No. 763,471. PATENTED JUNE 28, 1904.

H. E. ESSIG.

HORIZONTALLY PIVOTED WINDOW.

APPLICATION FILED JAN. 16, 1904.

NO MODEL. 4 SHEETS—SHEET 1.

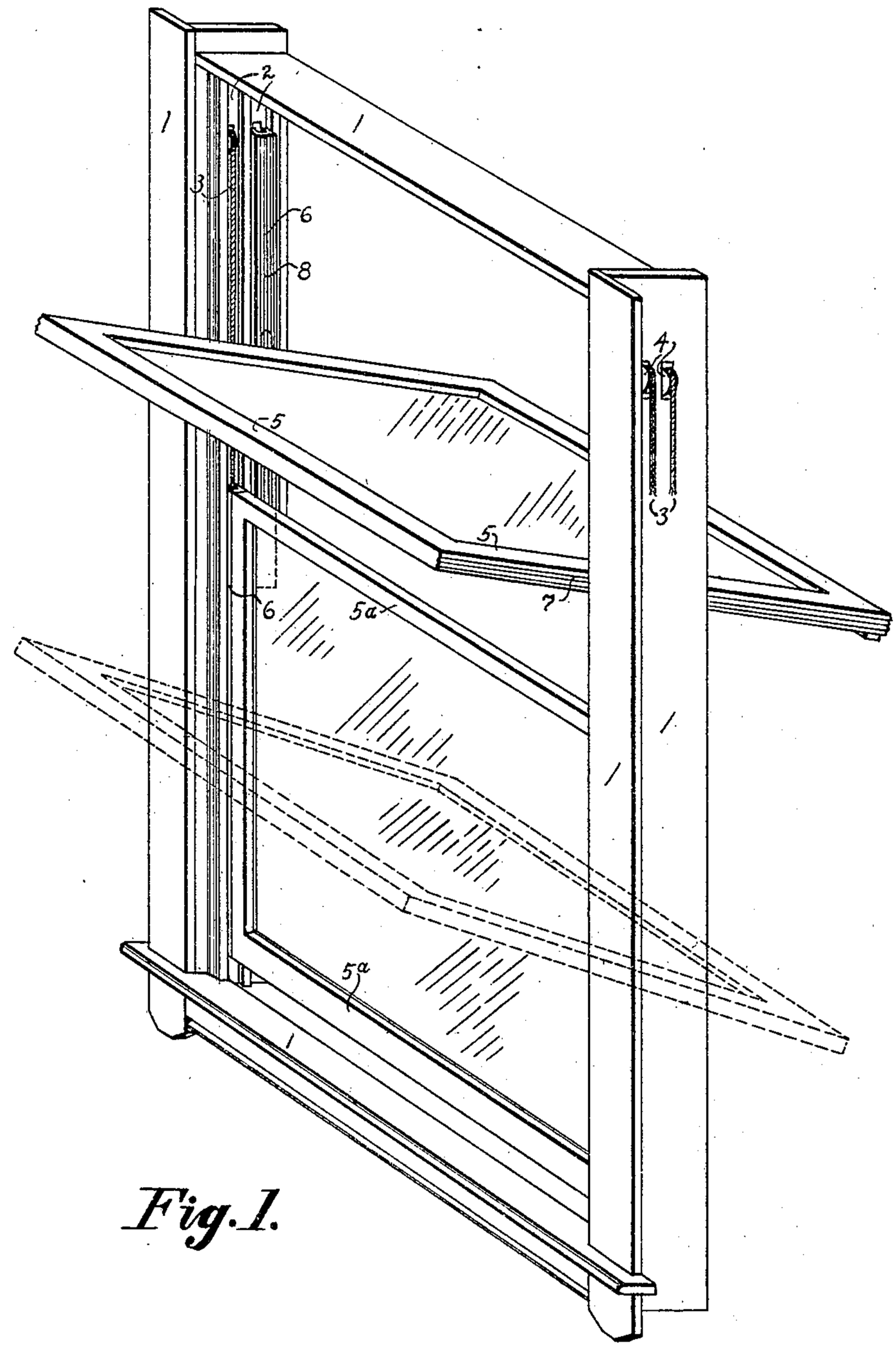

Fig. 1.

