Aug. 9, 1960 H. J. GILL, JR., ET AL 2,948,027

HINGED WINDOW CONSTRUCTION

Filed Dec. 23, 1957

Fig. 1

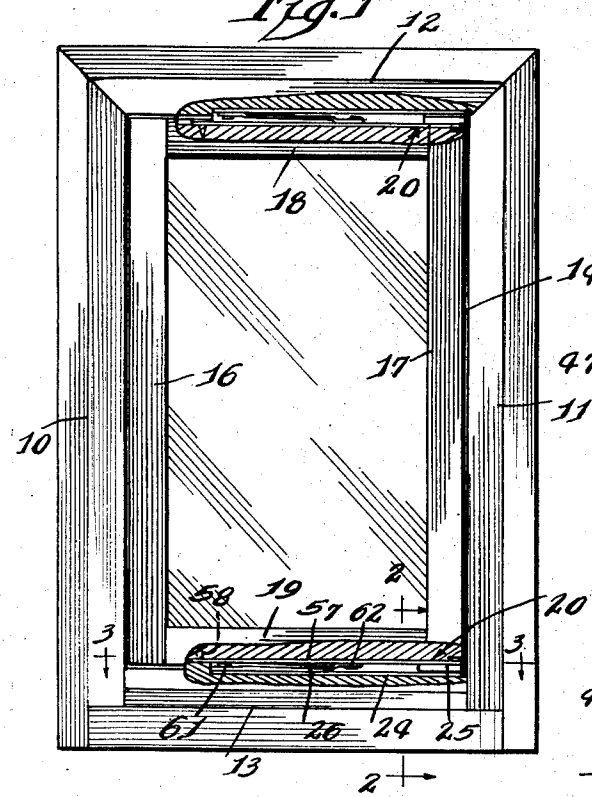


Fig. 8

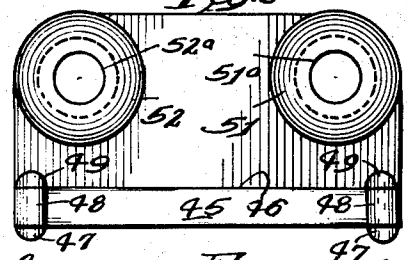


Fig. 7

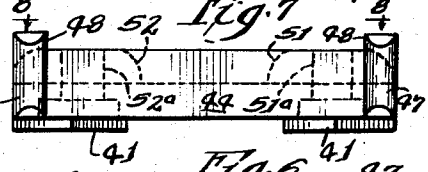


Fig. 6

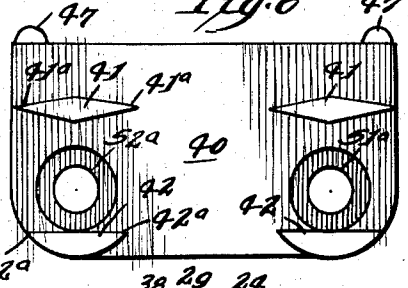


Fig. 5

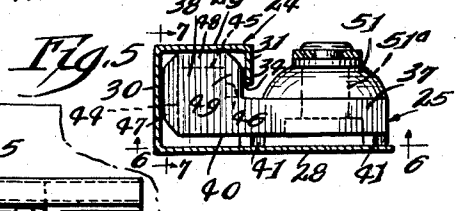


Fig. 2

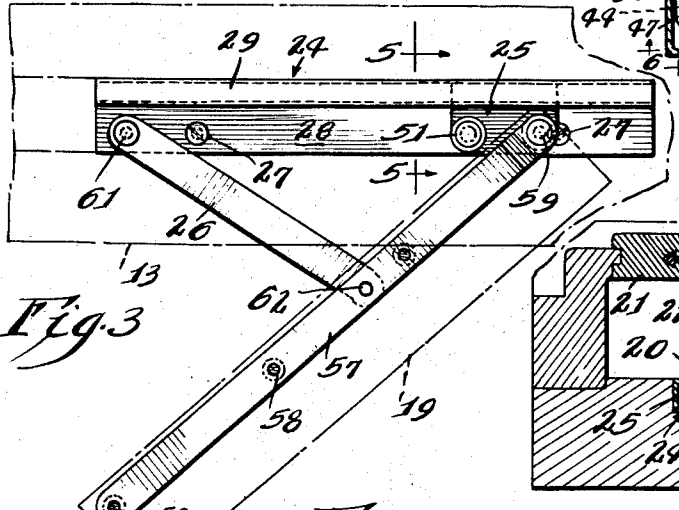
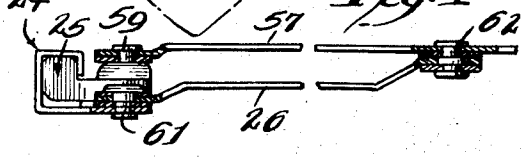
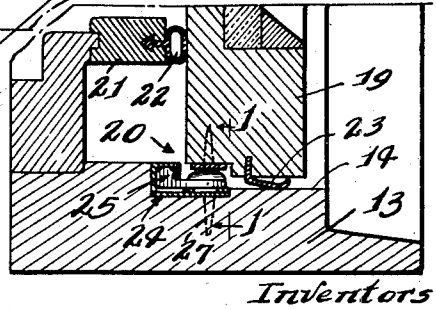


