March 27, 1956 H. R. DICKINSON 2,739,344

WINDOW BALANCE

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Fig. 2.

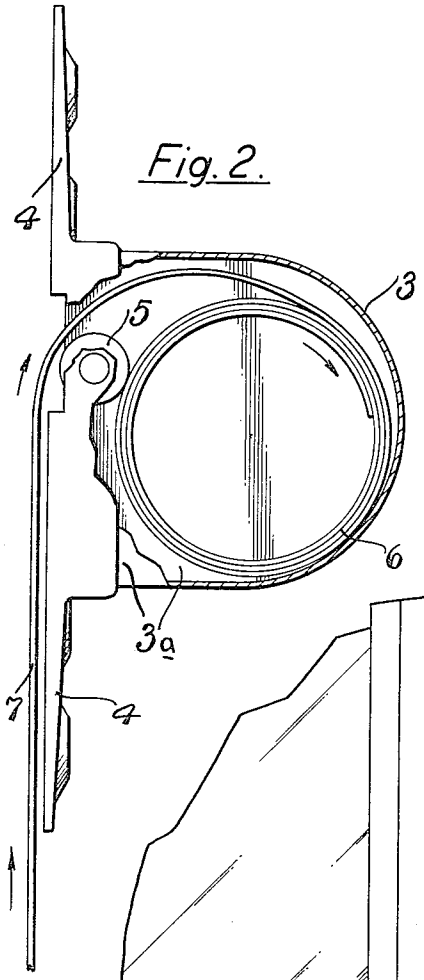


Fig. 3.

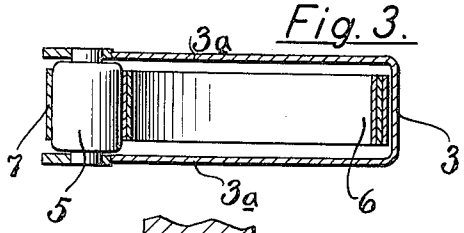


Fig. 1.

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WINDOW BALANCE

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1 Claim. (Cl. 16—197)

The present invention relates to window sash balances, being concerned with a self-winding spring balance, which has greater weight holding ability than previously for any given spring, tends to equalize differences in weight holding ability of any given spring at different points of its extension, and which prevents edge fraying of the spring and consequent early failure thereof in its use, which has greatly reduced its effective life.

It is an object and purpose of the invention to provide a practical, novel and very effective spring window balance in a coiled band spring structure, the unwound portion of the coiled band spring balancing or partially balancing the weight of a window sash to which it is secured, and the window sash when lifted having at least a part of its weight overcome through an automatic winding of the spring. When the sash is lowered a novel braking or clutching action between the extended spring and the coiled portion thereof, through the interposition of a roller between them, greatly reduces the tendency of the spring to unwind under the weight of the window, but when the window is moved upwardly, and its weight taken from the spring, the interposed roller revolves freely and is ineffective as a brake, the spring helping to lift the weight of the window.

An understanding of the invention may be had from the following description taken in connection with the accompanying drawing, in which,

Fig. 1 is a partial elevation and vertical section showing the application of my invention to a sliding window sash.

Fig. 2 is a similar partial side elevation and vertical section showing the action of the spring when the window sash weight is removed therefrom, as in lifting a window sash, Fig. 1 showing the roller acting as a brake when the sash is lowered, and

Fig. 3 is a generally horizontal section substantially on the plane of line 3—3 of Fig. 1, looking downwardly.

Like reference characters refer to like parts in the different figures of the drawing.

The environment in which my invention is used includes a window frame which has vertical side members **1**, and which will be supplied with the usual vertical guides for window sashes. For a sash, an opening **2** is cut through the side member **1** of the window frame and a spring balance unit of my invention is installed at said opening, the housing **3** having preferably an inner substantially semi-circular side, and which encloses the coiled band spring inserted through the opening **2** as shown in Fig. 1. Such housing is connected to a base member **4** having projecting ends which lie against or are inset at the inner side of the frame member **1** and are secured by screws or other permanent fastenings.

