Feb. 10, 1931. S. C. DREHER 1,791,808

CASEMENT WINDOW

Filed Oct. 30, 1929 2 Sheets-Sheet 1

Fig. 1.

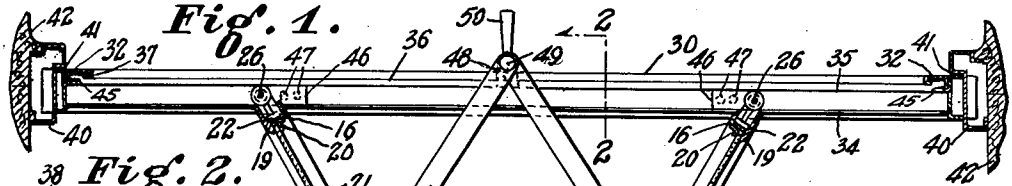


Fig. 2.

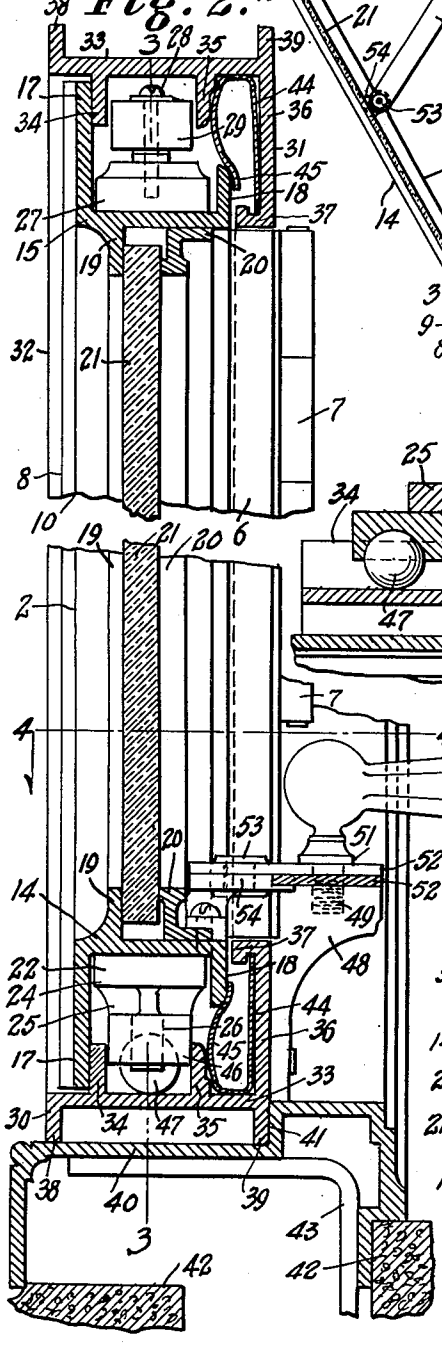


Fig. 3.

