

W. SAWYER.
SASH BALANCING DEVICE.
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1,014,182.

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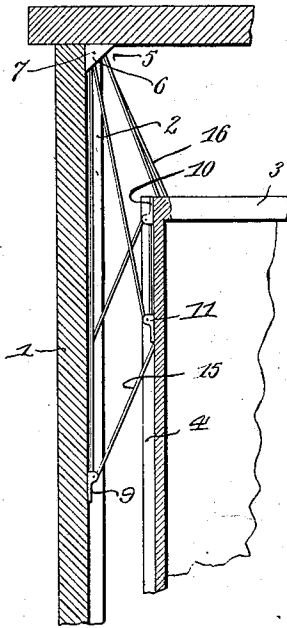


Fig. 1

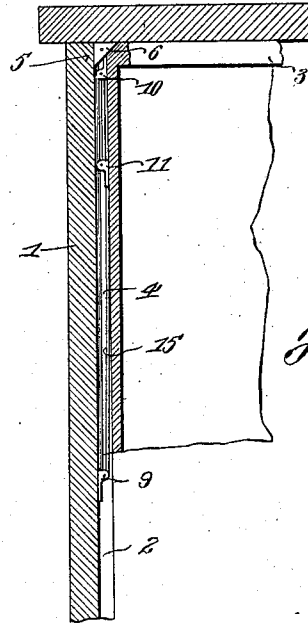


Fig. 2

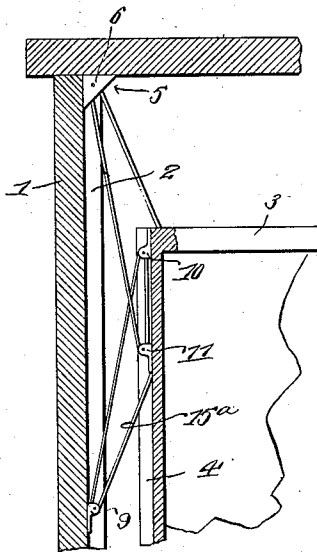


Fig. 3

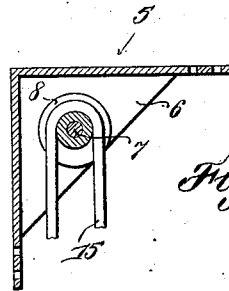


Fig. 4.

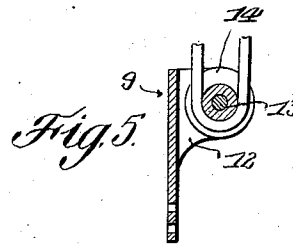


Fig. 5.

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SASH-BALANCING DEVICE.

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To all whom it may concern:

Be it known that I, WILLIAM SAWYER, a subject of the King of Great Britain, residing at Armstrong, county of Yale, in the Province of British Columbia, Dominion of Canada, have invented a new and useful Sash-Balancing Device, of which the following is a specification.

This invention has reference to improvements in sash balancing devices, and its object is to provide a simple means whereby a window sash may be moved to any desired position and will be there held without the necessity of counterbalancing weights, and thereby avoiding the boxing usually provided for accommodating such weights.

In accordance with the present invention the window sash is sustained at each side by a strand or strands secured at the ends to the sash and interwoven around pulleys carried by the sash and casing, or either of them, in such manner that the tension on the strands is sufficient to counteract any tendency of the sash to gravitate to the lower position when once raised, so that the sash will maintain any raised position to which it may be moved.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawings, forming a part of this specification, with the understanding, however, that while the showing of the drawings is of a practical embodiment of the invention, the latter is susceptible to various modifications or changes, and is, therefore, not confined to the exact showing of the drawings, but the practical embodiments of the invention may vary from such showing so long as the salient features are retained.

In the drawings:—Figure 1 is a vertical section of a window casing and a portion of a window sash with the invention applied, the sash being shown laterally displaced from the corresponding portion of the casing to better illustrate the course of the sustaining strand or strands. Fig. 2 is a similar view but with the sash in proper relation to the window frame and in the highest position. Fig. 3 is a view similar to Fig. 1 but showing a modified form of the sustaining strand structure. Figs. 4 and 5 are detailed sections of pulleys and brackets therefor used in conjunction with the invention.

