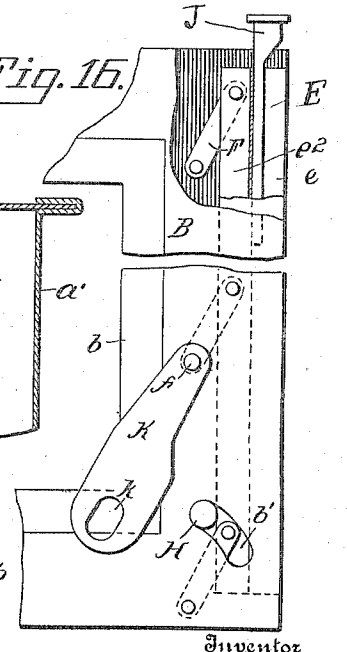
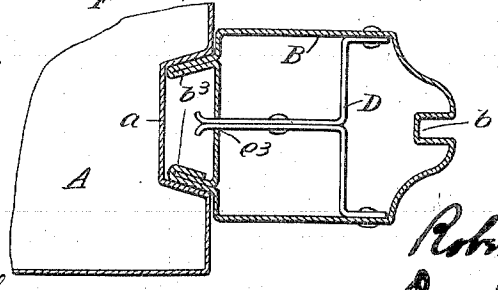


Fig. 5.



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F. C. Gibson.

L. B. Bridgee

Inventor

Robert C. Lieb

By Davis & Davis

Attorneys

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4 SHEETS—SHEET 3.

Fig. 7.

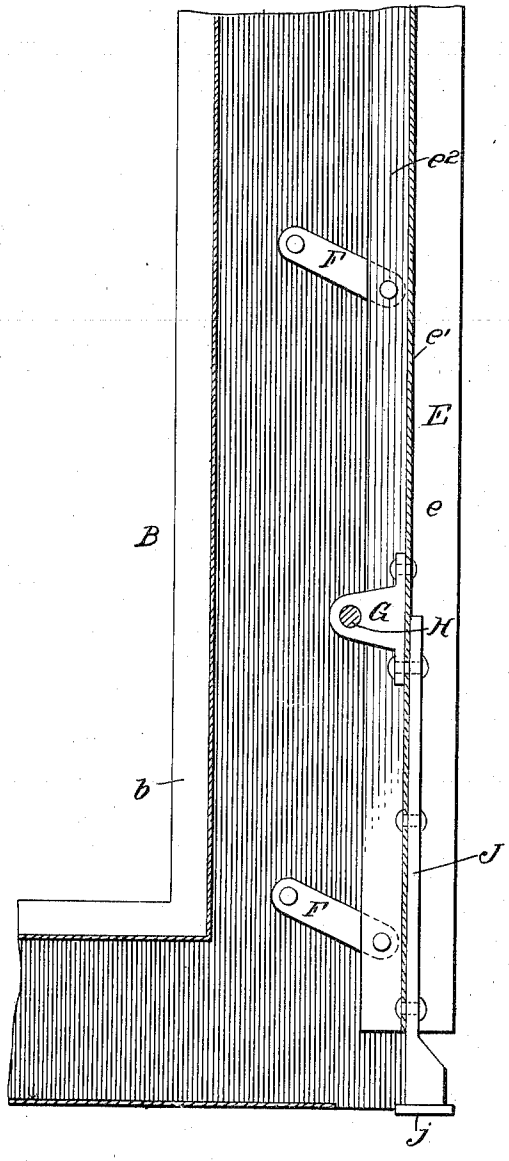
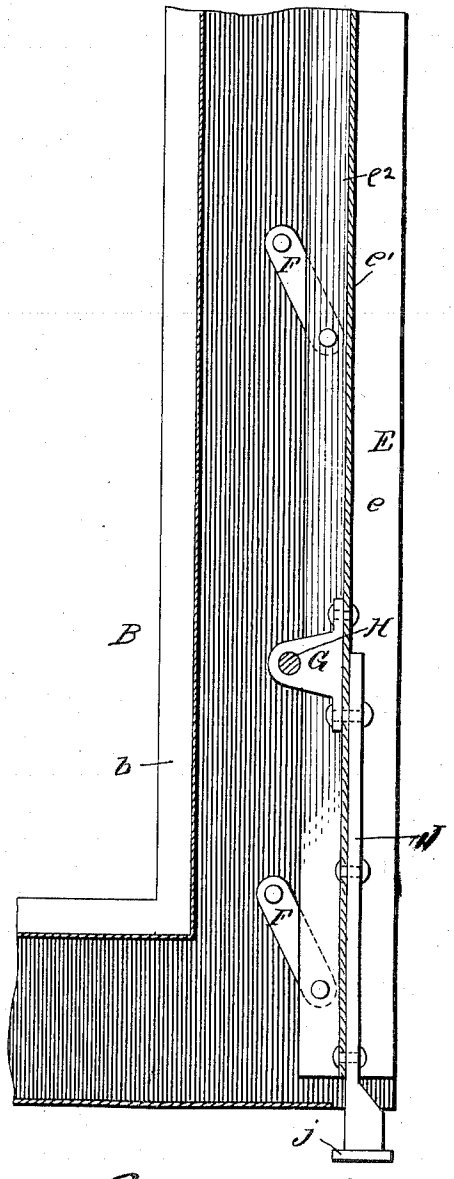


