Jan. 15, 1929. 1,699,267

J. P. APPLEBY

SASH BALANCE

Filed April 20, 1926 2 Sheets-Sheet 1

Fig. 2.

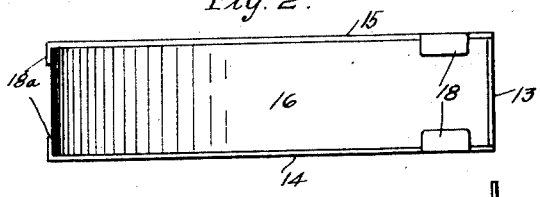


Fig. 1.

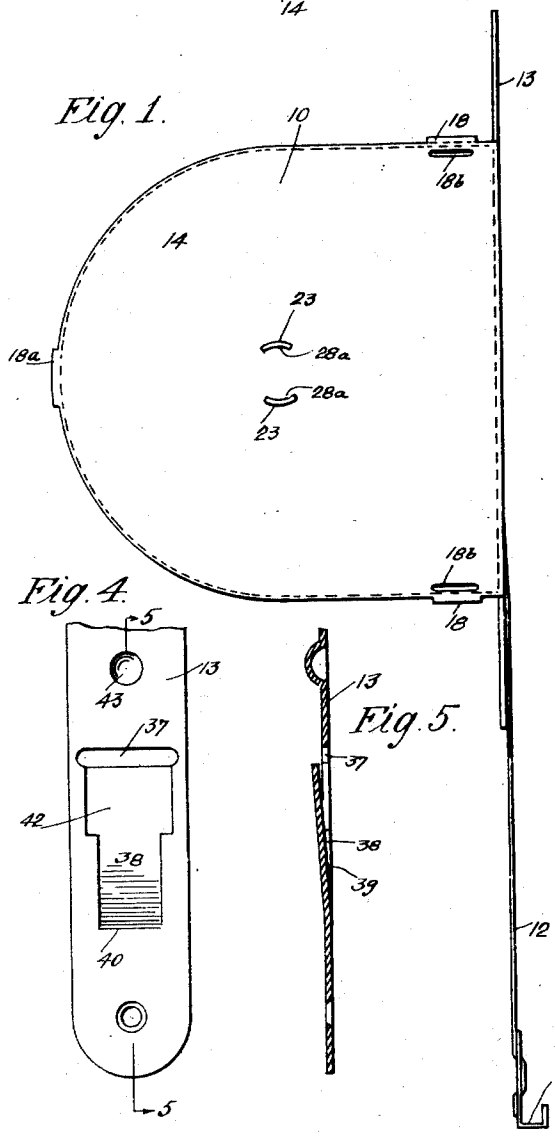


Fig. 3.

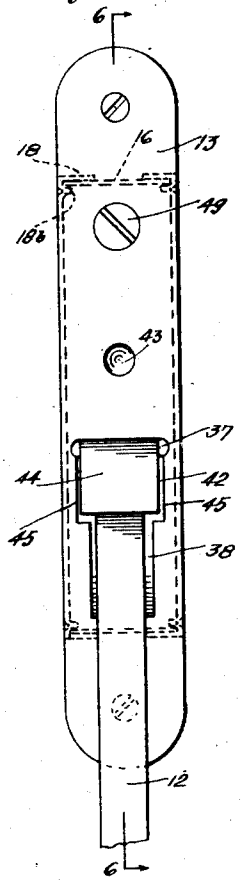


Fig. 4.

Fig. 5.

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Fig. 6.

