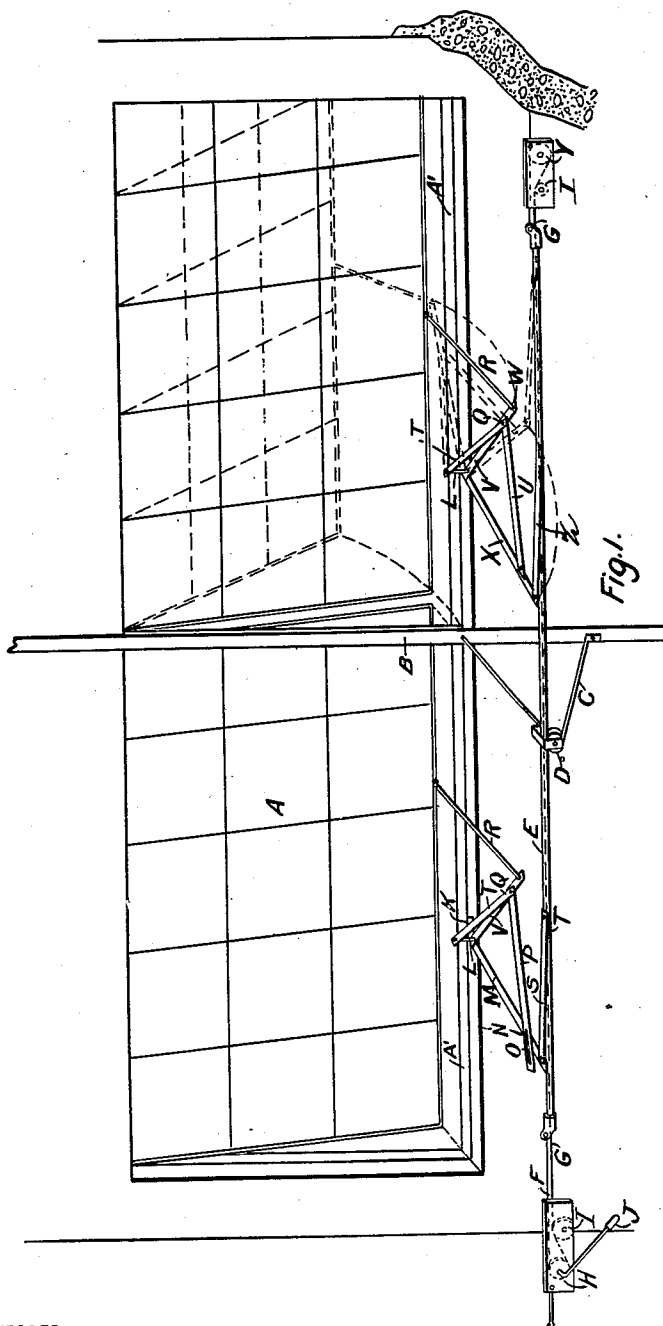


H. N. DAVOCK.
WINDOW SASH OPERATOR.
APPLICATION FILED FEB. 1, 1911.

1,018,034.

Patented Feb. 20, 1912.

2 SHEETS—SHEET 1.



WITNESSES:

Vera Pellman
W. C. Jennings

INVENTOR

Harlow H. Davock

BY *William M. Swan*

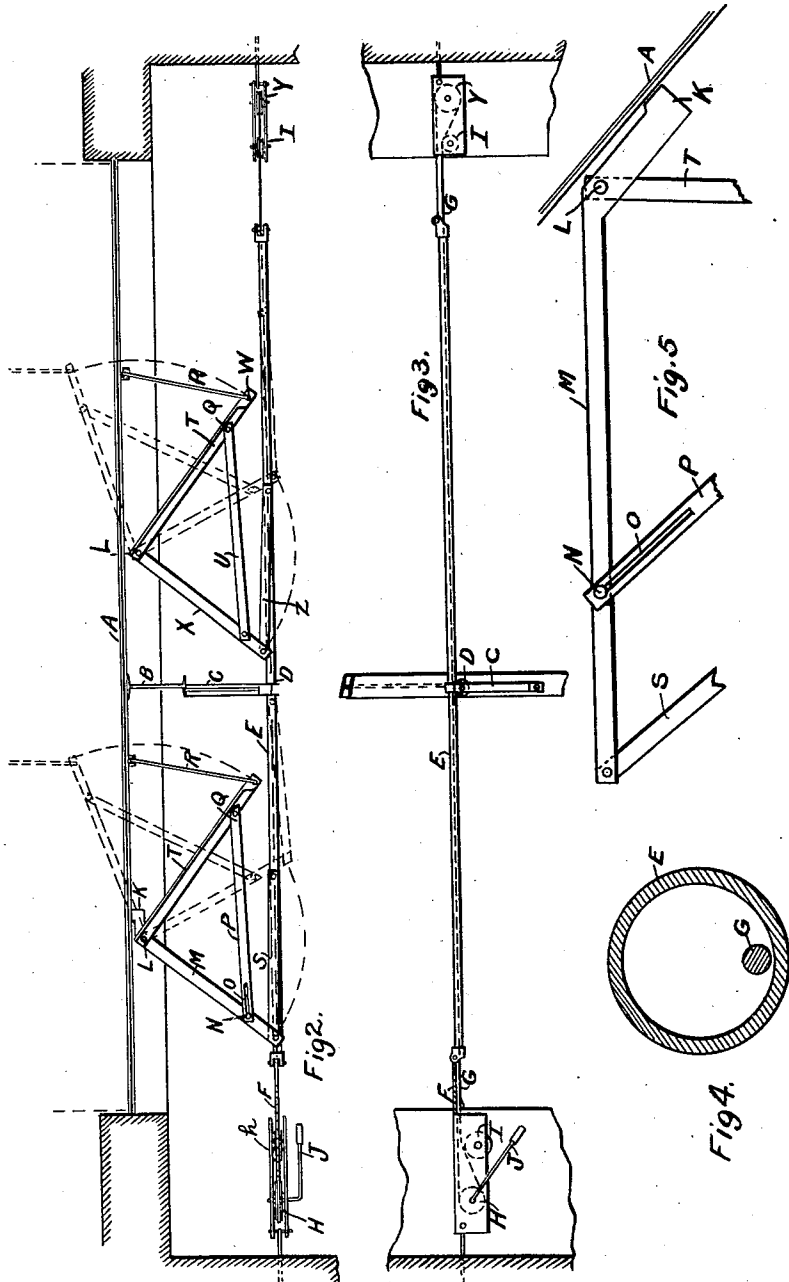
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UNITED STATES PATENT OFFICE.

HARLOW N. DAVOCK, OF DETROIT, MICHIGAN.

WINDOW-SASH OPERATOR.

1,018,034.

Specification of Letters Patent.

Patented Feb. 20, 1912.

Application filed February 1, 1911. Serial No. 605,993.

To all whom it may concern:

Be it known that I, HARLOW N. DAVOCK, who am a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Window-Sash Operators, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to window opening mechanism, and has for its object an improved device of this type whereby several windows comparatively remote and inaccessible, because of their height, or the weight of their sash, may be simultaneously opened or closed from a single control point.

The device is especially useful in connection with the metallic sash now so largely used in factory buildings, in which, in order to secure the maximum quantity of light, as much of each wall as structural conditions permit is built open to provide for windows of the metal sash variety, and large numbers of which are to be opened or closed at one time.

In the drawings:—Figure 1 is a perspective, showing my improved device applied to a couple of windows which are shown in open or outwardly swung position. Fig. 2 is a plan view of the operative parts of my improved device, their moving positions, being in some cases, indicated by dotted lines. Fig. 3 is an elevation of the device as a whole. Fig. 4 is a cross-sectional showing of the pipe which constitutes one of the tension members and of the cable or chains which pass through the pipe and constitutes the other tension member. Fig. 5 is a plan view of one of the window levers and its immediately associated parts.

