Nov. 9, 1937. D. ROSENTHAL 2,098,634

SASH BALANCE

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Fig. 1.

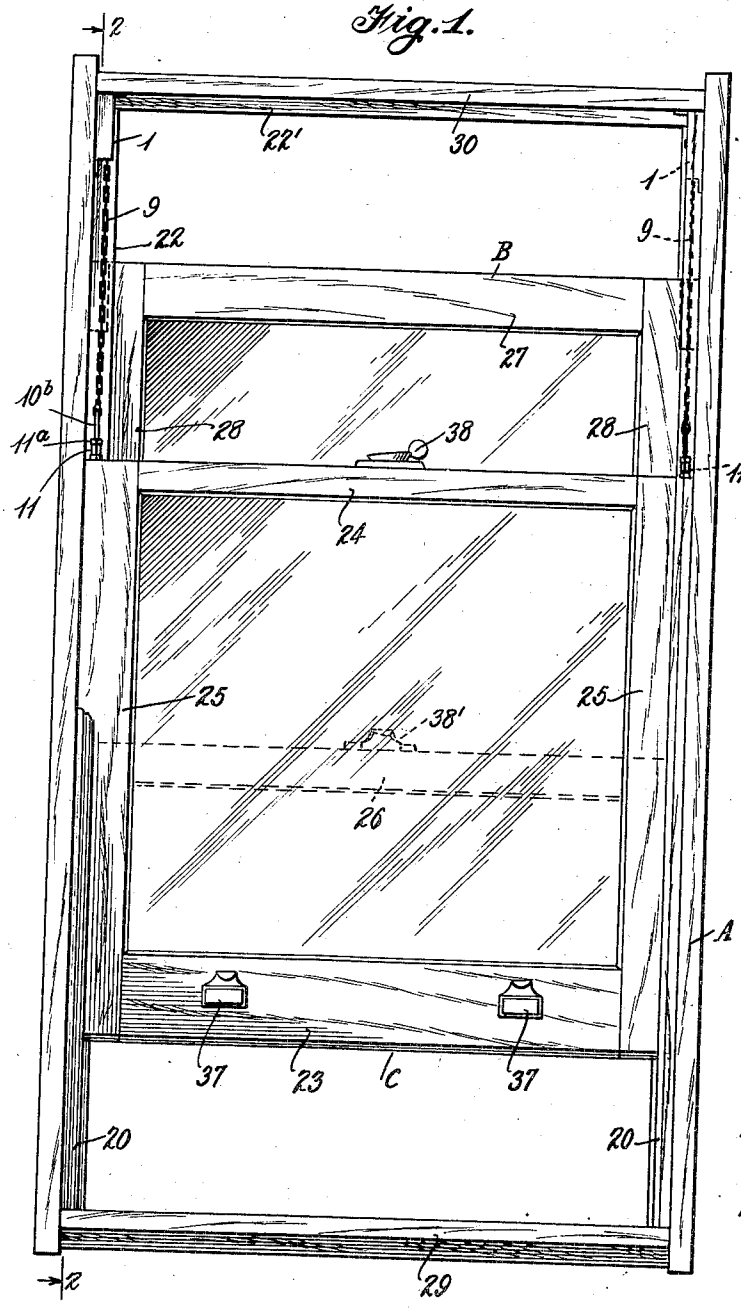
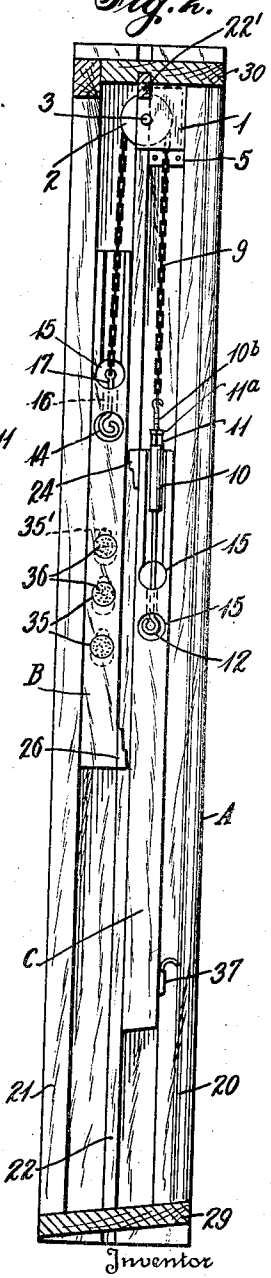


Fig. 2.