Fig. 3

Fig. 4





Inventors
Harvey J. Gill Jr.
Charles K. Sitterly
Willi Preu
By Schneider, Hofgren, Brady & Wegner
Attorneys

United States Patent Office

2,948,027

Patented Aug. 9, 1960

2,948,027

HINGED WINDOW CONSTRUCTION

Harvey J. Gill, Jr., Charles K. Sitterly, and Willi Preu, Dubuque, Iowa, assignors to Caradco Incorporated, a corporation of Iowa

Filed Dec. 23, 1957, Ser. No. 704,428

5 Claims. (Cl. 20—42)

This invention relates to a window hinge particularly adapted for use in hanging a casement window for swinging movement about an upright axis.

It is a general object of the invention to provide a new and improved window hinge of the type described.

A more specific object is to provide a new and improved hinge mechanism for mounting a window sash to swing about an upright axis between open and closed positions, including a guide block slidable in a horizontal track in the window frame, means pivotally connecting the sash to the block to swing about an upright axis as the block slides, a sash link connected between the sash and the frame to cause the block to slide as the sash swings, and means on the guide block to minimize friction as the block slides and to clean the track as the block slides in order to prevent binding of the block in the track.

Other objects and advantages will become readily apparent from the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is an outside elevational view of a casement window embodying the principles of the present invention, the view being partly in section at about the line 1—1 of Fig. 2;

Fig. 2 is an enlarged fragmentary sectional view taken at about the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary sectional view taken at about the line 3—3 of Fig. 1, illustrating the hinge mechanism as positioned when the window is open;

Fig. 4 is an elevational view of the hinge mechanism taken from the left of Fig. 3;

Fig. 5 is an enlarged sectional view of the hinge mechanism, taken at about the line 5—5 of Fig. 3;

Fig. 6 is a bottom plan view of the guide block, taken at about the line 6—6 of Fig. 5;

Fig. 7 is an elevational view of the guide block, taken at about the line 7—7 of Fig. 5; and

Fig. 8 is a top plan view of the guide block, taken at about the line 8—8 of Fig. 7.

While an illustrative embodiment of the invention is shown in the drawings and will be described in detail herein, the invention is susceptible of embodiment in many different forms, and it should be understood that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

Referring now to the drawings for a more detailed description, as illustrated, the invention is embodied in a casement window construction including a window frame having side legs 10 and 11 (Fig. 1), and top and bottom legs 12 and 13 defining a window opening 14 in which a window sash is mountable. The sash includes

side legs 16 and 17 and top and bottom legs 18 and 19, and is mounted in the window opening to swing about an upright axis passing through the upright leg 17 by means of a pair of hinge mechanisms 20, one at the top and one at the bottom of the sash.

If desired, the window construction may include horizontally disposed back stop strips such as that shown at 21 in Fig. 2, each carrying a tubular weather strip 22, one abuttable against each of the horizontal legs 18 and 19 when the window is closed, to seal the window opening. Additionally, the horizontal legs 18 and 19 of the sash may be provided with horizontal spring-like metal weather strips such as that illustrated at 23 to abut the horizontal legs 12 and 13 of the window frame when the window is closed.

The hinge mechanisms 20 for mounting the sash are identical in construction except for their disposition in the frame, and only the bottom one will be described in detail. As illustrated, the hinge mechanism includes a horizontal track 24 at the bottom of the frame adjacent the window opening, a guide block 25 slidable in the track, means pivotally connecting the sash to swing about an upright axis as the block slides, and a sash link 26 connected between the frame and the sash to cause the block to slide as the sash swings.