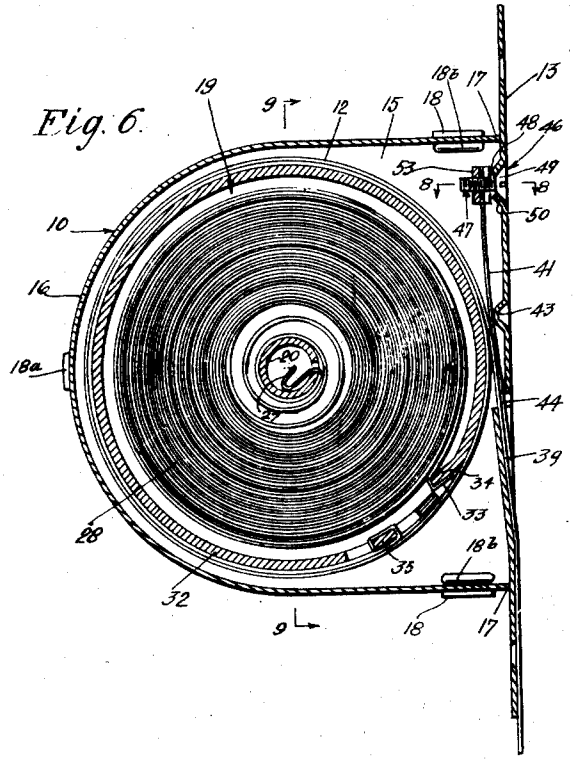


Fig. 9.

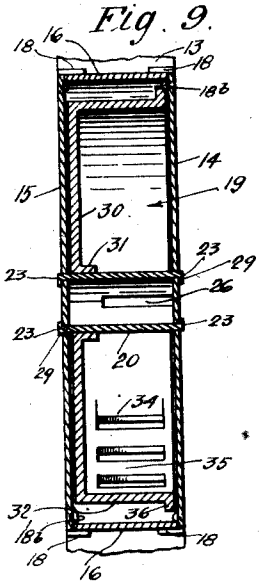


Fig. 8.

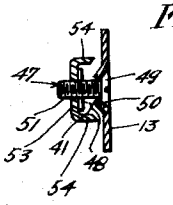


Fig. 10.

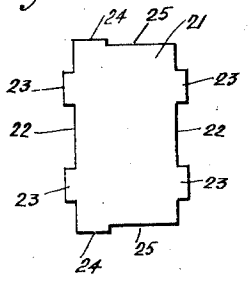
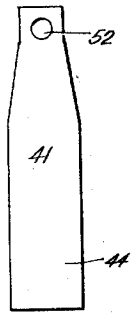


Fig. 7.



Inventor.
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Patented Jan. 15, 1929. 1,699,267

UNITED STATES PATENT OFFICE.

JAMES P. APPLEBY, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO FRANK GRAVES SASH, DOOR AND MILL COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

SASH BALANCE.

Application filed April 20, 1926. Serial No. 103,247.

This invention has to do with sash balances of the type embodying a spring-actuated drum or pulley mounted within a housing carried by a window casing, there being a flexible, metallic band wound about the drum and extending into connection with the window sash.

The general operation and utility of this type of balance, as well as its superiority over usual cord and weight balances, are well known to those skilled in the art, and therefore call for no discussion here.

It is among the objects of the present invention to provide a balance of the above-described type which shall have such structural characteristics that it may be manufactured and installed with comparative ease and low cost.

It is a further object of the invention to provide a novel, adjustable brake for spring-actuated sash balances, whereby, though the potential tension of the actuating spring is sufficient to balance sash of relatively great weight, the effective tension of the spring may be reduced so it is adapted to balance sash of lesser weight. By reason of this provision, a given balance may be adjusted to take sash of different weights, thus eliminating the necessity of manufacturing and stocking a large number of balances having different spring characteristics. The economic advantage of this is self-evident.

