June 28, 1932. A. LARSON 1,864,745

WINDOW SASH BALANCE

Filed June 11, 1930

Fig. 1

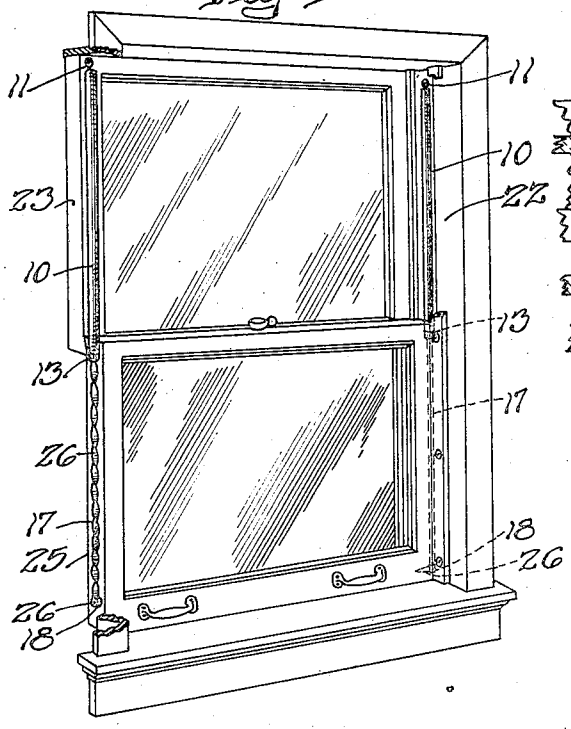


Fig. 2

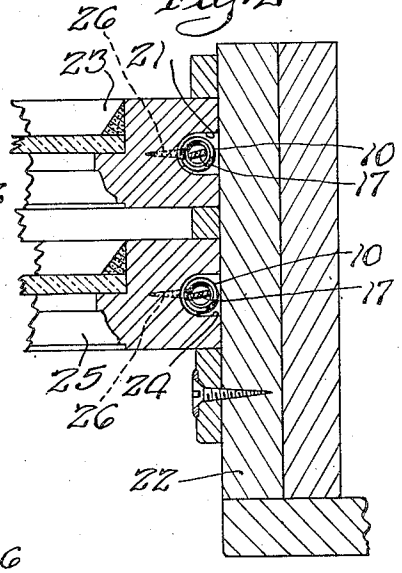


Fig. 3

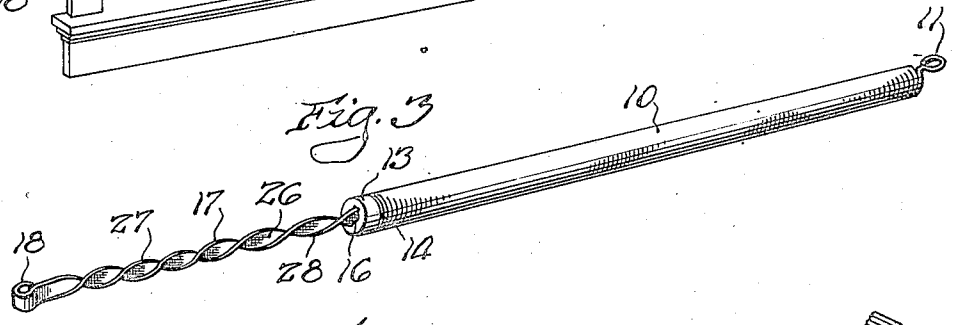


Fig. 4

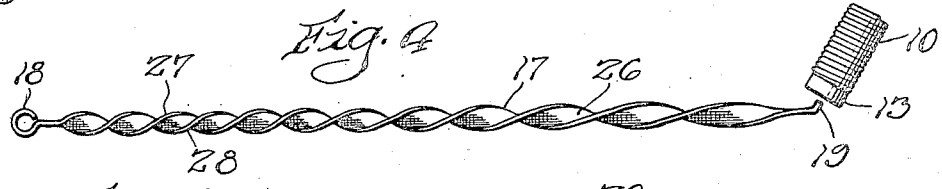
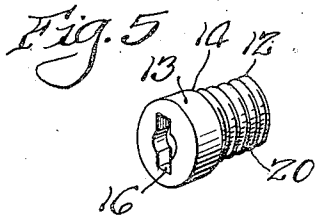


Fig. 5



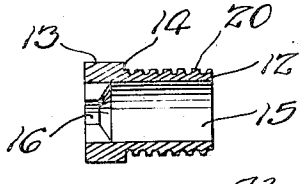


Fig. 6

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UNITED STATES PATENT OFFICE

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WINDOW SASH BALANCE

Application filed June 11, 1930. Serial No. 460,493.

