April 26, 1927. 1,626,018

A. L. WAGNIERE

SASH BALANCING DEVICE

Filed Jan. 18, 1923

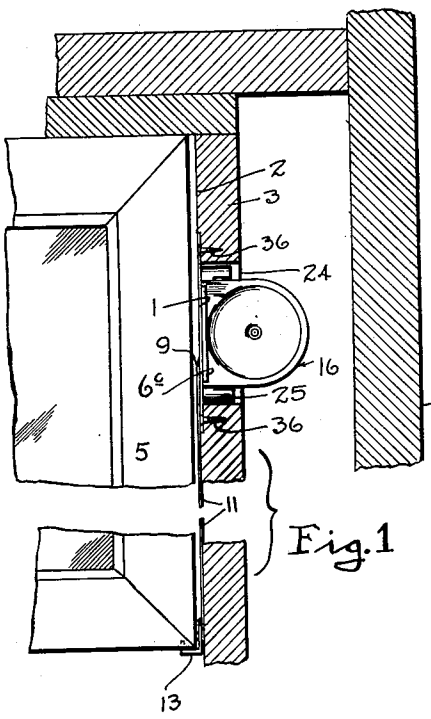


Fig. 1

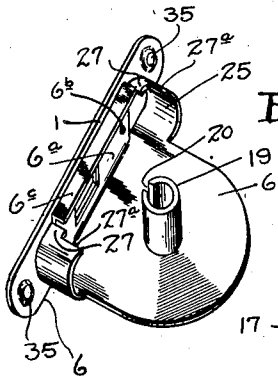


Fig. 5

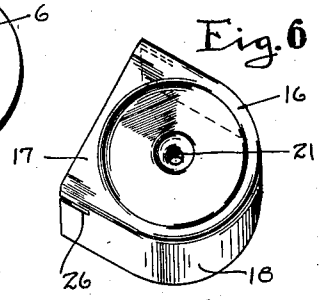


Fig. 6

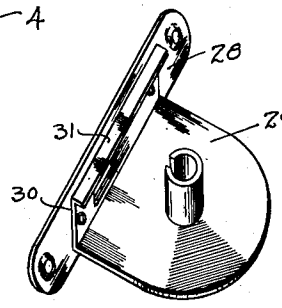


Fig. 7

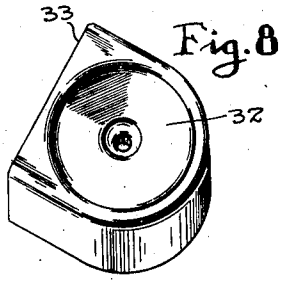
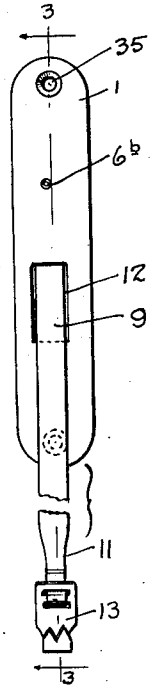


Fig. 8

Fig. 2



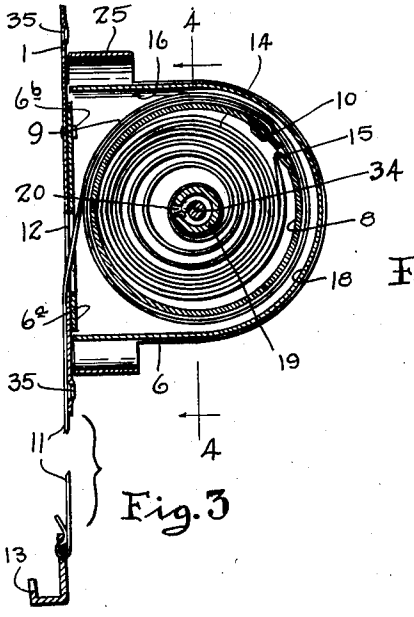


Fig. 3

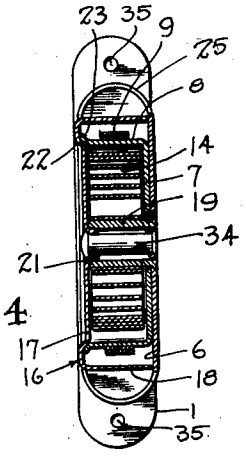


Fig. 4

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Patented Apr. 26, 1927. 1,626,018

UNITED STATES PATENT OFFICE.