Referring to the drawings there is shown a window frame 1 which may be of ordinary construction except that the customary boxing for the sash balancing weights is omitted as unnecessary. Only one side and a portion of the length of the window frame are shown in the drawings, but it will be understood that the device of the present invention is applied to both sides of the window.

The frame is assumed to be provided with the usual guide strips 2 for the direction of a sash 3, which latter may be of the ordinary construction, and at each side is provided with a longitudinal groove or channel 4, the construction being such that when the sash is seated between the guide strips 2 the depth of the channel 4 is sufficient to accommodate certain parts to be described.

At the upper corner of the frame 1 is an angle bracket 5 strengthened by side wings 6 to form an angular casing. Traversing the space between the wings 6 and secured to these wings is a pintle or rod 7 on which is mounted a roller 8. Other brackets 9, 10, 11 are provided and each of these brackets has spaced wings 12 in parallel relation carrying a pin 13 traversing the space between the wings 12 and secured at the ends to these wings. Mounted on each pin 12 is a roller 14 similar to the roller 8.

In the particular structure shown in Figs. 1 and 2 a strand 15 is made fast to the window sash within the channel 4 at an appropriate distance below the top of the sash. This strand is carried about the pulley within the bracket 9, the latter being secured to the frame 1 between the guide strips 2 at an appropriately low point, and from the pulley bracket 9 the strand 15 is continued upwardly along the frame 1 to and around the pulley 8 and from thence is directed to the top of the sash 1 where it is secured close to the corresponding corner of the sash. Also secured to the top of the sash adjacent to the point of securing of the strand 15 is another strand 16 which is carried to and around the roller 8 and thence to the roller bracket 11, which is located below the top of the sash an appropriate distance, thence the strand 16 is carried upward through the channel 4 to the roller in the bracket 10, which bracket is located near the upper end of the channel 4, and from this last named roller the strand 16 is carried to the strand 15 to which it is

united in any appropriate manner so that the strand 16 coalesces with the strand 15 and they become as one strand from this point around the pulley within the bracket 9 to the point of connection with the sash.

Instead of the arrangement shown in Figs. 1 and 2, the arrangement of Fig. 3 may be employed where a single strand instead of two are used. In this case there is a strand 15^a made fast to the window sash within the channel 4 close to the bracket 11, and this strand is carried to and around the pulley 14 within the bracket 9, thence to and around the pulley within the bracket 10 on the window sash, thence to and around the pulley within the bracket 11 also on the window sash, thence to and around the pulley 8 in the upper corner of the frame 1, and finally this strand is continued to and made fast at the upper end of the window sash.

The strands of Figs. 1 or 3 are, of course, present at both sides of the sash and frame, but since the operation of the invention is clear from the showing of one side only of the sash and frame, the drawings are confined to such showing.

The tension of the strands of Fig. 1 or the strand of Fig. 3 is dependent upon the weight of the sash, the heavier the sash the greater the initial tension on the strand. It is found in practice that with such arrangements the sash will not move under the action of gravity, but will maintain the position to which it may be moved, such movements being readily accomplished since the sash is in a more or less balanced condition, and but little force is needed for causing such movement of the sash. Neither is there any marked friction between parts so that neither the strands nor pulleys wear perceptibly during long intervals of time.

It will be understood, of course, that the channel 4 will accommodate the pulleys and strands and may as well be formed in the window frame as in the sash frame. It will also be understood that various arrangements of the pulleys, whether on the sash or on the window frame, may be employed.

While usually sash cord is employed for the flexible strands, this does not preclude the use of metal strands of various kinds, such as flexible wires or bands or chains where the use of such materials is desirable, this being especially true where the weights are heavy.