WITNESSES

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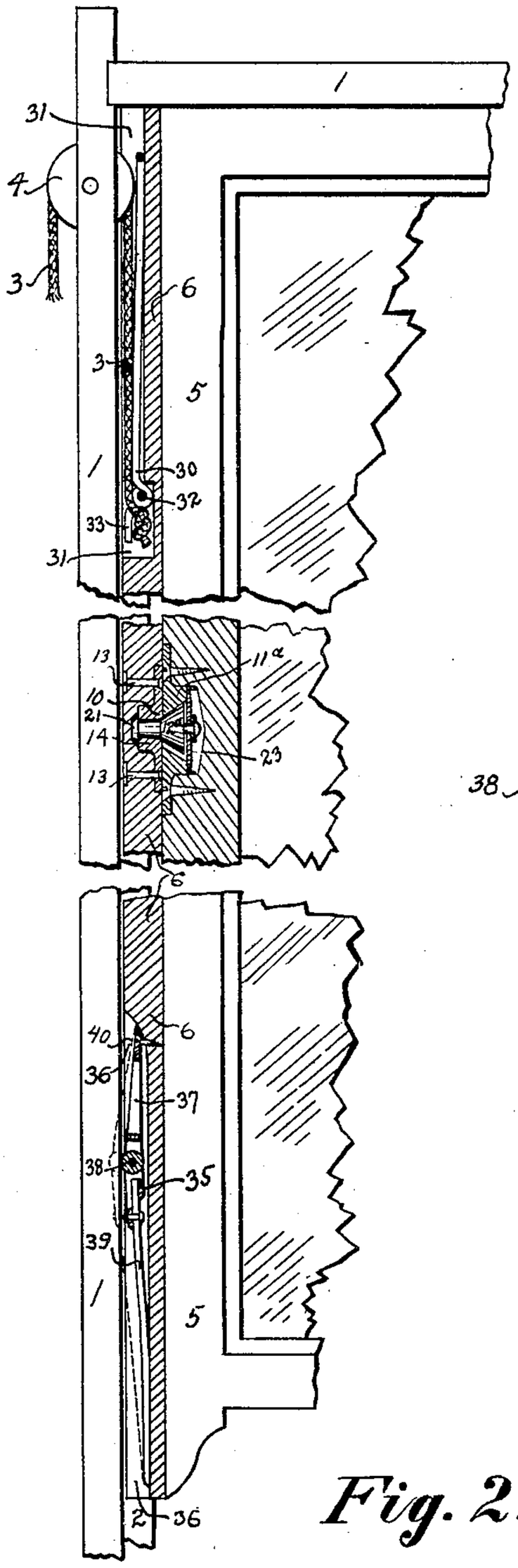

Fig. 2.

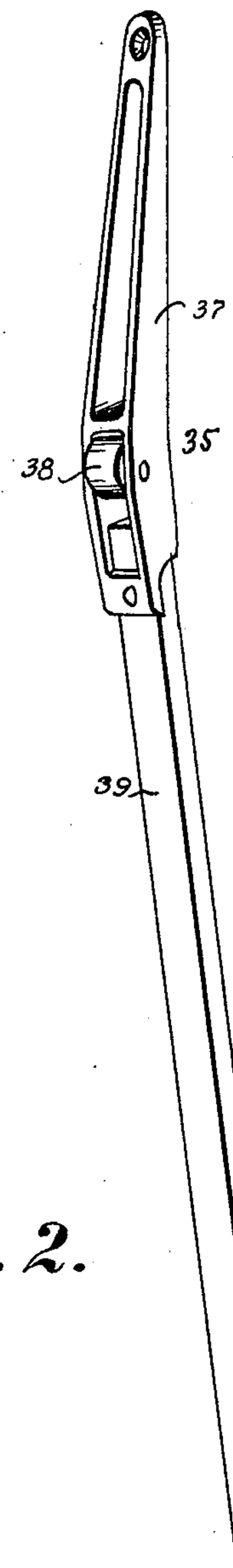

Fig. 3.

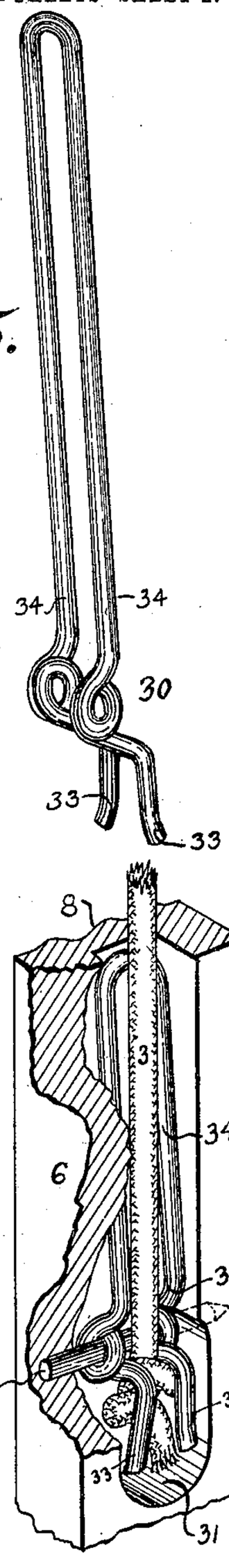

Fig. 4.

Fig. 5.

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NO MODEL. 4 SHEETS—SHEET 3.