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Fig. 3.

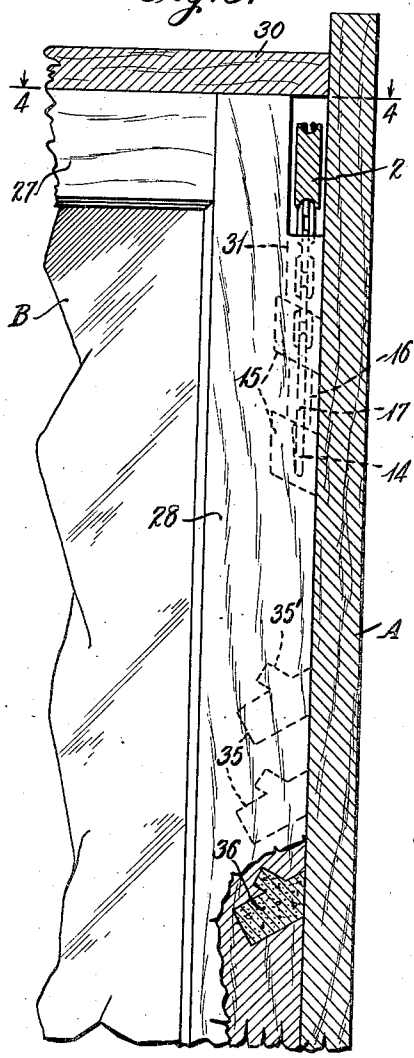


Fig. 5.

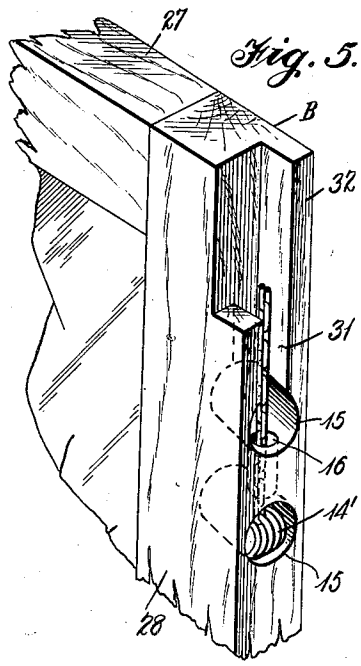


Fig. 6.

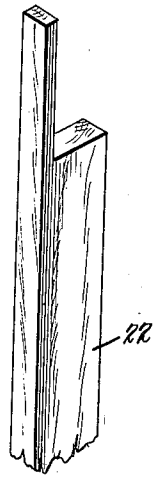


Fig. 7.

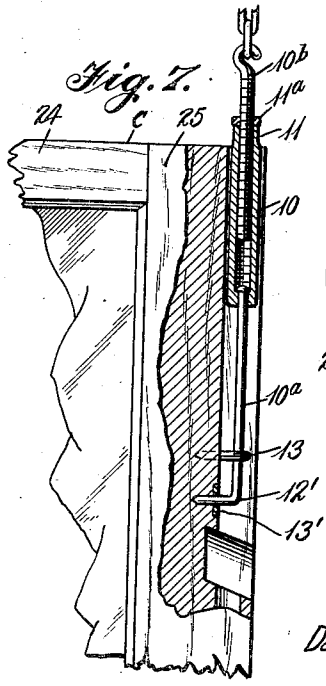


Fig. 8.