In the showing of Figs. 1 and 2, the double strands 15 and 16 are adapted more particularly for heavy sash and where the sash is light, a single strand as in the showing of Fig. 3 will be found efficient, and this may be even used for heavy sash providing the strand be sufficiently strong.

The numerous changes in the direction of the strand causes the same to be put under such tension as to overcome the weight of

the sash, so that it will remain in the position to which it is moved, but the arrangement may be such that a comparatively slight force will move the sash in either direction.

The brackets carrying the rollers may be struck up out of sheet metal and may be of a size to be housed in the groove 4, whether the same be on the sash or on the window casing, so that there is no interference with the movement of the sash because of the presence of these brackets.

The application of the invention to windows requires simply the production of a groove in the sash or in the window frame, but preferably in the sash throughout the length of the latter to house the brackets 10 and 11 and to permit the extension of the bracket 9 into the same groove.

The use of the brackets 9, 10, 11 necessitates simply the production of a longitudinal groove in each side of the sash for the accommodation of the brackets and strands, such grooves being very readily produced while the cutting of the sash or casing for the inseting of brackets beyond the line of the strands is wholly avoided.

The use of the present invention avoids the necessity of any exact counterbalancing of the weight of the sash as in the case of sash balancing weights as commonly employed, and while the invention has been described as useful in connection with window sashes it will be understood that it may be used wherever any object is to be adjustably sustained to be elevated or lowered with minimum exertion. Therefore, while the word "sash" is used both in the description and claims it is not intended that the invention shall be limited to application to sashes only, but the term is to include any object to which the invention may be operatively applied.

What is claimed is:—

1. A counterbalancing means for a movable sash comprising pulleys carried by the movable sash, other pulleys sustained in fixed relation to the movable sash, and a strand connected at both ends to the movable sash and having the middle portion passed about the pulleys carried by the movable sash, and between such middle portion and the respective ends of the strand passed about the fixedly sustained pulleys.

2. The combination with a sash, of a balancing means therefor comprising spaced pulleys on the sash and other spaced pulleys sustained fixedly with relation to the sash and more widely separated than the pulleys on the sash, and a flexible strand connected at one end to the top of the sash and at the other end to an intermediate point on the sash, the strand extending from the top of the sash about one of the fixedly supported pulleys, thence to the lower one of the

spaced pulleys on the sash, thence about the upper one of the spaced pulleys on the sash, and thence about the other one of the fixedly supported pulleys.

5 3. The combination with a sash having a longitudinal side groove, of a frame in which the sash is movable, spaced pulleys lodged in the groove in the sash in spaced relation one to the other, a pulley fixedly
10 supported in the frame near the upper end thereof, another pulley below the first named pulley and spaced therefrom a distance permitting the lowering of the sash to its full extent without interference by
15 the pulleys carried by the sash, and a flexible strand connected at one end to the upper part of the sash and at the other end in the groove below the lower one of the pulleys therein, said strand extending from the
20 top of the sash about the pulley at the upper end of the window frame, thence to the lower one of the pulleys of the sash, thence to the upper one of said pulleys on the sash, thence about the lower pulley on the win-
25 dow frame, and finally returning and secured to the sash.

4. The combination with a sash having a longitudinal side groove, of a frame in which the sash is movable, spaced pulleys
30 lodged in the groove in the sash in spaced

relation one to the other, a pulley fixedly supported in the frame near the upper end thereof, another pulley below the first named pulley and spaced therefrom a distance permitting the lowering of the sash 35 to its full extent without interference by the pulleys carried by the sash, a flexible strand connected to the upper end of the sash and extending from the same about the pulley at the upper end of the frame, 40 thence about the lower pulley of the frame and finally returning and secured to the window sash below the lower pulley thereon, and another strand connected to the upper end of the sash and passing thence about 45 the pulley at the upper end of the frame, and thence about the lower and upper pulleys on the sash in order and thence to the first named strand and there coalescing with the latter and by it continued about the 50 lower pulley on the frame and ultimately connected to the sash.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILLIAM SAWYER.

Witnesses:

W. E. FOREMAN,

H. C. ARMSTRONG.