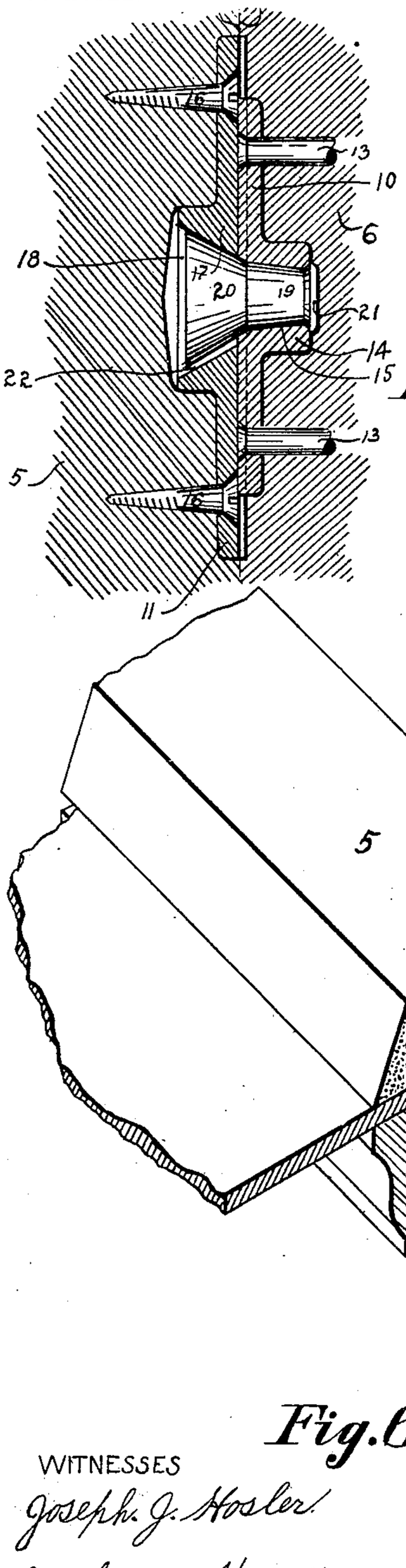

Fig. 7.

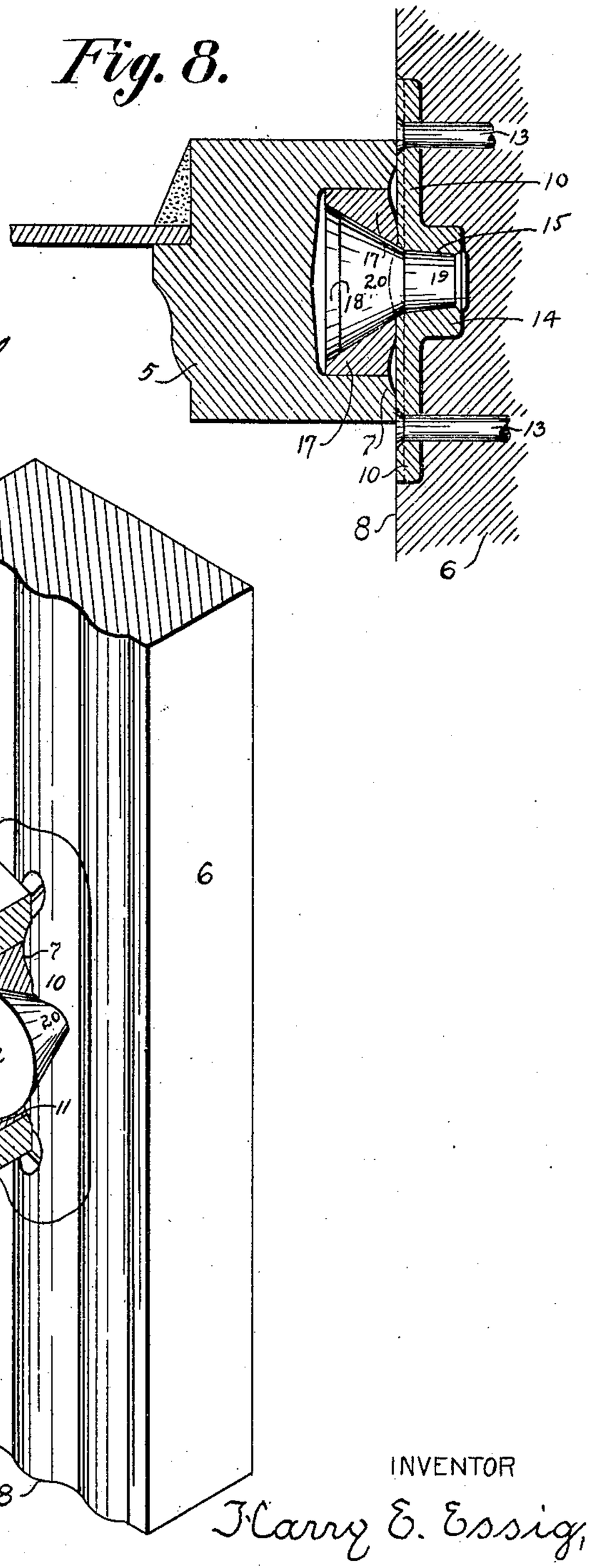

Fig. 8.

Fig. 6.

WITNESSES

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NO MODEL. 4 SHEETS—SHEET 4.

