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1,748,662

WINDOW OPERATOR

Filed May 15, 1929

3 Sheets-Sheet 1

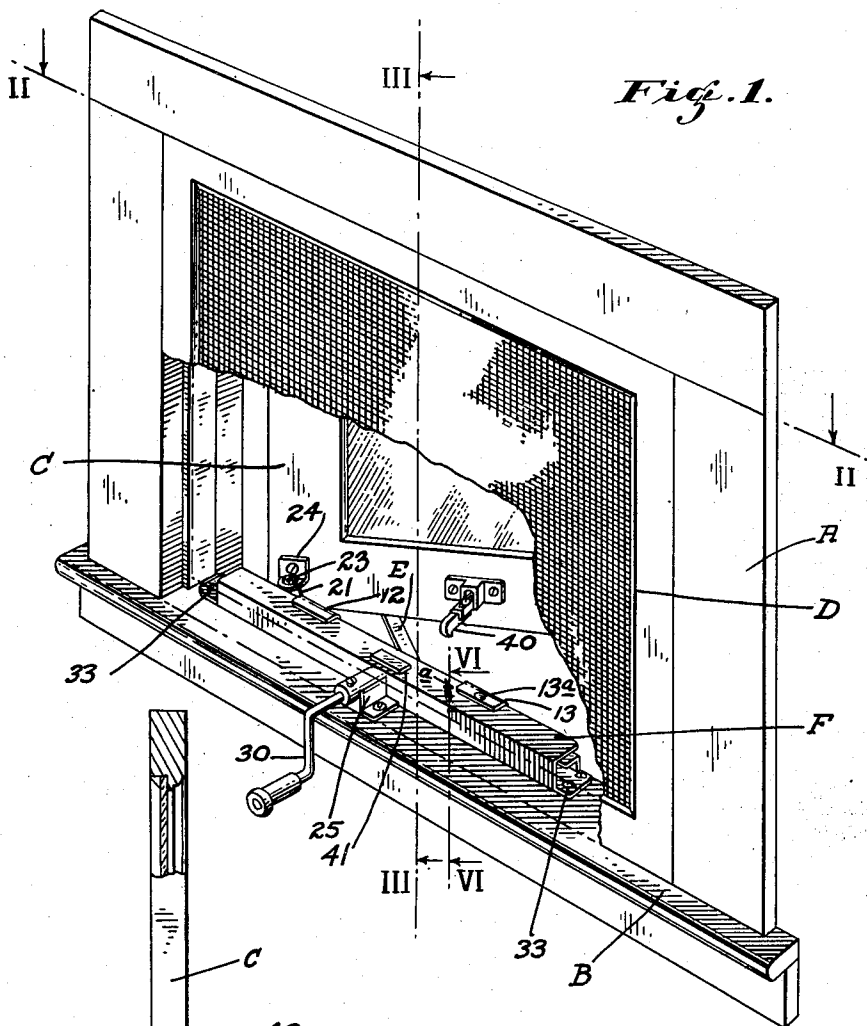


Fig. 1.

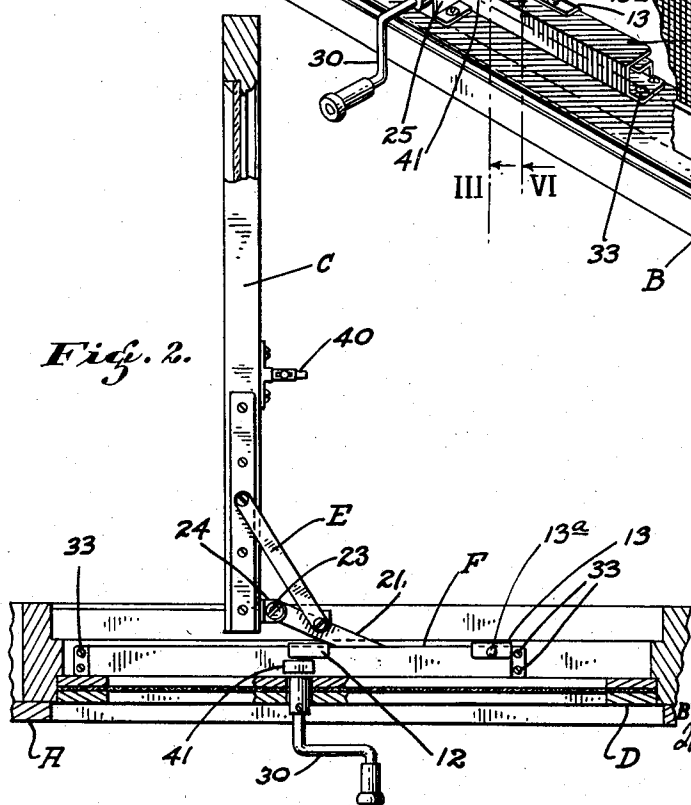


Fig. 2.

