July 22, 1952 E. H. BROWN 2,603,827

SASH BALANCE

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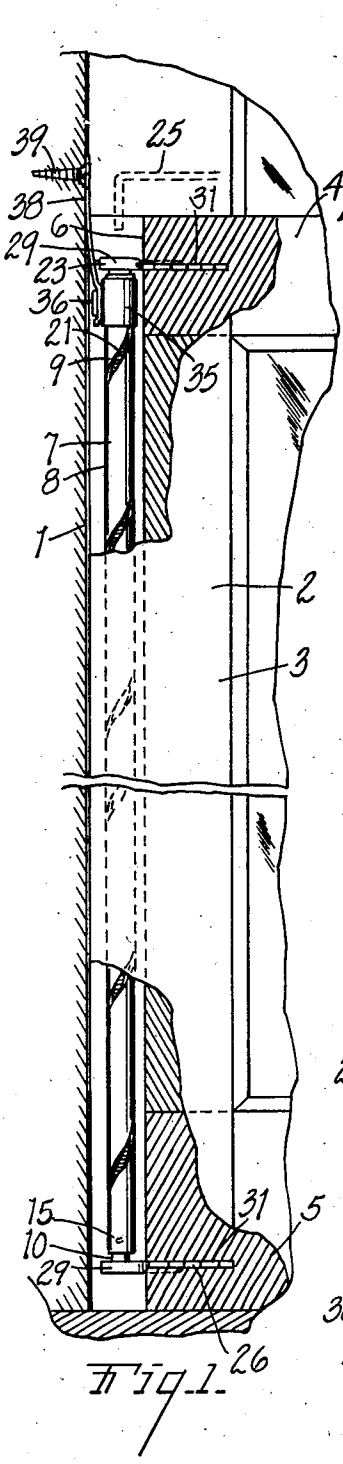


Fig. 1.

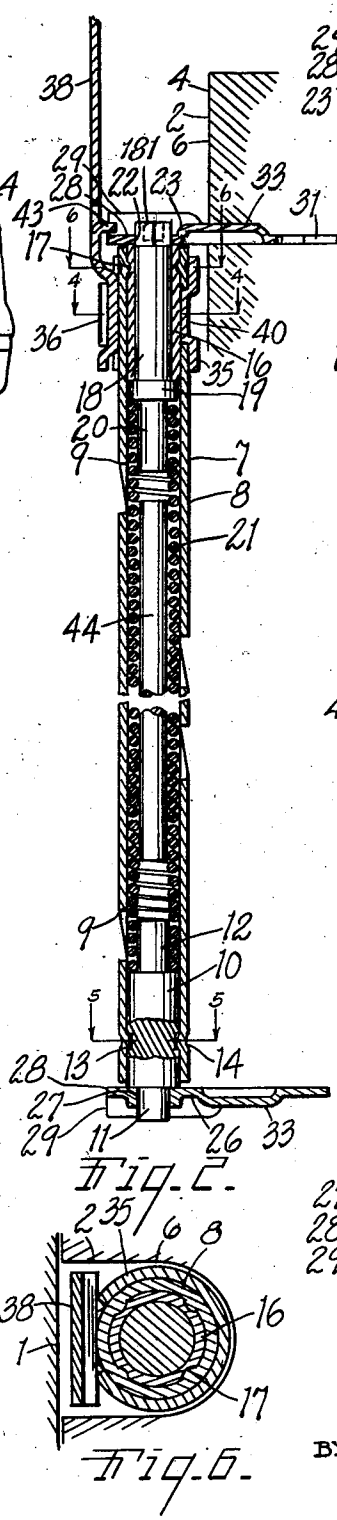


Fig. 2.

Fig. 6.

