Feb. 14, 1928. 1,659,507

D. B. WHISTLER

WINDOW OR THE LIKE

Filed March 26, 1924 3 Sheets-Sheet 1

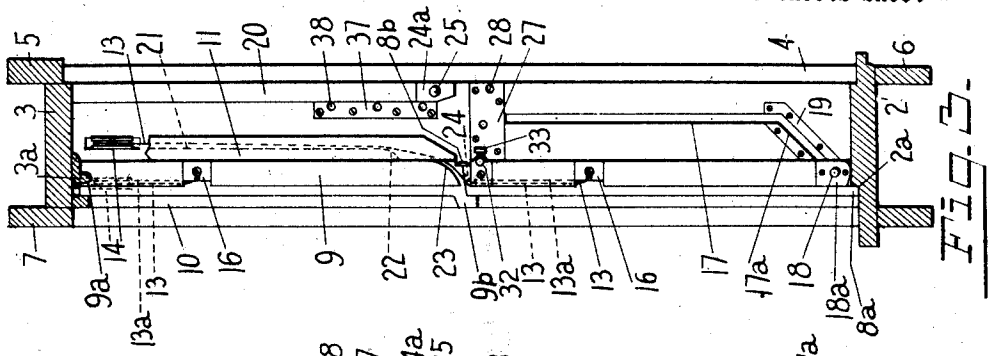


Fig. 3.

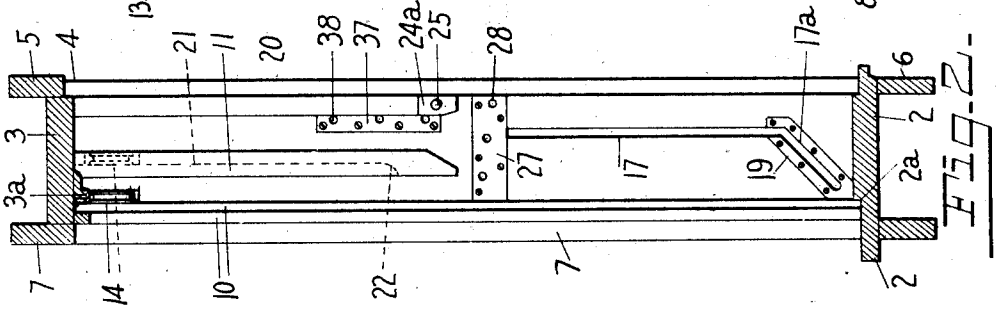


Fig. 2.

