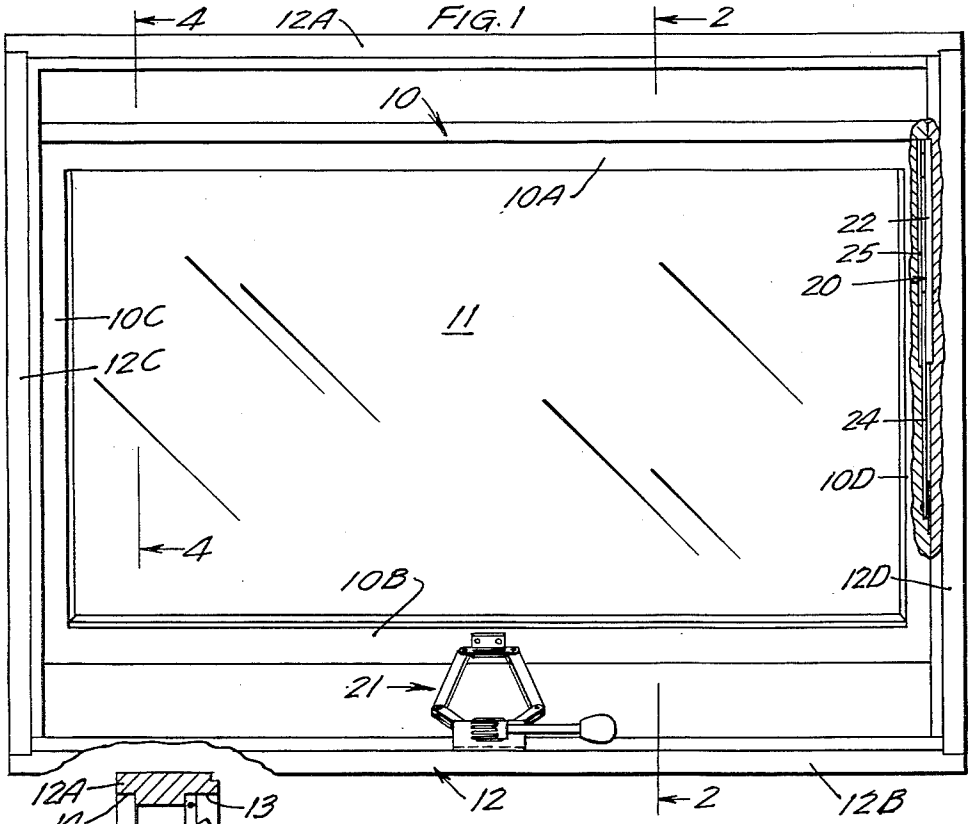
Aug. 30, 1960 H. L. STAVENAU 2,950,509

AWNING TYPE WINDOW STRUCTURE

Filed Jan. 22, 1957 2 Sheets-Sheet 1

FIG. 1



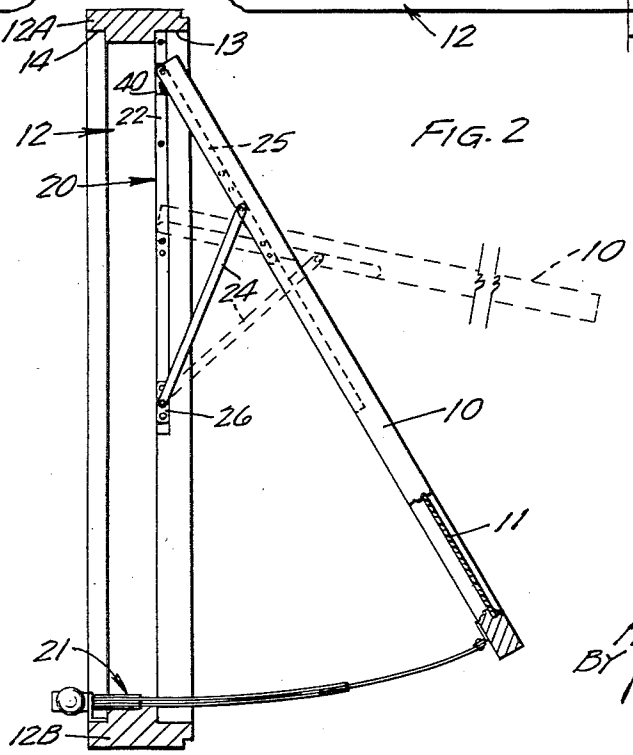


FIG. 2

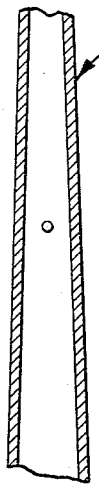


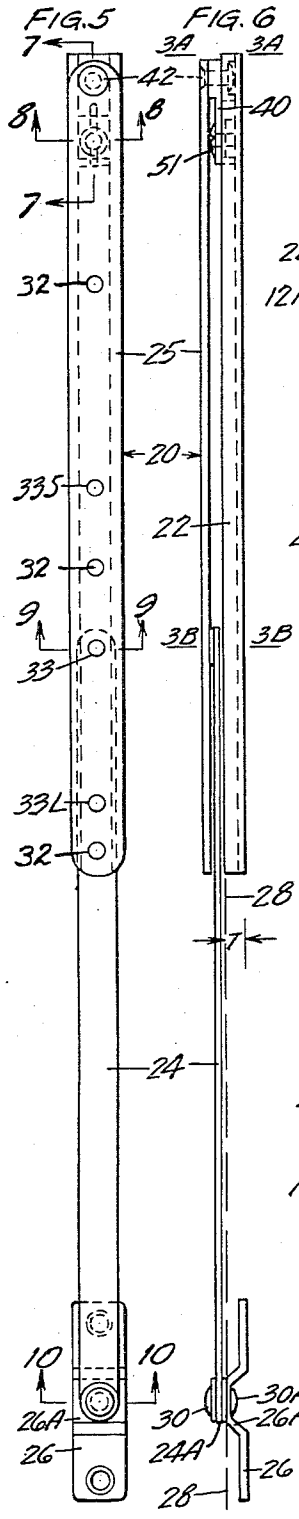
FIG. 11

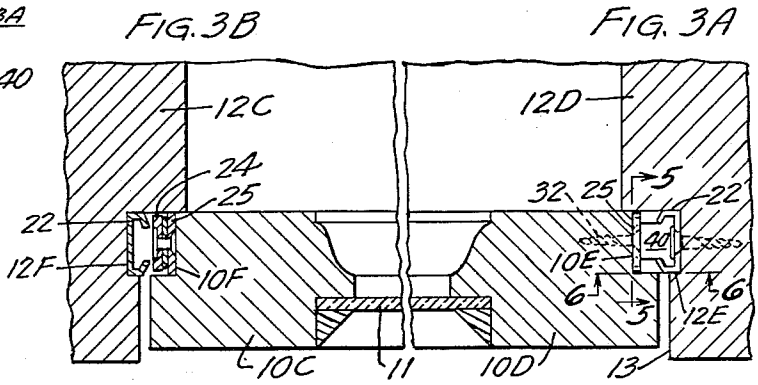
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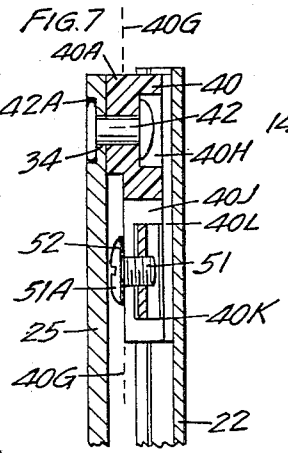
Aug. 30, 1960 H. L. STAVENAU 2,950,509

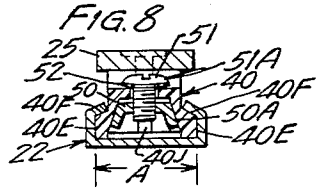
AWNING TYPE WINDOW STRUCTURE

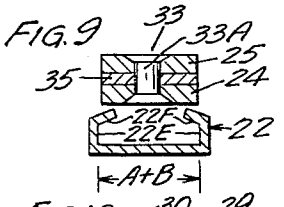
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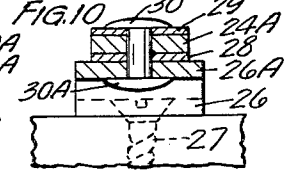


