March 18, 1952 L. A. MACKLANBURG 2,589,413

SASH BALANCE

Filed June 20, 1949 2 SHEETS—SHEET 1

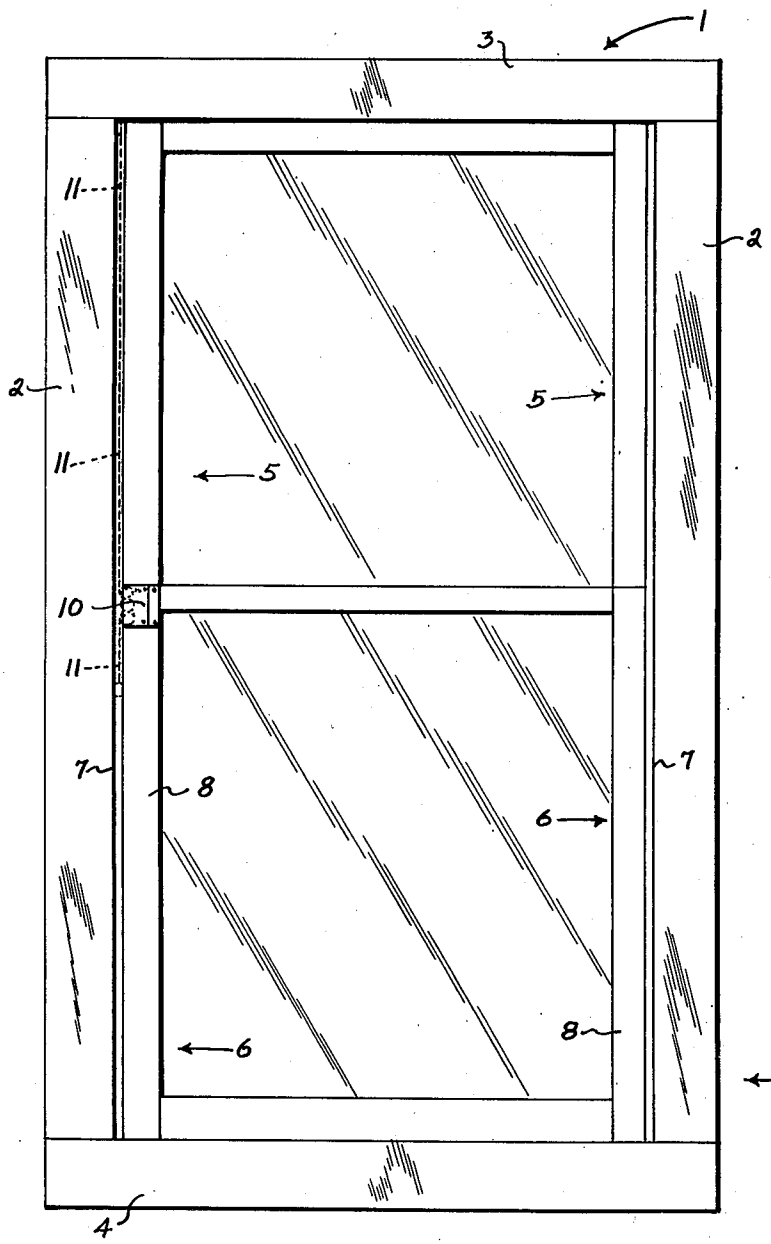

FIG. 1

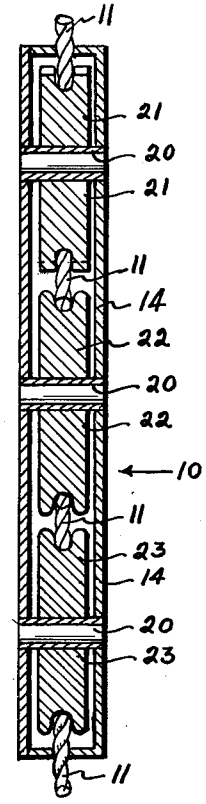

FIG. 4

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SASH BALANCE

Filed June 20, 1949 2 SHEETS—SHEET 2

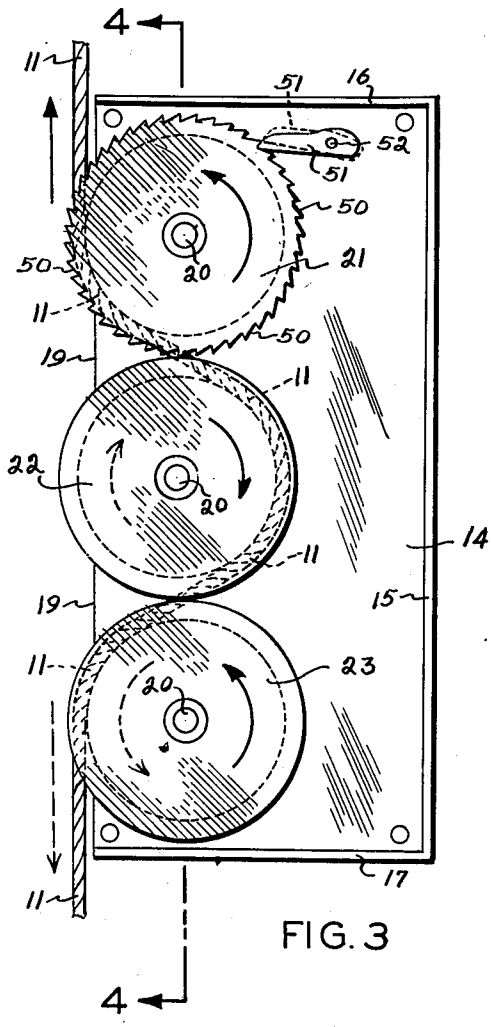

FIG. 3

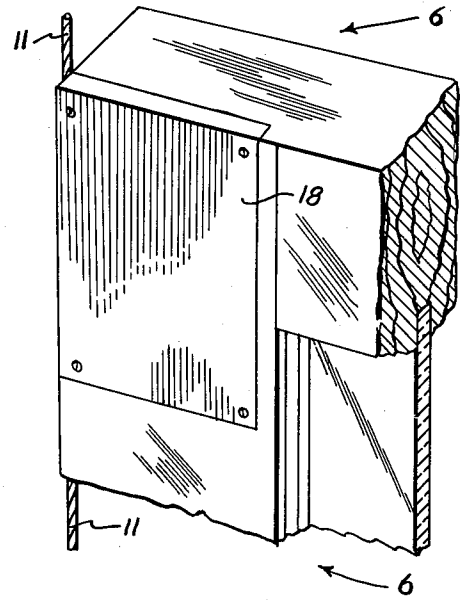

FIG. 2

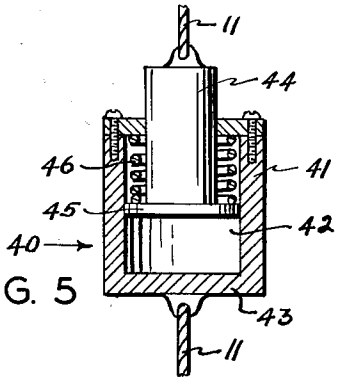

FIG. 5

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SASH BALANCE

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Application June 20, 1949, Serial No. 100,195

2 Claims. (Cl. 16—196)

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The present invention relates to apparatus for balancing or sustaining the equilibrium of vertically slidable window sash.

The mechanism of the present invention is an improvement over that described and claimed in United States Patent Numbered 2,428,976, which was issued to me on October 14, 1947.

The principal object of the present invention is to provide the mechanism of the patent with a means, other than friction, for retaining the sash in various positions of vertical adjustability.

The patented mechanism has been found to be entirely practical for stabilizing sash within certain weight limitations, but when applied to heavier sash, it has been found inefficient because of insufficient friction between the cable and the pulleys. Of course, this friction can be increased by increasing the number of pulleys in the train, or by increasing the longitudinal tension on the cable, or both, but such expedients have their draw-backs. For instance, if the cable tension is materially increased, then the sash is too hard to raise, and a longer pulley train requires a longer housing which occupies more space on the sash.