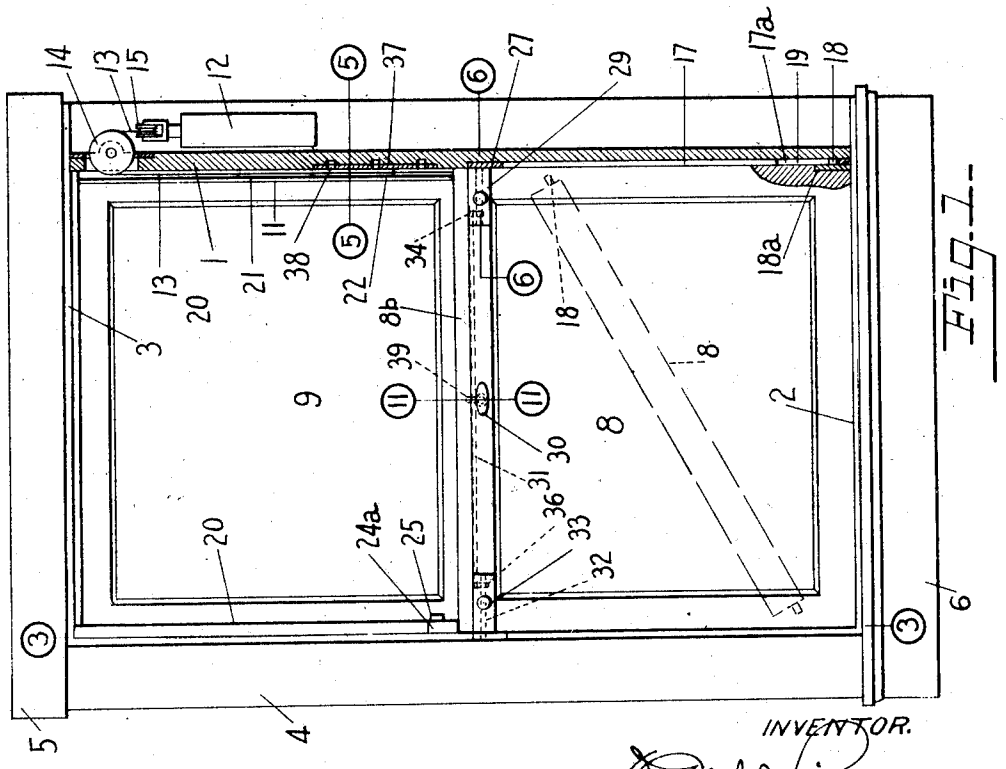


Fig. 1.

INVENTOR.

D. B. Whistler

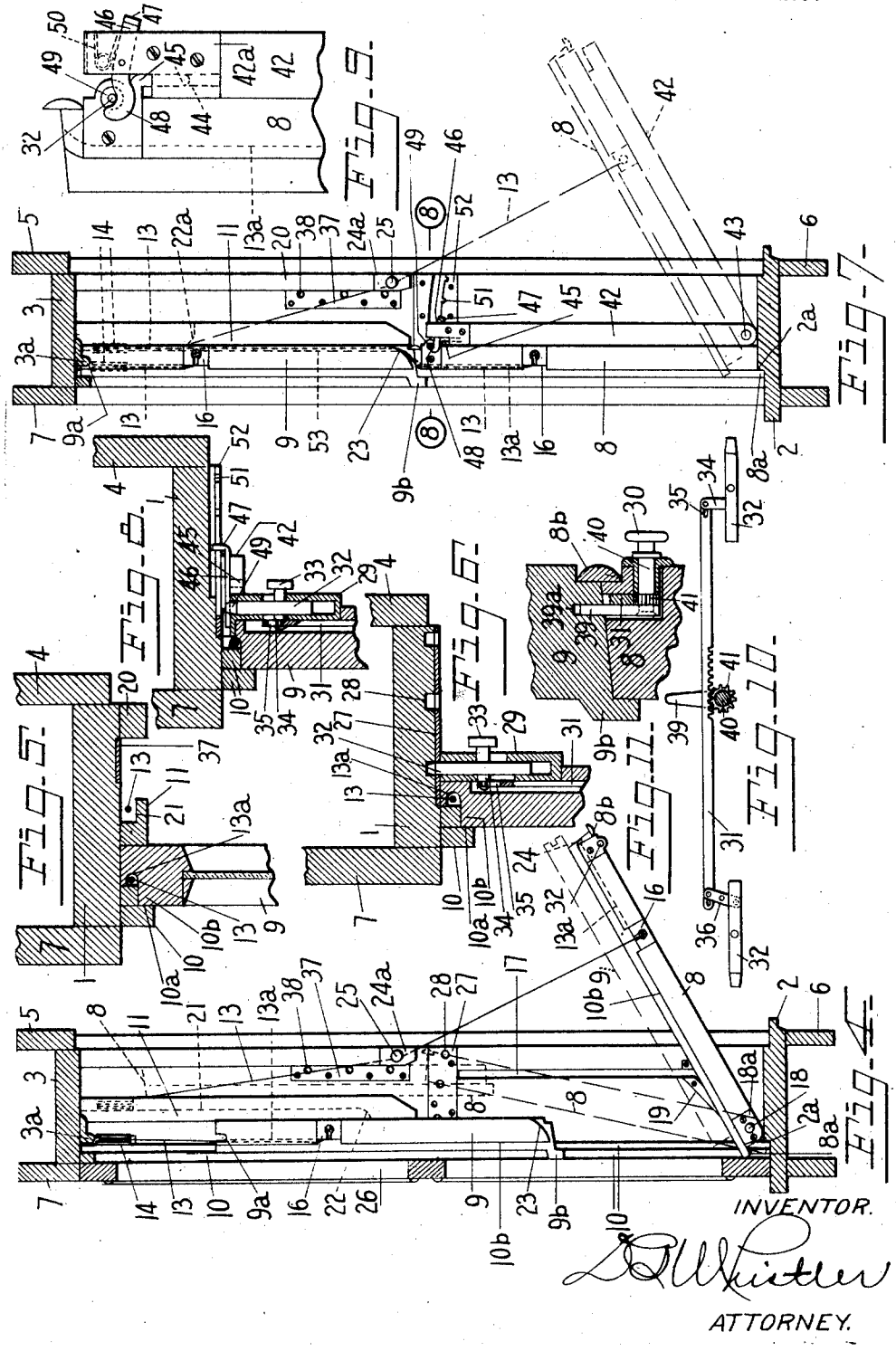
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Feb. 14, 1928. 1,659,507

D. B. WHISTLER

WINDOW OR THE LIKE

Filed March 26, 1924 3 Sheets-Sheet 2



INVENTOR.