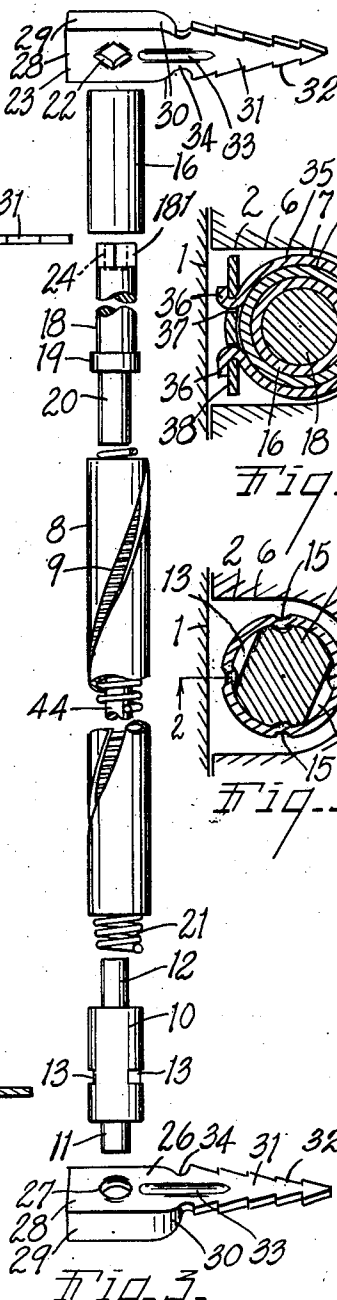


Fig. 3.

Fig. 4.

Fig. 5.

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SASH BALANCE

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10 Claims. (Cl. 16—197)

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This invention relates to improvements in a sash balance.

The main objects of this invention are:

First, to provide a sash balance including a rotating element having a spiral groove-like track and a torsion member in which the torsion member and the track are provided with a very effective driving connection adapted to minimize the tendency of the track follower to wedgingly engage the track, thereby tending to force it out of engagement or to make it inoperative.

Second, to provide a sash balance which is highly efficient and in which the tension of the spring may be effectively engaged and at the same time comprising parts which are economical to produce and may be economically assembled without the aid of any particularly skilled labor.

Third to provide a sash balance which permits rapid and easy installation.

Fourth, to provide mounting or attaching brackets for sash balance which may be attached without the use of screws and without weakening the sash; in fact, serving to reinforce the mortise and tension joints of the sash members.

Fifth, to provide a sash balance with mounting brackets which may be used either in square or round bottomed rabbets or grooves in the sash with equal security and facility.

Further objects relating to details and economies of the invention will appear from the description to follow. The invention is defined in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawings in which Fig. 1 is a fragmentary view partially in vertical section and partially broken away, illustrating the balance of my invention operatively associated with a window sash and its frame or casing.

Fig. 2 is an enlarged fragmentary view partially in longitudinal section of the balance of my invention illustrating structural details thereof in section on line 2—2 of Fig. 5, and at an intermediate step in the installation of the balance in the sash.

Fig. 3 is a fragmentary exploded view of the sash balances of my invention.

Fig. 4 is an enlarged fragmentary view in horizontal section on line 4—4 of Fig. 2.

Fig. 5 is an enlarged fragmentary view in horizontal section on line 5—5 of Fig. 2.

Fig. 6 is an enlarged horizontal sectional view on line 6—6 of Fig. 2.

In the accompanying drawing, 1 represents the

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window frame or casing and 2 a window sash which comprises the side uprights or risers 3, top member 4 and bottom member 5. These members have mortise and ten tenon engagements as is conventional in window sashes, the uprights being mortised to receive tenons on the ends of the top and bottom members.

The edge of the sash is grooved or rabbeted at 6. The balance designated generally by the numeral 7 comprises the tubular element 8 having the spiral groove-like track 9 formed therein. This is in practice desirably formed by spirally winding or twisting a strip of metal of suitable width upon itself.

The tubular element is provided with a journal member 10 at one end; the lower end in the structure illustrated has the journal member in the form of a screw machine piece fitting within the tubular element and having a reduced journal part 11 projecting from the tubular element and a reduced stud part 12 at its inner end. The journal member in the embodiment illustrated is provided with slot-like recesses 13 at its sides, the tubular element being lockingly engaged with these recesses by the indentations 14 and also desirably by the stop portions 15 (see Fig. 5). At its other end the tubular element is provided with a bushing 16 which is secured by the stamping or indenting the tubular element at 17. (See Fig. 6.)

The bushing rotatably engages the combined journal and tensioning member 18 which is rod-like and provided with a stop or thrust collar 19 engaging the inner end of the bushing. The tensioning member is provided with a stud or pin 20 projecting downwardly into the tubular element. The coil spring 21 arranged within the tubular member has its ends in clutching engagement with the studs or pins 12 and 20 being thereby connected at its lower end to the journal member 10 and through it to the tubular member and at its upper end to the tensioning member 18 which constitutes an anchoring member for the spring. The upper end of the tensioning member projects from the upper end of the tubular member and is provided with a non-circular head 181 conforming to opening 22 in the bracket member 23. The outer end of the tensioning member is provided with a socket 24 shown by dotted lines in Fig. 2 and adapted to receive a wrench or adjusting tool indicated by dotted lines at 25 in Fig. 1.

