

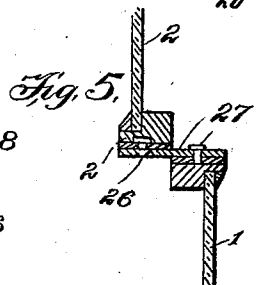
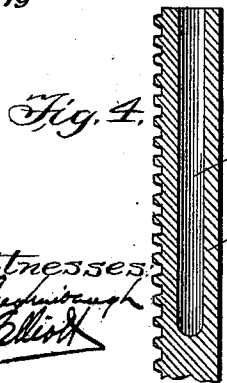
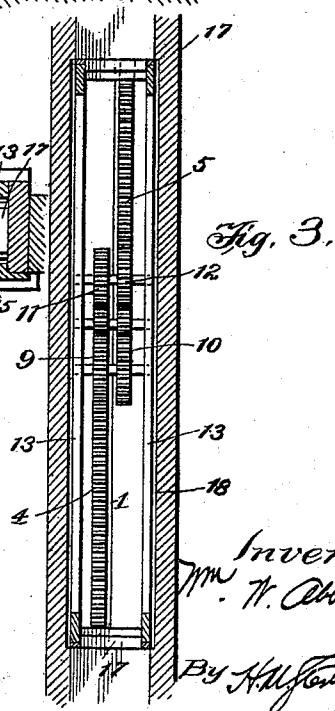
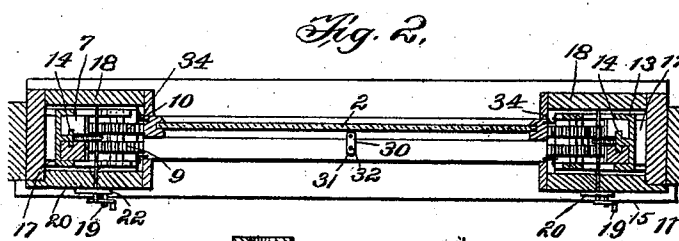
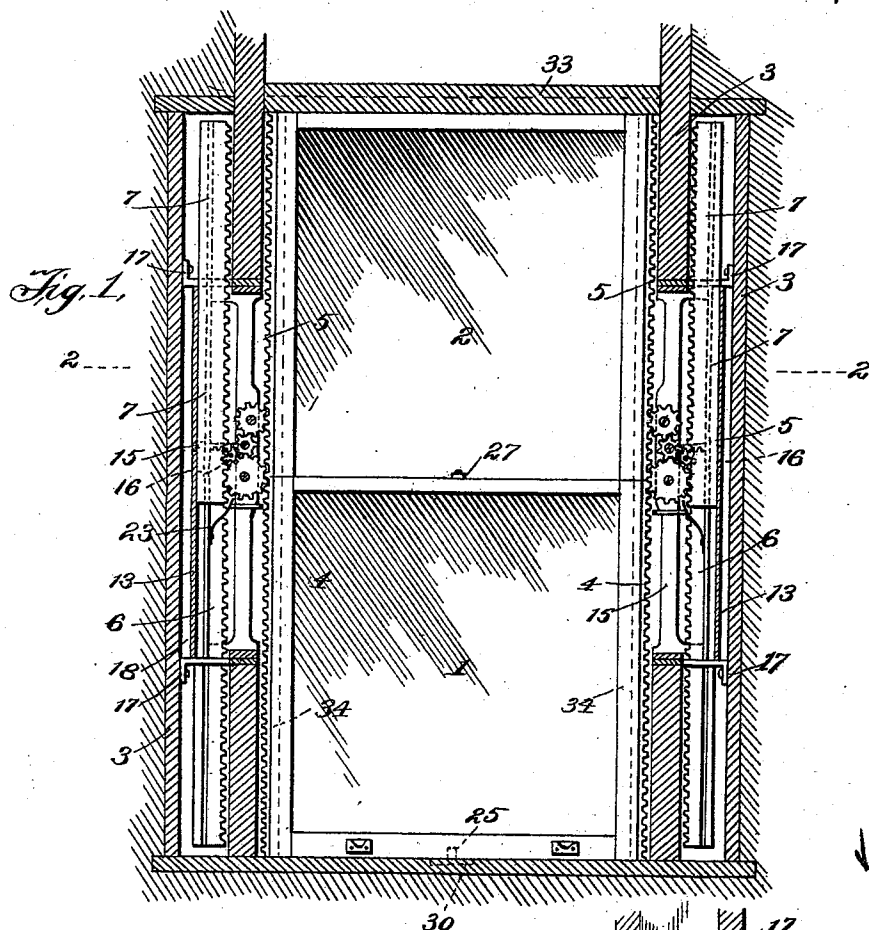
(No Model.)