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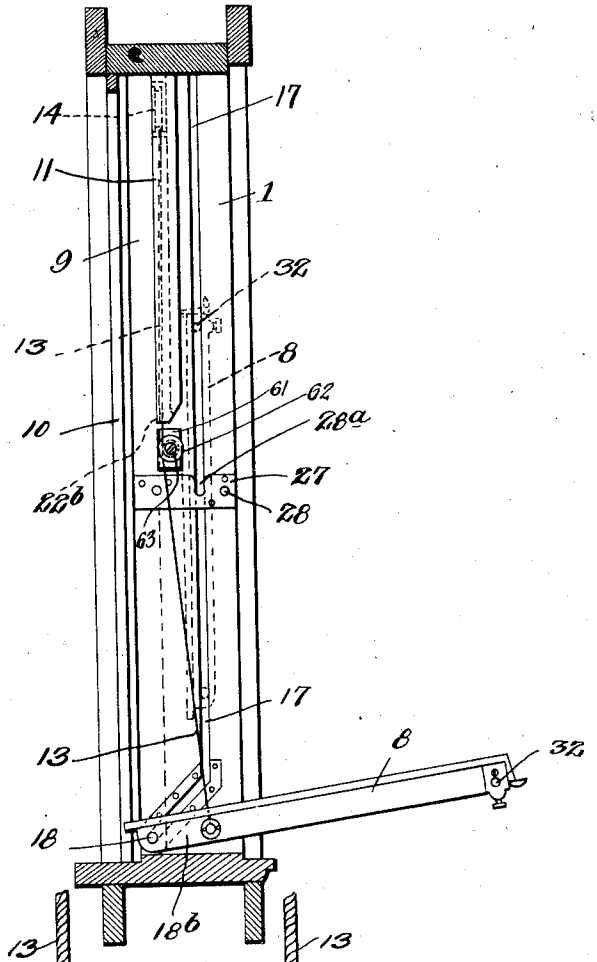
Feb. 14, 1928. 1,659,507

D. B. WHISTLER

WINDOW OR THE LIKE

Filed March 26, 1924 3 Sheets-Sheet 3

Fig. 12.



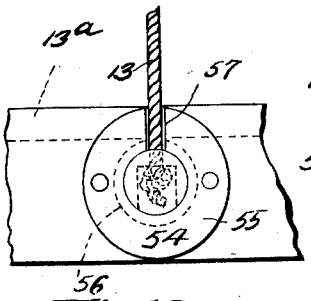


Fig. 13.

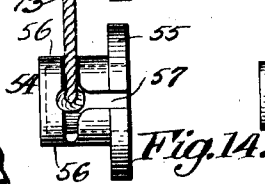


Fig. 14.

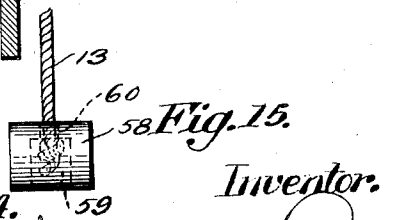


Fig. 15.

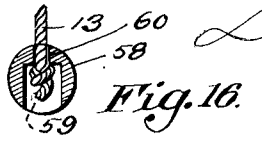


Fig. 16.

Inventor.

David B. Whistler

Patented Feb. 14, 1928. 1,659,507

UNITED STATES PATENT OFFICE.

DAVID B. WHISTLER, OF DAYTON, OHIO.

WINDOW OR THE LIKE.

Application filed March 26, 1924. Serial No. 702,368.

This invention relates to improvements in windows having reference to double-hung windows in which the sash have both the usual vertical sliding adjustment and an inward pivotal adjustment. The present invention is an improvement of the construction set forth in my copending application Ser. No. 672,807 filed Nov. 5, 1923.