The horizontal guide track 24 is secured in place in the horizontal frame piece 13 by means such as screws 27 passing through a first horizontal guide wall 28 of the track facing toward the window opening. The track includes a second spaced parallel guide wall 29 facing away from the window opening and toward the first guide wall, and third and fourth spaced parallel vertical guide walls 30 and 31 facing toward each other between the guide walls 28 and 29. As illustrated, the guide track is formed of a single piece of metal bent into the desired shape to provide the desired guide surfaces thereon. Thus, the guide wall 30 is turned at an angle of 90° from the guide wall 28, the guide wall 29 is turned from the wall 30 in a direction parallel to the wall 28 and is about one half as wide as the wall 28, and the guide wall 31 is turned from the wall 29 in a direction parallel to the wall 30 and is about one half as wide as the wall 30. This formation leaves an unobstructed slot 34 extending longitudinally of the track through which a portion of the guide block 25 may slide.

The guide block 25 comprises a shoe of anti-friction material, preferably nylon plastic, formed by a process of injection molding to include bearing surfaces engageable with the guide walls of the track as the block slides. As seen in Figs. 2, 4, and 5, in elevation the guide block 35 has a reversed L-shape and includes a main body portion 37 and a lug-like portion 38 to one side at one edge of the body portion 37. A bottom side 40 of the guide block faces toward the guide wall 28 and includes raised ribs 41 and 42 (Figs. 5 and 6) providing raised bearing surfaces of limited areas engageable with the guide wall 28 for minimizing friction as the block slides in the track. As best seen in Fig. 6, the ribs 41 and 42 are laterally spaced and longitudinally spaced on the guide block, and are located approximately adjacent the four corners of the block. Each of the ribs is elongated in the direction of block movement of the track, and each bearing surface is tapered toward pointed opposite ends as at 41*a* and 42*a* in order to clean the surface of the guide wall 28 as the block slides to thereby prevent the collection of dirt on the track which causes seizing and binding of the block in the track.

The guide block lug 38 includes sides 44, 45 and 46

facing respectively the side walls 30, 29 and 31 of the guide track. Each of the sides 44, 45, and 46 is formed with longitudinally spaced, transversely extending ribs providing raised bearing surfaces of limited areas engageable with the respective walls of the track to minimize friction as the block slides in the track. The side 44 has ribs 47 to engage wall 30, the side 45 has ribs 48 to engage wall 29, and the side 46 has ribs 49 to engage wall 31. The raised ribs may be beveled or rounded to further reduce the bearing areas engageable with the track if desired. As illustrated, the ribs 47 and 49 are rounded, and the ribs 48 have substantially flat bearing surfaces.

The main body portion 37 of guide block is formed with a pair of raised bosses 51 and 52 facing toward the window opening and having openings 51*a* and 52*a* therethrough for use in connecting the guide block to the window sash. Two bosses are provided in order to adapt the guide block for use in either the lower or the upper hinge mechanism. In the lower hinge mechanism, the boss 52 is utilized and in the upper hinge mechanism, where the guide block is inverted, the boss 51 is utilized.

In order to pivotally connect the sash to the hinge mechanism, a sash arm 57 is secured as by means of screws 58 to the horizontal leg 19 of the sash, and at one end is pivotally connected to the guide block 25 as at 59 (Figs. 3 and 4). In this manner, the sash is pivotally connected to the guide block to swing about an upright axis as the block slides in the track. The sash link 26 has one end pivotally connected to the track as at 61, and the other end pivotally connected to the sash arm as at 62 to cause the block 25 to slide along the guide track as the sash swings between open and closed positions.

In operation, as the window sash swings from the closed position illustrated in Figs. 1 and 2 to the open position illustrated in Figs. 3 and 4, the guide block 25 slides in the track 24 toward the pivotal connection 61, the link 26 swings outwardly from the tracks to the position illustrated in Figs. 3 and 4, and the sash pivots about the pivotal connections 59 and 62 to cause the block 25 to slide along the track. On swinging the sash toward the closed position, these movements are reversed. During the opening and closing of the sash, the areas of load or pressure between the guide block and the track vary from place to place about the guide block, and this shifting of the pressure areas tends to cause sticking and binding of the guide block in the track. The raised bearing surfaces of the guide block are positioned and shaped to engage the guide surfaces of the track in a manner to minimize friction, to prevent excessive loads on the block, and to prevent binding of the block in the track. The surfaces 41 and 42 are tapered to function additionally as track cleaners, to prevent a buildup of dirt and other foreign matter in the track.