2 Sheets—Sheet 1.

W. W. ABBOTT.
SASH BALANCE.

No. 527,760.

Patented Oct. 23, 1894.



Witnesses
W. W. Abbott
W. W. Abbott

Inventor:
W. W. Abbott
By *H. W. Folsom*
Att'y.

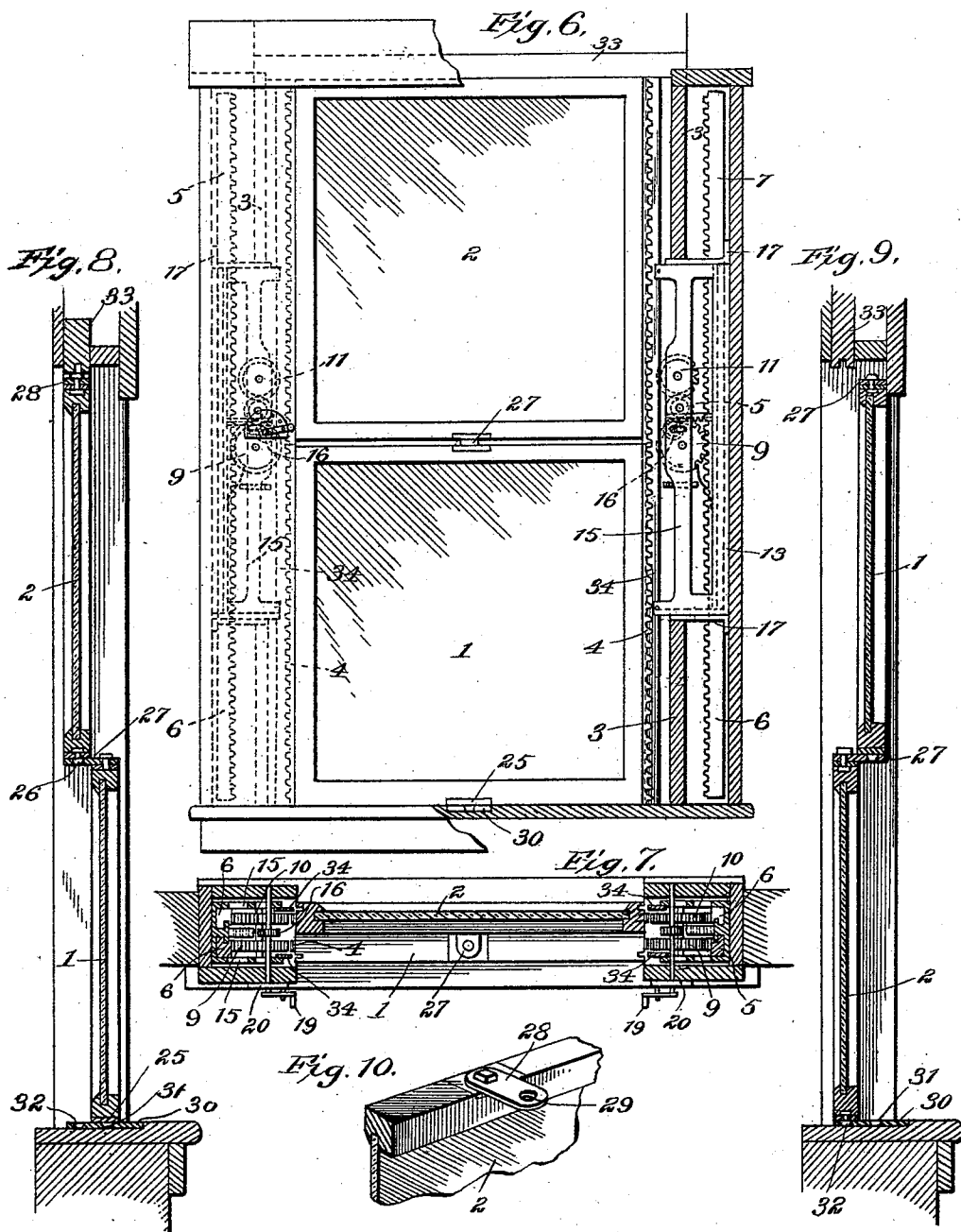
(No Model.)

