No. 753,893. PATENTED MAR. 8, 1904.

A. K. LOVELL.

WINDOW FRAME AND SASH.

APPLICATION FILED AUG. 13, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

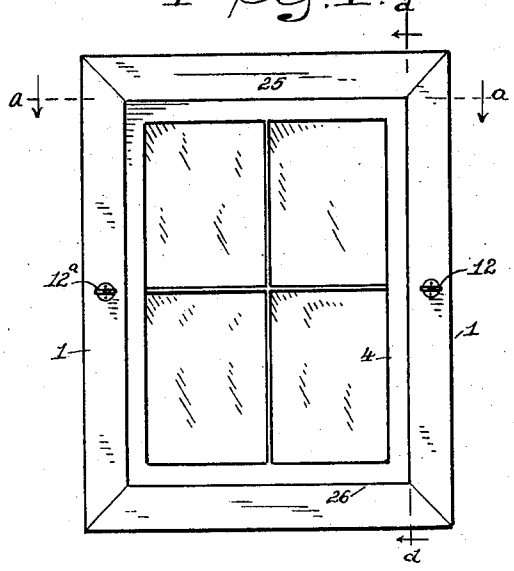


Fig. 2.

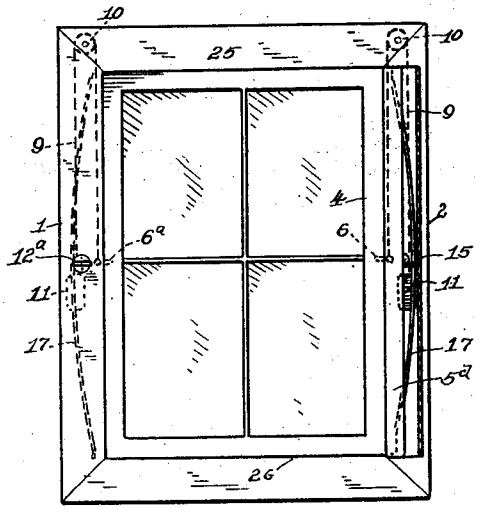


Fig. 4.

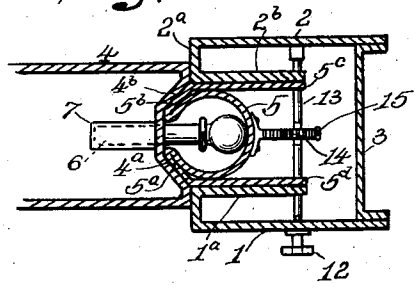


Fig. 3.

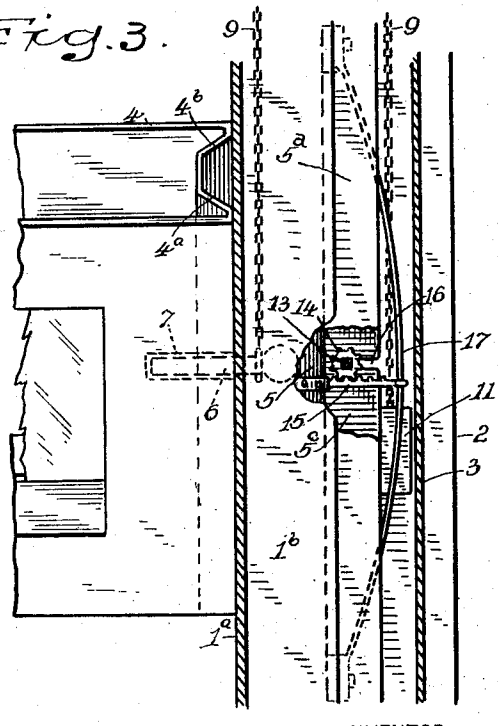
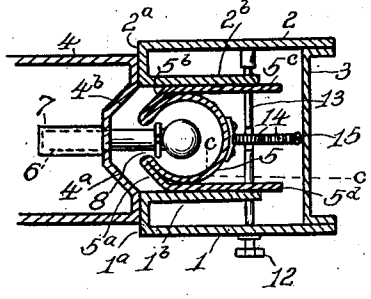


Fig. 5.



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Fig. 7.

