No. 740,953. PATENTED OCT. 6, 1903.

E. VAN NOORDEN.

DEVICE FOR OPERATING WINDOWS OR SHUTTERS.

APPLICATION FILED FEB. 21, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

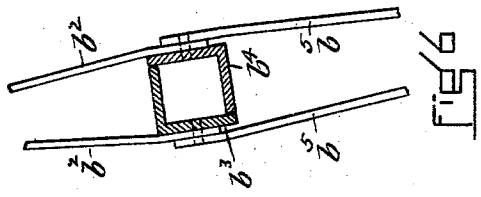


FIG. 6



FIG. 1

WITNESSES.

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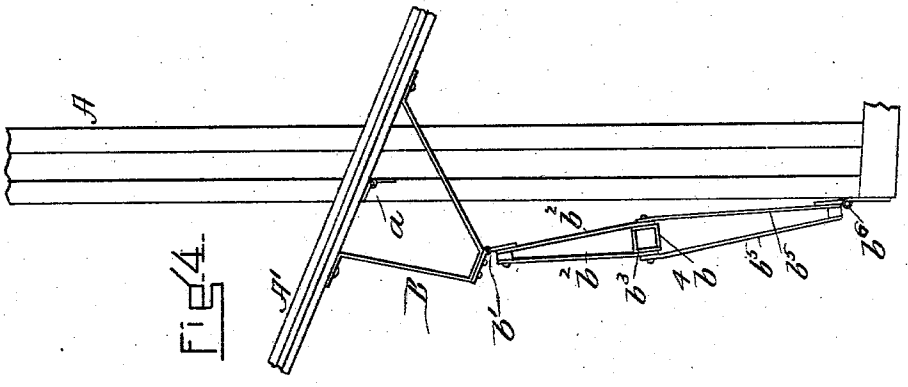



Fig. 4.

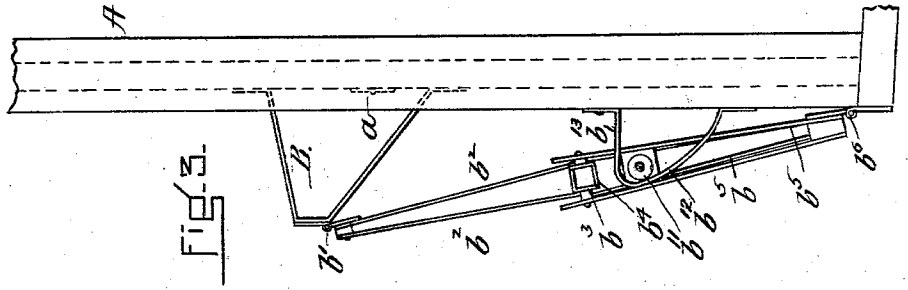



Fig. 3.

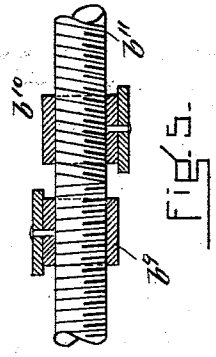



Fig. 5.




Fig. 2.

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# UNITED STATES PATENT OFFICE.

EZEKIEL VAN NOORDEN, OF BOSTON, MASSACHUSETTS.

## DEVICE FOR OPERATING WINDOWS OR SHUTTERS.

SPECIFICATION forming part of Letters Patent No. 740,953, dated October 6, 1903.

Application filed February 21, 1903. Serial No. 144,458. (No model.)

*To all whom it may concern:*

Be it known that I, EZEKIEL VAN NOORDEN, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Devices for Operating Windows or Shutters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

My invention relates to an improved device for obtaining the simultaneous closure or opening of a series of swinging sashes or shutters and for holding the same closed or at any variable degree of opening.

My invention consists in certain details of construction the adaptability of which to the purpose for which they were designed can best be seen and understood by reference to the drawings, wherein—

Figure 1 shows my device in elevation as applied for operating two adjacent sashes or where the sashes are arranged in series. Fig. 2 shows in elevation my device as applied for the operation of a single sash. Fig. 3 shows in cross vertical section the device applied to a window with the sash therein closed. Fig. 4 shows the same with the sash open. Fig. 5 shows a longitudinal cross-section of a certain detail of the construction, to which reference will hereinafter be made. Fig. 6 shows in cross-section a certain detail of construction, to which reference will hereinafter be made.