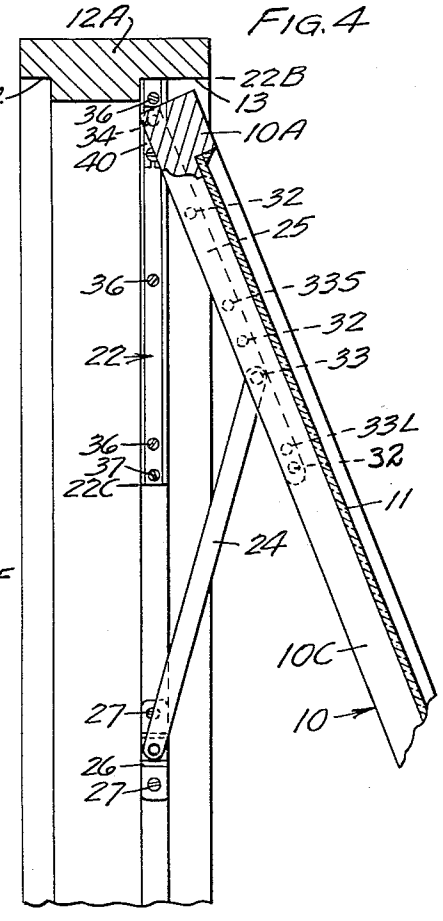












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2,950,509

AWNING TYPE WINDOW STRUCTURE

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Filed Jan. 22, 1957, Ser. No. 635,474

9 Claims. (Cl. 20—42)

This invention relates to hardware for windows or the like closures of the awning type which have gained wide popularity in modern houses. Windows of this kind are sometimes called "canopy" windows but the word "awning" will, for uniformity be used herein. The hinging of awning type windows may be accomplished by means of a hinge which is fastened to the top horizontal member of the window sash and to the contiguous window frame, but the preferred hinge structure, more commonly used is sliding hardware structure which allows the window not only to swing about a horizontal axis, but at the same time the top horizontal member of the window is moved downwardly as it is opened, so as to provide an opening at the top of the window for ventilation. Such motion of the window may be designated as a swinging-sliding motion and such terminology will be used herein to describe such characteristic movement of the window. The present invention is addressed to the problem of providing hardware for accomplishing the aforementioned opening and closing movement.

In the opening movement the window sash swings out at the bottom and is drawn down at the top. During the first few inches of outward swinging movement of the bottom of the window sash there is only a very slight downward movement of the top of the window but the rate of movement of the top of the window in a downward direction increases gradually as the lower portion of the window is swung farther and farther outwardly. Stated another way, for each increment of arcuate movement outwardly of the window the increment of movement of the top of the window sash downwardly is very small during the first part of the window opening movement and gradually increases as the window sash gains a greater and greater degree of opening. The converse is true during closing. In such opening and closing movement, it is desirable to have the window frictionally retained in any position to which it is adjusted, from fully closed to fully opened position. When the window is moved only a slight distance in the opening direction the top of the window is accordingly drawn down only a small amount but the leverage imposing such movement upon the top of the window is very powerful. Many times the user of the window will desire to leave the window in such slightly opened condition. Again in many instances the window may be opened to a mid-position somewhere between fully closed and fully opened or to the fully opened position and desire to leave the window in such position.

The force for opening and closing the window may be provided by a window operator of which various types are available, or the window may be opened and closed by a simple pull attached to the lower part of the window sash. A window opener suitable for providing the opening and closing movement is illustrated in copending application Ser. No. 520,555 filed July 7, 1955, now Patent No. 2,775,446, issued December 25, 1956.

In order to hold the window in any position of adjustment it is desirable to introduce friction in the window

hardware or in the operator mechanism or both and it is desirable that the degree of frictional resistance to movement should be sufficient to maintain the position of adjustment of the window for all conditions of use throughout its useful life, but should not require excessive force for manipulating the window and it is desirable that the friction should be capable of adjustment during use and then stay adjusted for long periods of use.