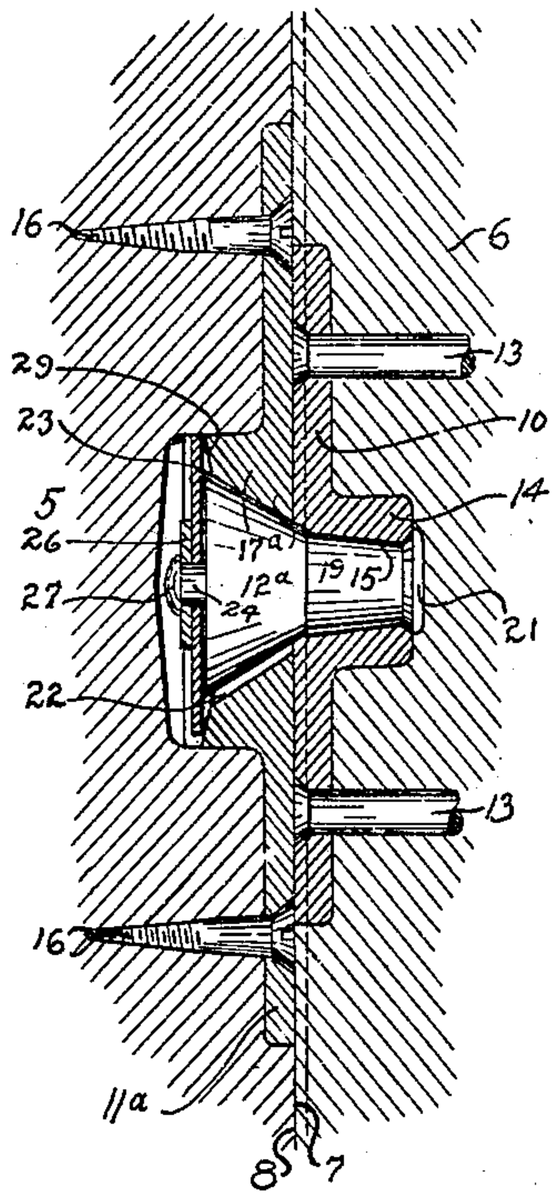


Fig. 9.

