Nov. 22, 1960 D. H. MUNRO 2,961,234

WINDOW OPERATOR WITH IMPROVED TRACK

Filed Nov. 12, 1957

FIG. 1.

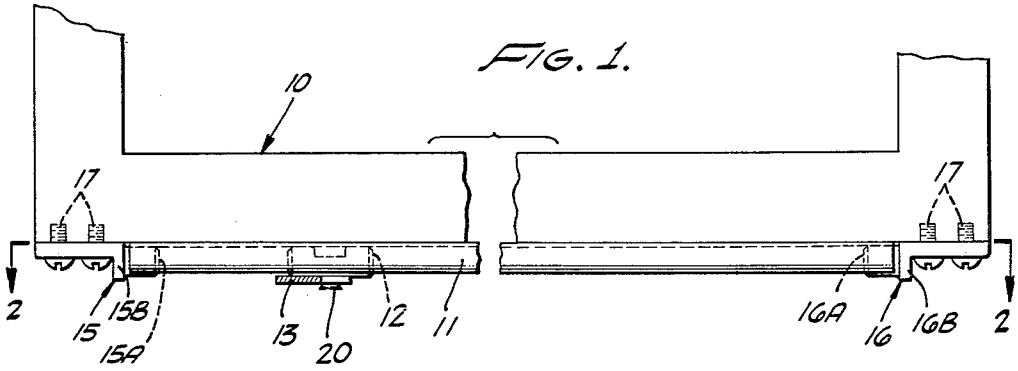


FIG. 2.

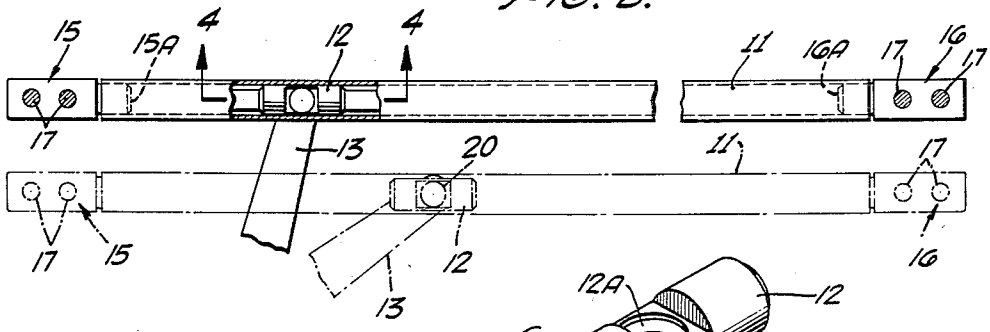
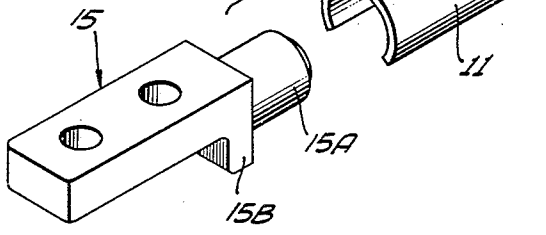


FIG. 3.



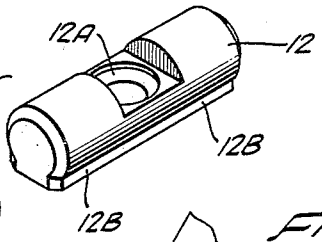


FIG. 6.

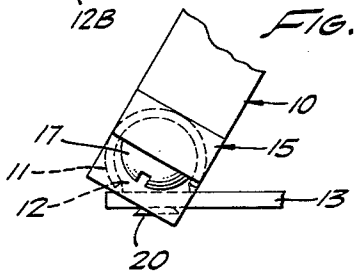


FIG. 4.

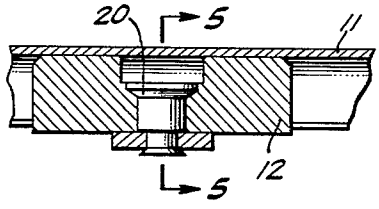
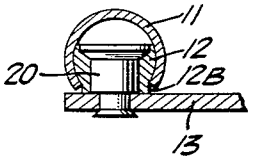


FIG. 5.



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WINDOW OPERATOR WITH IMPROVED TRACK

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5 Claims. (Cl. 268—109)

The present invention relates to improvements in window openers.

The present invention has particular applicability to mechanisms for operating windows of the type which are hinged on a supporting frame or part of a building structure. Usually such windows are opened and closed by an arm which is attached to the free end of the pivoted window and which is operated by a conventional crank mechanism mounted on the window frame. The character of the connection between the arm and the free end of the pivoted window is usually one in which a small roller on the end of the arm moves in a track mounted along an edge of the window. Since the range of movement of the window from open to closed position is relatively large, such actuating arm has some flexibility, so that the arm may flex somewhat when the window is being moved to different pivoted positions. Such flexing of the actuating arm, which is usually necessary, may give rise to difficulties in continued operation and, in particular, causes greater frictional forces to be developed between the window track and the cooperating roller on the free end of the actuating arm, so that greater forces are required to be developed to move the window to open and closed positions.

In accordance with the present invention, a window may be pivoted through relatively large angles without flexing of the actuating arm and with the application of relatively small energy. This is accomplished in general by providing a slotted tube on the window frame with a cooperating bearing block slidably mounted in the tube and attached to the free end of the actuating arm, and by allowing such slotted guide tube to rotate about its axis.

