April 29, 1958 W. K. YOUNGBERG 2,832,590

CASEMENT WINDOW OPERATORS

Filed Nov. 9, 1955

Fig.1.

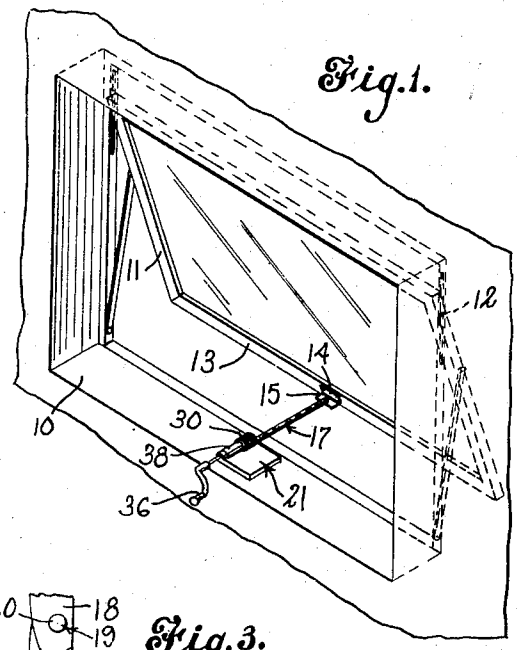


Fig.2.

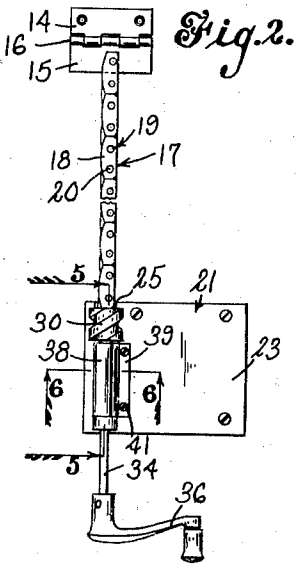


Fig.3.

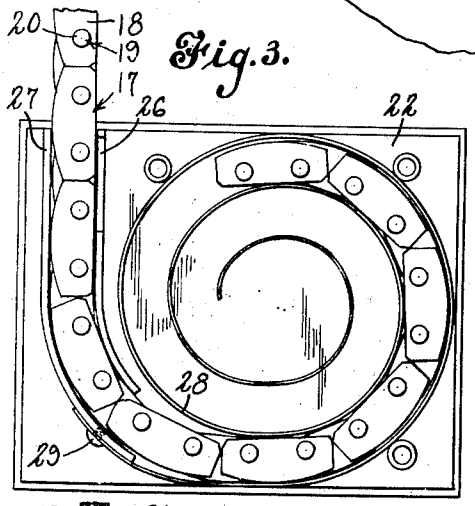


Fig.4.

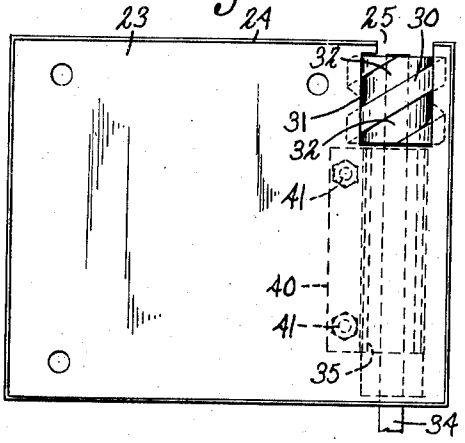


Fig.5.

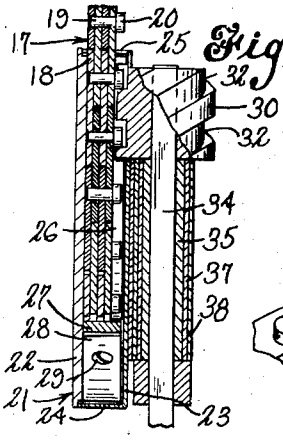


Fig.7.

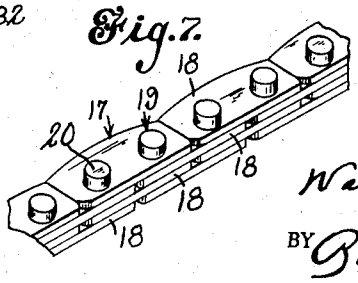
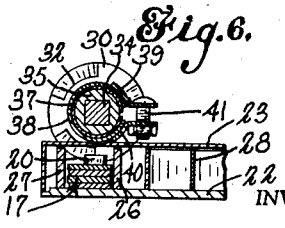


Fig.6.