We claim:

1. In a hinged window construction having a window frame and window sash mountable in a window opening in the frame, a hinge mechanism for mounting the sash to swing between open and closed positions, comprising, a guide track in the frame along one side of the window opening, a guide block slidable in the track, means pivotally connecting the sash to the guide block to swing about an axis normal to the track as the block slides, and a sash link having one end pivoted on the sash and the other end pivoted on the frame to cause the block to slide as the sash swings, said guide block having a bearing surface engageable with the track and tapering toward pointed opposite ends to clean the track as the block slides.

2. In a hinged casement window construction having a window frame and a window sash mountable in a window opening in the frame, a hinge mechanism for mounting the sash to swing about an upright axis between open and closed positions, comprising a horizontal guide track in the window frame along the bottom of the window opening, a guide block slidable in the track, means pivotally connecting the sash to the block to swing about an upright axis as the block slides, and a sash link having one end pivoted on the sash and the other end pivoted on the frame to cause the block to slide as the sash swings, said track having a guide wall facing the window opening, and said guide block having one side facing said guide wall and having raised bearing surfaces thereon providing limited bearing areas engageable with the guide wall to reduce friction as the block slides, said bearing surfaces being spaced apart laterally on the block and extending longitudinally in the direction of block movement and tapering toward pointed ends adjacent opposite ends of the block to clean the track as the block slides.

3. In a hinged casement window construction having a window frame and a window sash mountable in a window opening in the frame, a hinge mechanism for mounting the sash to swing about an upright axis between open and closed positions, comprising, a horizontal guide track in the wondow frame along the bottom of the window opening, a guide block of antifriction material slidable in the track, means pivotally connecting the sash to the block to swing about an upright axis as the block slides, and a sash link having one end pivoted on the sash and the other end pivoted on the frame to cause the block to slide as the sash swings, said track having a first guide wall facing the window opening, a second guide wall facing the first guide wall and away from the window opening, and third and fourth upright guide walls facing each other between the first and second walls, said slide block having four sides facing respectively the guide walls of the track, the first side of the guide block having raised bearing surfaces engageable with said first guide wall, laterally spaced on the guide block and tapering toward pointed opposite ends to clean the track as the block slides, the remaining three sides of the guide block having raised bearing surfaces engageable with the track, spaced longitudinally on the block and extending transversely of the direction of block movement.

4. In a hinged casement window construction having a window frame and a window sash mountable in a window opening in the frame, a hinge mechanism for mounting the sash to swing about an upright axis between open and closed positions, comprising, a horizontal guide track in the window frame along the bottom of the window opening, a guide block of antifriction material slidable in the track, means pivotally connecting the sash to the block to swing about an upright axis as the block slides, and a sash link having one end pivoted on the sash and the other end pivoted on the frame to cause the block to slide as the sash swings, said track having a first guide wall facing the window opening, and second and third upright guide walls facing each other, said slide block having three sides facing respectively said three guide walls of the track, the first side of the guide block having raised bearing surfaces engageable with said first guide wall, laterally spaced on the guide block and tapering toward pointed opposite ends to clean the track as the block slides, the remaining two sides of the guide block having raised bearing surfaces engageable with the track, spaced longitudinally on the block and extending transversely of the direction of block movement.

5. In a hinged casement window construction having a window frame and a window sash mountable in a window opening in the frame, a hinge mechanism for mounting the sash to swing about an upright axis between open and closed positions, comprising, a horizontal guide track in the window frame along the bottom of the window opening, a guide block slidable in the track, means pivotally connecting the sash to the block to swing about an upright axis as the block slides, and a sash link having one end pivoted on the sash and the other end pivoted on the frame to cause the block to slide as the sash

swings, said track having a guide wall facing the window opening, and said guide block having one side facing said guide wall and having raised bearing surfaces thereon providing limited bearing areas engageable with the guide wall to reduce friction as the block slides, said bearing surfaces being spaced apart laterally on the block and extending longitudinally in the direction of block movement.

References Cited in the file of this patent

UNITED STATES PATENTS

1,124,671	Soule	Jan. 12, 1915
1,929,762	Ulrich	Aug. 10, 1933
2,718,675	Olsen	Sept. 27, 1955
2,784,459	Anderberg et al.	Mar. 12, 1957
2,789,067	Link	Apr. 16, 1957