It is an object of the present invention to provide improved hardware for a window or the like closure of the awning type. It is a further object of the invention to provide improved hardware for the window or the like closure of the awning type which provides a controlled amount of frictional resistance to movement of the window at various positions of opening of the window. It is another object of the invention to provide hardware for a window or the like closure of the awning type wherein the frictional resistance to movement of said hardware and the window is varied at controlled rate from the closed to the open position of the window. It is another object of the invention to provide hardware for a window or the like closure of the awning type wherein the frictional resistance to movement of the hardware and hence of the window itself is adjustable so as to provide for variations in frictional resistance to suit the needs of service throughout the life of the mechanism and to permit the user of the window to make needed adjustments easily and capably, during the life of the window. It is another object of the invention to provide improved hardware of the aforesaid type providing an improved construction wherein frictional resistance of the structure is capable, due to the materials used, of being maintained with relatively little change throughout long periods of service during its useful life.

Other and further objects of the invention are those inherent in the apparatus herein illustrated, described and claimed.

The invention is illustrated with reference to the drawings in which:

Figure 1 is a vertical elevational view of a window or closure of the awning type as viewed from the inside of the building, the window being of the type which swings outwardly. Figure 2 is a vertical sectional view taken along the line and in the direction of arrows 2—2 of Figure 1 showing the window in a partially opened condition and in an extreme opened condition as during servicing. Figures 3A and 3B are related horizontal sectional views through the window, as shown in closed position, and of the contiguous side frame members in which the window is mounted. Figure 3A is a sectional view taken at an upper portion of the window as at the level of line 3A—3A of Figure 6 whereas Figure 3B is taken farther down on the window as at the level of line 3B—3B of Figure 6. It will be understood however, that in Figure 6 the hardware is shown removed from the window and window frame and the reference lines 3A—3A and 3B—3B are merely to show the level at which the sections of Figure 3A and 3B are taken when the hardware is installed in proper position in the window sash and frame. Figure 4 is an enlarged vertical sectional view of the window and frame and hardware taken along the line and in the direction of arrows 4—4 of Figure 1.

Figures 5 and 6, as well as 7 through 10 are related views showing the hardware removed from the window and window frame. The hardware is identical for the right and left side of the windows and one hardware structure may be used in either position. In Figure 5 the hardware structure is viewed as in the direction of arrows 5—5 of Figure 3A. In Figure 6 the hardware is viewed as in the direction of arrows 6—6 of Figure 3A. Figures 7, 8, 9 and 10 are enlarged fragmentary sectional views, Figure 7 being a vertical section taken along the

line in the direction of arrows 7—7 of Figure 5. Figures 8, 9 and 10 are horizontal sectional views taken, respectively, along the lines and in the direction of arrows 8—8, 9—9 and 10—10 of Figure 5. Figure 11 is an exaggerated fragmentary view of the tapered track as shown in Figure 4 other than that the inside top bearing surfaces are not illustrated.

Throughout the drawings corresponding numerals are used to designate the same parts.

To the accomplishment of the foregoing and related ends, this invention then comprises features here and after fully described and particularly pointed out in the claims, the following disclosure setting forth in detail illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principals of the invention may be employed.

Referring to the drawings Figure 1 and 2 illustrate a typical modern awning type window of which the window sash is generally designated 10. The sash is mounted in a window frame generally designated 12. The window sash is composed of a top member 10A, a bottom member 10B and side members 10C and 10D. In the sash there is supported the usual glass window pane 11. The window frame, sometimes designated a "surround," is composed of a top member 12A, a bottom member 12B and side members 12C and 12D. The frame 12 is provided with a rabbeted groove 13 in its front or outside surface and a similar and usually smaller rabbeted groove 14 on its back or inside surface. See Figure 2. The window sash 10 seats in the rabbeted groove 13, and is usually provided with weatherstripping all around against which the window sash seats. A fly screen is normally seated in the groove 14, on the inside of the window.

The window is supported or "hung" by a pair of hardware structures generally designated 20, which are the subject of the instant invention. The window is customarily manipulated from open to close position and vice versa by a "window operator" mechanism of which there is herein illustrated the mechanism generally designated 21, which per se forms no part of the present invention. A mechanism of such type is illustrated in application Ser. No. 520,555 filed July 7, 1955, but equivalent mechanisms for manipulating the window or a handle on the inside of the window, may be utilized if so desired.

The hardware 20 by which the window is "hung" is positioned in a recess formed by complementary grooves rabbeted in the side members 12C and 12D of the window sash and side members 10C and 10D of the window frame. Thus referring to Figures 3A and 3B in the member 12D of the window frame there is rabbeted a small groove 12E and in the adjacent side frame membr 10D of the window there is provided a corresponding groove 10E. These grooves extend in a vertical direction sufficiently to receive their intended hardware parts, but need not extend throughout the vertical height of the window.