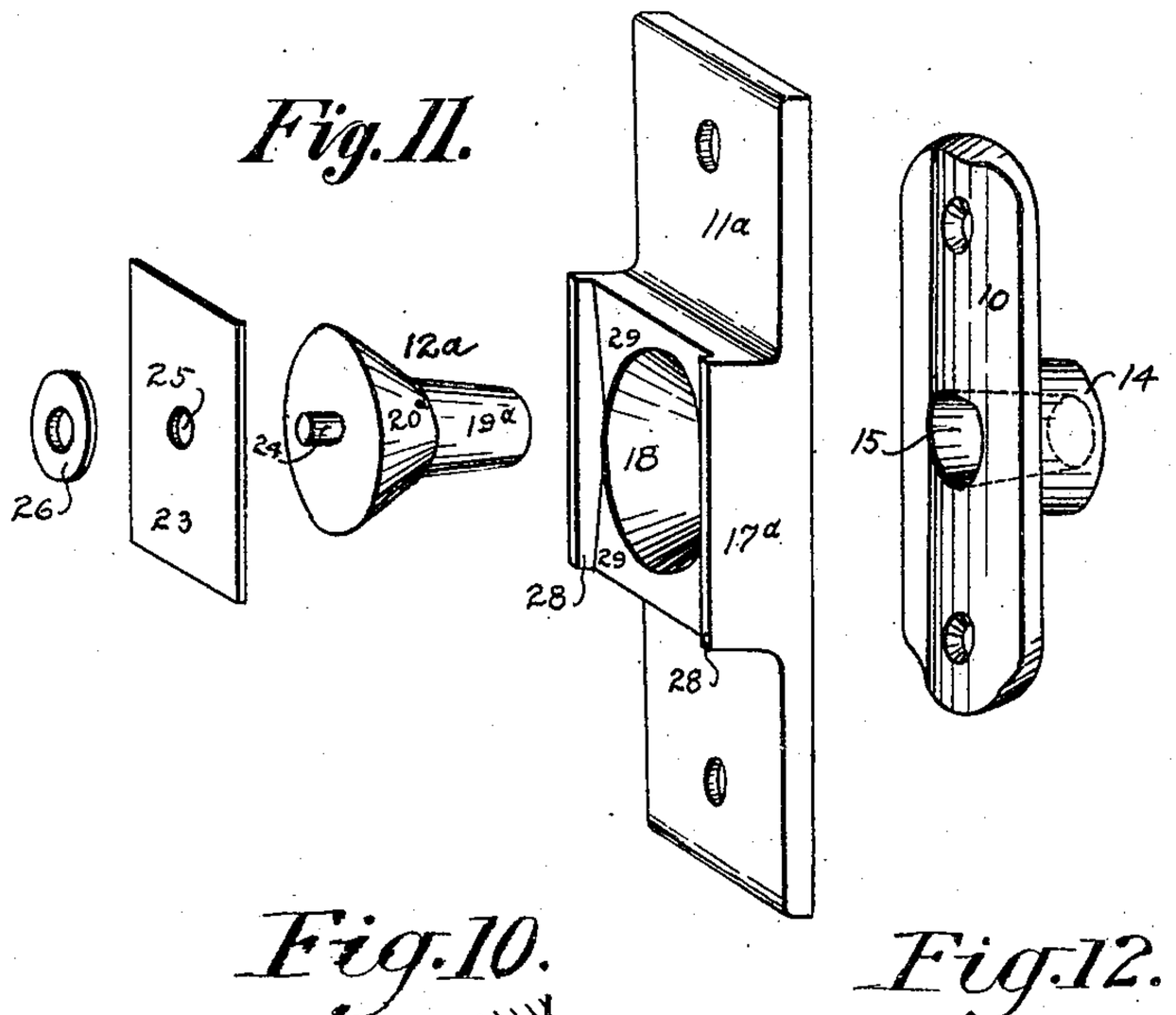


Fig. 11.

Fig. 12.

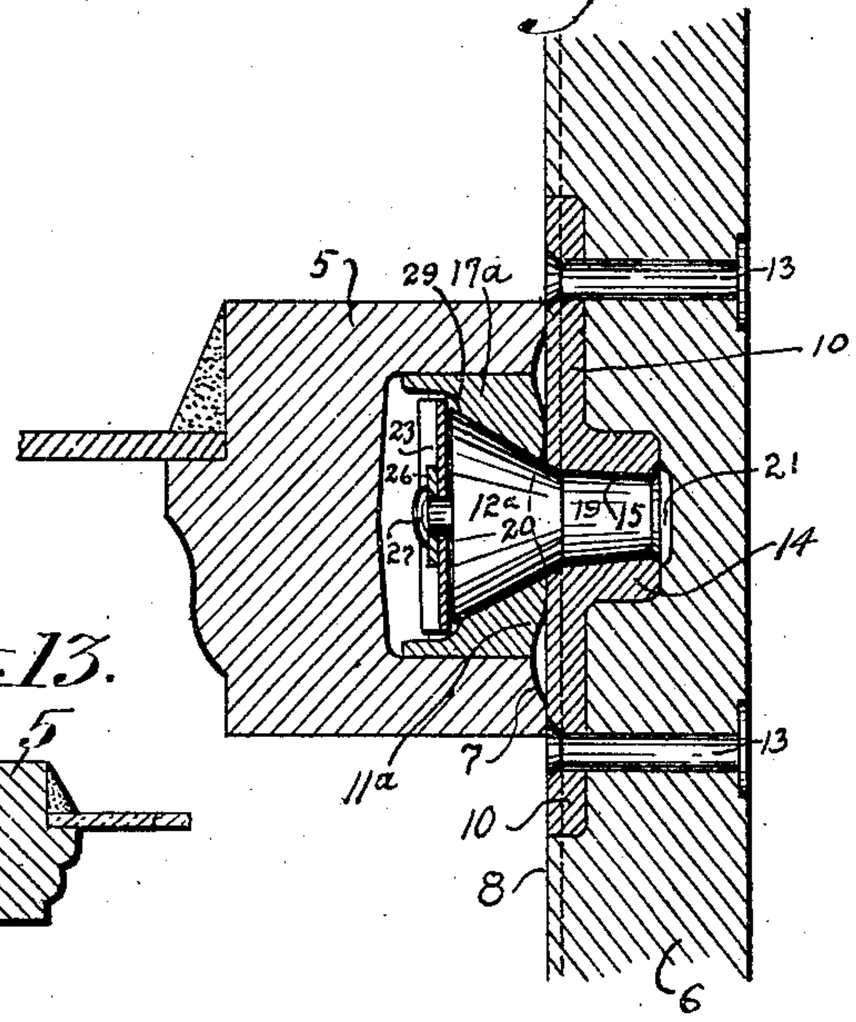
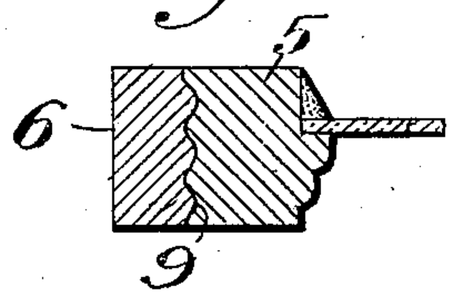
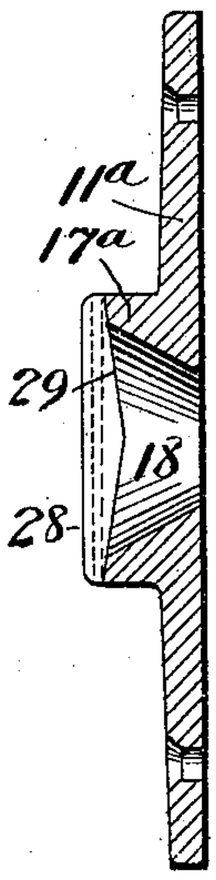


Fig. 13.





