April 6, 1954 R. H. HUMMERT 2,674,452

MANUAL OPERATOR FOR PROJECTED WINDOW SASH

Filed July 29, 1950

2 Sheets-Sheet 1

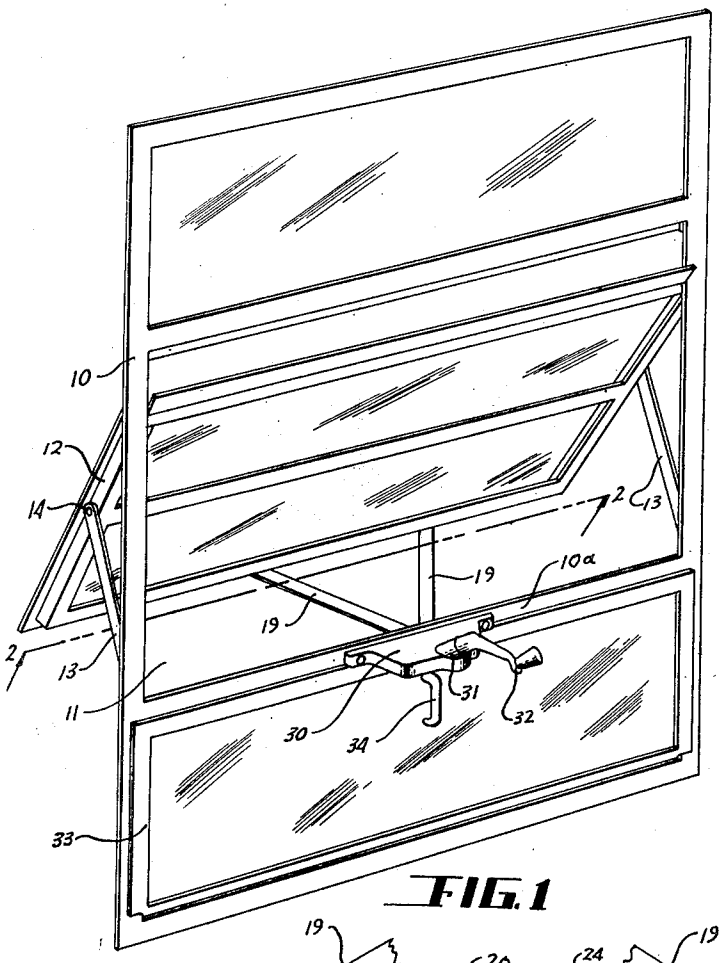


FIG. 1

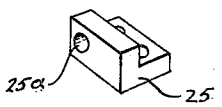


FIG. 5

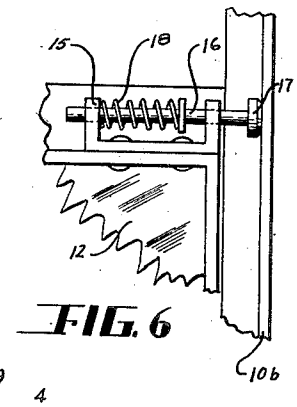


FIG. 6

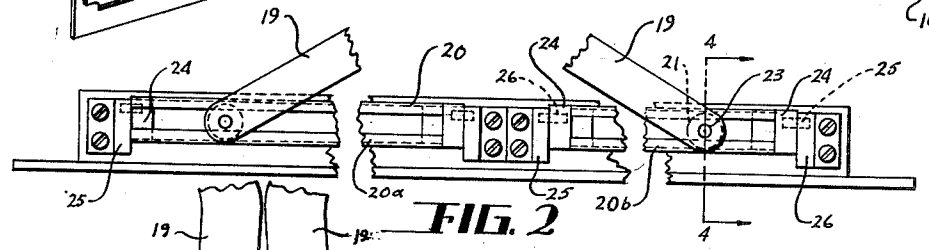


FIG. 2

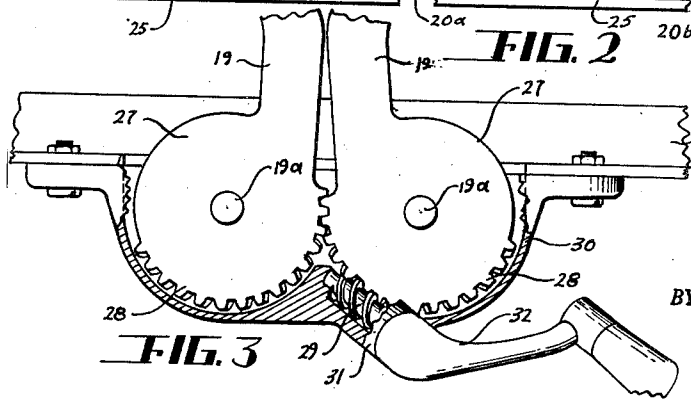


FIG. 3

INVENTOR.
ROBERT H. HUMMERT
BY
HIS ATTORNEY

April 6, 1954 R. H. HUMMERT 2,674,452

MANUAL OPERATOR FOR PROJECTED WINDOW SASH

Filed July 29, 1950

2 Sheets-Sheet 2

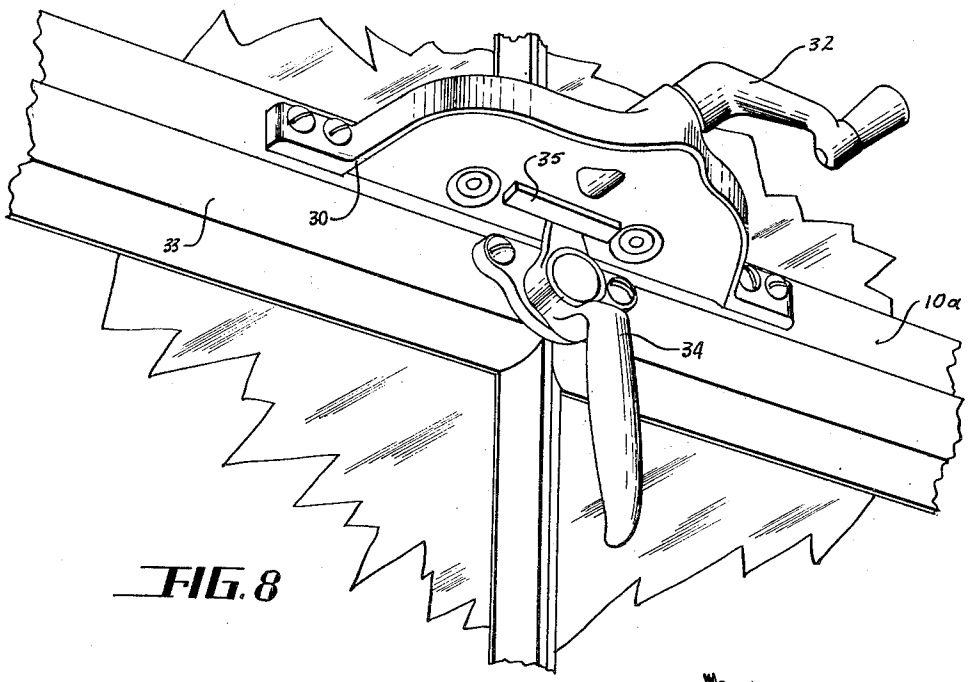


FIG. 8

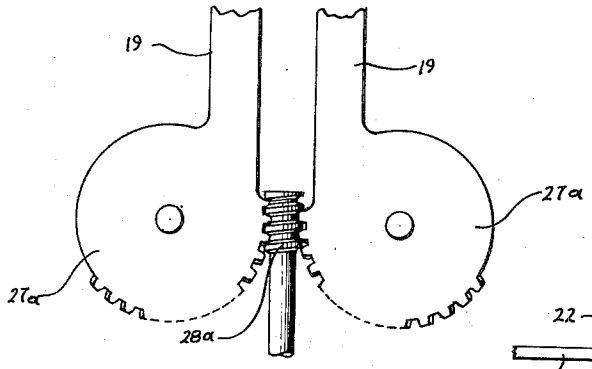


FIG. 7

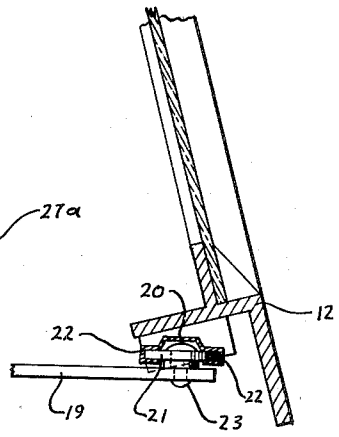


FIG. 4

INVENTOR.
ROBERT H. HUMMERT
BY
Emmett Reid
HIS ATTORNEY

Patented Apr. 6, 1954

2,674,452

UNITED STATES PATENT OFFICE

2,674,452

MANUAL OPERATOR FOR PROJECTED WINDOW SASH

Robert H. Hummert, Dayton, Ohio, assignor to Standard - Thompson Corporation, Dayton, Ohio, a corporation of Delaware

Application July 29, 1950, Serial No. 176,729

3 Claims. (Cl. 268—105)

1

This invention relates to a window operator and is designed primarily for operating a window sash which is so supported on the window frame that it may be moved from a window closing position to an inclined open position.