The structural characteristics of the device, whereby the above results are obtained, may be discussed to better advantage in the following detailed description, wherein further objects and novel features of the invention will be made apparent. Reference will be had to the accompanying drawings in which—

Fig. 1 is a side elevation of a balance embodying my invention;

Fig. 2 is a top plan view of Fig. 1;

Fig. 3 is an elevation of Fig. 1, as viewed from the right thereof;

Fig. 4 is a fragmentary elevation, similar in part, to Figure 3, but showing the sash supporting band and friction brake omitted;

Fig. 5 is a section on line 5—5 of Fig. 4;

Fig. 6 is a section on line 6—6 of Fig. 3;

Fig. 7 is a detached elevation of the brake spring or lever;

Fig. 8 is a section on line 8—8 of Fig. 6;

Fig. 9 is a section on line 9—9 of Fig. 6;

Fig. 10 is a developed view of an axle used in connection with the device, showing how this axle is made up of a flat metal sheet.

In view of the fact that the general operation and mode of attachment of spring actuated sash balances are well known to those skilled in the art, I have omitted a showing of the balance in mounted position; it being understood that housing 10 is inserted in a pocket at the side of a window casing (not shown) and that the hook or attachment member 11 at the end of sash supporting band 12 is adapted to be secured in any suitable manner to a vertically movable window sash (not shown).

In the preferred embodiment of my invention, housing 10 is made up of a single sheet of metal, this sheet being bent to provide an elongated face plate or escutcheon 13 and a pair of spaced side plates 14 and 15 extending at substantially right angles from the face plate. Completing the housing is a U-shaped strap 16, preferably made of somewhat springy metal so it need merely be cut to length and width from flat stock and then sprung to shape at time of attachment. The strap fits between side plates 14, 15, retaining ears 18^a being bent angularly from the side plates and engaging the arcuate portion of the strap to hold its ends 17 in contact with the rear side of plate 13, and retaining ears 18 being bent angularly from the side plates and over the leg portions of the strap to hold them from springing out of position. It will be noted the strap substantially follows the outline of the side plates. Preferably, lugs or projections 18^b are struck inwardly from the side plates to prevent the leg portions from being pressed inwardly too far, and with the lugs and ears 18 in the opposed relation shown, the ears and lugs are adapted to clamp the strap legs between them and insure the strap against accidental dislodgement.

A spring-actudated drum or pulley 19, is mounted for rotation about a stationary axle 20, the latter extending between and being terminally supported by side plates 14 and 15. I have shown an axle which is particularly well adapted for installation in the housing of a sash balance, and will proceed to describe it in some detail, although it will be understood that such claims as do not specify this particular type

of axle are not to be construed as in any way limited by this description. The stock of which the axle is made consists of a metal stamping 21 punched to the shape shown in Fig. 10 from sheet stock. This stamping is substantially rectangular in outline, the opposite edges 22 being fashioned to provide spaced, opposed lugs 23. The opposite edges 24 are notched partially along their longitudinal extent to provide alined notches 25, so, when sheet 21 is rolled to form the tubular, cylindrical axle 20, edges 24 are brought into contact while notches 25 are brought into register and combine to form a slot 26 (Fig. 9) which opens to one end, only, of the cylinder, and provides for the reception of anchor-end 27 of actuating-spring 28. Where edges 24 are brought together there is provided a continuous peripheral bearing face to take the drum. This rolling of sheet 21 brings lugs 23 into diametrically opposite relation, as shown in Figs. 1 and 9, the lugs being passed through complementary apertures 28ª in plates 14 and 15 and then spread or headed over at 29 to hold the side plates against separation and therefore hold the housing and pulley in assembly, it being understood that pulley 19 is slipped over the axle before the latter is inserted in the housing. This formation of the axle is desirable in that it calls only for a punching and rolling operation as distinguished over the more costly and difficult process of machining the axle from solid or tubular round stock.

The drum or pulley 19 is preferably cup-shaped, the bottom 30 thereof being centrally punched and pressed in at 31 to provide for mounting it rotatably upon axle 20, at one side of slot 26, the extent of bearing surface gained by the pressed in flange 31 being desirable inasmuch as the cup-shape of the drum prevents it from having bearing on the axle near plate 14 (Fig. 9). It will be noted that side plates 14 and 15 extend beyond the entire periphery of the drum, and therefore no other housing members are necessary to protect completely the sides of the drum.

