No. 696,308. Patented Mar. 25, 1902.

F. W. G. BOETTCHER.

WINDOW BALANCE.

(Application filed Jan. 3, 1901.)

(No Model.)

Fig. 1.

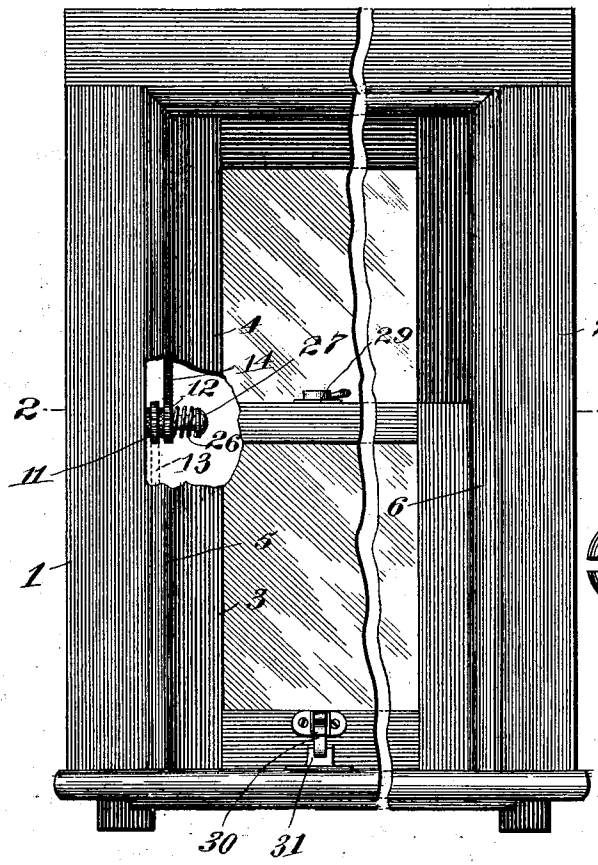


Fig. 4.

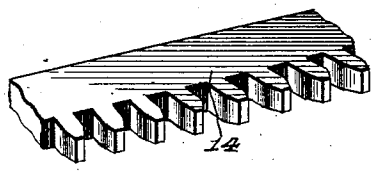
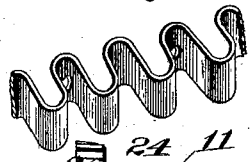


Fig. 5.



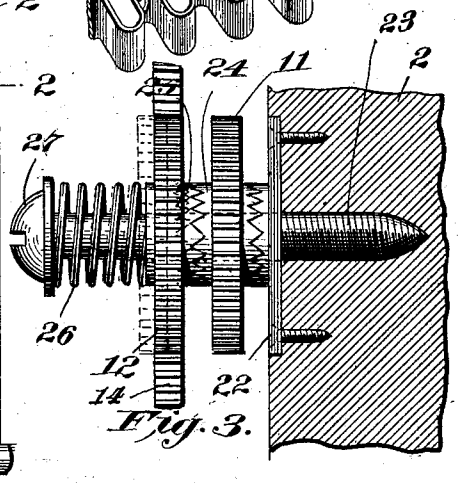


Fig. 3.

Fig. 2.

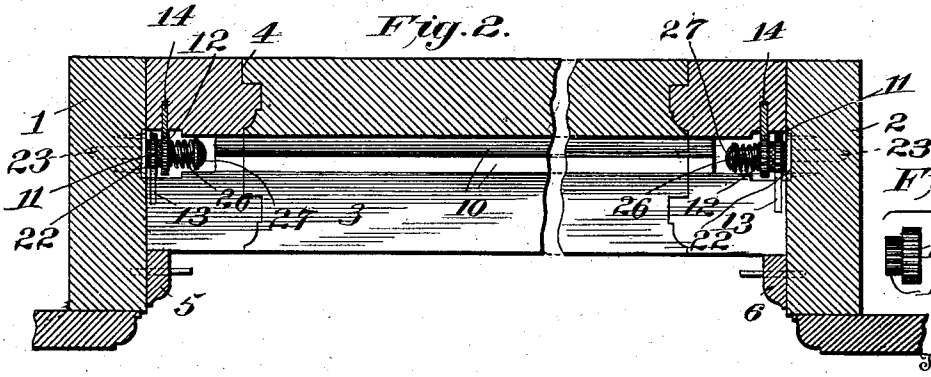


Fig. 6.



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UNITED STATES PATENT OFFICE.

FREDERICK W. G. BOETTCHER, OF DETROIT, MICHIGAN.

WINDOW-BALANCE.

SPECIFICATION forming part of Letters Patent No. 696,308, dated March 25, 1902.

Application filed January 3, 1901. Serial No. 41,979. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. G. BOETTCHER, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Window-Balances; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention is in the nature of an improvement in window appliances, and has for its object to provide improved means whereby the upper and lower sashes of windows may be readily balanced, moved simultaneously the same or different distances without weights or cords, either of the sashes moved while the other is stationary, and the sashes securely locked together when desired.

With this object in view my invention consists in the improved construction, combination, and arrangement of parts hereinafter fully described and afterward specifically claimed.