The objects attained in windows of this character consist in a straight-line vertical alignment of the sash which gives uniform depth to the window casement and overcomes the objectionable overlapping of the sash, as in the common type of double-hung windows, at their meeting rails. The straight-line arrangement of the sash also results in the upper sash acting as a brace for the lower sash, when the window is closed, thus providing a construction in which the window is more securely closed, that is to say, the window cannot readily be forced open from outside. A further advantage consists in the adaptability of windows having the sash arranged in this manner for effective weather-proofing without using metal weather stripping, or parts other than enter into regular construction, the highly important feature of weathering being thus provided without added cost of production.

The main objects attained in the angular adjustments of the windows consist in improved conditions for ventilation, the lower sash opening at the meeting rails and turning inward at a suitable angle, thus serving to deflect currents of air upward and to avoid direct drafts as result through windows opened by raising the lower sash vertically. The angular adjustment of the windows for ventilating is also effective to exclude the weather. A further advantage derived from the provision for the inward angular adjustment of the windows consists in the convenient accessibility of the outer surface of the sash for cleaning, both sash being adapted to be turned inward at any convenient angle, without interference with screens, thus enabling cleaning of both sides of the glass from inside.

Other characteristics of the improved windows consist in provision for removal of the sash from the frames without removing or loosening of the window stops or strips, in the interlocking of the sash with the window frame, when the window is closed, thus providing for an anti-rattle adjustment of the sash, and serving also to make fully effective the provision for weather-proofing.

The object of the present invention is to provide means for more effective control of the windows, having particular reference to control of the sash in their angular adjustment, to improve and cheapen the general construction, to improve the appearance, and generally to provide those refinements which come with the commercialization of a new product.

To this end, the improved window as illustrated in the accompanying drawings, as described in the herein detailed specification, and as defined and comprehended in the appended claims, comprises a form of construction in which the objects of the invention as herein set forth are achieved.

In the drawings:

Fig. 1 is an inside elevation of the window partially in section to show detail arrangements;

Fig. 2 is an inside elevation of a side of the window frame, or stile, including details of construction;

Fig. 3 is the same view as Fig. 2 including the sash in the frame;

Fig. 4 is the same view as Fig. 3 illustrating adjustments of the sash;

Fig. 5 is a detail sectional view taken on line 5—5 of Fig. 1;

Fig. 6 is a detail sectional view taken on line 6—6 of Fig. 1;

Fig. 7 is an inside elevation of one of the window stiles, with the sash in position, illustrating a modified form of construction.

Fig. 8 is a detail sectional view taken on line 8—8 of Fig. 7;

Fig. 9 is a further detail illustrating the sash latching mechanism shown in Fig. 8;

Fig. 10 is a detail assembly view of the window locking mechanism;

Fig. 11, is a detail sectional view on line 11—11 of Fig. 1 illustrating a feature of the window locking mechanism.

Fig. 12 is a side elevation of the window frame, with the sashes assembled therein, illustrating a modified form of preferred construction.

Figs. 13, 14, 15 and 16 are detail views illustrating a modified arrangement for connecting the weight cords to the sash.

The improved window as here shown consists of the frame, comprising the opposite stiles 1, stool or sill 2, and top cross frame 3, the casing, or trim, consisting of the side

casings 4, upper cross casing 5 and lower cross casing or apron, 6; the outer complete casing 7 also being illustrated in the drawings. Assembled in the frame are the sash 8 and 9.

The straight-line arrangement of the sash is best illustrated in Figs. 1 and 3, the sash being retained in vertical alignment, when the window is closed, by opposite outer weather beads 10, opposite inner stops 11 set to the upper sash, and the means provided for interlocking the sash one with the other and with the frame. The sash are counterbalanced by means of sash weights 12 connected to the sash preferably by means of wire cables 13 operable over sheaves 14—15, the ends of the cables 13 being connected by means of slotted anchor plates 16 to the sides of the sash 8—9, the arrangement as shown consisting in, counterbalancing both sash, with a single weight on a side, thus requiring the use of the double sheaves 15.