On each of these side frame members 12D and 12E of the window frame there are attached the track part of the hardware 20, these being designated 22—22. These tracks are fastened in a position such that the upper end of the track will extend to the level of the line 22B as shown in Figure 4 and the lower end of the track terminates at the level 22C. Farther down on the same frame member at each side of the frame there is positioned a plate 26 which is fastened by screws 27—27. The plate is raised at the center portion 26A (see Figures 6 and 10) so as to present a pivot surface at the surface 28—28, see Figure 6. The line 28—28 is positioned at a distance T from the bottom of the groove 12E in the side frame member equivalent to the total thickness of the track 22. In this way the link 24 is held in a position so that it will always clear track 22. On the plate 26 there is pivotally attached the lower end of the link 24, the pivotal connection being shown in Figure 10. Thus upon the surface of raised portion 26A there is provided a washer 31 of non-metallic material such as phenolic plastic impregnated cloth and it is upon this washer that the lower apertured end 24A of the link 24 is adapted to pivot, being held by rivet 30. Then on the inside surface of the lower end of the link (toward the sash 10) there is provided another washer 29 which is of a plastic such as nylon or polyvinyl plastic. The entire assembly is held together by a large headed rivet 30 which is solidly riveted over at 30A on the underside of the plate 26. The riveting slightly compresses the washer 29 and the washer 28 and the metal portion of the link is accordingly captured between such washers which therefore control the amount of friction exerted by the plate and rivet upon the link 24. I have discovered that this mode of construction maintains the amount of frictional resistance to swinging movement of the link 24 to a close degree throughout the life of the hinge mechanism.

In the preferred form of the invention, in each of the grooves 10A and 10F of the side members of the window there are seated frame bars 25 which are suitably apertured to receive countersunk screws 32 which enter into the side members 10D and 10C respectively of the window sash. In the frame bar there are provided a plurality of apertures 33, 33S and 33L. These apertures are provided for varying sizes of windows for which the hardware is manufactured and only one of them is used at a time. Thus the link 24 is shown in Figure 4 as being pivotally attached by the pivot at 33 which is the middle aperture and this is for a medium size window. If the window is small, the pivotal attachment is made at 33S whereas for a large window the pivotal attachment is made at 33L. For manufacturing convenience it is preferable to use only one frame bar which can thus be used for a full range of window sizes. In addition at the upper end of the window there is provided a pivot 34 and for convenience this is also a part of the frame bar. If desired pivots 33 and 34 can be on separable attachments, but for convenience it is desirable to use only one attachment which here is bar 25.

The construction of the pivotal connection at point 33, between the link 24 and the frame bar 25 is shown in Figure 9 wherein it will be observed that the pivot is formed by a rivet 33A the heads of which are countersunk into each of the members 24 and 25. Between these members at the pivot there is provided a friction control washer 35 which is preferably cut from a plastic impregnated fiber or cloth sheet such as a phenol plastic impregnated sheet, or the like. This washer can be the same as at 31. The rivet 33A is riveted so that its heads are flush, or substantially flush, with the exposed surfaces of the members 24 and 25 and in such position holds these members together with the friction control washer 35 between them.

One of the tracks 22 is seated in each of the grooves 12E and 12F in side members 12D and 12E of the window frame with the upper end of the track member being abutted against the upper member 12A of the window at line 22B. The track members are fastened in place by screws 36—36, which are countersunk and drawn down tightly into the material of which the side frames of the window frame is composed. At the lower end of each of the tracks 22 there is provided a screw with a raised head at 37 which serves as a stop against which the sliders generally designated 40 hit when the window is moved to its fully open position for servicing as shown in dotted lines in Figure 2. Stop screw 37 keeps the slider 40 from coming down out of track 20 once the assembly is completed. The screws 36 in each of the tracks are placed and drawn down tightly into the side frame members 12D and 12C and serves with the stop screws 37 to secure the track 22.