In the accompanying drawings, Figure 1 represents a view in inside elevation of a window equipped with my improvements, the central portion being broken out to narrow the figure and otherwise partially broken away. Fig. 2 represents a horizontal sectional view on a plane cut through the window and frame on the broken line 2 2 of Fig. 1. Fig. 3 represents a sectional detail view on an enlarged scale. Figs. 4 and 5 are views illustrating modifications in the construction of the rack-bars to be hereinafter mentioned. Fig. 6 represents in side and end elevation a differential gear which I embody in my improvements.

Like numerals of reference mark the same parts in the figures of the drawings.

Referring to the drawings by numerals, 1 and 2 indicate, respectively, the left and right uprights of the window-frame, and 3 and 4 the upper and lower sashes.

5 and 6 indicate the inside window-strips, by means of which the sashes are held in position, one at least of which should be readily removable to facilitate the removal of the sash from the frame. It will be understood, of course, that while one removable strip is sufficient to permit the removal of the sash both strips may be made removable in the same way, if desired.

10 indicates a horizontal parting-bead between the upper and the lower sashes, which in my construction is cut away at each end in order to provide space for gear-wheels 11 and 12. These gear-wheels thus occupy a central position in the height of the frame, being, when the sashes are in closed position, in line with and between the two parts of the strip 10 and between the lower end of the upper sash and the upper end of the lower sash.

13 indicates a rack-bar secured to the lower sash, and 14 a similar rack-bar secured to the upper sash, the teeth of said rack-bars being adapted to engage with the gear-wheels 11 and 12, respectively, when desired, and the sashes being of the same weight substantially and the teeth of the rack of one sash engaging the teeth on one gear-wheel, while the teeth of the rack of the other sash engage the teeth of the other gear-wheel, one sash will counterbalance the other when the two gear-wheels are arranged to rotate together, so that in such case the sashes will normally remain in any position to which they are adjusted, and any movement of either sash will cause a corresponding movement in the opposite direction of the other sash. The result of this arrangement is that by raising or lowering the lower sash, which is handiest to manipulate, the upper sash will be correspondingly lowered or raised without the necessity of handling the upper sash at all.

Under some circumstances it is desirable that one sash shall move through a greater distance than the other, it being especially desirable under certain conditions that the lower sash be raised a much greater distance than the upper sash is lowered. To accomplish this, I use a differential gear-wheel, as illustrated in Fig. 6, which wheel is provided with two sets of gear-teeth 15 and 16, the first set arranged in a circle of greater diameter than that of the second. If the lower sash-rack should be engaged with the teeth 15 and the upper sash-rack with the teeth 16, the relative movement of the lower sash will be greater than that of the upper sash, so that the lower sash may be raised, say, for instance,

two-thirds its full height, while the upper sash is lowered one-third its height. The difference between the diameter of the circles of the two sets of wheels having teeth 14 and 15 may be varied as desired.

The rack-bars may be made in any suitable style—for instance, by cutting teeth on the edge of a flat bar, as in Fig. 4, or by bending a strip of metal, as in Fig. 5, the bar of Fig. 4 being secured in a groove in the wood, as shown in Figs. 1 and 2, and the bent strip by means of nails or screws, in either instance it being preferred to have the outer edges of the teeth flush with the inner surface of the sash to which the bar is secured, as shown best in Fig. 2.

My preferred method of mounting gear-wheels is shown in the enlarged Fig. 3, in which 22 indicates a plate set in the frame, into which is threaded or otherwise secured a screw or headed pin 23. It will be noticed that the gear-wheels are separate and are provided on their respective adjacent faces with clutch-teeth 24 and 25, so arranged that when these clutch-teeth are engaged the two gear-wheels will rotate together. These clutch-teeth will engage each other by means of a spiral spring 26, located about the pin 23, between the head 27 of the pin and the first gear-wheel. When one sash is moved, rotating its particular gear-wheel, the other sash will be moved in the opposite direction, the engagement of the clutch-teeth causing the two gear-wheels ordinarily to turn together; but when either of the sashes is secured against movement by any suitable means (not shown) the yielding engagement of the clutch-teeth will permit the gear of the other sash to turn independently, so that the last-named sash may be raised or lowered when the first-named sash is locked. The pressure of spring 26 upon said gear-wheels is such that the said clutch-teeth may be caused to disengage for permitting independent rotation of said gear-wheels, the said wheels sliding on pin 23 against the pressure of said spring 16 sufficiently to permit of such disengagement of the clutch-teeth.

I provide an ordinary meeting-rail lock, as shown at 29 in Fig. 1, and also a lock 30, engaging a hook 31, to lock the lower sash down when desired.

It will be further understood that the rack and gear mechanism may be applied to either one or both sides of the window, as may be desired.

The advantages attending the operation of my invention will be readily apparent, and it will be obvious to persons skilled in the art to which the invention appertains that various slight changes may be made in the various constructions without departing from the spirit and scope of the invention.

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

The combination with a window-frame and upper and lower sashes slidable therein of a shaft secured centrally in the side of the frame, two gear-wheels slidably mounted on said shaft having their adjacent sides provided with clutch-teeth, a spring for normally holding the clutch-teeth in engagement, and rack-bars on the sashes having their teeth normally in engagement with the respective gear-wheels, substantially as described.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

FREDERICK W. G. BOETTCHER.

Witnesses:

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WM. C. GOTTMAN.