Referring to the drawings, A represents a frame in which there are arranged a series of sashes A′ and between the jamb portions of which, as from an axial center *a*, the sashes are pivoted to swing horizontally. Extending inward from the respective sashes and preferably with separate points of attachment thereto above and below the pivotal center of its support are the brackets B. These brackets are made alike, and they are secured to the side rails of the respective sashes to extend in uniform order, so as to be in line with one another, with which order of arrangement the brackets upon the adjoining side rails of the adjacent sashes are arranged in pairs, as may be seen in Fig. 1. Each pair of brackets is united by means of a connecting plate or bar *b*, preferably secured across their outer faces, and through the medium of which connecting-bar and brackets the adjacent sashes can simultaneously be moved or swung.

Pivotally secured to the leaf of a hinge *b′*, which hinge is attached to each one of the cross-bars *b*, are the links $b^2$ $b^2$. With this method of jointure the said links are capable of being spread apart longitudinally from the center of their pivotal attachment to the hinge *b′* or turned horizontally by reason of their connection therewith. The links $b^2$ $b^2$ diverge, and at the lower ends they are pivotally secured to the sides of the longitudinal bars $b^3$ $b^4$, respectively. These longitudinal bars $b^3$ $b^4$ are subjected to considerable strain, as will hereinafter appear when the way in which they operate is considered. Accordingly they are made of angle-iron and are disposed alongside one another to have the relative order of arrangement shown in Fig. 6 or with the united bars forming a rectangular structure. By making the separate bars of angle-iron they are made strong and rigid and are not easily twisted or bent. By arranging the bars as shown they reinforce one another. The arrangement also facilitates the bars sliding by one another longitudinally in reverse directions, which movement the bars have, as will hereinafter appear. This formation and arrangement of the longitudinal bars, however, is a mere detail of construction; but it is good by reason of its practicability.

Pivoted to the respective bars $b^3$ $b^4$ are the links $b^5$ $b^5$, which links are pivoted, preferably, by the same pivoted jointure as secures the links $b^2$ $b^2$, before referred to, whereby the links $b^2$ $b^5$ $b^2$ $b^5$ become practically pivotally joined together in pairs. The links $b^5$ $b^5$ converge and at their lower ends are pivoted to the leaf of the hinge $b^6$, which hinge is fixed to the frame, wherefore by such jointure the links $b^5$ $b^5$ may pivot longitudinally or turn horizontally, and for that matter the whole linked structure, if such be necessary for its proper operation. Of course there may be as many sets of links pivoted to the bars $b^3$ $b^4$ and pivotally hinged, as before explained, as is necessary, the number of course depending upon the number of sashes or shutters to be operated.

Pivoted to the ends of the respective bars $b^3$ $b^4$ are the links $b^7$ $b^7$. These links converge and at their lower ends are pivoted to one leaf of a hinge $b^8$, which is secured to the frame, so that the links $b^7$ $b^7$ may turn horizontally.

Pivotally secured to the sides of the links $b^7$ $b^7$, respectively, are the threaded boxes or nuts $b^9$ $b^{10}$, through which extends longitudinally the right-and-left screw $b^{11}$. The screw $b^{11}$ by reason of its variable combined horizontal and vertical movement is guided by a cam-surface $b^{12}$ of a bracket $b^{13}$, which is secured to the frame. By reason of its variable motion also the screw $b^{11}$ is turned by the universal-coupling connection $b^{14}$, which connects, through suitable bearings, with a pulley $b^{15}$ or any other suitable means of turning.

The operation of the various parts referred to is as follows: Assuming the sash to be closed, the parts have the relative order of arrangement shown in Figs. 1 and 3. Upon turning the right-and-left screw $b^{10}$ the links $b^7$ $b^7$, carried by the traveling nuts, are rapidly run apart. This motion of the links is imparted to the bars $b^3$ $b^4$, and they in turn are moved in a longitudinal direction reverse to one another, carrying with them the links $b^2$ $b^5$, which have pivotal attachment with these respective bars, as before explained. The truss structure formed by the links is accordingly longitudinally extended at both sides, and consequently its vertical extension is relatively shortened; but the lower end of the linked structure, by reason of the links $b^5$ $b^5$ being fixed with the frame through their hinged connection $b^6$, is incapable of a vertical movement. The objective result is therefore necessarily obtained that the sashes must be turned by the downward draft of the linked structure upon the brackets B, to which the structure is secured by the ends of the links $b^2$ $b^2$ and through the medium of the hinges $b'$ and connecting cross-bars $b$. As the sashes pivot, of course the brackets B, fixed to them, are caused to move longitudinally to describe an arc, so that the truss structure, like as I have described, which is connected with these fixed brackets, or rather to their connecting-bars $b$, must likewise have some degree of horizontal turning, which is attainable by the hinged jointure of the links $b^2$ $b^2$ and links $b^5$ $b^5$ to the said cross-bars and the frame, respectively, and it is to be observed in this connection that the truss structure, comprising the longitudinal bars and links through the point where it makes its hinged jointure with the frame, has a most variable movement in its operation, consisting of a longitudinal movement incident to the primary movement of the longitudinal bars and the simultaneous vertical and horizontal movement consequent upon the turning of the sashes, all of which movements are attainable by the methods of jointure before described. The right-and-left screw $b^{11}$, by which the reverse movement of the longitudinal bars is obtained, remains during its operation in relatively one position against a longitudinal movement; but it has a vertical movement following upon the divergence of the links $b^7$ $b^7$. Of course the relative position of the screw $b^{11}$ and the links $b^7$ $b^7$ becomes changed by their divergence, and this is provided for by the traveling nuts, which compensate for such relative change of position and provide a free running of the screw whatever the position of the links may be. The screw, together with the links, turns also horizontally with the main structure before referred to, which movement is permissible by the hinged jointure of the said links to the frame. The screw $b^{11}$ is guided in its combined vertical and horizontal movement by the cam-surface $b^{12}$ of the bracket $b^{13}$, as before explained. The adaptability of the universal coupling to the variable motion of the screw is apparent.