The upper sash is connected to the counterweights 12, as above described, by means of the cables 13 which pass through a clearance space 13^a in the sash rails as illustrated in Fig. 5 to the anchor plate 16, the sash being adapted to slide between the weather beads 10 and stops 11. The lower sash is connected to the counterweights also as described, is aligned vertically by the opposite weather beads 10, and is further connected to the window frame by means of grooves 17 in the opposite frames, and pivot studs 18, fixed in plates 18^a and secured to the opposite lower corners of the sash, and adapted to project laterally into and slide freely in the grooves 17, the grooves being deflected angularly in their lower course as indicated at 17^a which serves to deflect the sash inward out of the plane of the upper sash for vertical adjustment, the angular portion of the grooves being reinforced, as here shown, by metal plates 19 secured to the frames along the outer edges of the grooves. The upper course of the grooves 17 is in a vertical plane, substantially on a center line between stops 11 and outer stops 20 secured to the opposite sides of the frame and serving to guide the lower sash in its vertical adjustment.

By the described arrangement provision is made, as illustrated in the drawings, for both vertical and angular adjustments of the lower sash independently of the upper sash. To provide for the angular adjustments of the sash, the cables 13 are connected to the sash at a point intermediate the upper corners and the horizontal center line of the sash, thus to obtain a leverage to counterbalance to some extent the weight of the sash, in its angular adjustment, with the sash weights 12, thereby providing for easy adjustments of the sash as it rotates on the pivots 18, and for the control of the sash by the weights, by means of the cables 13, through an angular adjustment of 90° or more. The vertical adjustment of the sash is very much the same as that on an ordinary window, except that the sash first swings inward in line with the space between stops 11 and 20, the lower end of the sash, by reason of its pivotal connection therewith, following the course of the grooves 17.

To adapt the sash and counterweight cables 13, to both the vertical and angular adjustments of the lower sash, the inner sheaves 14 are set within the plane of stops 11, the stops being provided with rabbets 21, as best shown in detail Fig. 5, along their outer edge adjacent the window frame to receive the cables which together with sheaves 14 are thus out of the path of the lower sash in its upward movement and also out of view, thereby effecting neatness of appearance. To adapt the cables 13 to the vertical alignment of the lower sash with the upper sash, stops 11 are provided at their lower ends with inner clearances 22 and the inner lower corners of the upper sash are provided with clearances 23 and the outer upper corners of the lower sash with clearance 24, for the cables to adapt the same through their normal flexibility to yield sufficiently, against the pull of the counterweights thereon, to permit easy closing of the window.

When the lower sash is adjusted inward beyond the plane of the window frame, as illustrated in Fig. 4, the sash cables 13 are drawn into engagement with clamping devices 24^a secured to the lower ends of stops 20 which are provided with clamp nuts 25 adapted to be manipulated with the fingers to engage the cables and thereby to relieve the sash of the pull of the weights 12 thereon which serves to prevent the sash slamming shut which might otherwise occur.

By connecting the sash cables to the sash at an intermediate point the movement of the sash through its angular adjustments is free and easy to accomplish, as the sash and weights 12 counterbalance one another to the desired extent determined by the location of the cable anchor plates 16.

The upper sash also is capable of the same angular adjustments as the lower sash, as illustrated by the dotted outline position of the sash in Fig. 4. In the angular position of the sash, as illustrated, both sash will be in a convenient position for cleaning, the sash being turned inward and cleaned one at a time without interference one with the other, also without interference with the screen 26 which is shown in position in the window frame in Fig. 4.

The position of the lower sash indicated by dotted outline in Fig. 4 is one of a plurality of positions to which the sash can be

adjusted within the plane of the window frame for normal ventilating. In these several positions the sash is adapted to be interlocked with the frame by means of plates 27 secured to the opposite stiles and having a series of apertures 28 therein arranged on the radius taken from the center of the pivot stud 18 when the sash is closed, the apertures being aligned to be engaged by bolt locks 29 secured to the upper opposite corners of the sash.

The locks 29, as here shown, are provided with the novel feature of having both locks controlled by an intermediate knob or finger piece 30 secured to the sash rail and connected with the locks 29 by means of an extension rod 31, the rod being connected to the bolts 32 of locks 29 in any suitable manner, as indicated in Fig. 6, to provide each bolt 32 with limited free movement independent of rods 31, thus providing for further projecting either, or both bolts 32 by means of finger pieces 33, after the window has been normally locked by manipulation of the intermediate knob 30, the arrangement serving effectively to maintain anti-rattle conditions of the sash in their closed relation, and also to make more effective the provisions for weathering of the window which will be further described in detail. From the detailed illustrations of the window lock it will be obvious that both locks will be opened simultaneously by operating knob 30 in the opposite direction.