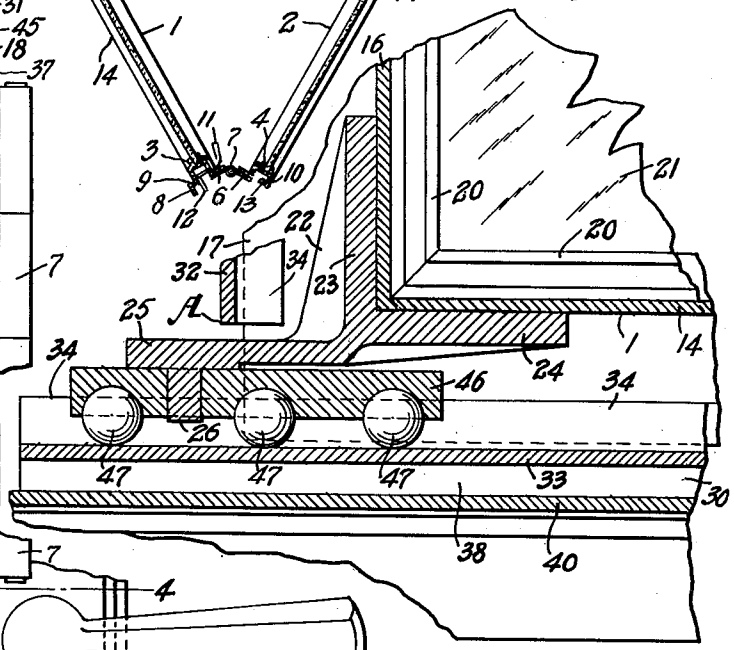
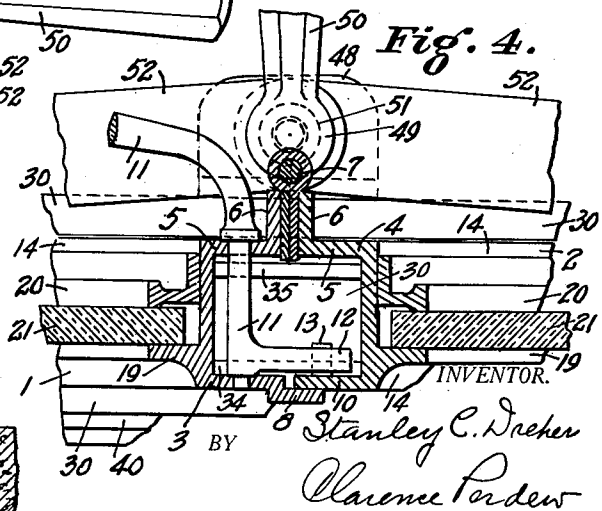


Fig. 4.



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Fig. 5.

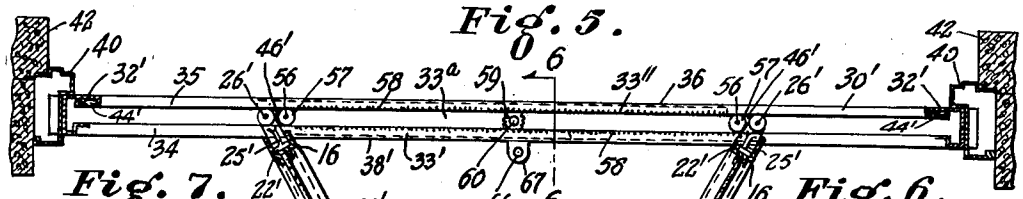


Fig. 7.

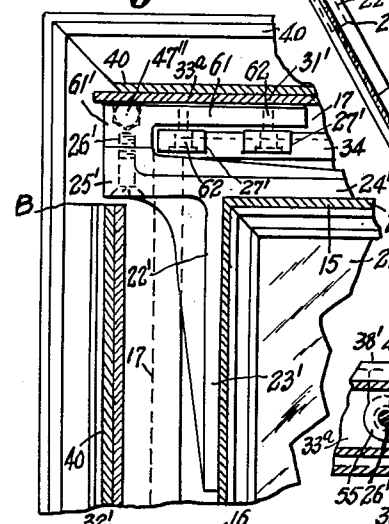


Fig. 6.

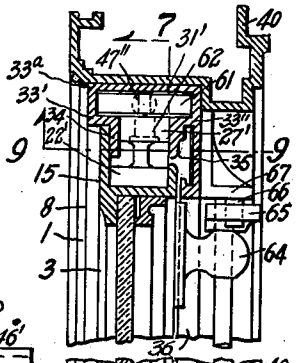


Fig. 8.

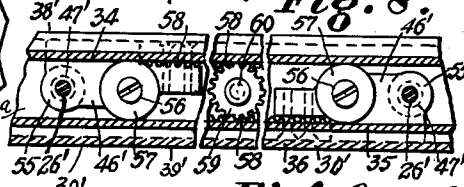


Fig. 9.

