Aug. 18, 1936. D. M. LEWIS ET AL 2,051,412

WINDOW SASH BALANCE

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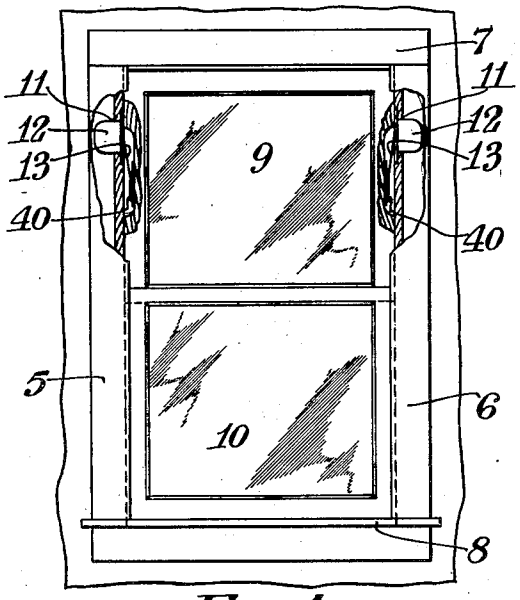


Fig. 1

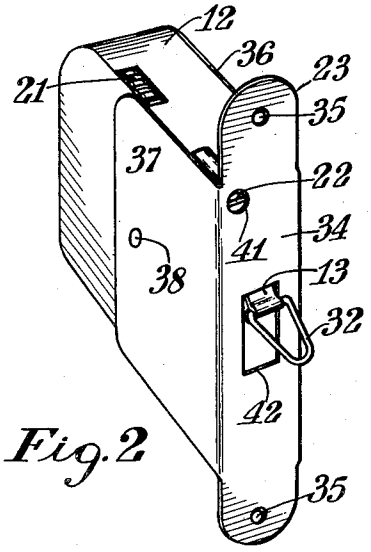


Fig. 2

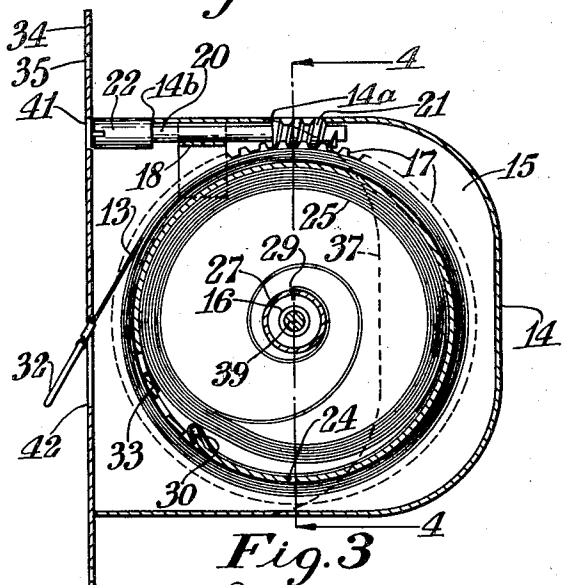


Fig. 3

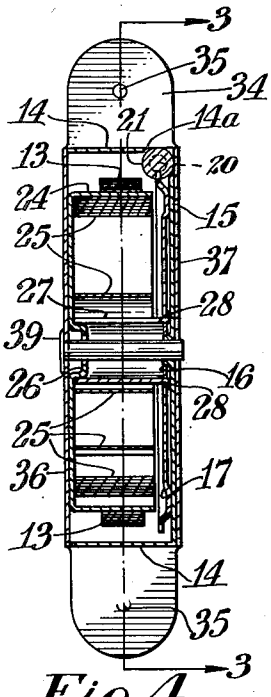


Fig. 4

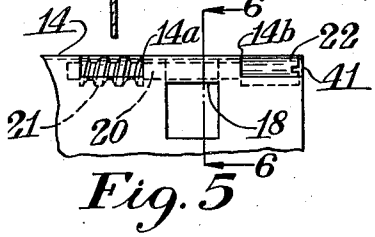


Fig. 5



Fig. 6

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WINDOW SASH BALANCE

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6 Claims. (Cl. 16—198)

This invention relates to counter-balancing devices and more particularly to window sash balances.

In one type of sash balance, it has been customary to employ means including a retractile spring mounted at each side of the window frame, for the purpose of supporting the window sash in any position to which it has been moved. In order to counter-balance different weights of window sashes, balances utilizing springs of different strengths have been provided, but since the range of satisfactory operation of any one spring has been rather limited, it has been necessary to provide a relatively large number of types of balances to accommodate the different weights of window sashes. It has also been found that even among sash sections of a given type and size, the thickness, and therefore, the weight of the glass therein varies within wide limits, so that frequently two different ranges of springs must be provided to properly balance the different sashes of a given size.