To provide for neatness of construction relative to the sash rail which carries the window locks, and simple mechanical arrangements, the operating knob 30, as here shown is connected to extension rod 31 by a rack and gear 41, as best shown in the detail assembly of the parts in Fig. 10, one end of the rod being secured to one of the bolts 32 by means of a rigid arm 34 and a slot and pin connection 35 which provides for limited free longitudinal movement of bolt 32 above referred to, the other end of rod 31 being connected to the opposite bolt 32 by a pivoted link 36 which serves to reverse the direction of movement of bolts 32 one relative to the other, thus causing both bolts to be projected and retracted in unison.

The provisions for weathering of the window consist of the weather beads 10 which, as best shown in detail Figs. 5 and 6, are formed of two pieces arranged to form a rabbet 10^a which is adapted to fit a rabbet 10^b of the sash, the upper rail of the upper sash being provided with a groove 9^a adapted to fit a tongue 3^a secured to the upper frame member 3, the lower rail of the lower sash being provided with a rabbet 8^a fitted to a rabbet 2^a in the stool 2, the meeting rails of the upper and lower sash being cut angularly one relative to the other, the upper rail having a weather drip strip 9^b and the lower rail a finishing strip 8^b to close the meeting rail juncture between the sash.

From the foregoing detail description of the window construction relative to weathering, it will be seen that the window as closed will have both sash pressed in close relation with the weather beads 10, the double rabbets 10^a and 10^b providing contact surfaces on four edges, with the sash interlocked with the window frames by the locks 29, this adjustment of the sash also serving to effect a close fitting relation of the sash at the meeting rails as well as at the rabbet joint between the lower sash and the stool and the tongue and groove connection of the upper sash with the upper cross frame.

A further detail which contributes materially to the effective weather-proofing of the windows consist in the grooves 13^a which, as stated, serve as clearance spaces for the sash cables, and the further practical purpose of preventing capillary attraction of moisture through the rabbet joints and further as drain ducts for any moisture finding its way into the joints and also as dead air pockets or channels acting to minimize seepage of air through the joints.

The interlocking of the sash, one with the other, is accomplished by means of a tongue 39, fastened to the stem 40 to which gear 41 is secured and coacting with a slot 39^a in the adjacent edge of the sash rail of the upper sash 9. Thus when the mechanism associated with knob 30 is manipulated to interlock the lower sash with the window frame the sash will also be interlocked one with the other which has the effect of forming a rigid relationship between the sash, the sash and the frame, and the sash and the weather beads with the result, as above stated, that an effective anti-rattle, weathered closing of the window is accomplished.

A further detail improvement is provided, as shown in the several figures of the drawings, by providing latch plates 37, secured to the opposite stiles, and provided with a series of vertically extended apertures 38 which are adapted to be engaged by the lock bolts 32 to lock the window in a selected position in its vertical adjustment, the arrangement serving as an element of safety, having particular reference to a safeguard for children when the windows are open and also to prevent further opening of the windows from outside.

The modified construction illustrated in Figs. 7, 8 and 9 of the drawings consists in substituting adjustable stops 42 for grooves 17 to coact with the lower sash in its vertical and angular adjustments. The stops are pivoted to the opposite stiles as at 43 and are adapted to swing with the sash angularly and to be released from the sash in the upward adjustment thereof, this be-

ing accomplished by means of slip tongues 45, being a part of locks 29 extended downward and engaging a keeper 44 in metal caps 42[a] secured to the upper ends of stops 42. Also associated with caps 42[a] are pivoted spring catches 46 having their inner free ends adapted to be engaged in a camming action by the tapered ends 49 of lock bolts 32; the outer ends of the catches being provided with a lateral extension 47 adapted to engage notches 51 of latch plates 52 secured to the opposite stiles of the window, thus serving to support the window in a selected position of angular adjustment, the catches being released by manipulation of the bolts 32. When the sash is moved to vertical position the sash will be released of stops 42, the catches 46 acting to hold the stops in position relative to plates 52 to cause tongue 45 to again freely engage the keeper 44 when the sash is lowered. A spring 50 acts on catches 46 to cause the same to coact with lock bolts 32 and plates 52 in the manner described.