The bracket 23 and the second bracket 26 are the same in structure except that the bracket 26 has a bearing opening 27 preferably flanged as

indicated to receive the journal 11 of the journal member 10. These brackets are formed of sheet metal stampings and comprise the head portions 28 having side flanges 29 which serve to stiffen the same, the inner ends of these flanges being inwardly curved at 30 serving also as stops limiting the driving penetration of the prongs 31. These prongs are tapered and have outwardly facing serrations 32 on their side edges. The longitudinal ribs 33 are of such length that they bridge the connecting zone 34 between the heads and the prongs, thus stiffening the brackets at a point or zone which is a weakened zone owing to the merging of the head into the narrower driving prongs. These brackets may be driven into the sashing and are commonly driven into the tenon portions of the top and bottom members and engage the edges of the mortises so that they serve as anchoring means for the parts of the balance.

The torsion member comprises the sleeve 35 which embraces the tubular member, this sleeve being formed of a strap of metal having its ends 36 arranged through slots 37 in the springable arm 38. This generally considered is the structure shown in the Luce patent, No. 2,370,867, issued March 6, 1945. The arm 38 is attached to the casing by means of the screw 39. The follower lug 40 of the torsion member is formed by slitting the sleeve at 41, the slits being parallel, the part between the slits being struck inwardly to provide the follower lug. The edges 42 of the follower lug are straight and engage the straight edges of the groove so that there is a minimum tendency for the follower lug to be forced out of the groove.

The arm 38 is preferably provided with a lug 43 which is of advantage in the mounting of the balance, the steps in mounting being desirably as follows:

With the balance tensioned and before installation of the sash in the frame, the torsion member is positioned against the bracket 23 with the arm 38 in engagement with the end of the bracket. This prevents movement of the torsion member when the sash is placed in the frame with the arm of the torsion member in its proper position to be attached to the jam of the frame. The lug 43 engaging the top of the basket holds the torsion member 35 in position during tensioning of the spring.

The tensioning rod or member 18 is pushed downwardly to disengage it from its coacting bracket 23 and rotated to secure the desired tension. It is held in its tension position while the spring pushes it upwardly and engages the non-circular head 181 of member 18 with the bracket, thus holding parts under the desired tension while the sash and balance are installed in the frame. When the sash is raised, the lug 43 is sheared off. This is of substantial advantage in assembling.

The balance proper and all its integral parts, when the projecting ends of both the spring and tube anchor and the adjusting axle have been inserted into the circular and non-circular openings respectively, seek and remain in perfect axial alignment without the possibility of a bind or excess friction of any of the integral parts with one another even if the brackets are driven in at quite a pronounced angle from their proper position either transversely or perpendicularly to the rabbet. This provides a full-floating assembly as there is no rigid mechanical fastening of the balance to the sash, which produces smoother, quieter and more efficient operation.

A tension member can be adjusted at any time to properly tension the spring. The structure is very simple and economical in its parts. The parts of the assembled tubular elements are all concentric, thus greatly facilitating the manufacturing and assembling. The non-metallic piling rod 44 is preferably provided to prevent buckling of the spring.

I have illustrated and described my invention in an embodiment which is highly satisfactory. I have not attempted to illustrate certain modifications and adaptations which I contemplate as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a sash balance, comprising a rotatable tubular element having a spiral track, a bushing secured within one end of said tubular element, a journal member secured within the other end of said tubular element and shouldered at its outer end to provide a journal and its inner end to provide a spring engaging stud, a tensioning member disposed within said bushing and having a non-circular bracket engaging portion at its outer end and provided with a collar coacting with the inner end of the bushing and with a reduced spring engaging stud portion, a coiled spring having its ends engaged with said studs of said journal and tensioning members, and attaching brackets, one bracket having a non-circular opening axially aligned with said tensioning member and receiving the non-circular end of said tensioning member, said non-circular end being disengaged from said non-circular opening by axial movement of the tensioning member inwardly of the tubular element against the thrust of said spring to permit the tensioning member to be circularly adjusted to adjust the tension of the spring, the other bracket having a bearing for said journal member.