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Fig. 7.

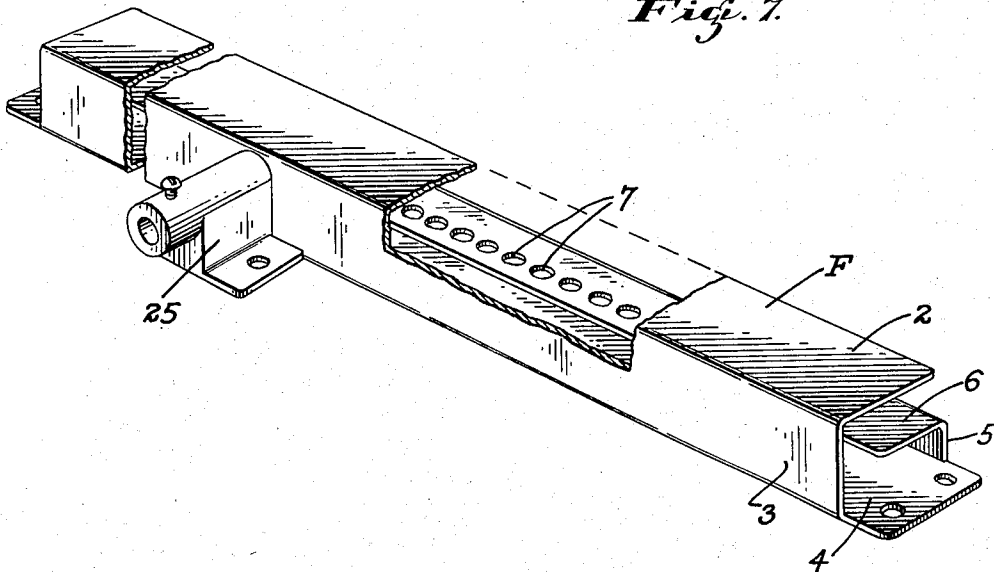


Fig. 8.

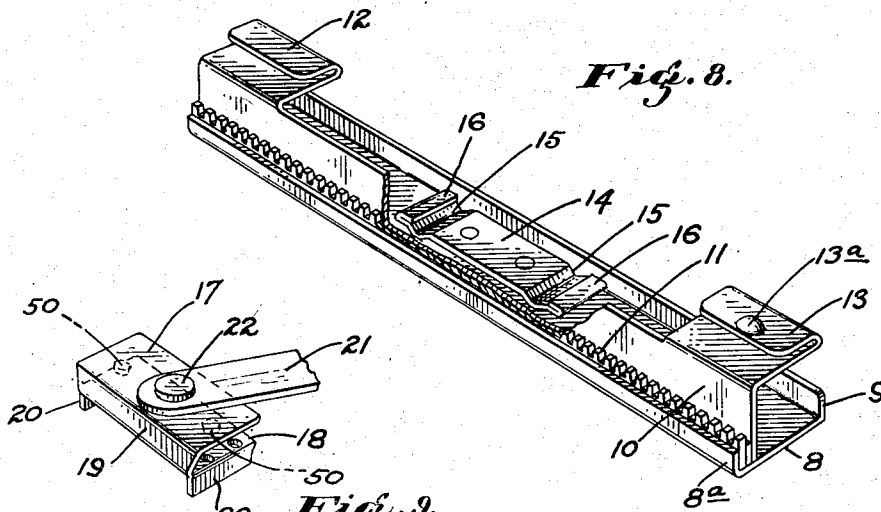


Fig. 9.

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WINDOW OPERATOR

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This invention relates to casement windows, that is, a swingable casement sash pivoted at one side of the frame to swing outwardly, and especially to an operator whereby a window of this character may be opened and closed.

Numerous types of casement windows adapted to swing both vertically and horizontally are in common use, and as practically all windows of this character swing outwardly, an inside screen must be employed. Hence when the windows is to be opened or closed it will either be necessary to remove the screen or to employ an operator which projects through the screen frame whereby the window may be opened or closed. The present invention has special reference to a window operator of this character.