This invention relates to certain novel improvements in window sash balances and has for its principal object the provision of an improved construction of this character which will be economical in manufacture and efficient in use.

The salient object of this invention is the provision of an improved construction in window sash balances of the character described herein which may be expeditiously installed on any window construction without necessitating the construction of boxes or housings as now commonly employed with window sash cords and weights.

Another object of the invention is the provision of an improved construction of the character described herein which will be simple in construction and which will include a minimum number of parts.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawing, showing the preferred form of construction and in which:

Fig. 1 is a perspective view of a window sash and frame showing part of the frame torn away and my invention in installed position;

Fig. 2 is a transverse sectional view of a portion of a window frame and upper and lower sashes showing one manner of mounting my invention in the window frame;

Fig. 3 is a perspective view of my invention in partly extended position;

Fig. 4 is a side elevational view showing a movable element embodied in the invention and the manner of inserting the same in a coil spring embodied in the invention;

Fig. 5 is a perspective view of a unit attached to the coil spring embodied in the invention; and

Fig. 6 is a sectional view of the unit shown in Fig. 5.

As commonly employed in the art, sash balances of the type employing cords and weights necessitate the construction of boxes for housing the weights and cords in the window frame and for supporting the movable pulleys associated therewith. The construction of these boxes is costly in new buildings and particularly costly in old buildings when these boxes are provided in the widow frames. It is, therefore, among the objects of my invention to provide a sash balance which will eliminate the necessity of any housing or box-like construction in the window frame and which may, therefore, be economically attached to any type of sliding window sash.

In this connection I provide an elongated coil spring 10 at one end of which is provided an eyelet 11 for attaching the spring to the window frame adjacent the upper end thereof. At the end of the spring 10 opposite the eyelet 11 there is provided a stem 12 on one end of which is formed a cap 13 providing an annular shoulder 14. The periphery of the stem 12 rearwardly of the cap 13 is threaded, as indicated at 20, and the end portion of the coil 10 opposite the eyelet 11 is connected to the stem 12 by winding the coils of the spring around the threaded portion of the stem. A cylindrical opening 15 is provided in the stem 12 and this opening extends inwardly from the rear end of the stem to a point inwardly of the cap 13 where the opening 15 communicates with a constricted opening 16 provided in the outer end of the cap 13, the purpose of which will be made apparent presently.

In this connection I provide an elongated spiral 17 which includes a portion bent back upon itself and providing a loop 18 at one end thereof. At the end of the spiral 17 opposite the loop 18 there is provided a lip 19 which is inserable into the cap 13 through the slot 16 provided therein. Formed in the spiral 17 is a convoluted groove 26 providing the ridges 27 and 28 which define the pitch of the spiral.

In the use of my invention on the lower sash of a window I attach the loop 11 of the coil spring 10, by means of a suitable connecting element such as a screw, to the upper end of the window frame. In this connection I may utilize the grooves customarily provided window sashes in the manufacture thereof.

In this manner of mounting my invention the coil 10 and the spiral portion 17 may then be mounted as shown in Fig. 2, in which a groove 21 is shown provided in the upper sash 23 and a similar groove 24 is provided in the lower sash 25. The spiral portion 17 is attached to the movable sash by means of a suitable connecting element, such as screw 26 or the like, which is inserted through the loop 18. In attaching the invention to a lower sash the loop 18 is attached to the sash at the outer edge thereof, and adjacent the bottom of the sash, and the coil 10 is then attached to the frame 22 adjacent the upper end thereof by means of a screw or the like inserted through the eyelet 11 into the frame 22. In attaching the invention to the upper sash the reverse of the arrangement described herein for the lower sash is employed and the spiral portion 17 is attached to the upper sash at the outer edge thereof and adjacent the upper end thereof and the coil 10 is then attached to the frame adjacent the bottom thereof. It will be seen, therefore, that in the use of the invention, when the sash with which it is associated is in closed position, as shown in Fig. 1 the spiral portion 17 is in extended position and retracted out of the coil 10. The coil 10 and spiral 17 are made in various lengths and sizes proportionate to the weight of the sash.

In attaching the device for use on the lower sash, for example, the spiral 17 is first disposed inwardly of the coil 10 and the coil is then attached to the frame in the manner explained above. The lower sash is then raised into opened position and the spiral 17 attached to the sash while the spiral is disposed in the coil 10. It will be seen, therefore, that as the lower sash is lowered into closed position the spiral is retracted out of the coil 10 and the free end of the coil revolves around the spiral, which places the coil spring under tension so that when the lower sash is brought down into, and allowed to remain in, closed position the coil spring remains under tension. It will be manifest therefore that when the lower sash is raised the coil spring will revolve around the spiral in the opposite direction and unwind itself thus releasing the tension of the spring and quickening the movement of the free end of the coil around the spiral and in this manner facilitating the upward movement of the sash. The tension exerted by the coil spring, however, is adapted to the various sizes and weights of window sashes and the tension of the spring is not sufficient in any case by itself to raise the lower sash if closed nor to close the same when open, and conversely with the upper sash, but is sufficient in each instance to retain the sash in open position.