Fig. 8.



Witnesses
F. L. Gibson.
L. B. Bridges

Inventor
Robert C. Lieb
By Davis & Davis
Attorneys

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4 SHEETS—SHEET 4.

Fig. 9.

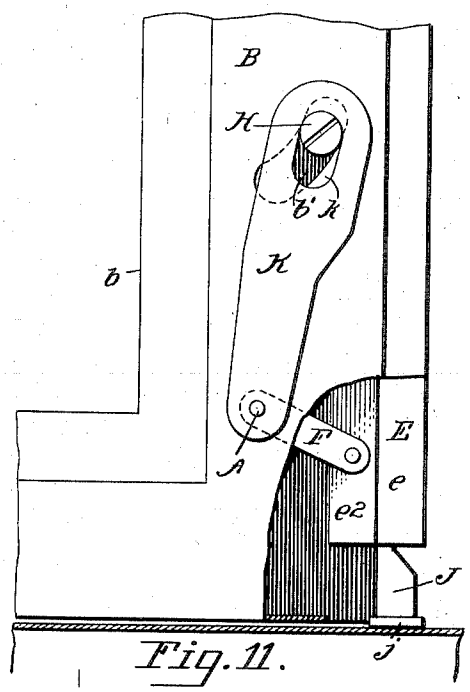


Fig. 10.

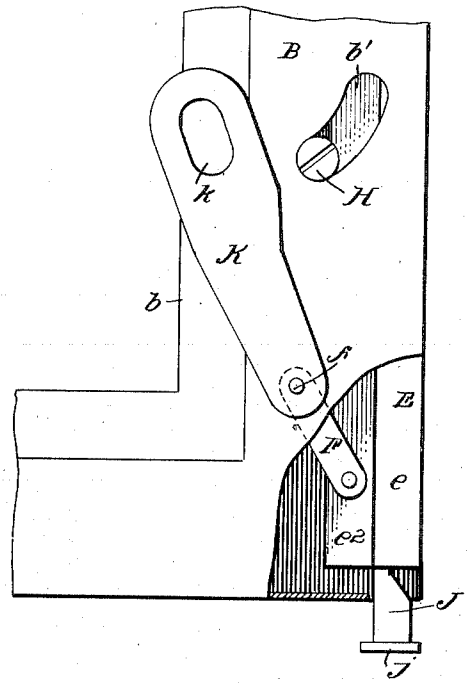


Fig. 11.