Ordinarily such a sash is moved to and retained in its inclined position by means of an actuating and locking member connected with said sash, extending inwardly across a part of the window frame and having means whereby it may be secured to said frame to retain the sash in adjusted position. Such a device is not only unsightly and inconvenient to operate but it extends into the room where it constitutes a hazard to people in the room, particularly to children.

One object of the present invention is to provide an operator for such a sash which will eliminate or minimize the hazard created by the prior operating device.

A further object of the invention is to provide an operator which can easily be operated to adjust the sash to the desired position and which will automatically lock the sash in its adjusted position.

The ordinary operating device for a projected sash is mounted adjacent one side of the frame and when the sash is moved to window closing position one side only of the lower portion of the sash is held in firm contact with the frame. To secure firm contact between the other side of the sash and the frame either a second operating device must be provided or some other type of locking device used at said other side of the sash. A further object of the invention is to provide an operating device which, in its normal operation, will move both side portions of the sash into firm engagement with the frame.

A further object of the invention is to provide such an operating device which is simple in construction, easily operated, pleasing in appearance, and which can be produced at a relatively low cost.

Some windows are provided below the outwardly inclined sash with an inner sash which is pivotally supported at its lower edge and is movable to an inwardly and upwardly inclined position. Such a sash is sometimes called a "hopper" sash. The hopper sash is normally provided at its upper end with a latch member to engage a keeper on a transverse portion of the window frame, and it is a further object of the invention to provide an operator for the outer sash having a part constituting a keeper for the latch of the hopper sash.

Other objects of the invention may appear as the operator is described in detail.

2

In the accompanying drawings Fig. 1 is a perspective view of a window having a projected sash and equipped with the invention; Fig. 2 is a bottom view of the lower edge of the sash and the parts carried thereby, as indicated by the arrow 2 in Fig. 1; Fig. 3 is a top plan view of the operating device with the casing broken away to show the actuating mechanism; Fig. 4 is a view taken on the line 4—4 of Fig. 2; Fig. 5 is a detail view of a bearing block; Fig. 6 is a detail view of one of the connecting devices between the upper portion of the sash and the frame; Fig. 7 is a plan view of a slightly modified form of the actuating mechanism; and Fig. 8 is a perspective view of the latching mechanism for the hopper sash.

In these drawings I have illustrated one embodiment of the invention and have shown the same as applied to a projected sash window of conventional form. It is to be understood however, that the operator as a whole, as well as the several parts thereof, may take various forms and may be applied to the sash, or sashes, of windows of various kinds, such for example, as the awning type window, the tropical type window, or a casement window, without departing from the spirit of the invention.

The window to which the operator is here applied comprises a frame 10 having a window opening 11 which is normally closed by a projected sash 12. This sash is supported by bars, or links, 13, pivotally connected at their lower ends with the frame at the respective sides of and near the bottom of the window opening and pivotally connected at their upper ends with the respective sides of the sash approximately midway between the upper and lower edges of the sash, as shown at 14. The upper end of the sash is normally in contact with the outer sides of the respective upright frame members and is usually capable of vertical movement with relation to the frame as the sash moves about the longitudinal axis of its pivotal connection with the supporting bars 13. Usually the sash 12 is provided adjacent the upper end of each side rail thereof with a bracket 15 in which a rod 16 is mounted for longitudinal movement, the bracket being rotatable about the rod, as shown in Fig. 6. The rod is provided at its outer end with a shoe 17 which is held in frictional engagement with the adjacent member 10b of the frame by a spring 18 acting on the rod. Thus when the sash is moved about the longitudinal axis of the pivots 14 the upper portion of the sash may move downwardly along the frame and at the same time the lower portion thereof may move outwardly to position the sash

in downwardly and outwardly inclined relation to the frame, as shown in Fig. 1.