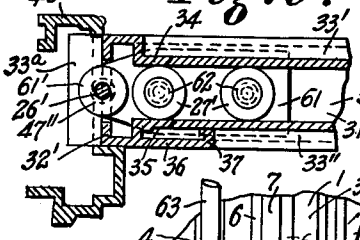
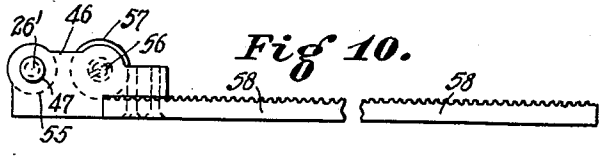


Fig. 10.



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UNITED STATES PATENT OFFICE

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CASEMENT WINDOW

Application filed October 30, 1929. Serial No. 403,605.

My invention relates to windows in which the sash is hinged on a vertical axis, and its object is to make possible the easy operation of relatively large windows of that character, as well as to provide tight and secure closure thereof. Other objects will appear in the course of the following description.

I attain these objects by the device illustrated, for example, in the accompanying drawings, in which—

Figure 1 is a sectional plan;

Fig. 2 is a vertical section on the plane of the line 2—2 of Fig. 1, with intermediate portions omitted;

Fig. 3 is a vertical section on the plane of the line 3—3 of Fig. 2, of a lower corner of a sash and adjacent portions of the sill, illustrating the pivotal and rolling mounting, the glass and its fastening strips being in elevation;

Fig. 4 is a partial horizontal section on the plane of the line 4—4 of Fig. 2;

Fig. 5 is a sectional plan of a modification;

Fig. 6 is a vertical section on the plane of the line 6—6 of Fig. 5, with intermediate portions omitted;

Fig. 7 is a vertical section on the plane of the line 7—7 of Fig. 6, of one side portion of a sash and adjacent portions of the frame, illustrating the pivotal and rolling mounting of this modification, the glass and its fastening strips being in elevation;

Fig. 8 is a horizontal section on the plane of the line 8—8 of Fig. 6, of middle portions of the sill;

Fig. 9 is a horizontal section on the plane of the line 9—9 of Fig. 6, of an upper corner portion of the frame, illustrating the upper mounting; and

Fig. 10 is a detail inverted plan of one of the lower pivot carriers and its rack, an intermediate portion of the latter being omitted.

In Figs. 1 to 4, inclusive, each sash 1 and 2 has an upright meeting rail 3 or 4, respectively, of channel shaped cross-section with the inner flange 5 provided with an inward projection 6 to which is fastened a respective leaf of a hinge 7. The outer flange 8 of the sash 1 is offset outwardly at 9 (Fig. 4) and extended to overlap the outer flange 10 of the other sash 2 when the window is closed. A latch 11 turns in the inner flange 5 of the overlapping sash 1, and has a hook 12 hooking over a pin 13 extending in from the inner side of the outer flange 10 of the other sash 2, to hold the sashes firmly in line and close together when the latter are closed. The bottom rail 14, top rail 15 and opposite end rail 16 of each sash 1 and 2 are of uniform cross-section in the shape of a channel with its outer flange 17 deeper than its inner flange 18. Projecting from the outer portions of the channel webs of all the sash rails, in the opposite direction from their respective flanges 5 and 8, or 17 and 18, are beads 19; and fastening strips 20, secured to the webs, hold the glass 21 against these beads 19, in well known manner.

On the lower corner of the end of each sash 1 and 2 opposite from its meeting end, a bracket 22 of T shape, inverted, has the stem 23 and one horizontal member 24 (Fig. 3) fixed to the webs of the end rail 16 and bottom rail 14 between their flanges 17 and 18. The other horizontal member 25, which is offset downwardly, projected some distance from the end of the sash, has a depending pivot pin 26. On the corresponding upper corners of the sashes 1 and 2, brackets 27, one of which is partly shown in Fig. 2, are secured to the webs between the flanges, and have upstanding screws 28 on which rollers 29 are journaled in vertical alinement with the respective pivot pins 26.