A further modification of the construction illustrated in Fig. 7 consists in providing clearances for the sash cords to the lower sash along the inner edges of the side sash rails of the upper sash, as indicated at 53 instead of in stops 11, the inner sheave 14 being located accordingly to direct the cord in a straight line. This arrangement serves to bring the cord on a more direct line between the sash to its point of connection with the lower sash, and thus to relieve to a greater extent the pressure on the cord by the lower sash when the window is closed. The arrangement also is somewhat more effective to conceal the cords from view as the same are farther removed inwardly from the open clearance spaces in stops 11.

The modified construction illustrated in Fig. 12 is a preferred form tending to the elimination of parts, neatness of appearance, ease and smoothness of operation, and lower cost of production. The arrangement as shown consists in extending the lower sash guide grooves 17 to the top of the stiles 1, thus providing a guide for the upper portion of the sash as well when the sash is adjusted vertically, the sash being brought into coacting relation with the upper extensions of the grooves by projecting the lock bolts 32 into the grooves which has the effect of controlling the upper portion of the sash in its upward movement, and at the same time maintaining a free and easy movement of the sash, lock plate 27 being slotted as at 28[a] to adapt bolts 32 to enter grooves 17 freely in the initial step of the upward movement.

The further modification illustrated in Fig. 12 consists in adapting the sash pivot plates 18[b] to serve also as means for connecting the ends of the sash cords, or cables 13, the plates being made longer and provided adjacent their upper ends with slots to receive the knotted ends of the cords. This serves to bring the cord connections relatively near the sash pivots 18, thus having the effect of adapting the sash to be operated, in the angular adjustments thereof, with greater ease, and also to limit the inward displacement of the cords to within the plane of the window frame.

Also in the modified arrangement illustrated in Fig. 12, the clearance 22[b] for the sash cords provided in sash stops 11 is much shorter, extending as illustrated in the drawing only a short distance upward from the lower ends of the stops, this modification serving to more effectively conceal the cords when the window is closed and to reduce the amount of cord exposed when the window is open at an angle.

The modified construction illustrated in Figs. 13 to 16 for connecting the weight cords 13 to the sash comprises a sash socket 54, having a flange 55, and a cylindrical sleeve 56, the flange and sleeve being provided with an irregular shaped slot 57 adapted to receive the sash cord 13, the socket being adapted to be secured to the sashes by means of screws, the flange 55 being set flush with the edges of the sash rails. Sleeve 56 is adapted to receive a cord lug 58 drilled and counterbored as at 59—60 to receive the knotted end of the sash cord. The parts as assembled on the sash are similar in construction to a bayonet-lock, part 58 being adapted to rotate freely in part 56 with the sash cord free to move in the circumferentially extended portion of slot 57, and also having free movement relative to sash grooves 13[a], the cords lying within the grooves as the window is closed. The free movement of the sash cords with lugs 58 and relative to sockets 54 serves to prevent bending of the cords (wire cables being used, as here shown) at their points of connection with the sash and thus to prevent crystallization and breaking of the cords.

A further modification is also shown in Fig. 12 in connection with the relation of the sash cords to stops 11, a guide pulley 62, secured to a plate 61 by means of a screw stud 63, being used as here shown to control the cord in the angular adjustment of both sash.

The operation of the sash in the above described modified construction is substantially the same as in the preferred form of construction illustrated in the other figures of the drawings, the stops 42 as stated, serving merely as a substitute for grooves 17 for controlling the lower portion of the lower sash in the adjustments thereof.

Having described my invention, I claim:

1. A window including in combination with double-hung sash arranged vertically

in alignment one with the other, opposite weather beads secured to the window frame outwardly adjacent the sash, opposite inner stops secured to the window frame adjacent the upper sash, grooves formed in said stops, the window cords for the lower sash running in said grooves, means acting to deflect said cords to an intermediate point of connection with the lower sash, means associated with the window frame, spaced from said upper sash stops and coacting therewith to guide the lower sash when said lower sash is adjusted vertically, and means secured to said sash and coacting with the frame to guide the lower portion of the sash in said vertical adjustment thereof.

2. A window including in combination with double-hung sash arranged vertically in alignment one with the other, opposite weather beads secured to the window frame outwardly adjacent the sash, opposite inner stops secured to the window frame adjacent the upper sash, grooves formed in said stops, the window cords for the lower sash running in said grooves, means acting to deflect said cords to intermediate points of connection in the opposite side edges of the lower sash, means associated with the window frame spaced from said upper sash stops and coacting therewith to guide the lower sash when said lower sash is adjusted vertically, and means interposed between said sash and the window frame and coacting therewith to deflect the sash inward to a plane parallel with the upper sash in said vertical adjustment thereof.