It has been proposed, in the past, to provide a friction brake for the spring cup, housing the retractile spring of a sash balance, but such an arrangement has not proved to be satisfactory, since it frequently imposes such a handicap on the action of the spring, that many times it will not rewind the sash supporting tape when the sash is elevated, but instead permits the tape to loop outside of the sash balance housing, with the possible result that it may become kinked and broken, thereby necessitating replacement.

In accordance with the main feature of the present invention, novel means are provided whereby the spring of a sash balance may be compensated in such a manner that the possible range of any given pair of sash balances is extended and yet the operating tension may be properly set to afford the best possible counter-balancing of their sash, thereby insuring reliable operation.

A further feature of the invention relates to a novel construction and arrangement of parts whereby a simple, compact sash balance can be provided.

For a clearer understanding of the invention, reference is made to the drawing in which Fig. 1 shows a window frame with a pair of window sashes mounted therein, and a pair of sash balances mounted in the sides of a window frame to have one end of their spring actuated tapes connected to the respective sides of one of the sashes; Fig. 2 is a perspective view of a sash balance of the present invention; Fig. 3 is a sectional view therethrough, substantially on the line 3—3 of Fig. 4 looking in the direction of the arrows; Fig. 4 is a sectional view thereof taken on the line 4—4 of Fig. 3 likewise looking in the direction of the arrows; Fig. 5 is a fragmentary view of the hood, showing the arrangement of the adjusting screw therein and Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5.

Referring especially to Fig. 1, 5 and 6 designate respectively, the sides of a window frame having a top portion 7 and the window ledge 8. Two window sash sections generally designated 9 and 10 are slidably mounted in any well-known manner in the window frame, so that they may be opened or closed. In order to counter-balance the weight of one of the sash sections such as 9, and thereby facilitate its movement and hold it in the position to which it has been adjusted, there is mounted in recesses 11 at each side of the frame, a sash balance 12 according to the present invention.

Each sash balance includes a hood 14 preferably formed of sheet metal. This hood centrally of its side 15, is provided with an apertured hub 16 on which there is rotatably mounted, a circular, stamped-out metal disk 17 with an offset annular rim parallel to the principal plane of the disk and having gear teeth cut about its edge. An adjustable screw 20 provided intermediate its ends with a worm 21 engaging the gear teeth on the disk 17 is mounted in the position shown, by means of a supporting strip 18 which is struck out of the side 15 of the hood and is wrapped about the shank of the screw as shown best in Figs. 3, 5, and 6. It should be noted that the screw 20 occupies the upper corner of the hood, which has cut-out portions 14*a* and 14*b* in which the worm 21 and the head 22 of the screw project. While this screw has been illustrated as occupying the upper corner of the hood, in certain types of sash balance, it should preferably be mounted in the corresponding lower corner thereof. The construction of the disk and the mounting of the adjusting screw afford an especially compact arrangement of parts. The screw 20 terminates in a slotted head 22 adjacent an opening 41 in the frame 23, of the sash balance. Within the hood there is also provided a spring cup 24 to retain the retractile spring 25, which cup at its open side projects into the central offset portion of the disk 17 which in turn

serves as a closure therefor. The cup is also provided with a depressed circular shoulder 26 having an aperture therein, which shoulder serves to center a split sleeve 27 having its right-hand end (as shown in Fig. 4), staked to, or otherwise, attached to the disk 17, as indicated at points 28. The inner end of the retractile spring 25 is bent to form a hook which engages the split portion of the sleeve 27, as shown at 29 (Fig. 3), while the other end of this spring is bent to form a second hook which engages an ear 30 struck out from the rim of the spring cup. On the rim of the spring cup, there is wound a flexible tape 13 provided at one end with a loop 32, which may be attached to a hook 40 (Fig. 1), on the edge of the sash section 9. The other end of the flexible tape 13 terminates in a hook engaging an opening at 33 in the rim or side wall of the spring cup.

The frame 23 of the sash balance having a flat face plate 34 formed with screw holes 35 by which the sash balance may be fastened to the side frame of the window, is provided with a right angular extension 36 which serves as a closure for the open side of the hood, and with a second right angular extension 37 parallel to the first extension and indicated in dotted lines in Fig. 3. Both angular extensions are provided with openings 38 in alinement to receive a pin 39 which serves to maintain the parts in assembled position. The face plate near its top is also provided with an opening 41 through which the screw 20 is adjustable and in addition is provided with an opening 42 through which an end portion of the tape 13 projects.

It should be noted that the tension of the spring 25 can be adjusted over a wide range of operation without disassembling the sash balance, or without even removing it from the window frame in which it is mounted, merely by adjusting the screw 20 through the opening 41 in the face plate 34 of the frame. From Fig. 3 it will be seen that as this screw is turned either clockwise or counterclockwise, its worm 22 engages the teeth of the disk 17 to rotate the disk in one direction or the other. Since one end of the spring 25 engages the split sleeve 27 carried by the disk 17, the tension of this spring may thus be adjusted at will.

From the foregoing it will be seen that the invention comprises a practical, compact sash balance which can easily be manufactured, easily installed and readily adjusted.