The operating device comprises two elongate rigid members, or arms, 19, which are movably supported on a fixed part of the frame, and preferably extend through or across the horizontal member 10a forming the lower edge of the window opening, and are supported on said frame member for movement about parallel axes. As here shown the arms are connected with the frame by pivot pins 19a and means are provided for moving said arms in opposite directions about the respective axes to move the outer ends of the arms toward or from each other. The outer ends of the arms are connected with the lower edge portion of the sash for movement lengthwise thereof and for movement therewith so that as the outer portions of the arms move toward each other the lower portion of the sash will be moved outwardly and as said outer portions of the arms move from each other the lower portion of the sash will be moved inwardly toward the frame. The arms may be connected with the lower portion of the sash, usually the lower edge of the lower sash rail, in any suitable manner. Preferably there is secured to the lower edge of the sash an elongate guide 20 which is preferably of channel form and in which supporting members 21 are mounted for movement lengthwise of the guide. In the present instance these supporting members are shown as circular heads of rivets and extend into the upper and lower channel portions 22 of the guide and move freely therein. The shank, or stud, 23, of each rivet projects outwardly through a slot between the channelled portions of the guide, and the outer end portions of the arms 19 are mounted on these studs for pivotal movement with relation thereto. The guide may comprise a single elongate member but when, as in the present instance, the sash is of substantial length, the guide is preferably formed in two parts, or sections, 20a and 20b. In order that the sash may move to an inclined position with relation to the arms 19 it is mounted on the guide for movement with relation thereto about a longitudinal axis. In the arrangement here shown each section of the guide has secured to each end thereof a block 24 having a pintle 25 extending beyond the outer side thereof. Rigidly mounted on each end of each section of the guide is a second bearing block 26 which is provided with a longitudinal bearing recess 25a to receive the pintle 25, the several pintles being arranged in longitudinal alinement so that the sash may move about a longitudinal axis with relation to the guide as a whole. Preferably the pintles 26 are arranged adjacent the inner side of the sash so as to permit a relatively large movement of the sash with relation to the guide, which is held against rotary movement by its connection with the arms 19. Thus when the sash 12 is moved outwardly to the position shown in Fig. 1 the sash will be in an inclined position with relation to the guide, as shown in Fig. 4.

The arms 19 may be moved about their respective axes, to adjust the sash, in any suitable manner. Preferably the inner end of each arm is provided with a flat enlargement 27 through which the corresponding pivot pin, 19a, extends. Each enlargement is provided with a toothed portion, or segment, 28, the two segments being in permanent mesh one with the other. A suitable rotatable element engages the toothed segment of one arm to impart rotary movement to the latter and that movement is transmitted through the meshing teeth to the other arm. Preferably this rotating member is in the nature of a worm 29 which is mounted on a fixed support and meshes with the toothed segment of one of the arms. In the present construction the toothed segments are enclosed in a housing 30 rigidly secured to the inner side of the frame member and this housing is provided with a bearing 31 for the worm and the worm is provided with a handle 32 by which it may be rotated. In the arrangement here shown the worm extends at an acute angle to the frame member on which the housing is mounted so that the handle projects only a relatively short distance beyond the housing, but it may be arranged in any suitable position with relation to the frame.

The toothed segments instead of meshing one with the other may be spaced apart, as shown at 27a in Fig. 7, and both directly engaged by the worm 28a.

In operation the rotation of the worm 29 in one direction moves the arms 19 toward each other so that these arms, as they move along the lower edge of the sash, will move the latter outwardly to an extended position, as shown in Fig. 1, and the worm being a self-locking element the sash will be rigidly locked in its adjusted position. When the worm is rotated in the opposite direction the arms will be moved one from the other and will move the lower edge of the sash inwardly and into a position above the flange of the horizontal frame member. When the sash reaches this position the arms will be substantially parallel with the sash, between the same and the frame member, and the outer ends of the arms will be close to the outer ends of the lower sash rail. Consequently both ends of the lower sash rail will be moved into firm engagement with the frame and will be locked in that engagement by the worm.

In the window here illustrated the window frame 10 is provided, below the frame member 10a, with an additional sash 33 of the hopper type which is pivotally mounted at its lower edge on the window frame in the usual manner and is movable to an inwardly and upwardly inclined position. Mounted on the upper rail of the hopper sash is a latch member 34 which engages a keeper carried by the frame to retain the sash in its closed position. This keeper may, as shown in Fig. 8, be carried by and form a part of the housing 30 for the actuating mechanism of the operator, which housing extends inwardly from the frame member 10a. In the present construction the bottom wall of the housing is provided with an elongate part 35 which projects beyond the lower surface of the bottom wall for engagement by the latch member 34 and forms a keeper therefor. Thus the keeper is a part of the housing and may be cast integral therewith, or it may be of different material cast in the housing.