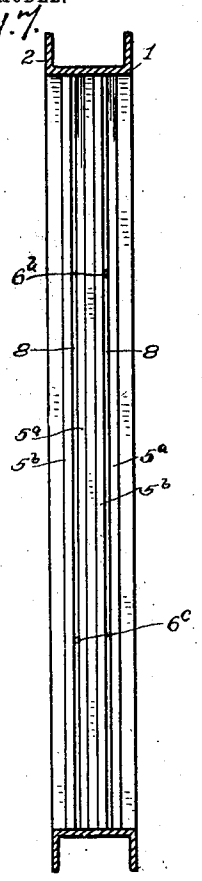


Fig. 6.

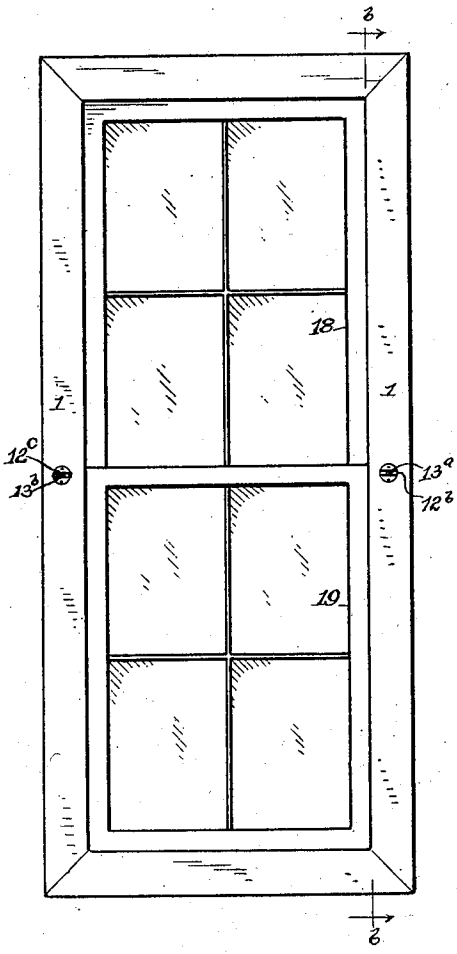


Fig. 11.

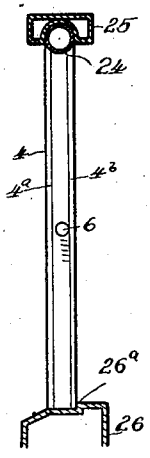


Fig. 12.

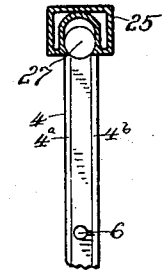
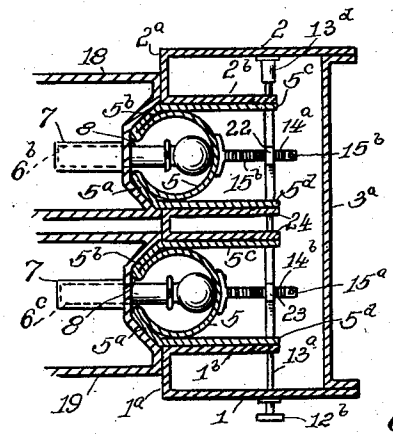


Fig. 8.



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APPLICATION FILED AUG. 13, 1902.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 9.

