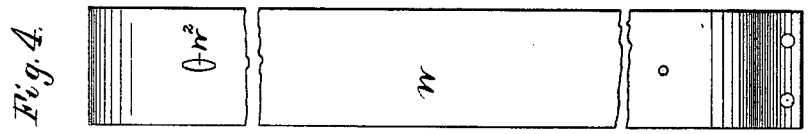
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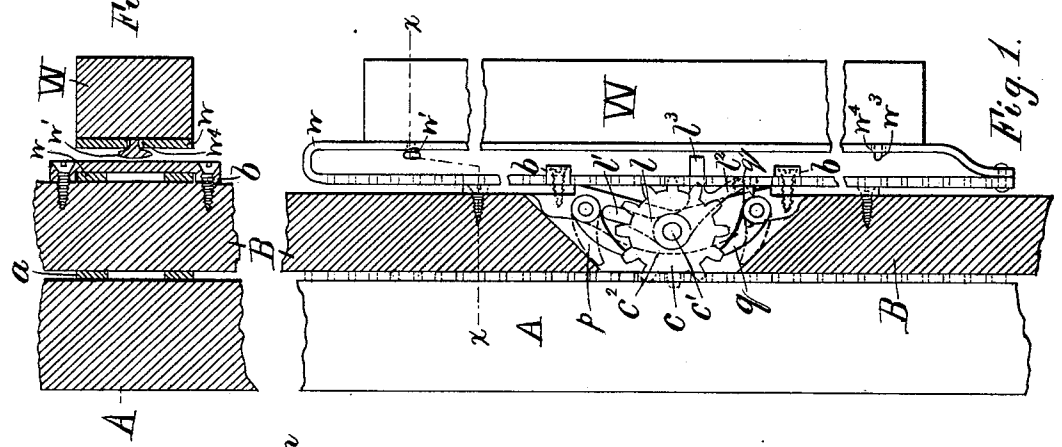
W. KADOW, Jr.

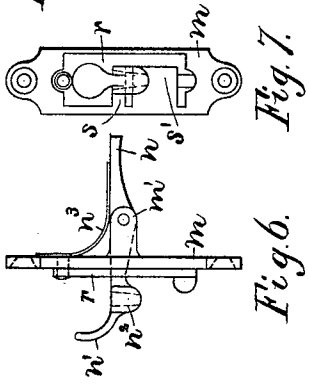
SASH BALANCE.

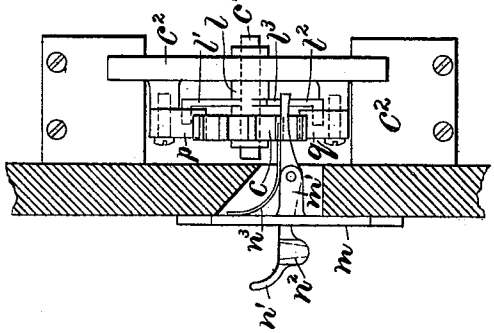
No. 405,711. Patented June 25, 1889.











Attest:
L. Lee.
F. C. Fischer.

Inventor.
William Kadow Jr. per
Ganer Miller, Attys

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM KADOW, JR., OF NEWARK, NEW JERSEY.

SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 405,711, dated June 25, 1889.

Application filed March 7, 1889. Serial No. 302,224. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KADOW, Jr., a citizen of the United States, residing at Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Window-Sash Lifters, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to provide a means for automatically raising a window-sash; and it consists, primarily, in the combination, with the window-sash provided with a rack upon one edge extending over its entire length, a similar rack arranged to slide within the casing on the side adjacent to the window-sash and supporting a counter-balance of greater weight than the sash, and a pinion mounted upon the window-frame intermediate to the said racks, of means for locking the pinion to prevent its rotation, and in a particular construction for a rack-bar attached to the counter-balance.

Heretofore considerable inconvenience has been experienced in employing a counter-balance merely of equal weight with the sash, so that it was necessary to apply force in raising the sash. By employing a counter-balance of greater weight than the sash, as in my invention, the sash is adapted to raise itself when the locking device for the pinion is disengaged therefrom, and it is only necessary for the operator to apply force in lowering the sash, which can obviously be done with much more facility.

In the annexed drawings, Figure 1 is a side view, partly in section, where hatched, of a part of the window-sash and window-frame and weight, showing the lifting device; Fig. 2, an edge view taken from the right of Fig. 1, with the weight and its rack removed to avoid obscuring the pinion and the parts operating therewith. Fig. 3 is a transverse section on line $x\,x$ in Fig. 1, the guide b being also shown in section. Fig. 4 is a detached rear view of the rack-bar, and Fig. 5 a front view of the same. In Figs. 1, 4, and 5 only the end and central portions of the weight and rack-bar are shown, the portion intermediate thereto being broken away in order to save space on the drawings. Fig. 6 is an edge view, and Fig. 7 a front view, of the means for operating the lock for the pinion on the outside of the window-frame.