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SASH-BALANCING DEVICE.

Application filed January 18, 1923. Serial No. 613,514.

This invention relates to a sash balancing device such as is employed to balance a window sash sliding in a window casement. In their construction these devices usually employ a spring-actuated pulley on which a flexible band wraps, the end of the band being attached to the sash. The casing of the balancing device includes side plates and there is a tendency for these side plates of the casing to interfere with the free rotation of the pulley. The general object of the present invention is to provide a simple construction for a device of this kind in which the pulley will be guided in its rotation, but in which it will be perfectly free to rotate; also to provide a simple construction for the casing which will enable it to be formed of two separable parts which are adapted to interlock by a simple movement, and giving rigidity to the face plate.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient sash balancing device.

A preferred embodiment of the invention is described in the following specification while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Figure 1 is a vertical section taken through the upper portion of a window casement and showing a portion of a sash, certain parts being broken away, and illustrating how the device is mounted in the casement and attached to the sash.

Fig. 2 is a front elevation of the device showing the face plate with a flexible band extending therethrough and broken away. This view is upon an enlarged scale as compared with Figure 1.

Fig. 3 is a vertical section through the device taken on line 3—3, of Figure 2.

Fig. 4 is a vertical cross section through the device taken on the line 4—4 of Figure 3.

Fig. 5 is a perspective showing one of the casing sections with the other parts removed.

Fig. 6 is a perspective of the cover section of the casing.

Fig. 7 is a view similar to Figure 5 but illustrating a modified embodiment of the invention.

Fig. 8 is a perspective of the cover section of the casing which is constructed to cooperate with the casement section illustrated in Figure 7.

In practicing my invention I provide a face plate 1 which is constructed to be countersunk into the face 2 of the vertical wall 3 of a casement 4, the same carrying a vertically sliding sash 5. This face plate carries a side plate 6 which, if desired, may be made integral with it.

The pulley of the device has a disc or disc body 7 with an integral circumferential rim 8 of substantially cylindrical form. The disc 7 lies adjacent the side plate 6 and the pulley is mounted to rotate. On the outer face of the rim 8 of the pulley a flexible band 9 is wrapped, the inner end of which is attached at 10 on the pulley and the outer end 11 of this band extends through an opening 12 in the face plate and is provided with a hook 13 or similar means for securing the same to the sash 5.

Within the pulley I provide a spring, preferably in the form of a spiral spring 14, the inner end of which is held fixed in any suitable manner while the outer end is attached at 15 to the pulley so that this spring exerts a rotary force on the pulley tending to balance the weight of the sash.

The casing also includes a cover section 16, see Figure 6, which includes a plate form body 17 and a flange 18 projecting laterally. The device also preferably includes a centrally disposed arbor 19 which may be of tubular form and provided with a slot 20 to engage the inner end of the spring 14. One end of this arbor may be secured to the center of the side plates 6 by riveting or similar means.

The cover section is preferably provided with means such as an integral button 21 which will engage the end of the arbor when the cover section is in position. This button, if desired, may be simply formed by offsetting the central portion of the plate 17 inwardly, see Figure 4.

On the inner face of the cover section 16 I also provide means for engaging and guiding the edge of the pulley rim 8, and this

is preferably accomplished simply by dishing or offsetting the central portion of the plate 17 inwardly, thereby forming an annular inwardly projecting shoulder 22, the inner face of which operates as a centering seat for the edge of the pulley rim 8 which, if desired, may be bent outwardly to form a projecting lip 23 to go upon this shoulder.