2. In a sash balance, comprising a rotatable tubular element having a spiral track, a bushing secured within one end of said tubular element, a journal member secured within the other end of said tubular element, a tensioning member disposed within said bushing and having a non-circular bracket engaging portion at its outer end and provided with a stop, a coiled spring having its ends engaged with said journal and tensioning members, and attaching brackets, one bracket having a non-circular opening axially aligned with said tensioning member and receiving the non-circular end of said tensioning member, said non-circular end being disengaged from said non-circular opening by axial movement of the tensioning member inwardly of the tubular element against the thrust of said spring to permit the tensioning member to be circularly adjusted to adjust the tension of the spring, the other bracket having a bearing for said journal member.

3. A sash balance comprising a rotatable tubular element having a spiral track, a coiled spring arranged within said tubular element, an axially adjustable tensioning member by which one end of said tubular element is rotatably supported, said tensioning member being provided with a stop limiting its outward movement, one end of said spring being connected to said tubular element and the other to said tensioning member and acting to urge it outwardly, attaching brack-

ets, said tensioning member being non-rotatably engageable with one bracket and being adapted to receive a tool whereby it may be disengaged from its bracket by axial movement of the tensioning member against the thrust of said spring and the tension of said spring adjusted.

4. In a sash balance comprising a rotatable tubular element having a spiral track, a bushing secured within one end of said tubular element, a journal member secured within the other end of said tubular element and provided with a spring engaging stud at its inner end, a tensioning member disposed within said bushing and having non-circular bracket engaging portion at its outer end and provided with a stop coacting with the inner end of the bushing and provided with an engaging stud, a coiled spring having its ends engaged with said studs of said journal and tensioning members, and attaching brackets, one of the brackets having a non-circular opening axially aligned with said tensioning member and receiving the non-circular end of said tensioning member, said tensioning member being adapted to receive a tool and to be disengaged from the non-circular opening by movement axially of the opening and against the thrust of said spring, the other bracket having a bearing opening for the journal of said journal member.

5. A sash balance comprising a rotatable tubular element having a spiral track, and a tensioning member at one end on which it is rotatably supported, a coiled spring arranged within said tubular element and having one end connected to said tensioning member and its other end to said tubular member, and supporting brackets, one of the brackets non-rotatably receiving said tensioning member, said tensioning member being adapted to be disengaged from said bracket by axial movement of the tensioning member against the thrust of said spring to permit tensioning adjustment of the spring, the spring acting to urge the tensioning member into engagement with its coacting bracket, the other bracket rotatably supporting the said tubular element.

6. A sash balance comprising a rotatable tubular element having a spiral track, and a tensioning member at one end on which it is rotatably supported, a coiled spring arranged within said tubular element and having one end connected to said tension member and its other end to said tubular member, and supporting brackets, one of the brackets non-rotatably receiving said tensioning member, said tensioning member being adapted to be disengaged from said bracket by axial movement of the tensioning member against the thrust of said spring to permit tensioning adjustment of the spring, the other bracket rotatably supporting the said tubular element.

7. An attaching bracket for a sash balance comprising integral head and drive prong portions formed as an integral stamping, the head portions being provided with side flanges curved inwardly at their ends and constituting drive stops and centering elements, the prong portion being tapered and having serrated edges, the head being adapted to receive a part of the balance to be supported, there being a reinforcing rib extending across the merging zone of the head and prong.

8. An attaching bracket for a sash balance comprising integral head and drive prong portions formed as an integral stamping, the head portion being provided with side flanges constituting drive stops, the prong portion being tapered and having serrated edges, the head having means to receive an end portion of the balance to support the same against lateral displacement.

9. An attaching bracket for a sash balance comprising integral head and prong portions formed as an integral stamping, the head portions being provided with side flanges constituting stop elements therefor, the prong portion being tapered and having serrated edges, the head having an opening between the flanges adapted to receive a part of the balance to be supported, there being a reinforcing rib extending across the merging zone of the head and prong.

10. An attaching bracket for a sash balance comprising integral head and prong portions formed as an integral stamping, the head portions being provided with side flanges constituting stopping elements therefor, the prong being tapered and having serrated edges, and the head having an opening between the flanges adapted to receive a part of the balance to be supported.

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REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Country	Date
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