2 Sheets—Sheet 2.

W. W. ABBOTT.
SASH BALANCE.

No. 527,760.

Patented Oct. 23, 1894.



Witnesses
T. C. Coughenour
C. M. E. E. E.

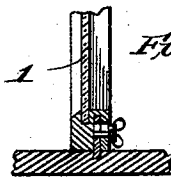


Fig. 11.

W. W. Abbott Inventor
by *A. M. Sterling*
Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM W. ABBOTT, OF PITTSBURG, PENNSYLVANIA.

SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 527,760, dated October 23, 1894.

Application filed October 13, 1893. Serial No. 488,024. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. ABBOTT, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Sash-Balances, of which the following is a description.

The invention particularly relates to improvements in mechanism for balancing window-sashes, and has been especially designed not only to counterbalance the sashes in their raising and lowering movement but to make the sash susceptible of a pivotal movement without interference from the balancing mechanism. Thus it will be seen that the main object of the invention is the construction and combination with the sash of balancing mechanism to facilitate the upward and downward movement thereof and still leave the sash free to be turned upon a pivot, securing thereby a sliding and a pivotal movement, though each independent of the other.

The invention consists in the combination of a window sash provided with a rack, with a movable frame or support mounted in the window frame and carrying a gravity actuated rack and a pinion, said pinion meshing with said gravity rack and adapted to engage the sash rack to balance said sash, or to be thrown out of engagement therewith to permit the window to be turned.

The invention further consists in certain means for engaging and disengaging the pinion connection whereby to permit the sashes to be turned upon their pivots instead of being raised, thus giving the sashes both a raising and a pivotal or swinging movement, as may be desired; and furthermore the invention consists in certain other novel features in the arrangement and construction of parts, all as hereinafter described and pointed out in the claims.

In the accompanying drawings in which the invention is fully illustrated, Figure 1, is a view in elevation of a window having the improved balancing mechanism applied thereto and disclosed by the sectional view shown of the window-frame. Fig. 2, is a transverse horizontal sectional view taken through Fig. 1 on the line 2—2. Fig. 3, is a view in side elevation of the window-frame as seen from

the rear. Fig. 4, is a sectional view taken through one of the balance racks showing the pocket therein for the reception of material to augment its weight. Fig. 5, is a vertical sectional view taken through the sashes at their meeting point. Fig. 6, is a view similar to Fig. 1, but showing the sash-balancing mechanism withdrawn from its engagement with the sash. Fig. 7, is a transverse horizontal sectional view taken through Fig. 6 and above the lower pivot of the top sash. Fig. 8, is a vertical sectional view taken through the window-frame and the sashes on a line through the pivots of the sashes. Fig. 9, is a view similar to Fig. 8, but showing the sashes changed in their position in order to bring the top sash in a position to rest on the sill of the frame that it might be turned upon its pivots. Fig. 10, is a detail view of a portion of the sash showing the swinging bar or plate constituting the pivot support, and Fig. 11, is a detail view showing a section through the lower sash, and disclosing a weather strip working therein.

The invention is illustrated in the present instance with a double sash, each sash working independently of the other as in the ordinary construction of windows. Thus it will be seen that there are two rack weights on each side occupying substantially the same relation to each other as the weights in common use. A description therefore of one side of the frame is applicable to the other side also.