The sill 30, cap 31 and jambs 32 of the window frame are of uniform cross-section comprising a web 33 integral with an outermost flange 34, an intermediate flange 35, and an innermost flange 36; the first two being of equal depth and the last being considerably deeper and having on its terminal edge a bead 37 projecting outward a short distance and then a short distance toward the web 33. These three flanges 34, 35 and 36 all project from the side of the web 33 that is presented toward the sashes 1 and 2; and the web 33 extends out past its outermost flange 34, with an outer edge flange 38 projecting in the opposite direction, while an inner edge flange 39,

of equal depth, also projects in this opposite direction, being alined with the innermost deep flange 36, which is at the inner edge of the web 33. These oppositely projected flanges 38 and 39 bear against the window casing 40, having a shoulder 41 abutted by the inner one 39 of these flanges. It will be understood that these frame members 30, 31 and 32 all are suitably secured to the respective members of the casing 40; and the latter is fastened against the building wall elements 42 by straps 43, one of which is shown at the bottom of Fig. 2.

The sash rails 14, 15 and 16 and the sill 30, cap 31 and jambs 32 have their respective flanges, just described, so located and proportioned that when the window is closed the outer flanges 17 of the sashes lap across and engage the outer sides of the outermost flanges 34 of the frame members, and the inner flanges 18 of the sashes closely approach the beads 37 of the innermost flanges 36 of the frame members, with the webs of the sash rails in the planes of the outwardly projecting portions of these beads 37. The space between the innermost frame flange 36 and the intermediate frame flange 35, throughout the length of each frame member, is occupied by a weather strip of deep U-shaped cross-section, the inner element 44 of which is flat, lying along the innermost flange 36 with its edge retained in the groove that is formed by the turning in of the bead 37 of this flange, while the bottom of the U shape is against the frame web 33, and the outer element 45 is engaged and bowed inward by the sash flange 18.

The pivot carriers 46 fit loosely between the outermost flange 34 and intermediate flange 35 of the sill 30, each having an opening receiving the pivot pin 26 of the lower bracket 22 of a respective sash. Also, in its lower surface, each carrier 46 has a series of sockets receiving balls 47 resting on the web 33 of the sill. The upper rollers 29 of the respective sash brackets 27 fit loosely between the corresponding flanges 34 and 35 of the cap 31.

At the middle of the inside of the window, a ledge 48 is fixed to the inner side of the sill 30, projecting upward and inward therefrom. A binding screw 49 is threaded into the top of this ledge and has on its upper end a handle 50, just below which it has an annular flange or shoulder 51. Links 52 have ends embracing this screw 49 and adapted to be clamped between the screw shoulder 51 and the ledge 48; or, if the screw is loosened, these links may swing, with the screw as a pivot. The opposite ends of these links 52 are pivoted on studs 53 in ears 54 fixed to and extending inward from the bottom rails 14 of the respective sashes 1 and 2. These pivotal connections of the links to the sashes are so located, and the links are of such length, as to allow the sashes 1 and 2 to be closed in alinement with the window frame; the connections being, as here shown, slightly less than half way from the pivotally supported ends of the sashes to the hinged ends thereof. The result of this connection is to prevent the two hinged-together sashes to move toward one end or the other of the window frame, compelling their hinge 7 to follow a line at right angles to the direction of travel of the pivotal supports of the sashes in the guiding channels of the sill and cap, in opening the window, as may be understood from Fig. 1.

The links 52 not only thus control the position of the sashes, but by tightening the binding screw 49, they will hold the sashes at any desired degree of opening. When the sashes are closed they overlap the frame outermost flanges 34 and the resilient weather strip element 45, affording two-place weather-excluding contact all around the frame; and the meeting rail flanges 8 and 10 overlap in addition to the closure at the hinge 7.