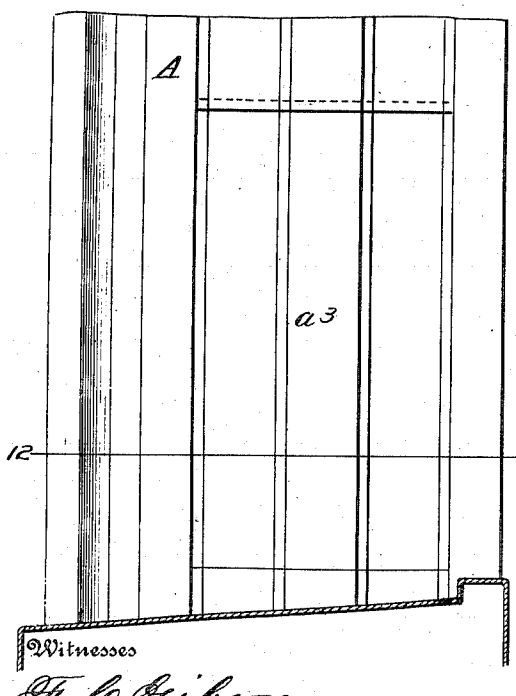


Fig. 12.

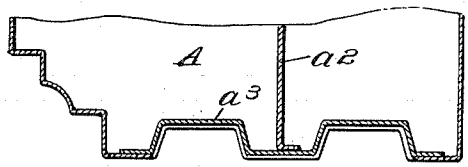


Fig. 13.

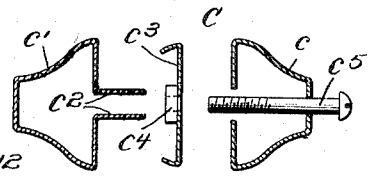
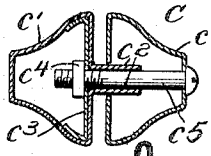


Fig. 14.



Witnesses

F. A. Gibson.

L. B. Bridges

Inventor

R. C. Lieb

By Davis & Davis

Attorneys

UNITED STATES PATENT OFFICE.

ROBERT C. LIEB, OF CHATTANOOGA, TENNESSEE, ASSIGNOR TO JOHN E. ANNIS, OF CHATTANOOGA, TENNESSEE.

FIREPROOF METAL WINDOW.

No. 811,072. Specification of Letters Patent. Patented Jan. 30, 1906.

Application filed September 18, 1905. Serial No. 278,988.

To all whom it may concern:

Be it known that I, ROBERT C. LIEB, a citizen of the United States of America, and a resident of Chattanooga, county of Hamilton, State of Tennessee, have invented certain new and useful Improvements in Fireproof Metal Windows, of which the following is a full and clear specification, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of the inner side of a window constructed according to my invention; Fig. 2, a vertical longitudinal section on the line 2 of Fig. 1; Fig. 3, a section on the line 3 of Fig. 1, showing the movable edge wall E of the sash in engagement with the casing; Fig. 4, a similar view showing said end wall shifted back into the sash-frame out of engagement with the casing to permit the sash to be removed from the casing; Fig. 5, a section on the line 5 of Fig. 1; Fig. 6, a detailed section hereinafter described; Fig. 7, a vertical longitudinal section through the lower right-hand corner of the lower sash, showing the position of the movable edge wall when the sash is down; Fig. 8, a similar view showing the position of the edge wall when the sash is raised; Fig. 9, a detailed view showing the movable edge wall or friction bearing-strip E of the lower sash locked in its outer position; Fig. 10, a similar view showing the friction strip or wall of the lower sash shifted inward out of engagement with the frame; Fig. 11, a vertical section of the sill, showing the slide-covered opening for introducing and removing the weights; Fig. 12, a horizontal section on the line 12 of Fig. 11; Figs. 13 and 14, detailed sections of the ribs for clamping the edges of the panes; and Figs 15 and 16, views similar to Figs. 9 and 10, showing the devices arranged for use on the upper sash.