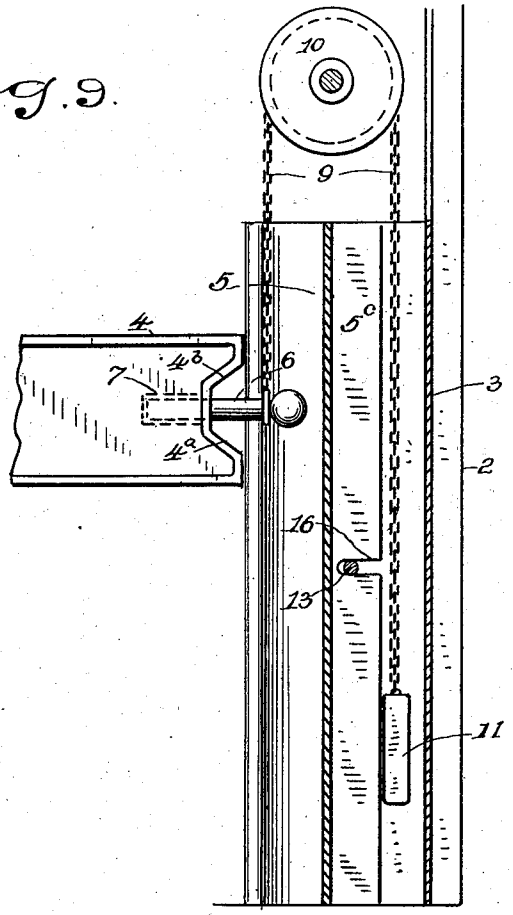
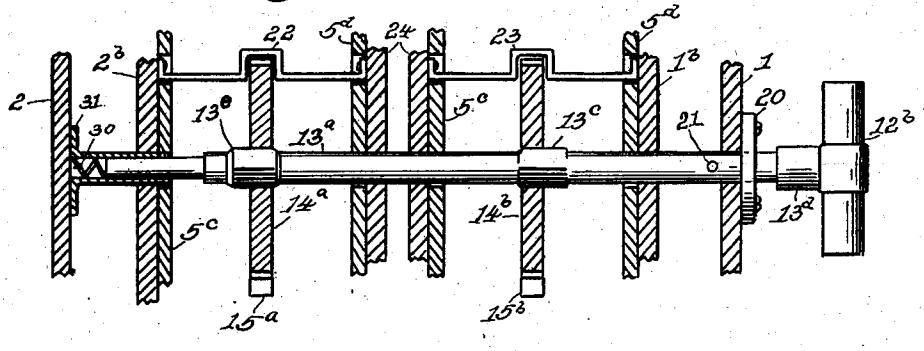


Fig. 10.



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UNITED STATES PATENT OFFICE.

ALBERT K. LOVELL, OF NEW YORK, N. Y., ASSIGNOR TO GERHARD F. DROUVÉ, OF BRIDGEPORT, CONNECTICUT.

WINDOW FRAME AND SASH.

SPECIFICATION forming part of Letters Patent No. 753,893, dated March 8, 1904.

Application filed August 13, 1902. Serial No. 119,542. (No model.)

To all whom it may concern:

Be it known that I, ALBERT K. LOVELL, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Window Frames and Sashes, of which the following is a specification.

My invention relates to an improvement in windows, and particularly in the frame and sash; and it consists in providing movable sashways extending practically the full length of the inside of the frame whether one, two, or more sashes are used. These sashways are adapted to conform to the window-sash under all the conditions that may result from imperfect construction or that may result from settling of the building.

The above-mentioned object of invention, together with other new features relating to the sash and frame, will be more particularly set forth in the following specification.

To enable others to understand my invention, reference is had to the accompanying drawings, in which—

Figure 1 represents a front elevation of a single window and its frame, the sash adapted to be pivotally hung therein. Fig. 2 is a front elevation, partly in section, of the single window and frame. Fig. 3 is an enlarged broken sectional view of the single-window casing or frame and broken view of the sash partially tilted on its pivotal support. Fig. 4 is an enlarged broken sectional view of the window-sash and sectional view of the frame through line *a a* of Fig. 1, showing the sashway brought against the sash. Fig. 5 is a view similar to Fig. 4, showing the sashway moved back so that the sash can be operated. Fig. 6 is a front elevation of two sashes and frame. Fig. 7 is a sectional view of the window-frame on line *b b*, Fig. 6, showing the sashway and the pivotal pins on which the sashes are supported. Fig. 8 is an enlarged broken horizontal sectional view of the two window-sashes and sectional view of the window-frame for the sashes, showing the sashways engaging the sashes. Fig. 9 is an enlarged broken sectional view of the single-window frame and sashway and operating-shaft through line *c* of Fig. 5, showing the sash raised and tilted. Fig. 10 is a broken sectional view of the double-window sashways and frame therefor and pinions and pinion-shaft for operating the sashways. Fig. 11 is a side elevation of the single-window sash and sectional view of its frame through line *d d* of Fig. 1, showing a compressible spring-tube at the top for keeping the sash firm against its sill. Fig. 12 is a broken side elevation of the single-window sash, showing as a modification a metal roll in place of the rubber tube.