In Figs. 5 to 10, inclusive, the sashes 1 and 2 are like those of the first example, with meeting rails 3 and 4 (Fig. 5) and bottom, top and end rails 14, 15 and 16, respectively, of the same cross section as those before described. The window frame members also are similar, the sill 30′, cap 31′ and jambs 32′ having the innermost flange 36 with its bead 37 and weather strip 44′ (Fig. 6). Its outermost flange 34 and intermediate flange 35 are also the same; but instead of the web being continuous between these they join an outer wall 38′ and the innermost flange 36 by separate webs 33′ and 33″, respectively, and an inner wall 39′ alined with the innermost flange 36 has its edge joined with the edge of the outer wall 38′ by a web 33^a which lies against the window casing 40. This casing 40 is like that of the preceding example, and is mounted in the building wall in the same way.

The sashes 1 and 2 have bottom and top corner brackets 22′, all of the same shape and, in general, similar to the lower brackets 22 of the first example, and being fixed to the sashes by their members 23′ and 24′ between the sash flanges 17 and 18 thereof. The projecting members 25′ have, extending downwardly from the upper one and upwardly from the lower one, pivot screws 26′. Each lower pivot carrier 46′ comprises an upstanding hub 55 receiving the respective pivot screw 26′, and, below this, a socket receiving a ball 47′. Extending under the respective sash 1 or 2, the carrier 46′ has an upright pin 56 on which is journaled a ball bearing roller 57; and one side of this extension of the carrier is recessed and receives one end part of a respective rack 58, screwed to the side of the recess. The parts just described are so proportioned and arranged that, with the ball 47′ resting on the web 33^a of the sill 30, the roller 57 is between and guided by the sill

flanges 34 and 35, while the racks 58 lie in the lower portion of the sill 30. The carriers 46′ of the two sashes are inversely arranged, allowing one rack 58 to fit under the outer web 33′ against the outer wall 38′, and the other rack 58 to fit under the inner web 33″ against the inner wall 39′; each rack presenting its teeth toward the middle of the sill 30 and meshing in common with a pinion 59 journaled on an upright pin 60 midway of the length of the sill, in the web 33ª.

Each upper pivot carrier 61 comprises a depending hub 61′ receiving the respective pivot screw 26′, and, above this, a socket receiving a ball 47″. Extending over the respective sash 1 or 2, the carrier 61 has an upper widened arm with depending pins 62 spaced longitudinally therealong, on which are journaled the rollers 27′. With the ball 47″ bearing up against the web 33ª of the cap 31′, the rollers 27′ fit loosely between the flanges 34 and 35 of the cap, while the widened arm lies in the spaces above the webs 33′ and 33″ thereof.

In this example, the racks 58, connected to the respective sashes 1 and 2 and both meshing with the single pinion 59 which is journaled on the fixed pin 60, prevent the two hinged-together sashes from moving toward one or the other end of the window frame, as the links do in the first example.

To latch the sashes in closed position, a rod 63 is journaled upright in bearing heads 64 projecting from the sash 1, and has fixed on its upper and lower end parts, respectively, hooks 65 to engage lugs 66 on ledges 67 fixed to the cap 31 and the sill 30. The handle 68 for turning this rod 63 is pivoted to swing up and down thereon, and has an extension with a hook 69 to hook over a button 70 on the other sash 2 when the sashes are closed together.

In either example, the sashes 1 and 2 are so operatively connected to each other and to the window frame as always to move in unison. The balls 47, or 47′ and 47″, rolling on the window frame webs, support the sashes with respect to vertical thrust, and the rollers carry the side thrusts. Thus, though the sashes collectively are a cantilever upon opening, they move easily at all points of their travel. The arrangement of the overlapping and mutually contacting parts of the sashes and frame is such that the two-place closure is effected easily and smoothly by the resultant movement of the sashes; and the latching or locking, in either example, is such as to draw the sashes tightly together at their places of contact, and tightly to the frame contact portions.

In both examples, as at A (Fig. 3) in the first, and at B (Fig. 7) in the second example, the jamb members 32 or 32′ terminate squarely, far enough from the sill and cap members of the window frame to allow the extended bracket and pivot carrier to pass the jamb members when the window is closed; the sill and cap members being extended to afford trackage for the carrier in this position. This shortening of the jamb members applies only to their parts nearer the sashes; the parts next to the building walls being full length and mitered at the corners, as are the members of the sashes, as is well understood in the art of metal window construction.