While I have shown and described one embodiment of my invention, I wish it to be understood that I do not desire to be limited to the details thereof as various modifications may occur to a person skilled in the art.

Having now fully shown and described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A window operator for use in opening and closing a projected type of window, wherein the closure is adapted to project outwardly at the bottom thereof, the bottom rail of the sash al-

ways remaining parallel to the window frame, the sash being lowered from the top as it is opened, said window operator including a pair of rigid link members each having a gear sector on one end thereof, said link members being concealed between the closure and the window frame when the closure is in closed position, a stationary support mounted upon the window frame, a pair of pivot pins mounted upon said stationary support, each of the links being provided with an aperture centrally disposed with respect to the gear sectors through which the pins project, said gear sectors meshing with each other, a manually operated worm mounted for rotation in said stationary support and meshing with only one of the gear sectors so that upon rotation of the worm the links rotate in unison in opposite directions about said pins, the axis of said worm extending at an angle with respect to the window frame, and means for interconnecting the other ends of the links to the bottom of the closure to actuate the sash from one position to another position, said last mentioned means including a pair of aligned channel members provided with reentrant flanges, said channel members being pivotally attached to the under side of the sash, a pair of slidable members mounted in the channel members, there being one slidable member for each channel member, and means for connecting one of the slidable members to one of the link members and the other slidable member to the other link member so that as the link members are adjusted the window is opened or closed.

2. A window operator for use in opening and closing a projected type closure mounted for swinging movement when moving from open to closed position and vice versa, wherein a portion of the closure always remains parallel to the main frame of the window, the top of the closure being lowered as the closure is opened, said window operator including a pair of symmetrically disposed link members concealed between the closure and the main frame of the window when the closure is in closed position, each link member having a gear sector in one end thereof, a stationary support mounted upon the window frame, means for pivotally mounting the link members with the gear sector of one meshing with the gear sector of the other, an angularly disposed worm rotatably mounted in the stationary support and meshing with only one of the gear sectors so that as the worm is rotated the gear sector is rotated about its pivotal mounting, and the other gear is rotated in the opposite direction about its pivotal mounting, and means for connecting the ends of the link members

opposite the gear sectors to the movable closure, said last mentioned means including a pair of connecting and slidable members, one pivotally connected to the end of one link member and the other pivotally connected to the end of the other link member, channel means having reentrant flanges in which channel means the slidable members are mounted, and aligned pivotal means having their axes aligned with the bottom of the closure for mounting the channel means for angular adjustment with respect to the closure without angular adjustment of the channel means with respect to the link members.

3. A window operator for use in opening and closing a projected type closure mounted for swinging movement when moving from open to closed position and vice versa, wherein the lower portion of the closure always remains parallel to the main frame of the window, said window operator including a link, means for pivotally mounting said link upon the sill of the window, means for actuating the link about the pivot, a channel member having reentrant flanges, pivotal means for pivotally attaching the channel member to the under side of the closure, the axis of the pivotal means being aligned with the bottom of the closure so as to permit angular adjustment of the channel means with respect to the closure, a slidable member mounted in the channel means and retained by the reentrant flanges, and means for pivotally connecting the slidable member to the end of the link, the plane formed by the bottom of the channel remaining substantially parallel to the plane through which the link is actuated irrespective of the angular position of the closure.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,503,393	Twordowsky	July 29, 1924
1,661,198	Rundgren	Mar. 6, 1928
1,956,476	Rund	Apr. 24, 1934
2,022,036	Haberstump	Nov. 26, 1935
2,050,403	Weiner	Aug. 11, 1936
2,088,098	Susor	July 27, 1937
2,103,864	Moseley	Dec. 28, 1937
2,185,321	Thoma	Jan. 2, 1940
2,315,542	Peremi et al.	Apr. 6, 1943
2,505,912	Reynaud	May 2, 1950
2,528,572	Bancroft	Nov. 7, 1950

FOREIGN PATENTS

Number	Country	Date
12,397	Great Britain	Sept. 30, 1886
353,966	Great Britain	Aug. 6, 1931