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BY

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No. 763,471. Patented June 28, 1904.

UNITED STATES PATENT OFFICE.

HARRY E. ESSIG, OF CANTON, OHIO, ASSIGNOR TO THE WILLIAMS PIVOT SASH COMPANY, OF CLEVELAND, OHIO, A CORPORATION.

HORIZONTALLY-PIVOTED WINDOW.

SPECIFICATION forming part of Letters Patent No. 763,471, dated June 28, 1904.

Application filed January 16, 1904. Serial No. 189,306. (No model.)

To all whom it may concern:

Be it known that I, HARRY E. ESSIG, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Horizontally-Pivoted Windows, of which the following is a specification.

The invention relates to windows having the sash horizontally pivoted to strips on each side, which strips are adapted to be moved laterally and to travel longitudinally in the grooves of the window-frame; and the objects of the improvements are to provide pivotal connections which will at all times draw and hold the strips tightly against the side edges of the sash, to provide a spring-cam connection between the weight-cords and the strips by which the upper ends of the strips are forced and held tightly against the side edges of the sash when it is alined with the strips, in each case utilizing the weight of the sash and its glass to automatically accomplish the result, and to provide springs on the lower parts of the strips with roller-bearings acting to press and hold the lower parts of the strips tightly against the side edges of the sash when it is alined with the strip and at the same time steadying the window in its movements. I attain these objects by the arrangement, construction, and mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a window and its frame, showing the lower sash alined with its side strips and the upper sash rotated on its pivotal connections; Fig. 2, an elevation of one side of a window and its frame, partly in section, showing the location of the several devices; Fig. 3, a detached view of the spring roller-bearing; Fig. 4, a perspective view showing the connection of the weight-cord with the sash-strip; Fig. 5, a detached perspective view of the spring-cam cord connection; Fig. 6, a perspective view showing the simple form of the pivotal connection of the sash with the side strip; Fig. 7, a longitudinal section of the same, showing the sash alined with the strip; Fig. 8, a similar view showing the sash rotated on the strip; Fig. 9, a longitudinal section of the sash and strip alined, showing the spring binding-plate applied to the pivotal connection; Fig. 10, a similar view showing the sash rotated on the strip; Fig. 11, detached views of the several parts of the pivotal connection in relative position for assembling with the spring binding-plate; Fig. 12, a longitudinal section of an alternate form of the bearing-plate, showing the normal position of the spring binding-plate in broken lines; and Fig. 13, a cross-section showing the side strip on the edge of the sash.

Similar numerals refer to similar parts throughout the drawings.

The window-frame 1 is made in the usual manner with the side grooves 2 for receiving the respective sash-strips and is provided with the ordinary weight chains, cables, or cords 3 and the pulleys 4. The sash 5 and 5^a are each made less in width than the inside clear width of the frame, and the usual strips 6 are pivoted on the side edges of the sash and are adapted to operate in the respective frame-grooves. The adjoining faces 7 and 8 of the sash edges and side strips are grooved and rigid or corrugated, as shown, so that when the sash and strips are alined and brought together the respective ridges enter and fit into the corresponding grooves, as shown particularly at 9 in Fig. 13, and when the sash are rotated on the strips the ridges are forced out of the grooves and bear against the crests of the opposing ridges, thus separating the strips from the sash according to the depth of the corrugations, as shown in Figs. 6, 8, and 10.

Each pivotal connection is composed of the pivot-plate 10, the bearing-plate 11, and the pivot proper, 12, and is preferably located in the transverse axis of the sash. The pivot-plate 10 is countersunk in the sash side of the strip, where it is attached by screws or by the rivets 13. The face of the pivot-plate is corrugated like the side strip, and on the rear side is preferably provided the central hub 14, in which is formed the pivot-aperture 15, which aperture is preferably tapered from the face of the plate toward the back, thus forming a more extended and firmer connection for the pivot-shank.

The bearing-plate 11 is countersunk in the side edge of the sash, where it is attached, as by the screws 16. The face of the bearing-plate is corrugated like the edge of the sash and on the rear side is preferably provided the central hub 17, in which is formed the bearing-socket 18. The bearing-socket is considerably flared from the face of the plate toward the back, thus shaping the socket as a truncated cone.

The pivot proper, 12, is formed with the tapered shank 19, which is adapted to be tightly entered into the pivot-plate aperture and with the flared or truncated cone-shaped head 20, which is adapted to operate in the bearing-socket. The tapered shank is preferably made with straight sides in the first instance, as shown in Fig. 11, and after it is tightly entered in the pivot-plate aperture the end is upset to form the rivet-head 21, by means of which a firm and fixed connection is made between the pivot and the plate.