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CASEMENT WINDOW OPERATORS

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1 Claim. (Cl. 268—104)

This invention relates to operating mechanism for a closure member and more particularly to an operating mechanism for a window hinged at one edge such, for example, as a casement window. Such a window swings outwardly about the edge at which it is hinged to the frame, and some mechanism is usually mounted upon the frame and secured to the free swinging edge of the sash to move the latter outwardly to open position and draw it inwardly to closing position.

It has beeen found convenient to provide mechanism for the purpose of opening and closing the window sash which may be operated by a crank or the like so that it responds to a rotating movement, thus giving greater leverage to the operator. Moreover, it is also convenient to provide mechanism which will require as small space as possible so that it will not be in evidence any more than is necessary and so that it will not protrude outwardly into the room or occupy an undesirable amount of space on the window sill.

In the present instance a flexible chain is provided which is connected at one end of the free swinging edge of the window sash and which at its other end may be coiled up in a relatively small casing mounted upon the window sill. This chain is flexible in one direction only so that, when held against flexing in this direction, it will be rigid and will serve as a means both to push the window open and to pull it closed. The chain as shown is made up of a plurality of links or segments held together by pivot pins about which the links may move in one direction. For convenience these pivot pins are extended from the surface of the chain (the upper surface as illustrated herein) and a worm is employed, the grooves of which engage with or receive the upper ends of the rivets in order to actuate the chain.

This worm is rotatably mounted in the cover of a casing within which the end of the chain is secured to the window sash and is coiled when the window is drawn to closed position. Thus all that part of the chain which does not extend between the casing of the window sash will be coiled into a relatively small space and concealed within the casing. The worm is mounted upon a shaft which is rotatably secured upon the cover of the casing which receives the chain and projects into the casing through an opening in the cover to engage the projecting ends of the pivot pins as previously described.

One object of the invention is to provide a new and improved operating mechanism for closure members hinged at one edge.

A further object of the invention is to provide a new and improved casement window operator wherein a chain flexible in one direction only is adapted to be coiled at one end within a casing and secured at its other end to the window sash, novel means being provided to operate the chain through a worm which engages the projecting ends of the pivot pins, securing the links of the chain pivotally together.

A still further object of the invention is to provide a

casement window operator wherein the operating arm comprises a chain flexible in one direction only and to provide compact and smoothly operating means for projecting and retracting the chain to move the window to open and closed position.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a perspective view of a casement window operator embodying my improvements applied to a window;

Fig. 2 is a top plan view of the operator itself detached from the window;

Fig. 3 is a view of the casing with the cover removed to show the interior mechanism;

Fig. 4 is a view of the under side of the cover of the casing;

Fig. 5 is a sectional view on line 5—5 of Fig. 2;

Fig. 6 is a sectional view on line 6—6 of Fig. 2; and

Fig. 7 is a perspective view of a short length of the chain.

To illustrate one embodiment of my invention I have shown a window frame **10** having a sash **11** hinged thereto at **12** so as to swing outwardly from the sash. Secured to the lower rail **13** of the sash is a hinge member comprising leaves **14** and **15** hingedly connected by a hinge pin at **16**. The leaf **14** is secured to the rail **13**, while the leaf **15** is attached to the end link of a chain flexible in one direction only and designated generally by the numeral **17**.

This chain, as shown in Fig. 7, comprises a plurality of flat plates or links **18** pivoted together with their ends in overlapping relation by the pivot pins **19**. As shown more especially in Figs. 5, 6 and 7, these pins are substantially flush with one surface of the chain, the lower as shown in Figs. 6 and 7, but are provided with heads **20** projecting from the upper surface of the chain.

As previously stated, the end of the chain which is not secured to the window sash is adapted to be coiled within a casing secured to the frame **10** designated generally by the numeral **21**. This casing comprises a flat base plate **22** and a cover **23**, the latter having projecting edge flanges **24** on all four sides to space it from the base plate **22**. In the front flange **24** of the cover is an opening **25** which permits the entrance of the chain into the casing.