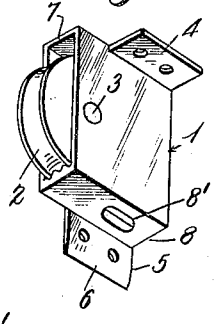
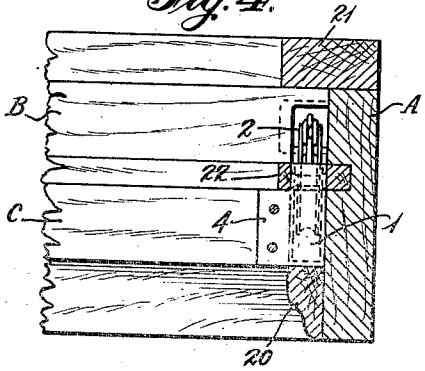


Fig. 4.



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2,098,634

SASH BALANCE

David Rosenthal, Ellenville, N. Y.

Application April 11, 1935, Serial No. 15,917

5 Claims. (Cl. 16—215)

This invention relates to an improved window frame and sash balances therefor wherein a pair of window sashes are movable in balancing relation to one another.

It is the object of the invention to provide a rugged pulley unit for the operation of double window sashes which is simple and economical in construction and which may be applied easily to existing old window frames as well as to new ones. It is a feature of the invention to apply this pulley unit to the window frame without the necessity of any time-consuming tool-working operations. Furthermore, this pulley unit is mounted in the frame so that it acts as a stop for one of the window sashes. Despite this function, the unit is adequately braced in the frame and it maintains its fixed mounting during the life of the frame.

It is a further object of the invention to provide a novel adjusting arrangement for the suspension of the window sashes in order to assure a complete closure thereof in their end positions. This adjustment may be made by means of an exposed member, requiring no removal of the sashes from the window frame. This adjustment may be made initially for compensating for inaccuracies and irregularities in the manufacture of the sash balance sashes and flexible member and for lost motion therein. Also, during the use of the window, the adjusting device serves to compensate for the wearing of the moving parts.

It is a further object of the invention to arrange the pulleys on the window frame so that the assembly presents a compact and pleasing appearance affording no exposed places for the ready accumulation of dirt and dust. Also in the closed position of the window sashes no pulleys are visible, merely the prismatic casings enclosing them.

It is a further object of the invention to provide a novel balancing arrangement for one sash against the other wherein the balancing ballast is invisible and is disposed symmetrically.

It is a further object of the invention to provide a sash balance requiring no additional head space above the top of the head jamb nor on the sides of the frame for the pulleys. The sash operating mechanism requires no drilling of holes from the inside to the outside of the frame and therefore no loss of heat or cold takes place, and undesirable drafts and atmospheric conditions are eliminated.

Other objects and purposes will appear from a more detailed description of the invention hereinafter set forth taken in conjunction with the accompanying drawings wherein:

Fig. 1 is a front elevation of the window frame assembly showing the window sashes in partly open position,

Fig. 2 is a longitudinal sectional view along line 2—2 of Fig. 1,

Fig. 3 is a front elevation of a portion of the upper end of the window frame showing the top sash in its closed position,

Fig. 4 is a horizontal sectional view along line 4—4 of Fig. 3,

Fig. 5 is a perspective view of the upper window sash shown in Fig. 3,

Fig. 6 is a perspective view of the parting strip shown notched at its upper end for accommodating the pulley unit,

Fig. 7 is a front elevation of the upper portion of the lower sash with parts broken away showing details of the adjusting mechanism,

Fig. 8 is a perspective view of my improved pulley unit.

In Fig. 1 is shown a window frame A of the usual construction having sashes B and C slidable therein. The sashes B and C are balanced against each other and are connected for conjoint movement by means of chains 9 connected to the sashes and guided upon opposite sides of the frame A through pulley units 1 mounted at the upper ends on opposite sides of the frame. In view of their balanced condition the sashes B and C remain in their adjusted positions.