The ends of the slot 24, which is cut in the casement to receive the device are frequently of half-round form, and in order to adapt the casing to fit neatly in the ends of these slots I may construct the casing with concavo-convex extensions 25, see Figure 5. These extensions may be made integrally with the side plate 6 and simply bent up to the desired shape, so that they lie adjacent to the face plate. I also prefer to construct the cover section in such a way that if it is moved toward the face plate, it will interlock with the body section of the casing. With the form of the casing shown in Figure 5 I accomplish this by providing slots 26 in the cover section 16. These may be placed in the plate body 17 or in the edges of the flange 18 as illustrated. These slots receive projecting tongue portions 27 of the extensions 25 when the cover section is moved toward the face plate 1, and the edges 27^a of these extensions engage the outer faces of the flange 18. The side plate 6 is formed with an integral web 6^a that is secured by rivets 6^b against the inner side of the face plate 1; and this web has an integral flange 6^c that projects over and engages the edge of the cover plate 17.

If it is not desired to give the casing the round extensions 25 at its upper and lower sides, the casing may be constructed as illustrated in Figures 7 and 8. In this instance the face plate 28 is also constructed as a distinct part from the side plate 29, and the side plate 29 may be provided with an integral web 30 secured to the inner side of the face plate and the web 30 has a flange 31. The cover section 32 would then have substantially the same form as that illustrated in Figure 6 except that the slots 26 are omitted, but the two sections of the casing may be interlocked in the same way, that is to say, by moving the cover section 32 bodily toward the face plate. When this is done, the flange 31 should project over and fit closely upon the adjacent edge 33 of the cover section, see Figure 8. In this way the flange interlocks with the side wall of the cover section and assists in holding the parts of the casing in their proper relation.

With this form of the casing, the other parts of the device would have the same construction and relation already described in connection with Figures 1 to 4 inclusive.

I provide means located at the arbor 19 for securing the cover section to the body section of the casing, and this means is preferably in the form of a bolt or rivet 34 which passes through the tubular arbor, see Figure 4. The face plate is provided with openings 35, see Figure 5, which enables screws 36 to be applied to attach the device to the window casement.

The casing section 16 is constructed so that the edge of its flange 18 rests against the inner face of the side plate 6 when the cover section is in place, see Figure 4. This flange therefore limits movement of the cover section 32 toward the side plates 29 and prevents the plate portion 17 of the cover section from being forced against the pulley in such a way as to interfere with its rotation. Such an inward movement of the plate portion 17 is also prevented by the arbor 19 which operates as a distance piece between the side plates of the casing.

It is evident that the engagement between the shoulder 22 and the lip 23 and also the engagement between the disc 7 and the side plate 6 will develop a certain amount of friction which, though not interfering with the free rotation of the pulley in operation, will be sufficient to insure that the sash will remain at any point in which it is left, and in addition to this of course the flexible band, extending as it does between the sash and the side of the casement, will offer some frictional resistance. These resistances assist in holding the sash at any point to which it may be raised or lowered.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take and I do not wish to be limited in the practice of my invention nor in my claims to the particular embodiment set forth.

What I claim is:

1. In a sash balancing device, the combination of a face plate having a side plate extending therefrom, a pulley having a disc with a central opening, lying against and frictionally engaging the side plate and having a cylindrical rim projecting from the disc, a tubular arbor attached to the side plate and passing through the said central opening of the disc, a spring within the pulley having its inner end attached to the arbor and having its outer end attached to the pulley to exert rotary force upon the pulley, a cover plate frictionally engaging the said cylindrical rim and having a body with a centrally disposed button engaging the end of the bore of the arbor, operating to center the arbor, and having a flange extending toward the side plate, means located at the arbor for securing the cover plate in position, and a flexible band wrapped on the outer face of the pulley, said face plate having an opening through which the end of the band extends for attachment to the sash.

2. In a sash balancing device, the combination of a face plate having a side plate extending therefrom, a pulley having a disc with a central opening, frictionally engaging the side plate and having a cylindrical rim projecting from the disc, an arbor attached to the side plate and passing through the said central opening of the disc, a spring within the pulley having its inner end attached to the arbor and having its outer end attached to the pulley to exert rotary force upon the pulley, a cover plate having an annular shoulder for centering, frictionally engaging and guiding the edge of the rim of the pulley, means located at the arbor for securing the cover plate in position, and a flexible band wrapped on the outer face of the pulley, said face plate having an opening through which the end of the band extends for attachment to the sash.