3. A window including in combination with double-hung sash arranged vertically in alignment one with the other, opposite weather beads secured to the window frame outwardly adjacent the sash, opposite inner stops secured to the window frame adjacent the upper sash, grooves formed in said stops, the window cords for the lower sash running in said grooves, means acting to deflect said cords to intermediate points of connection with the opposite edges of the lower sash, and means comprising a vertically extended groove in the frame and a part secured to said sash and coacting slidably with said groove to deflect the sash inward to a plane parallel with the upper sash and to guide the lower sash in said vertical adjustment thereof.

4. A window including in combination with double-hung sash arranged vertically in alignment one with another, means acting normally, as the window is closed, to retain the sash in said alignment including opposite inner stops for the upper sash, clearance provided in said stops to confine a portion of the sash cords and their sheaves, means provided in said sash to deflect the sash cords within the plane of the lower sash to intermediate points of connection in the opposite side edges thereof, said lower sash being adapted to be adjusted inward angularly, and means coacting with said sash cords to counteract the pull of the sash weights thereon and to support said sash in a selected position in said angular adjustment thereof.

5. A window including in combination with double-hung sash arranged vertically in alignment one with another, means acting normally, as the window is closed, to retain the sash in said alignment including opposite inner stops for the upper sash, clearance provided in said stops to confine a portion of the sash cords and their sheaves, clearance provided in said sash to deflect the sash cords within the plane of the lower sash to intermediate points of connection in the opposite side edges thereof, said lower sash being adapted for both vertical and angular adjustments relative to the window frame and means to interlock the sash with said frame in selected position in both of said adjustments.

6. A window including in combination with a sash adapted to be adjusted relative to the window frame, means to interlock the sash with said frame including opposite lock bolts secured to the sash, intermediate mechanism connected to the lock bolts by intervening members and operable to project said bolts to effect said interlocking relation thereof with the frame, and means to further project said bolts independently of said intermediate mechanism.

7. A window including in combination with a sash, means for adjusting the sash including grooves in the opposite jambs of the window frame, guide members secured to the opposite side edges of the sash and operable in said grooves, sash cords and slip joints connecting the cords to the sash, whereby upon disconnecting said joints and turning the sash at an angle the guide members will be moved out of said grooves and the sash freed of the jambs.

8. A window including in combination with upper and lower sash adapted to be adjusted vertically one relative to the other, opposite grooves in the window jambs spaced inwardly from the sash and extended parallel therewith, said grooves having lower reinforced terminals extended downwardly and outwardly from the grooves, connections between the lower portion of the lower sash and said groove terminals acting to deflect said sash laterally, and means for connecting the upper portion of said sash with said grooves for guiding the sash in the vertical adjustment thereof.

9. A window including in combination with a sash having an angular and a slidble adjustment relative to the window frame, a window lock comprising a plate secured to the window frame and having a

series of apertures therein, a bolt supported on said sash and adapted to be moved selectively into engagement with said apertures whereby to adjust the sash angularly, a guide groove for the sash extending upward from said plate, one of said apertures being open to the edge of said plate and aligned with said groove whereby to adapt the sash when the lock bolt is in engagement with said open aperture to be moved into slidable relation with said groove.

10. A window including in combination with a sash adapted to be adjusted vertically and angularly, rabbets formed in the outer side edges of the sash, sash cords extended into and confined in said rabbets, sleeves slotted for receiving the sash cords and secured at an intermediate point in the opposite edges of the sash intersecting the rabbets axially at right angles thereto, and lugs secured to the ends of the sash cords and supported in said sleeves.

11. A window including in combination with a sash adapted to be adjusted vertically and angularly, rabbets formed in the outer side edges of the sash, sash cords extended into and confined in said rabbets, sleeves slotted axially and circumferentially for receiving the sash cords and secured at intermediate points in the edges of the sash intersecting the rabbets axially at right angles thereto, and lugs secured to the ends of the sash cords and supported rotatably in said sleeves with the cords in register with the circumferentially extended slots for effecting the angular adjustments of the sash.

In testimony whereof I affix my signature.

DAVID B. WHISTLER.