According to this invention the track 22 has a cross-section as shown in Figures 3A, 3B and 8–10 and is shaped that while the slider generally designated 40 is permitted to slide up and down in the track the slider is not permitted to pull out of the track. A variety of complemen-

tary track and slider shapes will accomplish these purposes. One convenient manufacturing shape for accomplishing these purposes is a channel shaped member in which the flanges of the channel are bent towards each other as illustrated. However it is to be understood that it is within the purview of the invention to provide track members 22 of different cross-sectional shapes, the criteria being that the shape of the track 22 and the shape of the slider 40 should be interlocking and complementary and with the result that the slider 40 may move or slide along the track but should not pull away from or out of the track when the two are assembled together. The slider is assembled initially by movement into the open end of the track and where attached to the frame of the window as shown, the slider is prevented by window frame member 12C from sliding out of the top of the track and is prevented from sliding out of the bottom of the track by the high headed screw 37, see Figures 2 and 4. Once the slider is in the track it should not be capable of movement away from the track but should be free (within frictional limits) to move along the track. The form or shape for the slider 40 and the track 22 herein illustrated accomplish these purposes satisfactorily.

It is one of the features of this invention that the combined action of the track 22 and the slider 40 provide a closely controlled and regulatable amount of frictional resistance to movement of the slider throughout the range of movement of the sash from closed to open position and vice versa. According to this invention the track is composed so that it imposes upon the slider a maximum frictional resistance to movement of the slider along the track when the slider is in a position corresponding to the closed position of the window and that such resistance to movement is gradually decreased to a minimum frictional resistance to movement of the slider along the track, when the window is in a position corresponding to fully opened position. This is accomplished in accordance with this invention by making the track 22 with a slight but definite taper from a narrowest dimension at the top to a widest dimension at the bottom as shown in Figure 11. Thus for a track 22 which has an approximate length of 12 inches and approximate width of 5/10 inch for the dimension A as shown in Figure 8, the taper may be 0.001 inch per inch of length. In the illustrated form of the invention the track has side bearing surfaces at 22E—22E and inside top bearing surfaces 22F—22F for each flange which bears against the corresponding side and upper edge surfaces of the slider 40, the slider being held in the track by the bearing surfaces. These surfaces 22E—22E and 22F—22F are made very smooth and the width A of the track which is a minimum at the upper end, is gradually tapered to a maximum width at its lower end. Thus Figure 8 represents the width A at an upper level whereas Figure 9 represents a width A plus B at a lower level, the track being gradually tapered from end to end.

This slider is composed of a plastic molding preferably being made of nylon, Teflon or similar wear resistant plastic material. The plastic molding of the slider has an outer surface 40E—40E at its opposite sides which ride against the corresponding surfaces 22E—22E of the track. The slider also has an upper surface 40F—40F at each side which rides against the underside of the inturn flanges of the track at the surfaces 22F—22F. The slider has a general elevation throughout most of its length terminating at the line 40G, as shown in Figure 7 but at one end it is provided with a raised boss at 40A and under the boss there is provided a recess 40H. The boss serves as a pivot boss and a rivet 42 extends through an aperture in the boss and is pivotally attached at the hole 34 in the upper end of the frame bar 25 of the hinge mechanism. The rivet 42 is countersunk at 42A so as not to be exposed beyond the outer surface of frame bar 25.

The construction of the slider 40 permits the slider to be adjusted to control the amount of friction imposed by the slider upon the frame bar 25. Thus at the lower end of the slider there is provided a vertical groove 40J which extends longitudinally and centrally of the slider from the lower end to adjacent boss 40A. This permits the lower end of the slider to be adjusted in width. On the under surface of the slider there is a recess extending from the line 40K to the line 40L, the recess being of a shape decreasing in width toward the bottom of the recess (toward the outward direction in respect to the track; as shown in Figure 8). In this recess there is positioned a pressed metal stamping 50 into which the screw 51 is threaded, the head of the screw being broad at 51A. Under the screwhead is a thin bent washer 52 which holds the screw against turning and acts as a spring to control the amount of pull of the screw 51 on the stamping 50. The downwardly and outwardly sloping sides 50A—50A of the stamping 50 bear against the correspondingly shaped inside walls of the recess in the slider and as the screw 51 is tightened the stamping 50 will be drawn upwardly. This causes the lower bifurcated end of the slider to be spread out thereby increasing the pressure of the surfaces 40E and 40F of the slider against the surfaces 22E and 22F of the track. When the screw 51 is loosened the pressure is decreased. Spring washer 52 gives resiliency to this adjustment and compensates for wear and for slight irregularities. Thus by tightening or loosening the screw 51 it is possible for the user to adjust closely the amount of pressure imposed by the lower bifurcated ends of the slider against the cooperating interior surfaces of the track with the result that the amount of friction of the slider against the track may be closely adjusted and once adjusted the action will remain for long periods sufficiently constant for practical purposes.