The object of the present invention is to generally improve and simplify the construction and operation of mechanism of the character described; to provide a window operator which is universally adaptable to windows of different types and size; to provide a window operator which is reversible to take care of right and left hand hung windows; to provide a window operator which is adapted to maximum opening of a window, to provide a window operator which is automatically locked in all open positions; to provide other means for locking the window in a closed position; and further to provide means for automatically releasing both locking mechanisms during the opening or closing of a window.

The invention is shown by way of illustration in the accompanying drawings in which:

Fig. 1 is a perspective view showing the application of the invention to an outwardly swinging casement window,

Fig. 2 is a horizontal transverse section taken on line II—II of Fig. 1,

Fig. 3 is a vertical section taken on line III—III of Fig. 1,

Fig. 4 is a longitudinal vertical section of the window operator, said view being partially broken away to disclose the rack bar

and gear whereby longitudinal movement is imparted to the carriage,

Fig. 5 is a similar section of a portion of the window operator showing the shoe in released or unlocked position,

Fig. 6 is an enlarged cross section taken on line VI—VI of Fig. 1,

Fig. 7 is a perspective view partially broken away showing the housing or casing of the window operator,

Fig. 8 is a perspective view of the carriage,

Fig. 9 is a perspective view of the shoe.

Referring to the drawings in detail, and particularly Figs. 1 and 3, A indicates the casement frame of a window, B the sill, C the casement window and D an inside screen.

The upper and lower rails of the window sash are, in this instance, pivotally secured to the casement frame A through means of pairs of links, such as indicated at E, this type of mounting being commonly employed, and forming no part of this invention. Suffice it to say that a mounting of this character permits a window to be swung outwardly to assume the position shown in Fig. 2, and to be swung from that position to a comparatively closed position. Where casement windows of this character are employed, and where they swing outwardly it is, for all practical purposes, necessary to employ an inside screen such as indicated at D, hence it is necessary to employ a mechanism whereby the window may be opened and closed from the interior surface of the screen as it would otherwise be necessary to remove the screen every time the window was to be opened or closed.

Mechanisms of this character are generally referred to as operators. Such operators are by no means new, but the operator shown in the present instance is an improvement over operators heretofore described. It consists of an elongated housing generally indicated at F (see Fig. 7). It may be constructed of any suitable material. In this instance it is shown as bent up of sheet metal. It consists of an upper surface 2, an inner vertical wall 3, a base section 4, an outer vertical upturned wall 5 and an inturned horizontal-

ly positioned plate 6. This plate is provided with perforations throughout its length, as shown at 7, and the plate will hereinafter be referred to as the locking plate.

5 Slidably mounted interiorly of the casing shown at F is a carriage such as shown in Fig. 8, this carriage consisting of a base plate 8, an inner upturned flange 8^a and an outer upturned flange 9, the base being supported by the base plate 4 of the main housing, and the flanges 8^a and 9 being guided by and engaging the side walls 3 and 5 of the housing.

10 Suitably secured to the base plate 8 is a forwardly extending plate 10, and secured between said plate and the inner flange 8 is a rack bar 11. Formed on the upper edge of the plate 10 are two guide lugs generally indicated at 12 and 13. These guide lugs straddle the upper outer edge of the plate 2 of the main housing, and they serve as supplementary guides to the carriage, and the lug 13 also performs another function hereinafter to be described.

15 Secured centrally of the carriage 8 to the base plate 7 is a cam plate 14, V shaped cam surfaces 15 being formed at opposite ends thereof and said V shaped surfaces terminating in shoulders 16. Adapted to be supported by the cam plate 14 is a shoe, generally illustrated in Fig. 9. This shoe consists of an upper plate 17, a lower plate 18, a connecting vertical side member 19 and a pair of downwardly turned foot members 20. A link 21 is pivotally attached to the upper plate of the shoe, as indicated at 22 and the opposite end of the link is pivotally attached, as at 23 to a lug 24 secured to the sash of the window.

20 The main housing F has secured thereto a bearing extension 25. Journalled in said bearing is a shaft 26, and secured on the inner end thereof is a pinion 27 which meshes with a rack bar 11. The outer end of the shaft 26 is provided with a lug 28, and this is adapted to be straddled by the forked end 29 of a removable hand crank 30. The lower rail of the screen D is indicated at 31, and this rail is cut away, as shown in Fig. 3, to straddle the bearing 25, hence permitting the crank 30 to be inserted whenever the window is to be opened or closed.