Its construction and operation are as follows:

In the several views the sashes and frames are shown as being constructed of metal, although the same principle of construction and operation can be applied with equally good effect where the said sashes and frames are made of wood. As these two laterally-movable sashways, one on each side of the window-sash, and the mechanism for operating them, together with the peculiar construction of the window casing or frame, are precisely alike, a description of the construction and operation of one side will answer for both. Beginning, therefore, with the single window, the vertical sides 1 and 2, Figs. 4 and 5, of the frame have the right-angle bends 1^a 2^a nearest the sash 4, but not close enough to prevent free movement of the latter.

1^b and 2^b are parallel continuations of the sides 1 and 2 and between which is operatively located the sashway. This sashway is preferably constructed of a single piece of metal formed as follows: 5 is a circular tube or channel-way, the continuation of whose sides form the angles 5^a 5^b and rearwardly-projecting wings 5^c 5^d, adapted to operatively engage the inner sides 1^b and 2^b of the frame. The angular faces 5^a 5^b register with the angular faces 4^a 4^b of the sash to prevent the tilting of the sash on its pivotal pins 6 and 6^a, Fig. 2. These pins are inserted in the thimbles 7 of the sash and project through the opening or longitudinal slot 8 into the interior of tube or channel-way 5. 9, Fig. 9, is a sash-chain

attached to these pins, passing over the pulleys 10 and carrying the weights 11 at their free ends. The sashways extend, as before mentioned, the full length or practically the full length of the inside of the frame. They are operated to and from the sash through the medium of the handles 12 12[a], Fig. 1. These handles are attached to the outer ends of the shafts, of which the right-hand one, 13, is shown at Figs. 3, 4, and 5. This shaft is journaled in the sides of the window-frame and carries the pinion 14, adapted to engage with the rack 15, attached to and projecting rearward from the central tubular portion 5 of the sashway, so that by means of said handles the said sashways are moved back, as shown at Figs. 3, 5, and 9, and when said sashways are thus moved back until clear of the angular recess in the edges of the sash said sash is free to be tilted on the pins 6 and 6[a], and when thus tilted the sash can be raised or lowered within the limit of the frame or be revolved for convenience in washing. As before mentioned, the sash, Fig. 9, is tilted and is carried while thus tilted nearly to the top of the sashway. To close the window, the sash is lowered until the pins are vertically central with the sashway, when said sashways are carried into the angular recesses of the sash. This effectually secures the window against rattling or being tilted except from the inside and then only when the sashways are withdrawn. As the sashways are intended to conform to the sash throughout the entire length of the sash and to do so whether said sash is vertically true or not, it is necessary that the sashways be so balanced that either end is free to move. To accomplish this, the longitudinal slot 16, Fig. 9, is formed in each wing of the sashways and are adapted to embrace the operating-rods and be supported thereon. In other words, the sashways are pivotally supported on the operating-rods. This feature will not only keep the sashways clear of the lower part of the frame, but their weight on the rods will prevent said rods springing, and thereby disturb the engagement of the pinions with their racks.

17, Figs. 2 and 3, are trusses connected to both the upper and lower ends of the sashways and are adapted thereby to counteract lateral strain when said ways are brought firmly against the sash. As the said sashways are operated at the center, one end is quite liable to advance toward the sash faster than the other end. Therefore these trusses assist very materially in enabling the central strain of the rack and pinion to close the sashway against the sash and exert an equal pressure throughout the entire length of the sash.

The double sashes 18 and 19, Fig. 6, are constructed and operated similar to the single sashes just described, with the exception of certain minor details particularly adapted to double sashes. In this construction both sashes have the usual vertical movement both ways, besides a tilting movement the same as the single sash. The sashways for both the single and double windows extend, as before mentioned, the full length or practically the full length of the frame. As the sashways for the double windows are precisely like the sashways for the single window and the sides of the frame also being similar except as to length, the same figures of reference will answer for both; but to avoid confusion the racks, pinions, and shafts will be designated by different figures of reference.