A is the window-sash, B the window-frame, and W the counter-balance supported within the window-casing, and is made of greater weight than the window-sash.

a is a rack extending along the entire length of one edge of the sash.

w is a rack-bar of the same length as the rack a and secured to the window-frame B to engage with the pinion c by means of guides b, attached to the brackets c^2, supporting the pinion c. Such rack-bar w is provided with rack-teeth on the side adjacent to the window-frame, and with a smooth back adjacent to the counter-balance W, and to which the latter is attached by means of a lug w' near its upper end engaging with the vertical slot w^2 in the rack-bar. The counter-balance W is also provided with a pin w^3 at its lower end engaging with a hole w^4 in the rack-bar to steady the same when the device is in operation. It is evident that without some locking device to hold the pinion in a fixed position the counter-balance would tend to descend, so as to hold the window in its raised position continually. To avoid such objection, I provide two pawls p and q, pivoted adjacent to the pinion and engaging with the same. To operate these pawls, a bell-crank l is pivoted upon the axle c' of the pinion, having an arm l' to engage the pawl p when shifted, as hereinafter described, an arm l^2 engaging with a toe q' projecting backward from the pawl q, and an arm l^3, which is elevated to disengage the pawls from the pinion by means of a lever n. In its normal position the arm l' is withdrawn from contact with the pawl p to a position nearly under the point at which it is pivoted, thus permitting it to fall by its own weight into contact with the pinion c; and the arm l^2 is in contact with the toe q', thus holding the pawl q in engagement with the pinion. As the arm l^3 is lifted by means of the lever n, the arm l^2 is first withdrawn from the toe q', allowing the pawl q to drop out of contact with the pinion, and the arm l' gradually raises the pawl p out of contact with the pinion, thus leaving it free to move in the desired direction, as shown in dotted lines in Fig. 1.

The lever n is pivoted upon a plate m, se-

cured upon the outside of the window-frame and having lugs m' projecting inwardly, and between which such lever is pivoted. The lever is provided at its outer end with a thumb-piece n' and with a hole n^2 (shown in dotted lines in the drawings) for the application of a cord for operating the lever when necessary.

N^3 is a leaf-spring secured to the inner side of the plate m and bearing upon the lever n to hold it downward in its normal position.

In order to secure the lock in either position, a plate r, provided with slots s and s', open at one side of such plate, is pivoted at one end upon the plate m, and to hold the lever n in its normal position the plate r is swung into a vertical position, so as to inclose such lever in the slot s, thereby effectually preventing its vertical movement. To hold the lever in its inclined position when the pawls p and q are withdrawn from the pinion, it is necessary only to swing the plate r laterally far enough to release the lever n from the slot s, press the thumb-piece n' of the lever downward, and return the plate r to its vertical position, thus inclosing the outer end of the lever in the slot s'.

It is evident that in order to check the upward motion of the window it is only necessary to provide the pawl p to engage with the pinion c, as there is no tendency in the sash to lower by its own weight on account of the excessive weight of the counter-balance; and without the pawl q the sash could be drawn down without operating the locking device, as the rotation of the pinion would throw the pawl p upward, and the latter would drop by its own weight when the movement of the sash was discontinued. The pawl q is applied merely to lock the sash positively in any position so that it cannot be moved except by the operation of the lever n, but it is unnecessary to the successful operation of the device.

In practice I construct the rack-bar w of a single strip of sheet metal, cutting transverse slots in one end to admit the teeth of the pinion, and thus forming the rack portion, and bending the rear end parallel to that provided with the rack-teeth. In order to attach the counter-balance W to the back of such rack-bar, I cut a longitudinal slot in the same, and apply a T-shaped lug w' to the weight transversely to its length. To apply the weight to the rack-bar, it is held in a horizontal position while the T-shaped lug w' is inserted in the vertical slot w^2, and is then turned into position parallel with the rack-bar and is thus securely attached thereto.

It is evident that the rack-bar w might be formed of a single piece of sheet metal, similar to the rack a, and secured directly to the counter-balance W; but I consider the construction shown herein preferable.

Having thus set forth my invention, what I claim herein is—

1. The combination, with the window-sash provided with a rack upon one edge extending over its entire length, a similar rack arranged to slide within the casing on the side adjacent to the window-sash and supporting a counter-balance of greater weight than the sash, and a pinion mounted upon the window-frame intermediate to the said racks, of a pawl pivoted upon the window-frame above the pinion, a bell-crank pivoted upon the axle of the pinion having one of its arms adapted to engage the pawl to lift it out of engagement with the pinion, and a lever pivoted upon and operated from without the window-frame to lift the other arm of the bell-crank, substantially as shown and described.

2. In a sash-lifting device comprising racks a and w, applied to the edges of the sash A, and the counter-balance W, and an intermediate pinion c, mounted upon the window-frame, the combination, with the pinion, of the pawls p and q, arranged to engage with the same, the pawl q being provided with a toe q' projecting therefrom, as described, a bell-crank having arms l', l^2, and l^3, and a lever n, pivoted upon the window-frame, one of its ends projecting without the said frame and the other end engaging with the arm l^3, substantially as shown and described.

3. In a sash-lifting device comprising racks a and w, applied to the edges of the sash A, and the counter-balance W, and an intermediate pinion c, mounted upon the window-frame, the combination, with the pinion, of the pawls p and q, arranged to engage with the same, the pawl q being provided with a toe q' projecting therefrom, as described, arms l', l^2, and l^3, a lever n, pivoted upon the window-frame, one of its ends projecting without the said frame and the other end engaging with the arm l^3, and a plate r, pivoted at one end upon the frame and provided with slots s and s' open at one side of the said plate, the whole arranged and operated as and for the purpose set forth.

4. In a sash-lifting device, the combination, with the sash provided on one edge with a rack extending over its entire length, and a pinion pivoted upon the window-frame and engaging therewith, of a rack-bar secured to slide within the casing to engage with the pinion and supporting a counter-balance of greater weight than the sash, the said rack-bar consisting in a strip of sheet metal provided with a series of transverse slots upon one end to form the rack portion, and its other portion being bent parallel thereto and provided with means for attaching the counter-balance thereto, substantially as shown and described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM KADOW, JR.

Witnesses:
L. LEE,
H. J. MILLER.