The mechanism of the present invention requires little or no additional housing space, yet provides additional friction against downward movement of the sash without impairing the upward movement thereof.

Other objects will be apparent from the following description when taken in conjunction with the accompanying two sheets of drawings, wherein:

Figure 1 is an elevational view of the inside face of a conventional window frame with vertical slidable sash therein, the device of the present invention being shown operatively installed on one side of the lower sash;

Figure 2 is an enlarged fragmentary perspective view of the upper left hand corner of the lower sash;

Figure 3 is an elevational view of the pulley train housing with its face plate removed;

Figure 4 is a vertical sectional view taken substantially along the line 4—4 of Fig. 3; and,

Figure 5 is a vertical sectional view detailing a part of the mechanism.

Like characters of reference designate like parts in those figures of the drawings in which they occur.

In the drawings:

The reference numeral 1 indicates, as a whole, a typical window frame having vertical side members 2 and top and bottom members 3 and 4 re-

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spectively. Slidably mounted for vertical movement between the side members 2 are an upper sash 5 and a lower sash 6, both of which are conventional. The reference numeral 7 indicates the inside faces of the two side members 2, and the numeral 8 indicates the two side rails of the lower sash 6.

The sash balancing mechanism consists primarily of a sheave box or housing 10, a flexible cable 11, an anchoring element, not shown, for the upper end of the cable, and any suitable clamping mechanism, not shown, for anchoring the lower end of the cable to the frame member 2.

Referring now more particularly to Figures 2, 3 and 4, the box 10 and its associated parts will first be described.