3. In a sash balancing device, the combination of a face plate having a side plate extending therefrom, a pulley having a disc with a central opening, frictionally engaging the side plate and having a cylindrical rim projecting from the disc, an arbor attached to the side plate and passing through the said central opening of the disc, a spring within the pulley having its inner end attached to the arbor and having its outer end attached to the pulley to exert rotary force upon the pulley, a cover plate having a centrally disposed button engaging the end of the arbor and having an offset annular shoulder frictionally engaging, centering, and guiding the edge of the rim of the pulley, means located at the arbor for securing the cover plate in position, and a flexible band wrapped on the outer face of the pulley, said face plate having an opening through which the end of the band extends for attachment to the sash.

4. In a sash balancing device, the combination of a face plate having a side plate extending therefrom, a pulley having a disc with a central opening, frictionally engaging the side plate and having a cylindrical rim projecting from the disc, a tubular arbor attached to the side plate and passing through the said central opening of the disc, a spring within the pulley having its inner end attached to the arbor and having its outer end attached to the pulley to exert rotary force upon the pulley, a cover plate having a centrally disposed button in the form of a flange projecting into the end of the bore of the arbor, said cover plate further having a flange extending toward the side plate and having an offset circumferential shoulder for centering, frictionally engaging and guiding the edge of the pulley rim, means located at the arbor for securing the cover plate in position, and a flexible band wrapped on the outer face of the pulley, said face plate having an opening through which the end of the band extends for attachment to the sash.

5. In a sash-balancing device, the combination of a casing having a body section consisting of a face plate and a side plate extending therefrom, an arbor extending from the side plate, a pulley on the arbor, a spring within the pulley having its inner end fixed and its outer end attached to the pulley to exert rotary force upon the pulley, a flexible band wrapped upon the pulley, said face plate having an opening through which the end of the band passes for attachment to the sash, said casing also having a cover section with means for engaging the end of the arbor, said body section of the casing and said cover section having means for interlocking the same together when the cover section is moved bodily toward the plane of the face plate.

6. In a sash balancing device, in combination, a casing body section consisting of a face plate and a side plate extending therefrom, said side plate having bent extensions of concavo-convex form adjacent the face plate to conform to the ends of a slot in a window casement, a casing cover section comprising a plate body and a flange extending therefrom, said cover section having slots cut therein to receive portions of the said extensions of said side plate whereby the two sections of the casing may be interlocked by a bodily movement of the cover section toward the face plate.

7. In a sash balancing device, in combination, a casing body section consisting of a face plate and a side plate extending therefrom, said side plate having bent extensions of concavo-convex form adjacent the face plate to conform to the ends of a slot in a window casement, a casing cover section comprising a plate body and a flange extending therefrom, said cover section having slots cut therein to receive portions of the said extensions of said side plate whereby the two sections of the casing may be interlocked by a bodily movement of the cover section toward the face plate, an arbor carried by the said side plate, a pulley rotatably mounted on the arbor, a spring disposed within the pulley with its inner end attached to the arbor and its outer end attached to the pulley to exert a rotary force thereupon, and a flexible band wrapped upon the pulley, said face plate having an opening through which the end of said band extends for attachment to the sash.

8. In a sash balancing device, in combination, a face plate, a side plate having an integral web secured to the inner face of the face plate, a pulley rotatably mounted on the side plate, a cover plate opposite the side plate, cooperating with the side plate and face plate to form the casing of the de-

vice means for securing the cover plate to the side plate through the center of the pulley, a spring disposed within the pulley exerting a force to rotate the same, and a flexible band wrapped on the outer face of the pulley, said face plate having an opening through which the end of the band extends for attachment to the sash, said web having a flange engaging said cover plate when the same is attached to the side plate.

Signed at Los Angeles, California, this 9th day of January, 1923.

AUGUST L. WAGNIERE.