As mentioned above, one end of actuating spring 28 is connected to axle 20 at 27. The other end of spring 28 is secured in any suitable manner to the annular drum portion 32 of the pulley, for instance, by hooking end 33 of the spring over the in-pressed lug 34.

The flexible, metallic band 12, which comprises the connecting member between balance and sash, is wound about pulley 19, the inner end of the band being secured to the pulley in any suitable manner, for instance, by bending it about bar 35. Preferably, pulley 19 has an external flange 36 to prevent the band from running off the edge thereof.

Face plate 13 has a horizontal or transverse slot 37 through which band 12 is adapted to be led from pulley 19, the face plate preferably being depressed or bent inwardly to provide a channel or groove 38 to guide the band. The bottom face 39 of the channel is preferably inclined, so, projected, it is substantially tangential with respect to the pulley and merges into the vertical face of the face plate at 40 so band 12 is not sharply bent as it passes from the pulley to the channel and from the channel to the vertical face of escutcheon 13. Bottom face 39 becomes, in effect, a friction face which inclines downwardly and outwardly from slot 37, band 19 being adapted to be held between this face and an adjustable brake member 41, with varying degree of pressure.

Preferably, the channel 38 is widened adjacent slot 37 to provide a brake receiving recess 42. Adjustable friction brake 41 is disposed within the housing, but is adjustable to vary its braking effect by a control member operable from the outside of the housing. The brake consists of a lever, preferably a tempered steel spring, which is fulcrumed intermediate its ends on a boss or lug 43, which is pressed inwardly from face plate 13. That portion 44 of the spring lever which extends below fulcrum 43 comprises the shoe of the brake and this shoe engages band 12 where it passes through the brake recess. The inclination of face 39 is such that the combined thickness of band 12 and shoe 44, where they lie together in recess 42, is less than the depth of said recess, it following that the shoe does not project beyond the vertical face of plate 13 and therefore is prevented from interfering with the sash when the latter is moved. The side defining walls 45 of recess 42 hold shoe 44 against shifting laterally, and shoe 44 is preferably of appreciably greater width than band 12 so it overlies both side edges of the band to hold it within channel 38, overcoming any tendency the band may have to ride up the side walls of channel and become curled along its edges.

An adjustable connection between the upper end of spring lever 41 and plate 13 is indicated generally at 46. This connection consists of a controlling member in the form of screw 47 which projects through aperture 48 in plate 13, the slotted head 49 of its screw lying in counter sink 50 of the face plate so it is substantially flush with the forward face of said plate, and its threaded shank 51 extending through aperture 52 in spring lever 41. A nut 53 is threaded on this screw shank over spring 41 and has side flanges 54 (Fig. 8) adapted to engage opposite edges of the spring lever to hold the nut against rotation with respect to the screw. Therefore, by rotation of a suitable tool applied to the slotted head of the screw, the nut is moved longitudinally along the screw, the

inherent spring characteristics of the lever tending always to hold head 49 within counter sink 50 since said spring is normally bent somewhat about fulcrum point 43. When screw 49 is rotated to move the nut, and hence the upper end of the spring lever, towards plate 13, shoe 44 is pressed with greater force against band 12 where the latter runs over the inclined friction face, the shoe thus having the effect of reducing the effective tension of the spiral actuating spring 28 so the latter will balance a sash of relatively lighter weight than before. Of course, by rotating screw 47 so nut 53 moves away from the face plate, the upper end of the spring lever follows the nut, and screw 44 presses to a lesser extent on band 12, allowing the effective tension of the spiral actuating spring to approach its potential tension and therefore rendering it competent to balance a sash of relatively greater weight.

It will be understood the drawings and description are to be considered merely as illustrative of and not restrictive on the broader claims appended hereto, for various changes in design, structure and arrangement may be made without departing from the spirit and scope of said claims.