In Fig. 2 a change of feature is shown in the fact that instead of simultaneously operating adjacent sashes the device is applied for the operation of individual sashes. There is no essential variation in the construction, only instead of attaching the linked structure to the cross-bars connecting the brackets extending from the adjacent sashes they are directly secured to the brackets themselves, which are secured to the sash sides, as before explained. In point of fact, it makes no difference respecting the essence of my invention how many brackets there are or how they may be arranged, provided that all the sashes may be simultaneously closed by a means substantially like as I have devised; but the method referred to by which adjacent sashes can be simultaneously closed is perhaps the most practicable, especially if there are a series of windows.

My device is very simple. It is made up of parts which can be easily obtained and which do not require a special construction. It can easily be applied to any windows without changing their structure in any way.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A device for operating one or more swinging sashes or shutters, the same comprising a bracket fixed to and extending from each sash or shutter, a longitudinally-extending bar below said brackets longitudinally movable, a link connection between said bar and brackets, the same being pivoted to said bar and having a hinged and pivotal jointure with said brackets, and a link connection below said bar, the same being pivoted to said bar and making a hinged and pivotal jointure with a fixed base of support, substantially as described.

2. A device for simultaneously operating one or more swinging sashes or shutters, the same comprising brackets fixed to and extending from sashes or shutters, two longitudinally-extending bars below said brackets,

the same being longitudinally movable in reverse directions, links $b^2$, $b^2$, pivoted to the respective longitudinal bars and making a hinged and pivotal jointure with the brackets aforesaid, and links $b^5$, $b^5$, pivoted to said longitudinal bars and extending below the same and making a hinged and pivotal jointure with a fixed base of support, substantially as and for the purpose set forth.

3. A device for simultaneously operating a plurality of sashes or shutters, the same comprising a bracket fixed to and extending from each sash or shutter, links pivotally connected in pairs, each pair of links forming at one end a combined pivotal and hinged connection with a corresponding bracket extending from its sash or shutter as aforesaid, and at their other end having a combined hinged and pivotal connection with a fixed base of support, and means for drawing said links at the point of their pivotal connection, substantially as and for the purposes set forth.

4. A device for simultaneously operating a series of sashes or shutters, the same comprising brackets secured to and extending from the adjoining side rails of adjacent sashes, a cross-bar connecting each pair of brackets, links having a hinged and pivotal connection with said cross-bars, links having a hinged and pivotal connection with a fixed base of support, longitudinally-extending bars to which said links in pairs are respectively pivoted, and means for operating said bars in reverse directions, substantially as and for the purposes set forth.

5. A device of the character specified comprising brackets extending from each of the respective sashes or shutters, longitudinally-extending bars arranged in pairs to move longitudinally reversely to each other, links $b^2$, $b^2$, pivotally secured to said respective bars and extending above the same to make a hinged and pivotal connection with said brackets, links $b^5$, $b^5$, pivotally secured to said bars and extending below the same to make a pivotal and hinged jointure with some fixed frame of support, means for reversely moving said longitudinally-extending bars comprising links $b^7$, $b^7$, pivotally secured to the same and pivoted and hinged to some fixed frame of support, threaded boxes or nuts fixed to said links, a right-and-left screw passing through said nuts for spreading said links, and means for turning said screw, substantially as and for the purposes set forth.

EZEKIEL VAN NOORDEN.

Witnesses:
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SAUL SIPPERSTEIN.