The relation between the size of the pivot-head and the bearing-socket is such that when the strip is alined with the sash and closed against it the pivot-head is somewhat smaller in diameter than the bearing-socket and the contact-surface of the bearing is limited to the upper side of the head, thus leaving the intervening space or interval 22 on the lower side thereof, as shown in Figs. 2, 7, and 9, as a result of which the weight of the sash and its glass being carried on a bearing-surface inclined downward toward the strip acts to crowd or wedge the sash against the strip or, conversely, to draw and hold the strip against the side edge of the sash, and as the sash is rotated and the strips are forced by the corrugations away from the side edges the sash is raised up along the inclined bearing-surface, and when the separation of the strip from the sash is completed the pivot-head is drawn into the bearing-socket, so that it nearly or quite fills it and brings into play the full bearing-surface. In this position the weight of the sash continues to be carried on the upper side of the pivot-head, and by reason of this inclined bearing the sash and strip continue to be wedged or drawn together, so that there is a binding friction between the ribs of the sash and of the strips, which acts to hold the sash in any given position of rotation, and when the sash is brought to an alinement with the strips they are automatically drawn and held tightly together by the same means.

As an additional means for binding the sash and the strip together when the sash is rotated it is sometimes desirable to use the spring-plate 23, which is loosely connected on the large end of the head 20^a of the pivot 12^a by means of the round axial pin 24 formed thereon, which pin is passed through the central aperture 25 of the spring-plate, after which the washer 26 is preferably applied and the end of the pin is upset to form the head 27, as shown in Figs. 9 and 10, which head, however, does not bind tightly against the washer. This loose connection of the spring-plate on the axial pin of the pivot-head permits this head and the pin to be rotated with reference to the spring-plate by the turning of the pin in the central aperture of the spring-plate.

When the spring-plate is used, the side flanges 28 are provided on the rear end of the hub 17^a of the bearing-plate 11^a to hold the plate against rotation with reference to the hub, and the rear face 29 of the hub is inclined inward from the upper and lower edges, so that only the ends of the spring-plate will normally bear against the face of the hub, as shown by broken lines in Fig. 12, which is the position of the parts when the strip is alined with the sash and drawn closely to it, and in this relation of the parts the spring-plate ends merely touch the face of the hub and the spring is not designed to be in action; but when the sash is rotated and the pivot-head is drawn into the bearing-socket by the separation of the strip and the sash the spring-plate is brought into action by being bent in the middle, and its energy is engaged in pulling or drawing the strip and sash more tightly together and by increasing the friction of the respective ridges of the corrugations against each other serves further to bind and hold the sash in a given position of rotation

It will be understood that the spring binding-plates are only designed and used to supplement the inclined bearings of the pivotal connections when the sash is rotated out of alinement with the side strips, that they are not designed or intended to act at all to draw or hold the strips against the sash when they are alined, and that the simple truncated cone-shaped pivot-head operating in the similarly-shaped but slightly larger bearing-socket constitutes a complete device in itself and is ordinarly the preferred form.

The spring-cam connection 30 for the weight-cord is located in the recess 31 in the frame side at the upper end of each side strip and is preferably made of strong but elastic wire bent and formed as shown in Fig. 5. The cam is pivoted on the pin 32 some distance below the upper end of the sash-strip, and from the pivotal point the separate prongs 33 extend first outward toward the frame, thence downward, thus forming the forked hook, in which the knotted end of the weight-cord is engaged and from which the cord passes upward on the outer side of the pivot-pin that is between the pivot and the frame.

The spring-arm 34 of the cam preferably extends first outward from the pivotal point to clear the bottom of the strip recess, thence upward and inward for a considerable distance, so that only its upper end normally has a bearing against the sash-strip. The weight

of the window acting along the line of the cord on the outer side of the cam-pivot tends to rotate the cam and to force the spring-arm against the upper end of the sash-strip, and thereby to hold it tightly against the edge of the sash when the strip is alined with it. By making the spring-cam of wire, as shown, with the spring-arm in the form of a loop, the sides of the loop are well adapted to straddle the weight-cord and also the pulley in case it is desirable to extend the end of the arm to pass above the pulley, and a convenient connection with the pivot-pin is made by a turn or two of the wire around it, after which the ends of the wire are bent to form the prongs of the forked hook, and when the long spring-arm is flexed quite a considerable extent of its upper part is laid flat against the bottom of the strip-recess, so that its energy is exerted along an equal extent of the side strip, as shown in Fig. 2.

The spring-bearing 35 is located in the groove 36 in the frame side at the lower end of each side strip and is composed of the bracket 37, the roller 38, and the spring-arm 39. The bracket is transversely pivoted or loosely connected at its upper end to the side strip at a considerable distance from its lower end, as by the screw 40, and thence it extends downward and outward away from the bottom of the strip-groove and toward the window-frame. The roller 38 is transversely pivoted near the lower end and in the most protruding part of the bracket, and part of the roller is exposed on the outer side of the bracket to bear against the bottom of the frame-groove.