I claim:

1. In a sash balance, a housing having an elongated face plate, a drum journaled within the housing, a flexible sash-supporting band connected to and wound about the drum, said plate having a transversely extending slot through which the band is led from the drum, means adapted to revolve the drum to take up the flexible band, a friction face on the face plate and inclining downwardly and outwardly from the slot and adapted to take the band when it leaves the slot, a brake member disposed within the housing and embodying a lever fulcrumed intermediate its ends, the lever, at one side of its fulcrum, being adapted to engage the band where it runs over the inclined face, and an adjustable connection between the housing and the lever, at the other side of its fulcrum, whereby the lever is adapted to be moved about its fulcrum to engage the band with varying force.

2. In a sash balance, a housing having an elongated face plate, a drum journaled within the housing, a flexible sash-supporting band connected to and wound about the drum, said plate having a transversely extending slot through which the band is led from the drum, means adapted to revolve the drum to take up the flexible band, a friction face on the face plate and inclining downwardly and outwardly from the slot and adapted to take the band when it leaves the slot, a brake member disposed within the housing and embodying a lever fulcrumed intermediate its ends on the face-plate, the lever, at one side of the fulcrum, being adapted to engage the band where it runs over the inclined face, and an adjustable connection between the housing and the lever, at the other side of its fulcrum, whereby the lever is adapted to be moved about its fulcrum to engage the band with varying force.

3. In a sash balance, a housing having an elongated face plate, a drum journaled within the housing, a flexible sash-supporting band connected to and wound about the drum, said plate having a transversely extending slot through which the band is led from the drum, means adapted to revolve the drum to take up the flexible band, a friction face on the face plate and inclining downwardly and outwardly from the slot and adapted to take the band when it leaves the slot, a brake member disposed within the housing and embodying a spring fulcrumed intermediate its ends, the spring, at one side of its fulcrum, being adapted to engage the band where it runs over the inclined face, and an adjustable connection between the housing and the spring, at the other side of its fulcrum, whereby the spring is adapted to be moved about its fulcrum to engage the band with varying force; said adjustable connection embodying a screw extending through the face plate with its head at the outside of the plate and its shank extending through the spring, a nut threaded on the shank at the side of the spring opposite the face plate, and means adapted to hold the nut against rotation.

4. In a sash balance, a housing having an elongated face plate, a drum journaled within the housing, a flexible sash-supporting band connected to and wound about the drum, said plate having a transversely extending slot through which the band is led from the drum, means adapted to revolve the drum to take up the flexible band, a friction face on the face plate and inclining downwardly and outwardly from the slot and adapted to take the band when it leaves the slot, a brake member disposed within the housing and embodying a lever fulcrumed intermediate its ends, the lever, at one side of its fulcrum, being adapted to engage the band where it runs over the inclined face, and an adjustable connection between the housing and the lever, at the other side of its fulcrum, whereby the lever is adapted to be moved about its fulcrum to engage the band with varying force; said adjustable connection embodying a screw extending through the face plate with its head at the connection embodying a screw extending through the lever, a nut threaded on the shank at the side of the spring opposite the face plate, and means on the nut adapted to coact with the lever to hold the nut against rotation with respect to the screw.

5. In a brake for attachment to the face

plate of a sash balance housing, a lever extending substantially parallel to and fulcrumed intermediate its ends on the face plate, a shoe portion on the lever at one side of its fulcrum, and an adjustable connection between the plate and the lever at the other side of its fulcrum whereby the lever is adapted to be moved about its fulcrum to shift the shoe portion.

In witness that I claim the foregoing I have hereunto subscribed my name this 8th day of April 1926.

JAMES P. APPLEBY.

CERTIFICATE OF CORRECTION.

Patent No. 1,699,267. Granted January 15, 1929, to

JAMES P. APPLEBY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 124, claim 4, strike out the words "connection embodying a screw" and insert instead "outside of the plate and its shank"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of February, A. D. 1929.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)