Aligned with this opening is a guide channel consisting of substantially parallel spaced-apart plate members **26** and **27** which stand upwardly from the plate **22**. The channel provided between these members snugly receives the chain, as shown in Fig. 3, and holds the links against flexing at the point of entrance.

Toward its inner end this guide channel is curved inwardly, as shown in Fig. 3, so as to cause the chain to flex in order that it may coil upon itself. Secured to the inner end of the outer channel member **27** is a guide member **28** consisting of a flat flexible spring-like member coiled in the form of a scroll, which member gradually leads the extreme end of the chain toward the center of the casing so that it will be properly coiled with one coil lying closely engaged with the next until the scroll-shaped channel formed by the member **28** is filled. The member **28** is secured to the channel member **27**, as shown at **29**, and may be left free throughout the remainder of its length so that it will be free to accommodate itself to some extent at the sides of the coils formed in the chain.

Means are provided to project and retract the chain, which means, as shown, takes the form of a multiple worm **30** disposed in an opening **31** in the casing cover

23 adjacent the opening 25 in the flange 24, the worm being provided with helical grooves 32. The worm is carried upon a square shaft 34 mounted in a bushing 35 rotatably mounted on the cover 23 as will be hereinafter described, and a handle 36 is provided on the extended end of the shaft 34 by which the shaft may be rotated.

The bushing 35 is embraced by a split fiber sleeve 37 and this sleeve is in turn embraced by a split metallic sleeve 38. Secured to the metallic sleeve adjacent the free edges thereof are wing members 39 and 40 adapted to be drawn together by screws 41 so as to exert the proper friction upon the fiber sleeve 37 and through it upon the bushing 35. The metallic sleeve 38 is secured to the casing cover 23 so as to provide a fixed bearing for the bushing 35 and shaft 34 contained therein.

Fig. 3 is a top view of the base plate of the casing showing the chain partly coiled thereon, while Fig. 4 shows the bottom or inside view of the cover. It will be apparent that if the cover, as shown in Fig. 4, is turned over upon the base plate, as shown in Fig. 3, the worm 30 will overlie that portion of the chain between the channel members 26 and 27 in position for the grooves in the worm to engage the upstanding ends 20 of the pivot pins 19.

Rotation of the crank 34 and consequently of the worm 30 will effect translation of the chain in either an outward or inward direction depending upon the direction of rotation of the crank. If the chain is projected outwardly, it will stand rigidly between the casing and the hinged leaf 15 so as to push the window to, and hold it in, open position. During this movement the portion of the chain within the casing is uncoiled from the scroll-shaped guide member 28 so far as is necessary to provide a sufficient length to open the window to the desired extent. If the shaft 34 is rotated in the opposite direction, the chain will be retracted into the casing and caused to coil upon itself within the guide member 28, the chain being free to flex in this direction. When the window is completely closed, substantially all of the chain will be coiled within the casing and no space on the window frame or ledge will have to be provided to accommodate the chain except that occupied by the casing.

By providing the outer metallic split sleeve 38 and the inner split fiber sleeve 37, the proper frictional resistance to turning can be placed upon the bushing 35 so that this bushing and the shaft 34 will be permitted to turn smoothly and easily, but at the same time will remain in any position to which it is moved.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the claim.

What I claim is:

An operating mechanism for a closure mechanism hinged at one end to a casing, said mechanism comprising a chain member flexible in one direction only, a casing in which one end portion of said member may be coiled and provided with an opening through which the other free end of the chain may be projected, means hingedly connecting said free end to the closure member, said chain comprising a plurality of pivoted elements, pivot pins connecting said elements together and having end portions projecting from the outer surface of the chain member, a worm member rotatably mounted on the casing and engaged with the projecting end portions of said pivots to retract and project the chain when the worm is rotated, said casing including a cover having an opening therein, a bearing provided on the cover, a shaft rotatably mounted in said bearing upon which the worm is mounted, said worm member projecting into the casing through said opening to engage the pivot pins of the chain, means for rotating said shaft, said bearing comprising an inner split sleeve embracing the shaft, and an outer split sleeve embracing the inner sleeve and secured to the cover adjacent the opening therein, and means for contracting the outer sleeve to exert frictional pressure upon the inner sleeve.

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