The pinion-shafts 13[a] and 13[b] are, Fig. 6, preferably located midway of the frame and are provided at their outer ends with the handles 12[b] and 12[c]. Each of said shafts carries the two pinions—viz., 14[a] and 14[b], (see Fig. 8,)—which is, of course, a duplicate construction of the opposite side of the frame. These pinions operate in the racks 15[a] and 15[b]. As there are only two operating-shafts, one on each side of the window and carrying four pinions, two on each shaft, to operate the four sashways, it is necessary at times that all the pinions should be engaged by the shafts, and at other times only one set of pinions are operated by the shafts. To accomplish this, (see Fig. 10,) the pinion-shifts are provided with a longitudinal movement as follows: The shaft 13[a] is journaled in the sides of the window-frame and also in open slots (not shown) in the wings of the sashway similar to what is shown and described in the single-sash window. 13[e] and 13[c] are square places on the shaft 13[a] and are adapted thereby to be freely engaged and disengaged with square holes provided in the pinions 14[a] and 14[b], and these squares are so arranged that one or both sets of sashways can be operated at a time. In the view shown the squares 13[e] 13[c] are engaging both pinions, and in this position the shaft will operate both sashways at the same time, so that one or both sashes may be raised, lowered, or tilted. The shaft is normally held in this position by means of the expansible spring 30 in the thimble 31, projecting from the inside of the frame 2. When, therefore, the shaft is pushed in until the enlarged portion 13[d] brings up against the flange 20, the square 13[e] will have passed out of the pinion 14[a], thus leaving such pinion idle, while the pinion 14[b] will operate the sashways for the lower window-sash 19, so that when said ways are moved back this lower sash can be tilted on its pins, one of which pins, 6[c], is shown at Fig. 7. When the shaft is withdrawn until the pin 21 brings up against the side 1 of the frame, the pinion 14[b] will be disengaged and the pinion 14[a] brought under control of said shaft to operate the sashways of the upper window-sash 18, so as to permit said window to be tilted on its pins 6[b]. (Shown at Fig. 7.) The housings 22 and 23, Figs. 8 and 10, are provided to maintain the vertical position of the pinions when the square por-

tions of the shaft is withdrawn therefrom; otherwise it would be difficult to reënter said squares. These housings are shown attached to the inner sides 1^b and 2^b of the frame and the sides of the filling-piece 24. As the frame for the double windows must necessarily be wider than for the single window, this rectangular filling-strip 24, Fig. 8, is placed between the two sashways, and the inner wings of said sashways operatively rest against said strip. Owing to the extra width of the double-window frame the backing-strip 3^a must, of course, be made longer than the strip 3. (Shown at Figs. 4 and 5.)

It will of course be understood that the sashways for the double windows are pivotally supported on the pinion-shafts, and are also provided with trusses similar to the sashways for the single window. In fact, as before mentioned, these double-window sashways are the counterpart of the sashways for the single window, except the double-operating mechanism. In the ordinary single window adapted to tilt there is an outside stop on the casing for the upper rail of the sash and an inside stop on the sill for the lower rail of the sash, and consequently the sash can only be tilted one way. In my improved construction of the single window I have arranged for tilting the window both ways.

24, Fig. 11, represents a round flexible tube secured in a semicircular recess in the upper part 25 of the frame, the upper rail of the sash being grooved to fit said tube. The window-sill 26 is provided with the inside projection or stop 26^a. To open the window, the sashways are first thrown back, as previously described, when an upward pressure of the sash will compress the tube 24 sufficient to allow the lower rail of the sash to clear the stop 26^a. This will permit the sash to be tilted in either direction, and when thus tilted it can be raised and lowered as previously set forth. This construction can be used to great advantage on windows that are horizontally swung on pivotal points located central with the upper and lower sash rails of the window. In the present style of windows operating in this manner the stops at the top and bottom, which also serve as weather-strips, are broken in the center to permit the sash to swing horizontally. This broken condition leaves more or less of an opening for wind, dust, or rain to enter. In my construction the window is fully protected both at the top and bottom. The construction shown at Fig. 12 is similar, except that in place of a rubber tube the metal roll 27 is used, and the groove in the frame is elongated to permit said roll to be raised by the sash in opening. This roll, as well as the rubber tube previously described, will serve as a weather-strip for the top of the sash.

While I show no means for keeping the sashways firm against the sides of the sash, in case there should be any tendency of the former to work back it will be understood that any well-known means may be employed for this purpose. In the construction shown there is supposed to be sufficient friction on the pinion-shaft to keep the sashways in place.