Referring to the several parts of the invention by numerals, 1 indicates the lower sash and 2 the upper sash, each of which is held within the window frame 3 in suitable ways or guides. On each side of the sashes are provided racks those on the lower sash indicated by the numeral 4 and those of the upper sash by the numeral 5. These racks are firmly secured to the sashes and extend along the entire length thereof.

Corresponding to the racks 4 and 5 are the gravity actuated or balance racks 6 and 7, respectively, which are metallic bars having a rack face. These balance racks are preferably hollow and provided with a pocket 8 designed to be filled with shot or other material in order to vary the weight of the racks and secure a perfect balancing of the sash. The

balance racks are preferably of greater length than the sash racks in order to insure their constant engagement with the cog gears, and permit the sashes to be raised slightly beyond their own length, for a purpose which will appear. These balance racks operate upon the sash through their respective cog gears 9 and 10 which are loosely mounted upon a shaft within the window-frame, and mesh with both the balance racks and sash racks.

The relation of the several racks and weights to each other when the sashes are in their closed position will be as follows: The weight racks of the lower sash *i. e.*, racks 6 are raised and engage the cog 9 at its lower end while the sash rack 4 engages with the said cog at its upper end. Thus as the window sash is raised the weight rack is lowered, and vice versa with the racks and weights of the upper sash.

The cogs 9 and 10 being located on the same sash and at a point in the window-frame where the sashes meet it is desirable to extend the racks 4 and 5 sufficiently beyond their respective sash at their meeting point to make certain their engagement with the cog gear. As an auxiliary feature to the balance mechanism just described there is provided the gears 11 and 12 which mesh with the sash racks and are operated by their idlers or pinions respectively, which mesh with the main gears. The function of this additional gear 11 and 12 is merely to transfer the engagement of the racks 4 and 5 thereto when the sashes have been raised beyond the main cog gear which might possibly result by accident, in which case the racks would be still kept in gear and not displaced, the action of the weight racks being brought in such an event on the sash through the system of gears and not alone by means of the main cog gear.

A further and important feature of the invention resulting from the above described sash balance, is the adaptability of the sashes to be turned with a vertical pivotal movement independent of the raising and lowering of the sashes. This feature is provided for by mounting the weight racks and gearing in a frame 13 having a lateral adjustable movement. This frame is located in the window-frame and is provided with grooves 14 in its rear portion in which operate the weight racks, and has a lateral extending rack 15 which is operated upon by a gear 16 for sliding the frame back and forth, by which action the engagement and disengagement of the gears with the sash rack is effected. A suitable grooved plate or support 17 is located in the window-frame at the top and bottom of the recess 18 formed for the reception of the adjustable frame 13, and in these supports the upper and lower ends of the said frame find a bearing on which they can slide back and forth.

The tension gear 16 for operating the sliding frame 13 is mounted on a shaft having its bearings in the window-frame, and on be-

ing turned inward forces the frame 13 out bringing cogs 9 and 10 in mesh with racks 4 and 5, respectively, or on the reverse movement of the gear 16 the balance mechanism is thrown out of engagement and the sashes are free to be turned upon their pivots. The gear 16 is provided with a crank arm 19 by which it is operated, and a face-plate 20 is also provided around the shaft on the outer face of the window-frame. The plate 20 is provided with indentations 21 for engaging a stud or projection 22 on the crank arm to lock the pinion at any desired point. It will also be seen that the gear 16 operates to vary the tension of the gearing of the racks when in operative connection.

When the sliding frame 13 is forced back and the gears thrown out of engagement with the sashes the tendency of the weight racks would be to fall down and reach a point of rest and destroy their proper relation to the sash racks, but this liability is overcome by the spring-stop 23 which is secured to the frame 13 and comes into engagement with the cogs 9 and 10 as soon as disengagement is made between the said cogs and the sash-rack. The free end of the spring is connected with the stationary part of the window-frame, and in the operation of sliding the frame 13 back it will pull the spring into engagement with the cogs 9 and 10.