What I claim is:

1. In a device of the class described, a sheet metal hood provided with an integral struck up hub, a disk provided with an offset central portion and with gear teeth in its edge, said disk being rotatable on said hub, a sleeve secured to and projecting from the center of said disk, an adjustable worm element mounted on said hood to engage said teeth whereby said disk may be rotated, a sheet metal spring cup having its rim projecting toward the offset portion of said disk, said cup being provided with a struck-up, apertured hub formed centrally thereon to engage the free end of said sleeve, a retractile spring in said cup having one portion connected thereto and having a second portion connected to said sleeve whereby said spring may be wound around said sleeve, and a tape having one end connected to said cup and adapted to be wound around the rim of said cup.

2. In a device of the class described, a sheet metal hood provided with an integral struck-up hub, a disk provided with an offset central portion and with gear teeth in its edge, said disk being rotatable on said hub, a sleeve secured to and projecting from the center of said disk, an adjustable worm element mounted on said hood to engage said teeth whereby said disk may be rotated, a sheet metal spring cup having its rim projecting toward the offset portion of said disk, said cup being provided with a struck-up apertured hub formed centrally thereon to engage the free end of said sleeve, a retractile spring in said cup having one portion connected thereto and having a second portion connected to said sleeve whereby said spring may be wound around said sleeve, a tape having one end connected to said cup and adapted to be wound around the rim of said cup, a frame for said hood provided with a face plate having two openings therein, through one of which the other end of said tape projects, said worm element having an end accessible thru the other opening in said face plate whereby said element is adjustable while said device is mounted in a window frame.

3. In a device of the class described, a sheet metal hood comprising a side member having a cut-out portion at its upper corner, said side member being provided with an integral struck up hub in spaced relation to said cut-out portion, a disk provided with an offset central portion and with gear teeth in its edge, said disk being rotatable on said hub, a sleeve secured to and projecting from the center of said disk, an adjustable worm element mounted on said hood with said worm engaging said teeth whereby said disk may be rotated and with a portion of said worm projecting through said cut-out portion of said hood, a sheet metal spring cup having its rim projecting into the offset portion of said disk, said cup being provided with a struck-up, apertured hub formed centrally thereon to engage the free end of said sleeve, a retractile spring in said cup having one portion connected thereto and having a second portion connected to said sleeve whereby said spring may be wound around said sleeve, a tape having one end connected to said cup and adapted to be wound around the rim of said cup, a frame for said hood provided with a face plate having two openings therein, through one of which the other end of said tape projects, said worm element having an end accessible thru the other opening in said face plate whereby said element is adjustable while said device is mounted in a window frame.

4. In a device of the class described, a sheet metal hood provided with a centrally located aperture in its side, a disk provided with an offset central portion having a centrally located aperture therein, said disk being provided with gear teeth in its edge, a sleeve secured to and projecting from the center of said disk about the aperture therein, an adjustable worm element mounted on said hood to engage said teeth whereby said disk may be rotated, a sheet metal spring cup having its rim projecting toward the offset portion of said disk, said cup being provided with a struck-up apertured hub formed centrally thereon to engage the free end of said sleeve, a retractile spring in said cup having one portion connected thereto and having a second portion connected to said sleeve whereby said spring may be wound around said sleeve, means passing through the apertures in said hood, said disk and said cup for retaining the same in operative relation, and a tape having one end

connected to said cup and adapted to be wound around the rim of said cup.

5. In a device of the class described, a hood comprising a side member having a cutout portion at its upper corner and provided with a centrally located aperture therein, a disk having a centrally located aperture therein and provided with gear teeth in its edge, a sleeve secured to and projecting from the center of said disk at the aperture therein, an adjustable worm element on said hood with its worm engaging said teeth whereby said disk may be rotated, a portion of said worm projecting through the cut-out portion of said hood, means for fastening said worm element on said hood, a spring cup having its rim projecting toward said disk, said cup being provided with a centrally located aperture therein, a retractile spring in said cup having one portion connected thereto and having a second portion connected to said sleeve whereby said spring may be wound around said sleeve, means passing through the apertures in said hood, said disk and said cup for retaining the same in operative position, and a tape having one end connected to said cup and adapted to be wound within around the rim of said cup.

6. In a device of the class described, a hood comprising a side member having a cutout portion at its upper corner and provided with a centrally located aperture therein, a disk having a centrally located aperture therein and provided with gear teeth in its edge, a sleeve secured to and projecting from the center of said disk at the aperture therein, an adjustable worm element on said hood with its worm engaging said teeth whereby said disk may be rotated, a portion of said worm projecting through the cutout portion of said hood, and a piece struck up from said hood for fastening said worm thereto, a spring cup having its rim projecting toward said disk, said cup being provided with a centrally located aperture therein, a retractile spring in said cup having one portion connected thereto and having a second portion connected to said sleeve whereby said spring may be wound around said sleeve, means passing through the apertures in said hood, said disk and said cup for retaining the same in operative position, and a tape having one end connected to said cup and adapted to be wound within around the rim of said cup.

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