The pulley units are shown in detail in Fig. 8, it being understood that one of these is arranged for the mounting upon the right side of the frame while the other is adapted for mounting upon the left side of the frame. Fig. 8 illustrates the pulley unit upon the right side of the frame shown in Fig. 1. In this unit a sheave 2, having a groove upon the periphery thereof for retaining and guiding a flexible member such as a chain or rope or cable is mounted for rotation about a pintle 3 which may be upset in the casing of the unit. Any other suitable mounting for the sheave 2 may be used. The casing is in the form of a rectangular prism having only one open face through which projects a portion of the pulley for guiding the flexible chain 9 in alignment with the upper sash B. An aperture 8' is provided in the lower horizontal face 8 for permitting the passage of the flexible member in alignment with the lower sash C. Attaching flanges 4 and 5 are formed integrally with the casing and extend at right angles to each other for the purpose of attaching each unit to the upper horizontal and vertical

members of the window frame by means of suitable fastening elements such as screws which may be passed through apertures formed therein. Such a mounting of the unit assures a rigid and permanent connection thereof to the window frame. In view of the substantially complete enclosure of the pulley within the casing, an undue accumulation of dirt and dust does not take place.

As an added feature, the end of the wing **5** is bevelled to permit the continued travel of the lower sash until the top edge thereof strikes the lower face **8** of the pulley unit whereupon this face serves as a stop for the sash. If desired, this face **8** may be reinforced by providing reinforcing ribs on the inside of the casing or increasing the thickness thereof so that it may perform this function as shown in Figure 8.

In order to assure a proper closure of the window by rendering coincident the limits of travel of the sashes B and C, adjusting means is provided for varying the effective lengths of the chains **9** extending between the sashes. This refinement is necessary in view of the irregularities in the manufacture of the parts and the lost motions and wear therein. Furthermore, temperature and atmospheric variations in addition to a wearing of the parts render necessary the adjustment of the length of the flexible member extending between the window sashes. For this purpose each chain **9** is shown in the illustrated embodiment fixedly connected to the upper sash and adjustably connected with the lower sash by means of a turnbuckle device **10** which is readily accessible for adjustment above the top of the lower sash, requiring no removal of the sashes from the window frame.

The structural features in accordance with the instant invention may be easily applied to window sash constructions of the conventional type. Fig. 1 illustrates the lower sash C as composed of a lower horizontal member **23** and upper horizontal member **24** and vertical side members **25**. The upper sash B is composed of a lower horizontal member **26** and upper horizontal member **27** and vertical side members **28**. The window in its closed position brings member **23** in contact with the sill **29** and the member **27** in contact with the inside of the top of the frame **30**. The lower sash is slidable in guideways formed on the side of the frame between the inside stop **20** and a parting strip **22**, whereas the upper sash B is slidable in guideways formed between the parting strip **22** and blind stop **21**.

The sides or stiles **25** and **28** are channeled adjacent the tops thereof for receiving the chain and the connected transmission elements.

Any suitable means known in the art may be provided for the connection of the ends of the chains to the window sashes. As shown in the illustrated embodiment transverse bores **15** are drilled in each edge of the sides **28** bridged by a passage **16** (Fig. 5). A loop **14** fitted in the lower bore **15** is connected integrally or by a separate transmission member **17** to the higher bore at which point connection is made to one end of the chain (Fig. 2). In a different embodiment, a wire loop **14'** of several turns serves to retain the end of the chain in the lower bore **15**. A similar construction provides for the connection of the chain to the lower sash with the exception that the connecting member is in the form of a turnbuckle **10** having the exposed part **11** preferably formed polygonally for the accommodation of a wrench to vary the effective length of the turnbuckle and thereby the length of the chain from the fixed end of the upper sash to the point of connection of the lower sash. The turnbuckle **10** as shown in Fig. 2, and in enlarged form in Fig. 7, consists of a closed sleeve body having the shaft **10***a* rotatably fixed at the lower end thereof. The threaded shaft **10***b* extends from the upper end of the sleeve and engages at its top with the end of the chain. The body and the polygonal section **11** remains fixed with respect to the top of the window sash and a rotation thereof effects a variation of the exposed length of the threaded shaft **10***b* and the resulting length of chain between the two sashes. A better finished appearance results from this arrangement. A lock unit **11***a* maintains the parts in their adjusted positions. If desired the turnbuckles with the adjustment features may be applied to the upper sash B instead of to the lower ones.