25 In actual operation the housing F which contains the main operating mechanism is secured to the sill plate of a window by means of screws or the like, as shown at 33 in Figs. 1 and 2 and link 21 is connected to the sash of the window C at the point indicated at 23. If the window is closed and it is desired to open the same, crank 30 is turned anti-clockwise so as to move the carriage in the direction of arrow *a* (see Fig. 1). However, before the window can be opened it is necessary to release a spring latch, such as shown at 40, (see Figs. 1 and 6). This latch is pivotally secured to the lower sash rail of the window C

and the inner end of the latch normally engages a catch or lug 41, the latch and catch serving the function of locking the window in its closed position, and it is accordingly necessary to automatically release the latch before the window can be opened. This is accomplished during the first or initial movement of the carriage.

When the window is closed lug 13 lies directly under the spring latch 40. Lug 13 is provided with a cam surface, such as indicated at 13^a and when the carriage moves in the direction of arrow *a* the cam 13^a passes in under the spring latch and raises it sufficiently to clear it with relation to the catch 41, thus automatically unlocking the window.

It may here be stated that during the initial movement of the carriage no movement whatsoever is imparted to the shoe shown in Fig. 9. This initial or independent movement of the carriage before movement is imparted to the shoe will be best understood by referring to Figs. 4 and 5. First of all, it should be explained that the shoe is normally locked with relation to the housing by means of a pair of pins, such as shown at 50. The upper plate 17 of the shoe overlies the perforated locking plate 6 of the main housing, as clearly shown in Fig. 4, and the pins 50 secured to the plate 17 project downwardly through the perforations in the locking plate, hence the shoe is normally locked against movement. The shoe is, however, provided with a pair of foot members 20, one at each end thereof, and these foot members engage the V shaped cam surfaces 15 at opposite ends of the cam plate. Hence, when crank 30 is rotated movement is transmitted to rotate the pinion 27 and as the pinion 27 meshes with the rack bar 11, and this is secured to the carriage, the carriage will move in the direction of arrow *a*. The cam surfaces 15 will, in this manner, force the shoe in an upward direction, and thereby lift the pins 50 clear of the perforations 17, as shown in Fig. 5.

Hence it will be noted that the carriage will travel independently of the shoe until the pin 50 on the shoe has been raised sufficiently to clear the perforations 17. At that time the foot members of the shoe are engaged by one or another of the shoulders 16 and the shoe will then travel in unison with the carriage. During movement of the shoe a pull is exerted on the link 21, and the window will thus be gradually opened.

The shoe will, during continuous movement of the rack bar, assume the position shown in Fig. 5. The moment however the crank is released or in other words, when the window has been opened to the position desired, the shoe will drop back to a central point between the V shaped cam surfaces 15, this being due to the downward tension of a leaf spring 60 interposed between the lower plate 18 of the shoe and the under surface

of the locking plate 6. Hence, whenever the rack bar stops the shoe drops and locks itself thereby locking the window in any open position to which it may be adjusted. The latch 40, on the other hand, locks the window when the window is completely closed and it is thus locked in any open position and in the fully closed position. In fact it is double locked in the fully closed position as the window is not only locked by the latch 40, but also locked by means of the pins 50 on the shoe.

In the present instance, the window operator is shown as applied to an outwardly swinging casement window which is swung about a vertical axis. It should, however be obvious that where a window is swung about a horizontal axis it is only necessary to secure the window operator to one side or another of the casement frame A. In other words, merely changing it from a horizontal position such as shown in Fig. 1, to a vertical position at one side or another of a window.

It may also be stated that this device is equally applicable to transoms, and to vertical sliding double hung windows. Such windows of course usually employ an exterior screen and the operator would not be so essential, but it is essential where small children have a tendency to hang out of windows, for instance the travel of the carriage can be so arranged that the window can only be raised a few inches, thereby making it impossible for a child to open the window any further and fall out.

Where the operator is attached to a vertical sliding window it is again secured to one side or another of the casement frame, and the shoe may be directly connected to the sash of the window or through means of the link 21 and the lug 24.

The link 21 may be swung to one side or another of the shoe, thereby making it applicable to right or left hand hung windows and by providing a maximum travel to the carriage it can obviously be applied to windows of different sizes. It permits permanent installation to windows of inside screens, it locks the window in any open position and in closed position, it may be arranged to limit the opening movement of a window and as such provides safety both against burglary and against children falling out of the window.

