May 6, 1930. T. E. KING 1,757,720

SASH OPERATING APPARATUS

Filed Feb. 6, 1928

Fig. 1.

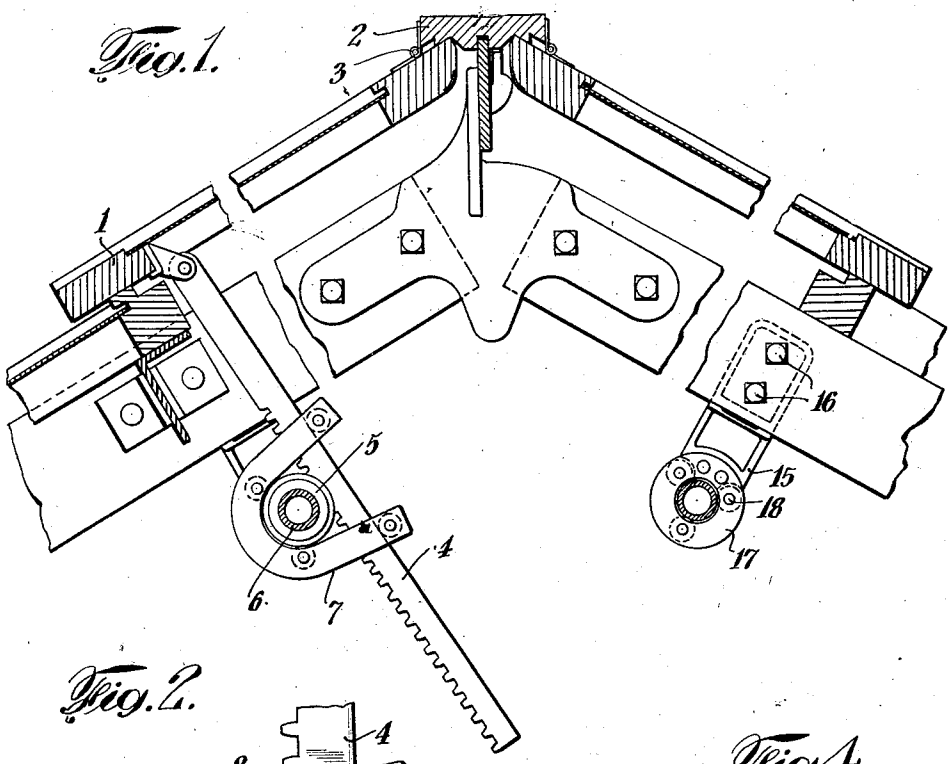


Fig. 2.

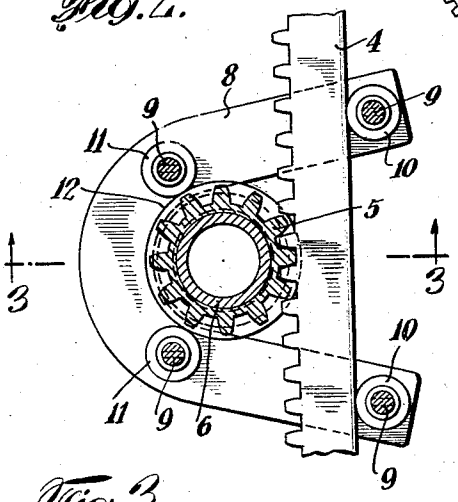


Fig. 4.

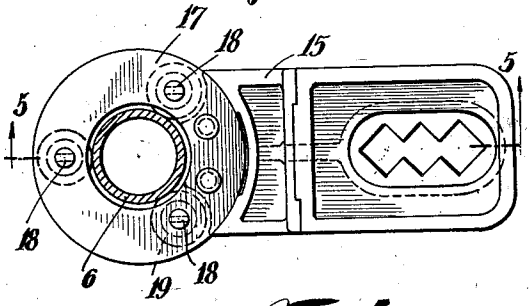


Fig. 5.

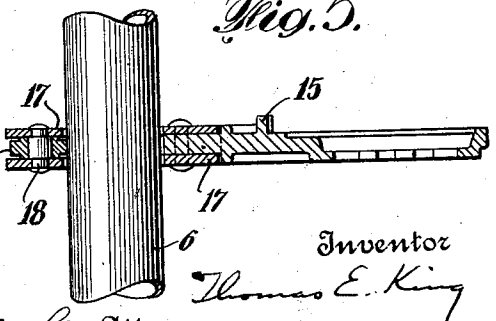
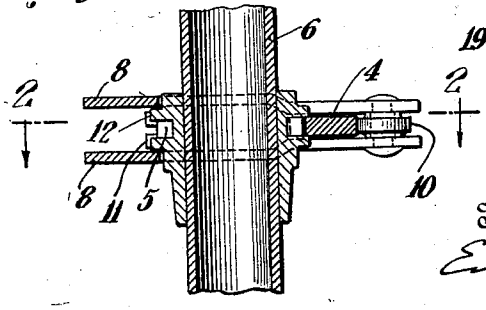


Fig. 3.