Fig. 7 illustrates a modified embodiment for fixing the turnbuckle in the lower sash A. A laterally bent extremity **12'** on the turnbuckle shaft **10***a* is inserted within an aperture in the window sash and is retained therein by a staple **13**. A washer **13'** at the point of anchorage of staple **13** imparts a permanence to the attachment.

In order to provide a satisfactory balancing of the two window sashes which shall be permanent in its nature, bores **35** are drilled in the sides of one or both sashes in a downwardly inclined direction and are filled with a suitable plastic means **36** of the desired weight. In view of the downward inclination of these weight pockets, no losses of the material during the life of the window is possible. A further refinement to assure a retention of the weighting medium in the bores is provided by supplemental bores **35'** extending at an angle to the bores **35** for keeping the material within the bores.

The front face of the upper corners of the window sash B are notched on the inside (Fig. 5) in order to clear the projecting part of the pulley **2**. Each parting strip **22** is also notched at its upper end (Fig. 6) for permitting a flush fit on the pulley unit on each upper corner of the window frame. Likewise the top parting strip **22'** extending along member **30** terminates before reaching the strips **22** for accommodating the pulley units.

In view of the fact that the pulley unit is mounted within the confines of the frame without the drilling of any holes from the inside to the outside thereof, there is no possibility of the admission of cold air therethrough and the production of undesirable drafts and other objectionable atmospheric conditions.

The adjusting arrangement described above assures a tight closure of the window permitting a locking thereof by means of the co-operating elements **38** and **38'** upon the sashes C and B respectively. Upon its release the window may be opened to any desired degree by means of the lifters **37** attached to the base member **23**.

Although I have shown and described a preferred embodiment of my invention, changes may be made therein by those skilled in the art without departing from the spirit of the invention as defined in the appended claims.

What I claim is:

1. A sash pulley comprising a rectangular prismatic casing formed of two side faces, top and bottom faces, a closed end and an open end opposite thereto, a pulley rotatably mounted between said side faces having a portion thereof project-

ing beyond said casing through said open end, a slot in the bottom face of said casing near the closed end adapted to permit the passage of a flexible member over said pulley, an attaching flange extending downwardly in the plane of one of said side faces and below said bottom face, and a second attaching flange extending perpendicularly from the second side face and in the plane of said top face.

2. The combination claimed in claim 1 wherein said two attaching flanges are of lesser width than that of the side faces from which they extend and are disposed adjacent the closed end of the casing.

3. A sash pulley comprising a rectangular prismatic casing having two flat vertical faces and two flat horizontal faces, said casing adapted to fit into the upper corner of a window frame and having an opening therein at the rear thereof, a pulley in said casing having a portion thereof projecting through said opening, means for rotatably mounting said pulley between the vertical faces of said casing at the rear portion thereof, an aperture in the lower horizontal face of said casing at the front thereof adapted to permit the passage of a flexible member over said pulley, an attaching flange extending horizontally from the vertical face of said casing remote from the vertical side of the window frame and in the plane of the upper horizontal face, and a second attaching flange extending downwardly in the plane of the vertical face abutting against the vertical side of the window frame and parallel to the plane of the pulley, said attaching flanges being disposed at the front portion of said casing situated remotely from said opening.

4. The combination claimed in claim 3 wherein the lower edge of the second attaching flange is bevelled and the lower face of said casing is reinforced.

5. A sash pulley comprising a rectangular prismatic casing having two plane vertical faces and two plane horizontal faces, attaching flanges extending from said casing in planes normal to each other forming extensions of one of said vertical faces and one of said horizontal faces whereby said casing is adapted to fit closely in the upper corner of a window frame, said casing having an opening at the rear thereof, a pulley rotatably mounted in said casing between said two plane vertical faces having a portion thereof projecting through said opening, and an aperture in the bottom horizontal face near the front of said casing adapted to permit the passage of a flexible member over said pulley.

DAVID ROSENTHAL.