The spring-arm 39 is preferably made of a long straight strip of strong but elastic wood and is suitably connected by its upper end to the lower end of the bracket, and thence it extends downward and inward toward the bottom of the strip-groove, so that normally its lower end only rests against the bottom of the groove at or near the lower end of the strip. The normal relation of these parts when the spring-arm is not flexed is such that the roller would stand farther away from the side strip than the bottom of the frame-groove, as shown by broken lines in Fig. 2; but when the sash and strip are entered in the frame the spring-arm is flexed, and the bracket is swung back on its pivotal or loose connection, and the roller is brought to bear against the bottom of the frame-groove, to the effect that the energy of the spring-arm acts to force the lower end of the side strip away from the window-frame—that is, against the edge of the sash when it is alined with the strip. When the long spring-arm is flexed, quite a considerable extent of its lower part is laid flat against the bottom of the strip-groove, so that its energy is exerted along an equal extent of the side strip, which with the pressure of the bracket at its point of connection against the strip at a considerable distance above the lower end serves to press and hold the entire lower section of the side strip against the edge of the sash when the strip and sash are alined, as shown by full lines in Fig. 2.

It will be apparent that the parts of the pivotal connection can be transposed on the sash and the strip without affecting the principle of its operation, that the operation of the pivotal connection and the other devices to draw and hold the sash and strip together would operate just the same if their adjoining faces were not corrugated, that the spring-cam operates as an ordinary cam rotated by the weight of the window-sash with its projecting part made quite long and as a spring, but that its operation would be substantially the same with a shorter and inflexible projection, and that some of the features of the cam-spring and spring-bearing are designed to adapt them to perform their functions efficiently in the specially-constricted places in which they have to be located.

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

1. In combination, a window-sash and a separable strip on its side edge, there being corresponding corrugations on the adjoining faces, and a pivotal connection between the sash and the strip comprising a truncated-cone-shaped bearing-socket in the one and a similarly-shaped slightly-smaller pivot-head on the other adapted to operate in the bearing-socket.

2. A pivotal connection for a window-sash and a separable strip comprising a truncated-cone-shaped bearing-socket in the one and a similarly-shaped slightly-smaller pivot-head on the other adapted to operate in the bearing-socket, and a spring binding-plate on the pivot-head adapted to resist the separation of the strip from the sash.

3. A pivotal connection for a window-sash and a separable strip comprising a truncated-cone-shaped bearing-socket in the one and a similarly-shaped slightly-smaller pivot-head on the other adapted to operate in the bearing-socket, and a spring adapted to resist the separation of the strip from the sash.

4. A pivotal connection for a window-sash and a separable strip comprising a truncated-cone-shaped bearing-socket in the one and a similarly-shaped slightly-smaller pivot-head on the other adapted to operate in the bearing-socket.

5. A pivotal connection for a window-sash and a separable strip comprising a truncated-cone-shaped bearing-socket in the one and a similarly-shaped pivot-head on the other adapted to operate in the bearing-socket.

6. A pivot for a window-sash and a separable strip having an inclined bearing-surface whereby the weight of the one acts to draw and hold the two together.

7. In combination, a window-frame having a weight with a cord passed over a pulley, a

sash having a separably-connected strip on its side edge, and a connection for the cord and the strip comprising a cam pivoted on the strip and eccentrically attached to the cord, there being a spring-arm on the cam adapted to be rotated by the weight of the sash to press the strip toward the sash.

8. In combination, a window-frame having a weight with a cord passed over a pulley, a sash having a separably-connected strip on its side edge, and a connection for the cord and the strip comprising a cam pivoted on the strip and eccentrically attached to the cord, the cam-arm being adapted to be rotated by the weight of the sash to press the strip toward the sash.

9. A connection between a separable sash-strip and a sustaining-cord comprising a cam pivoted on the strip and eccentrically attached to the cord, there being a spring-arm on the cam adapted to be rotated by the weight of the sash to press the strip toward the sash.

10. A connection between a separable sash-strip and a sustaining-cord comprising a cam pivoted on the strip and eccentrically attached to the cord, the cam-arm being adapted to be rotated by the weight of the sash to press the strip toward the sash.

11. A cam connection for a separable sash-strip and a sustaining-cord comprising a wire bent as an elongated loop to form the arm, circular loops formed to embrace the pivot, and the free ends bent to engage the cord.

12. In combination, a window-frame, a sash having a separably-connected strip on its side edge adjacent to the frame, and a bearing for the strip comprising a bracket loosely connected at one end to the strip, an elongated spring attached at an angle apart from the strip to the other end of the bracket with its free end against the strip, and a roller pivoted on the bracket and adapted to bear against the frame to flex the spring and press the strip toward the sash.

13. A spring-bearing for a separable sash-strip comprising a bracket loosely connected at one end to the strip, an elongated spring attached at an angle apart from the strip to the other end of the bracket with its free end against the strip, and an exposed roller pivoted on the protruded part of the bracket.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HARRY E. ESSIG.

In presence of—
HARRY FREASE,
PETER G. WILLIAMS.