The base plate **4** to which the housing **3** is secured is open at its vertical side or has an opening therein adjacent the upper end thereof. A roller **5** is mounted to turn about a horizontal axis between opposite sides of the housing. The roller is mounted on and between opposed parallel vertical sides **3a** of the housing **3**.

Between said roller and the inner portion of the housing a coiled band spring **6** is located, against the semi-circular inner side of the housing. The center of the spring **6** is below roller **5**, as shown. Such spring is of a self-winding type, the coils of the spring closely engaging or hugging each other and each of the coils, if free to do so, would take a smaller diameter than in the wound spring. When the spring is pulled out force is required to pull and unwind it. When free of such force, the spring automatically rewinds with successive coils of the springs closely and tightly engaging each other.

The outer free end portion of the spring is carried over the roller **5** and extends downwardly in a section **7** which lies against a vertical edge portion of a window sash **8**, the terminal portion of the section **7** being turned inwardly underneath the lower edge of the window sash **8** and permanently secured thereto.

If a lower window sash is in an upper position, that is, the sash is open, when the sash is moved downwardly to close the window the spring engages against the upper outer portion of the roller **5**. Such roller, substantially diametrically opposite, engages against the outermost coil of the spring **6** at the roller. This causes the roller to act as a brake. The roller does not turn but the spring is moved slidably over it with attendant frictional resistance to the downward movement of the window. Accordingly, if the sash is open, any tendency for it to move downwardly by gravity is overcome and checked by reason of the engagement of the roller at one side against the wound spring coils at **6** and at the opposite side with the drawn out extension **7** which passes over the roller.

When the window sash is lifted, that is, when it is opened, the section **7** first springs upwardly to be entirely free of the roller **5**, as in Fig. 2, and the coils of the spring automatically self-wind, the roller **5** rotating freely.

It is of course to be understood that inasmuch as a self-winding band spring when unwound will normally have the unwound portion take a dished position, that is, be concave at its inner side transversely of the spring, the roller **5** may be made to conform to such natural concave shape of the spring if desired, its surface conforming to the concavity of the spring. This is a matter of choice in conjunction with the shape of the roller for controlling more or less the braking action of the roller upon the spring when the window sash is moved downwardly.

In practice one of the window balancing springs, constructed, mounted and assembled with the window as described, is located at each vertical side edge of the window sash and it may be used with either or both an upper or lower sash in a window.

When the lower sash is in lower position, the outer section **7** of the spring pulled from the drum is under a continuous strain such that when the window sash is moved upwardly the spring automatically rewinds and aids in lifting the weight of the window sash.

With the structure described, a greater weight holding ability for any given spring follows by reason of the brake applied so that in addition to the resistance of the spring to a window sash moving downwardly there is the braking action, thus the spring may be used with window sashes of greater weights than could otherwise be used if such braking structure was not present.

The window sash when lifted to any given position will be maintained in such position. Moreover, the edge portions of the spring are not rubbed against the window frame vertical side members **1**. All rubbing frictional contact with any part of the window structure is eliminated, thereby eliminating all wear of the spring particularly at its longitudinal edges which has heretofore occurred in practice, shortly resulting in thinning or splintering the spring band at such edges with a rapid deterioration and destruction of its usefulness. The

spring band is, preferably, of tempered steel which will yield to force but returns to original form when the force is removed and is capable of sustaining strains which does not exceed the elastic limit of the spring material.

The invention is defined in the appended claim and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

A window balance comprising, a housing having spaced parallel vertical sides and a generally semi-circular inner side, said housing having an opposite outer vertical side with an opening therethrough, a roller mounted to turn on a horizontal axis located across said opening in the outer side of said housing, above a horizontal plane disposed midway between the upper and lower sides of said housing, and a self-winding coiled spring having a coiled portion within said housing, having an end portion extending through said opening above said roller and thence downwardly in a generally vertical direction, the coiled portion of said spring within the housing bearing at generally opposite sides against said roller and semi-circular portion of the housing, respectively, above and below the center of said coiled spring portion.

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