It is therefore an object of the present invention to provide an improved connection between a pivoted window and the mechanism for pivoting such window to open and closed positions.

Another object of the present invention is to provide an improved operating mechanism for pivoted windows that avoids the necessity of flexing an actuating arm.

Another object of the present invention is to provide an improved mechanism for operating windows that develops relatively small frictional forces so that the window may be opened and closed easily.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. This invention itself, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best understood by reference to the following description taken in connection with the accompanying drawings in which:

Figure 1 illustrates the free end of a pivoted window having the novel actuating mechanism mounted thereon in accordance with the features of the present invention.

Figure 2 is a view taken generally on the line 2—2 of Figure 1 and also shows the mechanism in two different operating positions.

Figure 3 is a perspective view showing some of the elements also illustrated in Figures 1 and 2.

Figure 4 is a sectional view taken on the line 4—4 in Figure 2.

Figure 5 is a sectional view taken on the line 5—5 of Figure 4.

Figure 6 is an end view of a portion of the structure shown in Figure 1.

The drawings illustrate a conventional window 10 which is pivotally mounted on a window frame or supporting structure by conventional means (not shown). Figure 1 shows the free end of such pivoted window.

The mechanism for pivoting such window 10 comprises generally a slotted guide tube 11, a cylindrical bearing block 12 slidably mounted in the tube 11 and an actuating arm 13 which is attached to such bearing block 12.

The tube 11 is rotatably supported at its opposite ends on a pair of specially formed brackets 15 and 16, such brackets or supports 15, 16 being secured to the outer edge of the window 10 by fastening means such as machine bolts 17 that are threaded into the metal window 10. These supports or brackets 15, 16 each have corresponding cylindrical portions 15A and 16A that extend into corresponding opposite ends of the tube 11 so as to allow the tube 11 to freely rotate on the same. Substantial longitudinal movement of the tube 11 is, however, prevented by engagement of the opposite ends of the tube 11 with the enlarged portions 15B and 16B, respectively, of supports 15 and 16.

Prior to assembly of the tube 11 on such supports 15 and 16, the cylindrical guide block 12 with the actuating arm 13 attached thereto is first disposed within the tube 11 with a portion of such bearing block extending through the slotted opening in the tube 11, as shown in Figure 5. The tube 11 may be slotted along its entire length, or the slotted portion therein may extend from one end of the tube to a region close to the other end. The actuating arm 13 is pivotally supported on the bearing block 12, and for this purpose there may be provided, for example, the special form of rivet 20 which has its head disposed in the undercut and chamfered portion 12A (Figure 3) of the bearing block, the other end of the rivet 20 being upset to retain the actuating arm 13 in such a manner that the free end of the actuating arm 13 may pivot with respect to the bearing block 12.

This bearing block 12 is generally cylindrical with the cylindrical portion thereof being slightly less than the diameter of the guide tube 11 so as to provide relatively large bearing surface which coacts with the inside of the guide tube 11. Such bearing block 12 has integrally formed therewith a generally rectangular base portion 12B which extends through the slotted opening of the guide tube 11 and cooperates with the spaced edges of the guide tube 11, as shown in Figure 1, so as to prevent turning of the bearing block 12 about the axis of the tube 11.

The actuating arm 13 is actuated by conventional mechanism (not shown) mounted on the frame on which the window 10 is pivoted. Such mechanism may be of conventional type which incorporates a handle rotatable by an operator to pivot the arm 13 to different positions illustrated in Figure 2.

It will be observed, upon movement of the actuating arm 13 to the positions illustrated in Figure 2, the bearing block 12 slides in the tube 11 and also the tube 11 rotates about its axis on the supports 15 and 16. Due to the fact that the tube 11 is free to rotate about its axis, there is substantially no flexure in the actuating arm 13; hence, it is not necessary to provide a flexible actuating arm; and furthermore, by this arrangement fric-

tional forces are minimized and the window may be opened and closed with comparative ease.

While the particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

1. A window having a pair of supports secured in spaced relationship on one edge thereof, a slotted tube, means rotatably mounting said tube on said supports for rotation about the axis of said tube, a bearing block slidably mounted in said tube and having a portion thereof extending through the slotted portion of said tube, and an actuating arm pivoted on said bearing block, said slotted tube extending substantially the full width of said window.

2. A window actuating mechanism for opening and closing a window comprising, a pair of supports for attachment to a window, a tube, means rotatably mounting said tube on said supports for rotation about the axis of said tube, said tube being slotted, a bearing block slidably mounted in said tube and having a portion extending through said slotted tube, and an actuating arm attached to said bearing block, said slotted tube extending substantially the full width of said window.

3. A window actuating mechanism for opening and closing a window comprising, a slotted tube extending substantially the full width of said window, a bearing block slidably mounted in said tube and having a portion extending through the slotted portion of the tube and an actuating arm pivoted on said bearing block, means for rotatably supporting said tube on said window for rotation about the axis of said tube.

4. A window actuating mechanism for opening and closing a window comprising, a slotted tube extending substantially the full width of said window, means for attachment to a window for rotatably supporting said tube about its axis, a bearing block slidably mounted in said tube and having a portion thereof extending through the slotted portion of the tube for engaging said tube to rotate it about its axis.

5. A window operating mechanism for opening and closing a window comprising, an elongated guide extending substantially the full width of said window, means for attachment to a window for rotatably supporting said guide about its longitudinal axis, a bearing block slidably mounted on said guide, and an actuating arm pivoted on said bearing block cooperating with said guide to produce rotation on said means when said actuating arm is operated.

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