However the amount of friction imposed by the slider on the track is varied and greatest frictional resistance is imposed when the slider 40 is in the upper end of the track 22 and this frictional resistance gradually decreases as the slider moves downwardly in the track. The reason for this is that when the window is only slightly opened any force in or out on the lower portion of the window is multiplied by a greater leverage, insofar as moving the slider up and down is concerned, than when the window is opened farther. Since the window may be subjected to varying forces of wind and the like on the outside and it is desired to hold the window opening adjustment where it is, it accordingly follows that greater frictional resistance is needed in the mechanism for holding a window in a particular condition of adjustment when it is near closed position than is required when the window is in some more open position. Accordingly by use of the present invention greater frictional force is provided by the tapered track upon the slider, when the slider is in a condition corresponding to closed window position than when it is in a position corresponding to an open window.

It is apparent that many modifications and variations of this invention as hereinbefore set forth may be made without departing from the spirit and scope thereof. The specific embodiments described are given by way of example only and the invention is limited only by the terms of the appended claims.

I claim as my invention:

1. An awning type window structure comprising a window frame, a window sash, a link pivotally connected at one end to said frame, a pivot for pivotally connecting the other end of said link to the window sash, a longitudinally tapered track mounted on the window frame, and means slidably movably along the track for slidably connecting an end portion of the window sash to the track, said means being adjustable for varying the frictional resistance to movement of the means along said track, said track presenting progressively varying fric-

tional resistance to the movement of said means along the track.

2. Hardware that may be placed in a window structure comprising an elongated link, a first pivot pivotally connected to one end of the link, an elongated sash bar, a second pivot for pivotally connecting the opposite end of the link to an intermediate portion of the sash bar, an elongated longitudinally tapered track, a slider mounted for movement along the track, said track being tapered to progressively vary the frictional resistance to the movement of the slider along the length of the track, and a third pivot for pivotally connecting the opposite end of the sash bar to said slider, said slider and said link being mounted on the same side of the frame bar.

3. The hardware of claim 2 further characterized in that the track has a pair of oppositely faced side portions, said taper being defined by said side portions diverging from one another along the length of the track and the slider has a pair of oppositely faced side portions that bear against the side portions of the track.

4. An awning type window structure comprising a window frame, a window sash, means supporting said sash for swinging and sliding movement in said frame, said means including an elongated link, first pivot means connecting one end of said link to the window frame, second pivot means for connecting the opposite end of said link to the window sash, a slider, third pivot means for connecting said slider to an end portion of the sash at a position spaced from the pivot connection of the link to the sash, and an elongated longitudinally tapered track mounted on the frame, said slider being mounted on said track to travel in engagement with the tapered portion of the track, said track presenting progressively varying frictional resistance to the movement of the slider along the longitudinal length of the tapered track.

5. The awning type window structure of claim 4 further characterized in that the tapered track is defined by a pair of oppositely faced longitudinally tapered side walls that diverge outwardly from one another along the length of the track and that the slider has a pair of sides that abut the adjacent side walls of said track, said slider side walls being made of resilient material.

6. The apparatus of claim 4 further characterized in that the track includes a pair of oppositely faced longitudinally extending side wall portions that diverge outwardly from one another from the position of the slider on the track in a window-opened position to a window-closed position.

7. The apparatus of claim 4 further characterized in that said track is in the form of a channel for embracing the slider.

8. The apparatus of claim 4 further characterized in that said track and slider are constructed so that the slider can move along but not out of the track and means is provided for adjustably varying the frictional pressure of the slider against the track.

9. The apparatus of claim 4 further characterized in that said track is metal and said slider is plastic and the track and slider are constructed so that the slider is partially embraced by the track, said slider being provided with means for varying its width for varying the frictional pressure between the slider and the track.

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