The sashes 1 and 2 are each provided at their center in the bottom portion of the frames with pivots 25 and 26, respectively, and the upper portion of the frame of both sashes is provided with a bar or plate 27 and 28 respectively, which bar is pivotally secured to the top of said frames and is provided with a socket 29 to receive the pivots referred to, according as the windows are operated.

In order to turn the sashes on their pivots it is necessary that they should be in their lowered position, and for this purpose a plate 30 is provided with sockets 31 and 32 is located in the sill to receive the pivots 25 and 26 respectively. Thus it will be seen that when it is desired to turn the lower sash (No. 1) it is brought into its normal or lowered position, the pivot 25 entering socket 31, and the bar or plate 27 swung out at right angles so that pivot 26 of the upper sash (No. 2) will enter its socket 29. In this position the lower sash is free to turn while the upper sash remains stationary. To turn the upper sash it is necessary to lower the same so that pivot 26 will enter socket 32, while the lower sash is shoved up into the position shown in Fig. 9, in which position its pivot 25 enters the socket 29 in the swinging bar 28 on top of upper sash and thus the upper sash is permitted to be turned.

In the top of the window-frame is provided a follower 33 the function of which is simply to close the open space at the top when the upper sash is drawn down and to permit a slight raising of the upper sash in order to allow the plate 27 located on top frame 1 to be swung under the same and receive the

pivot 26. This follower may be provided with a bead which will enter a groove on the top of the upper sash or vice versa. In Fig. 11 I have shown a weather-strip in the lower bar of the lower sash that is adapted to be moved vertically within the said sash and to enter a groove in the sill.

For the purpose of making a perfect weather joint at the sides of the sashes, I have provided a strip 34, preferably of thin metal, which is secured to and operates with the sliding frame, in which is carried the balancing mechanism, and this strip projects normally beyond the window-frame and into a groove 35 formed in the side of the sash.

While I have illustrated and described my invention as applied to windows it is obvious that its application extends to other devices requiring a counterbalance, and such application I hold to be within the spirit and scope of the invention.

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

1. In a sash-balance, a gravity actuated rack, a sash carrying a rack, a pinion located between and adapted to mesh with said racks, and a horizontally movable frame carrying said pinion and gravity rack, adapted to be operated back and forth to cause the said pinion to engage or disengage the sash-rack, as and for the purpose set forth.

2. In a sash-balance, a gravity actuated rack, a sash carrying a rack, a pinion connecting said racks, a movable frame carrying said gravity rack and pinion, and provided with a rack for sliding said frame back and forth, and a gear engaging said frame actuating rack, substantially as and for the purpose set forth.

3. In a sash-balance, a movable rack, a sash carrying a rack, a pinion connecting the said racks, an auxiliary pinion adapted to engage the sash-rack, and an idler gear located be-

tween said pinions whereby motion is imparted from one pinion to the other, as and for the purpose set forth.

4. The combination with a window sash having centrally located vertical pivots at both top and bottom and provided with side racks, of a gravity actuated rack located within the window frame and a pinion held in engagement therewith and adapted to engage or disengage the said sash rack, whereby the sash may be operated vertically or be permitted to disengage the pinion, and be turned on its pivot.

5. In a window, the combination of an upper and a lower sash, each having a pivot in the base of its frame, and a swinging bar or plate carried on the top of each sash adapted to receive the pivot of the other sash, as and for the purpose set forth.

6. In a window, the combination of an upper and a lower sash, each having a pivot in the base of its frame, a swinging bar or plate having a socket therein carried on the top of each sash, and adapted to receive the pivot of the other sash, and a sill-plate having sockets for the reception of the respective pivot points, as and for the purpose set forth.

7. The combination with a sash having a pivotal and a sliding movement, and provided with racks, of a horizontally movable frame movably mounted within the window-frame, and movable racks and a pinion mounted within said movable frame, and a strip carried by the said movable frame adapted to project beyond the window frame and into engagement with the sash, as and for the purpose set forth.

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

WILLIAM W. ABBOTT.

Witnesses:

OSCAR J. STEINER,
BENJ. H. LIGHTFOOT.