The objects of this invention are to render the window absolutely fireproof; to permit the sash to be readily removed from the casing without the employment of removable guide-strips; to permit broken panes to be readily replaced by whole ones; to automatically tighten the sashes in their guideways by the simple act of closing them, thereby rendering them stormproof and preventing rattling, and to permit the sash-weights to be readily attached to their chains after the window is constructed, as more fully hereinafter set forth.

To the accomplishment of these objects and such others as may hereinafter appear the invention consists of the parts and combination of parts hereinafter fully described, and particularly pointed out in the appended claims, reference being had to the accompanying drawings, forming a part of this specification, in which the same reference characters designate like parts throughout the several views.

Referring to the drawings annexed by reference characters, the letter A designates the window-frame as a whole, which is constructed entirely of sheet metal, being provided with longitudinal depressions a, whose sides are inclined for the reception of the flanges of the sash. Extending longitudinally through the hollow frame is a rigid partition a^2, whose edges are rigidly attached to the opposite walls of the hollow frame and which is preferably made of heavier metal than the frame proper, thereby dividing the frame into two weight-compartments and serving to stiffen the frame. The outer wall a' of the frame is preferably made of a separate piece flanged along its edges to engage the edges of the sheet forming the main part of the frame and also at the point where the stiffening-wall a^2 is attached to it. These flanges or ribs serve to rigidly attach the outer wall to the other walls and also to add rigidity to the frame. The sash B, including the glass supporting-ribs C, is also constructed of sheet metal. The ribs C are composed of the hollow inner strips c, the hollow outer strips c', provided with longitudinal flanges c^2, the connecting-bolts c^5, and the strip c^3, carrying the nuts c^4. The flanges c^2 extend into a longitudinal slot in the outer wall of the inner strip c. The strip or plate c^3 lies within the outer strip C' and bears against the inner wall of said strip, and the screw-bolts c^5 extend through the inner strips and between the flanges c^2 and are screwed through the nuts c^4, thereby serving to clamp the inner strips removably against the edges of the panes, permitting the panes to be removed and replaced at will.

In the lower part of each inner wall of the upright partitions of the frame is formed an opening which is covered by a sliding section

a^3, suitably supported within the hollow frame and having vertical depressions corresponding with the depressions a, in which the sash-flanges work. This slide is held against the inner wall of the frame by the vertical edge of the partition a^2 and is capable of being slid up and down to permit the sash-weights to be inserted and removed at will.

The upright bar of each sash is constructed of sheet metal and made hollow, being provided with grooves b for the reception of the edges of the glass panes, which panes are preferably provided with embedded wire of a suitable mesh to render the window fireproof. The uprights at the left-hand side of the sash are provided with flanges b^3, which fit and work in the grooves a in the frame, these flanges being inclined toward each other to frictionally engage the inclined walls of the grooves a. The upright at the right-hand side of each of the sashes is provided with flanges e, similar to the flanges b^3, but which are carried by a strip e', which practically constitutes the edge wall of the sash-bar and is adapted to be moved inward and outward with respect to the window-frame upright, so that the flanges e may be projected into the grooves a of the frame or may be withdrawn into the sash-bar. When the flanges are fully projected, the strip or wall e' bears at its edges against the vertical flanges b^4 of the sash-bar. The longitudinal edges of the strip e' are bent inward to form flanges e^2, which are pivotally connected by links F to the respective front and back walls of the sash-bar, these links serving to support the movable wall in its movements to and from the frame.