The examples presented are those of metal construction, which is best suited for realization of all of the advantages of the invention. However, it will be understood that I am not limited to any certain material, and that details of construction may vary incident to changes of material, or under other circumstances arising in practice.

Modifications other than that exemplified, therefore, may occur, and while I have rather specifically illustrated and described certain examples of my invention, I do not wish to be understood as being limited to such precise disclosure, but what I claim as new and desire to secure by Letters Patent is:

1. In a casement window, a frame, sashes with upright ends hinged together, means whereby the opposite ends of said sashes are guided along said frame, and an operative connection between said frame and the respective sashes contained at all times within said frame, whereby said sashes are restricted to movement in unison.

2. In a casement window, a frame, sashes with upright ends hinged together, means whereby the opposite ends of said sashes are guided along said frame, a holding element fixed on said frame, and an operative connection between said holding element and the respective sashes, contained at all times within said frame, whereby said sashes are restricted to movement in unison.

3. In a casement window, a frame comprising a horizontal channel, sashes with upright ends hinged together, means guided in said channel whereby the opposite ends of said sashes are guided along said frame, and an operative connection between said frame and the respective sashes, contained at all times within said channel, whereby said sashes are restricted to movement in unison.

4. In a casement window, a frame comprising a sill having a channel longitudinally of the frame, sashes with ends hinged together, means guided in said channel whereby the opposite ends of said sashes are guided along said frame, and an operative connection between said frame and the respective sashes, contained at all times within said channel, whereby said sashes are restricted to movement in unison.

5. In a casement window, a frame, sashes with upright ends hinged together, means pivoted on the respective sashes and guided by said frame whereby the opposite ends of

said sashes are guided along said frame, and a gear-toothed operative connection between said frame and the respective sashes whereby said sashes are restricted to movement in unison.

6. In a casement window, a frame comprising a longitudinal channel, a sash having one end pivotally supported in and guided by said channel, and comprising a flange lapping across one side of said channel, said frame comprising a flange lapping across the opposite side of said sash, a resilient weather strip held between the opposite side of the frame channel and said frame flange, deflected by said opposite side of said sash, and means swinging the opposite end of said sash away from said frame channel and flange and said weather strip, when said pivoted means travels along said channel.

7. In a casement window, a frame, a sash mounted in said frame, an outer flange and an inner flange on said sash, extending toward said frame, an outer flange on said frame, lapped by the outer sash flange, an intermediate flange on said frame, extending toward said sash, an inner flange on said frame, lapping across the inner sash flange and having a recess opening into the space between it and the intermediate flange, and a resilient strip of U-shaped cross-section held between these flanges, with the edge of one of its elements held in said recess and its other element projecting past said intermediate flange to be deflected by said inner sash flange.

8. In a casement window, a frame, a sash, an outer flange and an inner flange on said sash, extending toward said frame, an outer flange on said frame across the outer side of which the outer sash flange laps, an intermediate flange on said frame, extending toward said sash, an inner flange on said frame, lapping across the inner sash flange and having a recess opening into the space between said inner frame flange and said intermediate frame flange, a resilient strip of U-shaped cross-section held between the intermediate and inner frame flanges, with the edge of one of its elements held in said recess and its other element projecting past said intermediate flange to be deflected by said inner sash flange, a carrier guided between the outer and intermediate frame flanges, means connected to one end of said sash and pivoted on said carrier, and means swinging the opposite end of said sash outward when said pivoted end travels with said carrier.

9. In a casement window, a frame, sashes with upright ends hinged together, means whereby the opposite ends of said sashes are guided along said frame, a pinion rotatable on said frame, and racks connected to the respective sashes and meshing with said pinion whereby said sashes are restricted to movement in unison.

10. In a casement window, a frame, sashes with upright ends hinged together, means whereby the opposite ends of the sashes are guided along said frame, toothed members connected to the respective sashes, and toothed means rotatable on said frame and in mesh with said toothed members.

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