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UNITED STATES PATENT OFFICE

THOMAS E. KING, OF WESTFIELD, NEW JERSEY, ASSIGNOR TO HITCHINGS & COMPANY, OF ELIZABETH, NEW JERSEY, A CORPORATION OF NEW JERSEY

SASH-OPERATING APPARATUS

Application filed February 6, 1928. Serial No. 252,069.

This invention relates to apparatus adapted for operating sashes and the like. It is an object of the invention to provide an apparatus which shall be simple in construction, and which shall be easily operable at all times.

Other objects and advantages of the invention will appear hereinafter.

A preferred embodiment of the invention selected for purposes of illustration is shown in the accompanying drawings, in which,

Figure 1 is a section showing the apparatus applied to the roof or ridge sash of a greenhouse.

Figure 2 is a large detail view of the operating mechanism, the same being a section taken on the line 2—2 of Figure 3.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is an enlarged detail view of the shaft bearing, and

Figure 5 is a section on the line 5—5 of Figure 4.

Referring to the drawings, and particularly to Figure 1, a portion of a greenhouse roof has been illustrated in which the sash 1 is pivotally mounted by means of the hinge 3 upon the longitudinally extending member 2 of the greenhouse frame. Interengaging means for operating the said sash 1 are provided comprising a rack 4 which is pivotally connected to the sash and a pinion 5 which may be secured to a shaft 6 which extends longitudinally through the greenhouse for connection to a plurality of sashes as explained hereinafter. In order to hold the rack and pinion in proper operative relationship a frame or yoke 7 may be provided comprising a pair of U-shaped members 8 which may be secured together in spaced relationship by means of the rivets or bolts 9. Preferably the rack 4 passes between the spaced U-shaped members 8, and the pinion 5 is mounted on the shaft 6 in such position that the teeth of the pinion may engage the teeth of the rack.

Anti-friction means are provided to promote freedom of relative movement between the rack and pinion and the yoke. Thus upon the rivets 9 are mounted rollers 10 between the spaced members 8, in position to engage the back of the rack 4 in such manner as to receive the backward thrust therefrom while the rollers 11 are mounted to engage the projecting flanges 12 of the pinion in order to take the opposed thrust therefrom or from the shaft on which said pinion is mounted. In this manner, as will be observed, both the rack and pinion move against the rollers 10 and 11 respectively in such manner that friction or binding of the parts is substantially eliminated.

It will be understood, of course, that the shaft 6 may be provided with a plurality of pinions 5 arranged to cooperate with a plurality of racks 4 for operating a plurality of sashes simultaneously. The shaft 6 may be rotated by means of a crank (not shown) or any other suitable means.

In order to support the shaft 6 in proper position and to prevent sagging thereof, suitable supporting means may be provided at intervals comprising brackets 15 which may be secured to the greenhouse frame by means of the bolts 16. Secured to each bracket 15 are a pair of spaced washers 17 carrying rivets or bolts 18 upon which are mounted rollers 19. The said rollers are spaced so as to engage the shaft 6 at equidistantly spaced points so that the shaft is firmly supported, but is permitted to rotate freely.

In operation, as the shaft 6 is rotated the engagement of the teeth of the pinion with the teeth of the rack causes the rack and the sash to move up or down depending upon the direction of rotation of the shaft. As will be observed, the yoke 7 holds the parts in proper operative engagement at all times and the lateral thrusts of both the rack and pinion are taken by the rollers 10 and 11.

It will be understood that the invention may be variously modified and embodied within the scope of the subjoined claims.

I claim as my invention:

1. Apparatus of the class described comprising in combination a shaft, a pinion secured thereon, a rack engaging said pinion, and means for retaining said rack and pinion in effective engagement including a frame, anti-friction means mounted thereon to en-

gage and take the thrust of said rack, and other anti-friction means mounted thereon to take the thrust of said shaft.

2. Apparatus of the class described comprising in combination a shaft, a pinion and a collar secured thereon, a rack engaging said pinion, means for retaining said rack and pinion in effective engagement including a frame, anti-friction means mounted thereon to engage the rack, and anti-friction means mounted thereon to engage peripheral portions of said collar.

3. Apparatus of the class described comprising in combination a frame, opposed sets of anti-friction rollers mounted thereon, a shaft and a rack positioned between said opposed sets, a pinion secured to the shaft and operatively engaging said rack, one set of said bearings being adapted to take the thrust from said shaft and the other set to take the thrust from said rack.

In testimony whereof, I have signed my name to this specification this second day of February, 1928.

THOMAS E. KING.