B indicates one of the vertical I beams of a building, upon which the system of window opening parts is supported through the medium of the brackets C. The several windows A are hinged, preferably along their top edge, so that their lower portions swing freely away from the frame, which may, of course, be either wood or metal, and from the sill A'. Pivoted to the lower edge of the frame is one end of a link R, whose other end is pivoted to one end of the link V, which in turn is pivoted by the

same pin as the lever M, the end of the lever M farthest from the window frame being pivotally attached to the adjacent end of the bar S, whose other end is pivoted to the pipe section E, which extends, from the operative control point, in front of several windows. The pipe section E is slidably supported on the roller D in the bracket C, and through it passes the cable or chain G, whose end portions pass about the sheaves H and Y, which are considerably farther apart than the distance between the ends of the pipe section E, and these ends are then attached to the adjacent pipe end, thus forming with it a continuous loop or circuit, the loop effect being especially noticeable at each end thereof, adjacent the sheaves. The passage of all but the extreme ends of the flexible cable G through the pipe section E, prevents any tendency toward sagging of the cable, and makes it possible to space the supporting bracket C much farther apart than would be the case if the cable G did not pass through, and were not supported by, the pipe E. In factory buildings where the entire space between the upright supports of a concrete arch or truss is often occupied by windows and their supporting sash, this is a very important feature. The sheave being actuated by means of the crank J, and there being, if desired, intermediate gear wheels h, whereby the actuating motion may be compounded, or reduced for the sake of greater power upon the individual window links, the pipe section E is drawn toward the actuating sheave, or pulled away therefrom; this results in actuating the system of links and levers pivoted to the pipe section, and results in positively swinging outward or inward the hinged window A, the operative center of the several links and levers being the pivot pin L, which is anchored in the sill A'.

In the type of links illustrated in the right hand portion of Fig. 1, the pull of the pipe section E upon the link Z draws upon the lever X, which is pivoted at L, and to which, adjacent its point of attachment to the link Z, is pivoted one end of the link U, whose opposite end is held at all times spaced from the pivot pin L by the brace rods T and V. Pivoted at A to the outer end of the rod V is one end of the window link R, whose outer end is attached to the window frame, and whose movement lengthwise of itself

as actuated by the swing of the other links and levers, opens and closes the hinged window.

In the modified form illustrated in the left hand portion of Fig. 1, the link and lever system is quite similar, except for the fact that the main lever M, which is pivoted by the pin L, has a short extension K beyond its point of pivoting, which is adapted to engage against the window frame when the window is closed. When the pipe section E first begins to move, its pull, through the bar S, upon the lever arm M forces the end K against the window frame A to a slight degree, due to the disparity in the length of the parts M and K, thus overcoming any adhesive tendency of the window frame and its casing due to ice or paint. There is lost motion as to the other parts, however, until the pin N reaches the end of the slot O in the end of the lever P, which it strikes with a shock sufficient to appreciably jar the frame parts and assist the work begun by the lever arm K. Then the swing of the parts is thrown also directly upon the link R, which, because of the leverage, now swings the window frame open much more rapidly.

This device could, with slight changes, be adapted to use in connection with a series of horizontally swinging windows or even doors, and I desire it to be understood as within the scope of my invention to substitute some equivalent actuating means for the pipe section E, in place of the sheaves H and Y and their take-up or compensating rollers I.

What I claim is:—

1. In combination with a casing, a frame hinged thereto, a series of link and lever

members pivoted to one another and centrally pivoted to said casing, one of said link members being attached to said hinged frame, a tubular member extending adjacent said frame substantially parallel with the plane thereof, one of said levers being pivoted thereto, a flexible member having its center portion slidably engaging through said tubular member, sheave members at each end of said tubular member and spaced therefrom, the ends of said flexible member being passed thereover and attached to the adjacent ends of the tubular member, and means for actuating said sheave members and thereby actuating the frame toward or away from its casing and said tubular and said flexible members, substantially as described.

2. In a combination with a hinged frame, a tubular member slidably supported with respect thereto, a flexible member slidably engaging through said tubular member, the ends thereof extending in loop form beyond the ends of said tubular member and being connected therewith, manually actuatable sheave members over which the looped ends of said flexible member pass, and a series of link and lever members connected with said hinged frame and with said tubular member and with one another, and adapted to be actuated by the movement of said tubular member to and fro with respect to the frame, thereby swinging the same on its hinges, substantially as described.

In testimony whereof, I sign this specification in the presence of two witnesses.

HARLOW N. DAVOCK.

Witnesses:

STUART C. BARNES,
WILLIAM M. SWAN.