It will be understood that the sashways for the double windows can be brought firmly against the sashes, so as to lock them against being opened from the outside, or they may be set back just far enough to allow the sashes to be raised and lowered the same as ordinary sashes are raised and lowered; but when it is desired to tilt the sashes the sashways must be moved back far enough to clear the sashes.

While I show a movable sashway on each side of the sash, it will be understood that one side may be equipped the same as an ordinary window and a movable sashway on the opposite side. However, I prefer to use a movable sashway on each side of the sash.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a window, the combination with the sash and frame, of laterally-movable sashways, vertical grooves in the edges of said sash adapted to be engaged by the sashways, an operating-shaft in said frame and carrying pinions, racks projecting from the sashways to be engaged by said pinions whereby said sashways are operated, for the purpose set forth.

2. In a window, the combination with the sash and frame, of laterally-movable sashways extending vertically the full length or practically the full length of the inside of the frame, shafts carrying pinions and journaled in the frame, racks projecting from the sashways adapted to be engaged by said pinions, for the purpose set forth.

3. In a window, the combination with the sash and frame, of laterally-movable sashways extending vertically the full length or practically the full length of the inside of the frame, shafts carrying pinions, and journaled in the frame, racks projecting from the sashways adapted to be engaged by the pinions, a portion of said sashways embracing said shafts and fulcrumed thereon, for the purpose set forth.

4. In a window, the combination with the sash and frame, of a sashway, the central portion tubular and having a longitudinal opening in one side, and rearwardly-projecting wings, for the purpose set forth.

5. The herein-described sashway made of a single piece of suitable material, the central portion of tubular construction and having a narrow longitudinal slot or opening therein, rearwardly-projecting wings, combined with an angular face on each side of said slot, for the purpose set forth.

6. In a window, the combination with the

sash and frame, of laterally-movable sashways extending vertically the full length or practically the full length of the inside of the frame, said sashways having a tubular central portion, a longitudinal opening or slot therein, an angular face on each side of said slot, rearwardly-projecting wings, the sash having angular faces adapted to receive the angular faces of the sashways, pivotal pins projecting from said sash into the tubular sashways and adapted to move up and down said sashways, said sashways adapted to move laterally in the frame to and from the sash, shafts journaled in the frames and carrying pinions adapted to engage racks projecting from the sashways to effect such movement, for the purpose set forth.

7. In a window, the combination with the sash and frame, of laterally-movable sashways embraced by said frame and extending the full length or practically the full length of the inside of the frame, the central portion being tubular and having a slot in its face and rearwardly-projecting wings adapted to operatively engage the inner walls of the frame, pinion-shafts journaled in the frame, racks projecting from said sashways adapted to be engaged by said pinions, the wings of said sashways having longitudinal slots adapted to embrace said shafts and be fulcrumed thereon so as to practically sustain the weight of said sashways, each sashway provided with a truss substantially as shown, the edge of the sash provided with recesses adapted to receive the sashways, cords and weights arranged substantially as shown, all for the purpose set forth.

8. In a window provided with two or more pivotally-supported sashes, the combination with the frame and sashes, of laterally-movable sashways provided for each sash and embraced by the frame, and extending the full length or practically the full length of the inside of said frame, racks projecting from said sashways, endwise-movable shafts in said frames, pinions thereon, said pinions adapted to engage said racks, whereby all of said sashways may be moved at once, or the sashways for any one of the sashes may be moved while the remaining sashways remain idle, for the purpose set forth.

9. In a window provided with two or more pivotally-supported sashes adapted to be raised and lowered while in a vertical position or when tilted, of laterally-movable sashways provided for each sash and embraced by the frame, and extending the full length or practically the full length of the inside of the frame, shafts in said frame, means substantially as shown on said shafts and sashways whereby said sashways are brought into engagement with the sashes to prevent their being tilted, and moved therefrom to permit tilting, means whereby all of said sashways can be operated at once or the sashways for a single sash may be operated while the remaining sashways are idle, for the purpose set forth.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 12th day of August, A. D. 1902.

ALBERT K. LOVELL.

Witnesses:
G. DROUVÉ,
A. W. PECK.