The box 10 is preferably made of sheet metal, is substantially rectangular in form, and consists of a back wall 14 having one perpendicular side wall 15 and top and bottom walls 16 and 17 respectively. The front of the box 10 is adapted to be entirely closed by a removable face plate 18. One side or edge of the housing remains entirely open, and this side is the one which lies adjacent the left hand edge 19 (Fig. 3) of the back wall 14.

Rotatably mounted within the housing 10 upon pivot pins or axles 20 are three sheaves 21, 22 and 23 which are in substantial vertical alignment with each other, and which are peripherally grooved to receive the flexible cable 11. The office of the cable 11 is more fully described hereinbelow. The pins 20 are permanently fixed in the back wall 14, and the front plate 18 is superficially bored in its inside face to nest the forward ends of these pivot pins. This arrangement maintains the sheaves 21, 22 and 23 in fixed relation to each other and to the housing, except for their rotation.

The above described mechanism is somewhat similar to that disclosed in my above mentioned patent. The present improvement of that structure is best illustrated in Fig. 3, wherein one peripheral flange of the uppermost pulley 21 is provided with ratchet teeth 50, and wherein a pawl 51 has one end pivotally mounted to the back wall 14 of the housing by a pivot pin 52, with its other end operatively engaging the teeth 50. The pawl and tooth arrangement is such that when the pulley 21 rotates in the direction of the arrow (Fig. 3), the tip of the pawl rides over the teeth 50, but when force is exerted tending to reverse the direction of the pulley's rotation, the pawl tip

engages the teeth and prevents rotation of the pulley.

Before the housing 10 is mounted upon the window sash, (Fig. 2), the cable 11 is threaded between and partially around the three pulleys or sheaves 21, 22 and 23, as shown. Due to the way the cable 11 is threaded through the sheaves, the sheave 22 acts to place a "kink" in the line. With longitudinal tension placed on the line by the anchoring elements at its top and bottom, frictional resistance to the movement of the sheaves along the cable is set up between the sheaves and the cable. Without the presence of the pawl 51, this frictional resistance would be constant whether the sash was moving upwardly or downwardly. But with the pawl in action, the pulley 21 is stopped, and therefore the line must slide thereover when the sash moves downwardly. For this reason, the device is capable of functioning with heavier than normal sash.

If desired, all three of the pulleys could well be provided with teeth 50 and pawls 51 in order to increase line friction against downward movement of a heavy sash. If the device is to be used on a sash of normal weight, then the pawl may either be removed from the housing, or it may be swung back out of contact with the pulley.

As a means for decreasing the friction between the sheaves and the cable only during upward movement of the sash 6, the mechanism of Figure 5 is interposed in the cable 11 between the lower end of the housing 10 and the upper end of the clamping mechanism.

This friction relaxing mechanism is indicated, as a whole, by the reference numeral 40, and consists substantially of a cylindrical body 41 forming a chamber 42 with a closed bottom 43 and an open upper end. A plunger 44 having an outwardly extending annular flange 45 at its lower end is slidably positioned within the chamber 42, and a helical spring 46 is provided around the plunger and seated upon the flange 45. The upper end of the chamber 42 is closed by an annular plate 47 which surrounds the upper portion of the plunger 44, and the upper end of the spring 46 bears against the nether surface of this plate 47.

When the mechanism 40 is used, the cable 11 is severed and one portion is attached to the upper end of the plunger 44, while the other portion is attached to the lower end of the body 41 as shown.

With the mechanism 40 thus installed in the cable, upward movement of the window sash 6 will act to compress the spring 46 and thus slacken the cable. This, of course, decreases friction between the cable and the sheaves and permits the sash to be more easily raised. As soon as this upward movement of the sash ceases, the spring returns to its expanded condition, and the cable is again held taut.

It is thought to be obvious that the above described mechanism will accomplish all of the objects and purposes set forth hereinabove.

Obviously the invention is susceptible to some change or alteration without defeating its practicability, and I therefore do not wish to be confined to the preferred embodiment shown in the drawings and described herein, further than I am limited by the scope of the appended claims.

I claim:

1. In a sash balancing mechanism, a means for creating friction on a sash supporting cord, including: a rigidly mounted housing having one side open to permit entry and exit of said cord; a plurality of pulleys rotatably mounted on individual vertically aligned axes with the adjacent edges of the pulleys in close proximity, the cord being trained along the opposite edge of each alternate pulley so that the pulleys offer resistance to the longitudinal travel of the cord; and means in the housing for holding at least one of said pulleys from rotating in one direction.

2. Structure as specified in claim 1 in which said holding means includes: teeth on said one pulley; and a pivoted pawl for engaging said teeth and stopping rotation of the pulley in one direction only.

LOUIS A. MACKLANBURG.

REFERENCES CITED

The following references are of record in the file of this patent:

REFERENCES CITED

UNITED STATES PATENTS

Number	Name	Date
2,428,976	Macklanburg	Oct. 14, 1947