Rigidly attached to the lower end of the movable strip e' of the lower sash is a bolt J, provided at its lower end with a head or flange j. This bolt normally tends to descend below the lower edge of the sash, the supporting-links F being inclined outwardly and downwardly, so that the weight of the strip causes it to normally drop. The right-hand edge wall of the upper sash is constructed in the same manner, except as hereinafter set forth. It will be observed, therefore, that when the lower sash is closed down the bolt J will strike against the casing and force the flanges e outward into tight engagement with the walls of the grooves a, thereby tightly locking the sashes against rattling and ingress of air, and when the lower sash is opened the flanges recede from tight engagement with the grooves in the frame; but this recession is not as great as shown in Fig. 4, but is only sufficient to permit the sash to be raised and lowered easily. This movement of the strips carrying the flanges is limited by any suitable means, and preferably by the simple device shown, which consists of a pin H, rigidly attached to the strip and working through an arcuate slot b' in the front wall of the sash-bar and adapted to engage in a slot k in the free end of the locking-lever K, which lever is pivoted to the inner wall of the sash-bar, preferably by the same pivot f, which pivotally connects the inner end of one of the lowermost links F to the wall of the sash-bar. With this arrangement when the sash is closed the pin H lies in the upper ends of both the slots k and b'; but when the sash is opened the strip or wall E is permitted to gravitate sufficiently to bring the pin H to the bottom of the slot k, where its movement is arrested and in which position the flanges e will be in loose engagement with the grooves in the frame.

To permit the strips E to recede far enough into the sash-bars to enable the sashes to be removed from the frame, as shown in Fig. 4, it is simply necessary to spring the locking-lever K off the end of the pin H, and thereby permit the pin H to drop down to the bottom of the arcuate slot b', this slot being just long enough to bring the flanges e within the outer edge of the sash-bar. On the upper sash the devices for supporting and locking the guide-strip E are reversed—that is, the links F incline downwardly and inwardly, the bolt J is attached to the upper end of the strip and is adapted to project above the upper end of the sash when the sash is lowered, the locking-lever K depends, and the slot b' curves upwardly and inwardly. With this reversed arrangement of the parts when the sash is lowered the weight of the sash bearing against the window-frame will cause the bearing-strip E to move upward and back far enough to project the bolt J above the sash a short distance, so that when the sash is closed the top of the window-frame will force the bolt downward and bind the guide-flanges against the frame. This upward-and-backward movement of the strip E need be so slight the usual looseness of the sash in the frame will allow sufficient play between shoulders b^4 and the frame to permit a sufficient movement of the strip when the sash is open.

The meeting-rails of the sash are provided with flanges x, which engage over each other, as shown in Fig. 2, to close the narrow space between the meeting-rails. The weight-chains a^5 run over the usual pulleys a^4 and are attached to the sash by means of brackets D, made of sheet metal and bolted to the respective inner sides of the front and back walls of the sash. The outer ends of these brackets work through vertical slots e^3 in the flange-carrying strips and serve to assist in guiding the same in its to-and-fro movements. The use of these brackets D for chain connections is rendered necessary by reason of the impossibility of attaching the chains to the movable strips. I have shown these brackets D upon both sides of the sash; but it is evident that they need only be employed at the sides carrying the movable strips, as at the side

carrying stationary guide-flanges the chains may be connected directly to the sash-bar in the usual manner.

It will be observed that the projecting end of the bolt J is provided with a broad flat head in order to prevent holes or dents being made in the window-frame.

It will be apparent to those skilled in the art that various mechanical embodiments of the invention are possible, and I therefore do not wish to be limited to the exact arrangement and construction shown.

What I claim, and desire to secure by Letters Patent, is—

1. In combination with a frame member and a sash member, of a guide carried by one of the members and working in a groove in the other member, means for supporting the guide so that it will be capable of free normal movement toward the grooved member, means whereby this movement is restricted, whereby when the sash member is open it shall have a free sliding action in the frame member, and means whereby the guide may be positively forced against the grooved member when the sash is closed.