As best shown in Fig. 4, the pitch of the convoluted groove 26 increases gradually from the end at which the loop 18 is disposed to the end providing the lip 19. It will be seen, therefore, that since when the sash is in closed position the spiral is retracted out of the coil and the coil is placed under tension, the coil will revolve relatively slow at first as the sash is opened and the relative speed with which the coil revolves around the spiral will gradually increase as the sash reaches its fully opened position and the cap 13 nears the end of the spiral adjacent the loop 18. The increased pitch provided in the spiral 17 at the end thereof opposite the loop 18 prevents the tension of the spring 10 from withdrawing the sash into open position when the spiral is in extended position out of the coil, the increased pitch making it more difficult for the coil 10 and cap 13 to revolve around the spiral 17. The gradually decreasing pitch provided in the spiral toward the end having the loop 18 facilitates the rotatory movement of the coil 10 as the sash is moved into opened position and the tension on the coil accordingly decreased due to the movement of the spiral 17 into the coil 10 and the consequent unwinding of the coil. Conversely, the rotatory movement of the coil about the spiral is relatively fast at first as the sash is moved into closed position from extended position and the movement of the coil is relatively slow as the spiral reaches extended position. It will be manifest, therefore, that this arrangement of the graduated pitch in the convoluted groove 26 of the spiral prevents the coil 10 from pulling the lower sash up into opened position when closed and likewise prevents the lower sash from falling down into closed position when opened, the converse being the case with the upper sash.

In case the coil spring 10 loses some of its tension due to standing under tension, the hook 11 and its supporting screw may be removed and the coil given a few turns by hand to secure the desired tension therein, after which the hook and its supporting screw may be reinserted into position.

From the foregoing description of the invention it will be manifest that the construction described herein provides an improved window sash balance which while serving its other objects will eliminate the necessity for the housing boxes used with window sash cord and weight balances and the like. It will likewise be seen from the foregoing description that the invention described hereinbefore being simple in construction will be economical in manufacture and will be capable of being expeditiously installed for use on any type of window sash and frame.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification, without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise

details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention what I claim as new and desire to protect by Letters Patent is:

1. In a device of the class described, an elongated spiral member, said member having a portion at one end thereof bent back upon itself to provide a loop and having a portion at the opposite end thereof bent angularly to provide a lip, said member having a convoluted groove formed in the periphery thereof and extending from said loop to said lip portion, said spiral being formed so that the pitch of said groove is graduated from a minimum at the end providing said loop to a maximum at the end providing said lip, an elongated spring member adapted to have one end attached to a support and having a free end rotatable on said spiral member, means including a guide member for guiding said spring member in said groove, said means including means providing connection between said guide member and said spring member.

2. In a device of the class described, an elongated spiral member having a convoluted spiral groove formed in the periphery thereof, said member having a portion at one end thereof bent angularly with respect to the longitudinal axis of said member providing a lip portion, an elongated coil spring member adapted to have one end attached to a support and having a free end rotatable on said spiral member, means on said spring member at one end thereof providing a guiding member, means providing connection between said guiding member and said spring member whereby when said lip portion is introduced into said guiding member and said spiral member moved longitudinally in one direction the free end of said spring member will rotate around over said spiral member whereby said spiral member will be drawn into said spring member and whereby when said spiral member is moved longitudinally in an opposite direction the free end of said spring member will rotate in an opposite direction around said spiral member and said spiral member will be retracted out of said spring member.

3. A window sash apparatus comprising an elongated spiral member adapted to be attached at one end to a sash, and a lip at the other end of said member, an elongated coil spring adapted to be attached at one end to a window frame and a guiding structure at the other and free end of said spring being provided with a slot for the reception of said lip so that said spiral member may be moved into and out of said spring and the free end of said spring revolve about said spiral member.

4. A window sash apparatus comprising an elongated coil spring adapted to have one end free and the other end attached to a window frame, an elongated spiral member provided with a convoluted groove, the pitch of said groove varying from a minimum at one end to a maximum at the other, and said member being adapted to have the end thereof at which the pitch of the groove is least attached to a movable sash, and a structure at the free end of said spring for guiding said spiral member into and out of said spring so that said spiral member and sash may be moved relative to said spring and frame and the free end of said spring will revolve around said spiral with increasing speed, as the attached end of said spiral member approaches said spring and conversely thereof.

In testimony whereof I affix my signature.

ALGOT LARSON.