While certain features of the present invention are more or less specifically described, I wish it understood that various changes may be resorted to within the scope of the appended claims, similarly, that the materials and finishes of the several parts employed may be such as the manufacturer may decide, or varying conditions or uses may demand.

Having thus described my invention, what

I claim and desire to secure by Letters Patent is:

1. A device of the character described comprising an elongated housing adapted to be secured to a window casement frame, a carriage slidably mounted in the housing, a shoe supported by the carriage and adapted to move in unison therewith, said carriage having a limited longitudinal movement independent of the shoe, a connection between the shoe and a window whereby the window may be opened or closed, means normally locking the shoe with relation to the casing and against movement with the carriage, and means actuated by the independent limited movement of the carriage for releasing the shoe so that it will move with the carriage to open or close the window.

2. A device of the character described comprising an elongated housing adapted to be secured to a window casement frame, a carriage slidably mounted in the housing, a cam plate on the carriage, a shoe supported by the cam plate and normally movable in unison therewith, said carriage and cam plate having a limited longitudinal movement independent of the shoe, a connection between the shoe and a window, means normally locking the shoe with relation to the housing and against movement with the carriage, and means actuated by the independent limited movement of the carriage and the cam plate for releasing the shoe so that it will move with the carriage and the shoe to open or close the window.

3. A device of the character described comprising an elongated housing adapted to be secured to a window casement frame, a carriage slidably mounted in the housing, a cam plate on the carriage, a shoe supported by the cam plate and normally movable in unison therewith, said carriage and cam plate having a limited longitudinal movement independent of the shoe, a connection between the shoe and a window to be opened, a locking plate on the housing having a plurality of locking members formed thereon, means on the shoe normally engageable with the locking members and locking the shoe with relation to the housing and against movement with the carriage and the cam plate, and means actuated by the independent limited movement of the carriage and the cam plate for releasing the shoe so that it will move with the carriage and the cam plate to open or close the window.

4. A device of the character described comprising an elongated housing adapted to be secured to a window casement frame, a carriage slidably mounted in the housing, a cam plate on the carriage, a shoe supported by the cam plate and normally movable in unison therewith, said carriage and cam plate having a limited longitudinal movement independent of the shoe, a connection

- between the shoe and a window to be opened, a locking plate on the housing having a plurality of locking members formed thereon, means on the shoe normally engageable with the locking members and locking the shoe with relation to the housing and against movement with the carriage and the cam plate, means for imparting longitudinal movement to the carriage and the cam plate, said means causing the cam plate to ride in under the shoe and raise it sufficiently to release it with relation to the locking means, and said cam plate having shoulders formed thereon engageable with the shoe to move it in unison with the carriage when the shoe has been released with relation to the locking means.
5. A device of the character described comprising an elongated housing adapted to be secured to a window casement frame, a carriage slidably mounted in the housing, a cam plate on the carriage, a shoe supported by the cam plate and normally movable in unison therewith, said carriage and cam plate having a limited longitudinal movement independent of the shoe, a connection between the shoe and a window to be opened, a locking plate on the housing having a plurality of locking members formed thereon, means on the shoe normally engageable with the locking members and locking the shoe with relation to the housing and against movement with the carriage and the cam plate, a locking latch secured to the window and engaging a catch on the housing when the window is locked and means actuated by the independent limited movement of the carriage for releasing said latch and for simultaneously releasing the shoe so that it will move with the carriage and the cam plate to open the window.
6. A device of the character described comprising an elongated housing, a carriage slidably mounted therein, a rack bar secured to the carriage, a shaft journaled in the housing and having a pinion secured thereto and normally intermeshing the rack bar, means for imparting rotary movement to the pinion so as to impart longitudinal movement to the rack bar and the carriage, a shoe supported by the carriage, means normally locking the shoe with relation to the housing, and means on the carriage whereby during initial movement of the carriage the shoe is released and then engaged and moved in unison with the carriage.
7. A device of the character described comprising an elongated housing, a carriage slidably mounted therein, a rack bar secured to the carriage, a shaft journaled in the housing and having a pinion secured thereto and normally intermeshing the rack bar, means for imparting rotary movement to the pinion so as to impart longitudinal movement to the rack bar and the carriage, a shoe supported
- by the carriage, means normally locking the shoe with relation to the housing, and a cam member on the carriage adapted during initial movement of the carriage to raise the shoe vertically to release the shoe with relation to the housing, and other means on the carriage engageable with the shoe as it is released to move it in unison with the carriage.
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