2. In combination with a window-frame and a sash working therein, of a guide-strip carried by the sash and engaging a groove in the frame, means for supporting this guide-strip in such manner that it will have a free normal movement when the sash is open, whereby the sash may be freely restricted in the frame, means for limiting said movement of the guide-strip, and means whereby the guide-strip may be forced against the frame to lock the sash against movement in the frame.

3. A rib for a window-sash consisting of an outer hollow section provided with longitudinal flanges along its inner sides, an inner hollow section slotted along its outer side for the reception of said flanges, and connecting screw-bolts passing through the inner section and between the flanges and into the outer section.

4. A rib for a window-sash consisting of an outer hollow section inclosing a nut-carrying strip and provided with longitudinal flanges, an inner hollow section engaging over said flanges, and screw-bolts passing through the inner section and between the flanges and screwed into said nuts, for the purpose set forth.

5. The combination of a hollow sheet-metal window-frame divided vertically into two weight-compartments by a stiffening-web whose edges are rigidly attached to the opposite walls of the frame, an opening being formed in the lower part of each of the inner walls of the upright members of the frame, and a slidable cover for said opening, said cover being confined between the inner wall of the upright member and the inner edge of the stiffening-web.

6. In combination with a window-frame, a slidable sash working in grooves therein, one of the edge walls of the sash being movable to and from the frame, pivotal links supporting said movable wall so that it shall have a free movement to and from the frame, means for restricting this movement, whereby the sash may slide freely in the frame without becoming disengaged therefrom, and means for releasing the movable wall so that it may be drawn back into the sash-frame to permit the sash to be removed from the window-frame.

7. In combination with a window-frame, of a sash adapted to slide therein and carrying a movable edge wall, means for supporting this edge wall so that it shall have a free normal play to and from the frame while the sash is open, means for projecting this movable wall toward the frame to lock the sash against movement in the frame, and means whereby the movable wall is limited in its movement and may be released for withdrawal back into the sash, said means consisting of a pin attached to the movable wall and projecting through a slot in the adjacent wall of the sash, and a movable locking-arm carried by the sash and having a slotted end in engagement with said pin, for the purposes set forth.

8. In combination with a window-frame, a sash working and guided therein, and means for tightening the sash against rattling and a device for actuating said means by the act of closing the sash.

9. In combination with a window-frame provided with grooves a sash provided with flanges working in said grooves, said flanges being movable to and from the frame, and means operated by the closing of the sash to project the flanges tightly against the frame to lock the sash against rattling and ingress of air.

10. In combination with a vertical window-frame, a sash vertically guided therein and carrying in one of its rails a gravitating strip carrying flanges adapted when projected beyond the edge of the sash to engage the window-frame, and a depending part adapted by the closing down of the sash to project said flanges and tighten the sash against rattling.

11. In combination with a frame member, a sash member sliding therein, a guide carried by one of the members and working in a groove in the other member, and a device for projecting the guide member upon the casing of the sash member.

12. In combination, a window-frame, a sash slidable therein a guide carried by the sash and adapted to engage the window-frame this guide being movable to and from the window-frame, and a device connected to the guide and projecting beyond the end of the sash whereby when the sash is closed the guide member will be forced tightly against the window-frame.

13. In combination, a window-frame, a sash,

a guide-carrying strip inclosed in the sash-bar and movably supported therein, a device whereby the guide-carrying strip may be locked in its projected position, or permitted to recede into the sash-bar, and means for automatically tightening the guide against the window-frame when the sash is closed.

14. In combination with a window-frame, a sash working in grooves therein, one of the edge walls of the sash being movable to and from the window-frame, means for actuating the movable edge-wall for the purpose set forth, a bracket attached to a stationary part of the sash and projecting through an opening in said movable wall, weight-chains connected to the sash, one of the chains being connected to the projecting end of said bracket.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 1st day of September, 1905.

ROBERT C. LIEB.

Witnesses:
H. H. ADKINS,
A. W. LAWSON.