Nov. 30, 1943. D. TAPPAN 2,335,816

SASH BALANCE

Filed Jan. 1, 1942

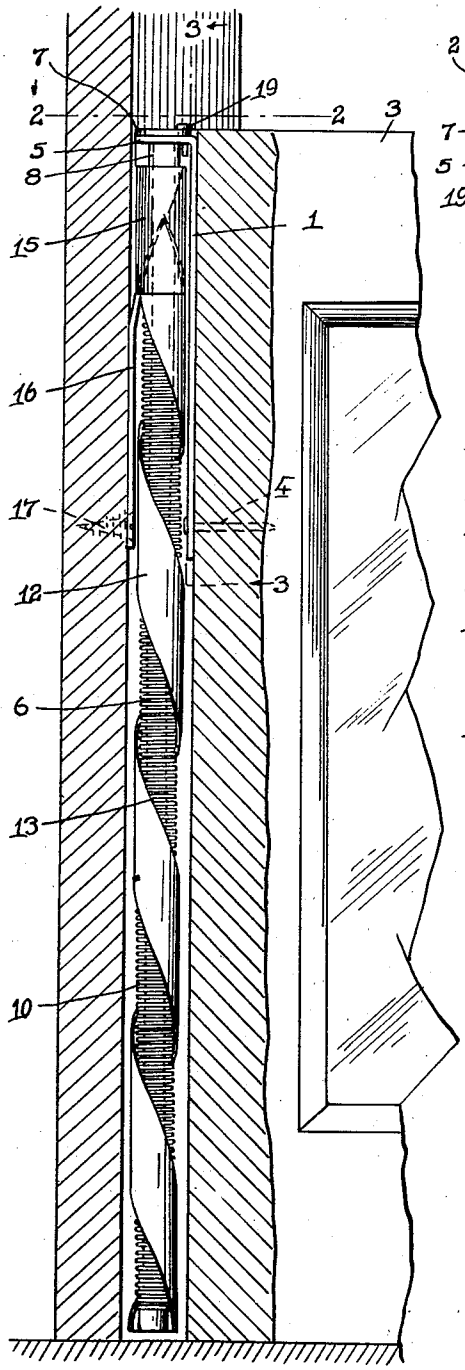


FIG 1

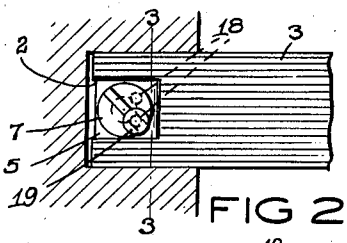


FIG 2

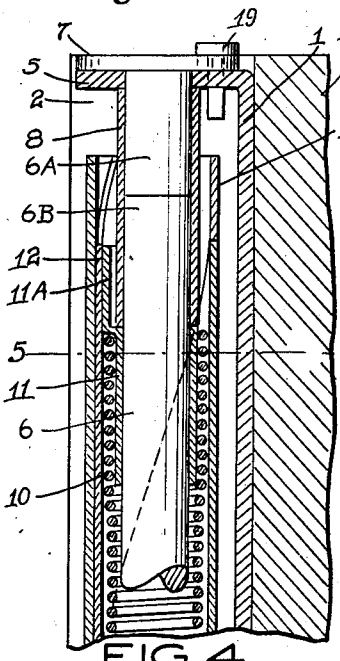


FIG 4

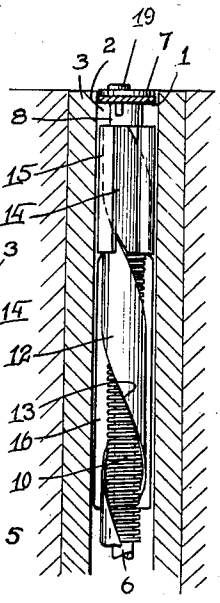


FIG 3

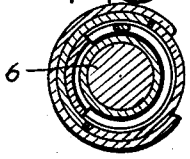


FIG 5

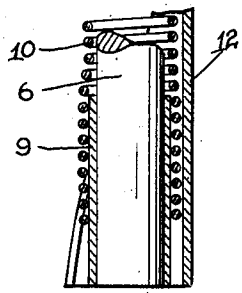


FIG 6

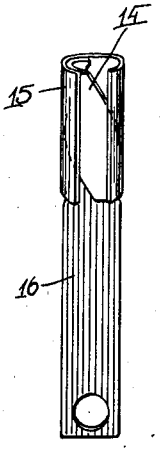


FIG 7

INVENTOR
DEWITT TAPPAN
BY
ATTORNEY

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SASH BALANCE

Dewitt Tappan, Rochester, N. Y., assignor to The Caldwell Manufacturing Co., Rochester, N. Y., a corporation of New York

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5 Claims. (Cl. 16—197)

This invention relates to a window sash balance and more particularly to the type in which a spiral element surrounds a coil spring and operates to transmit the torsional force of the spring to the window sash to balance the weight thereof and provide for the quick and easy up and down movement of the sash in the window frame and the object of this invention is to provide a novel construction for this type of sash balance which operates to supplement the action of the spring element in its balancing function and thereby increases the usefulness and practicability thereof.

Another object of this invention is to provide a novel sash balance which is inexpensive in construction and easily attached and adjusted in a window sash.

All these and other objects and attendant advantages of this invention will become more readily apparent from the detailed description thereof which follows, reference being had to the accompanying drawing in which

Figure 1 illustrates a sectional view of a portion of a window frame and window sash with my novel sash balance shown attached to the window frame and window sash.

Figure 2 is a horizontal sectional view taken on the line 2—2 in Figure 1.

Figure 3 is a vertical section taken on the line 3—3 in Figure 1.

Figure 4 is an enlarged vertical section of the upper portion of the sash balance as it appears attached to the window sash.

Figure 5 is a horizontal section taken on the line 5—5 in Figure 4.

Figure 6 is a vertical section of the lower portion of the sash.

Figure 7 is a detail perspective view of the operating member of the spiral sleeve which tensions and releases the tension of the balancing spring member.

A window sash balance of the type which employs a long, helically wound torsion spring surrounded by a spiral member and connected thereto to provide a coiling and uncoiling action of the spring is not new. However, my present invention provides a novel construction for such a window sash balance which makes this type of sash balance more practical and efficient in its balancing action of the window sash and at the same time simplifies its structure.

As illustrated in the figures of the drawing, my improved and novel sash balance comprises the bracket 1 which is adapted to be fastened into the groove 2 in the window sash 3 by a screw or nail 4 so as to have the outturned end 5 of this bracket provide a pivotal support for the tension rod 6. The latter is made up of a short section 6A and a long section 6B of which the short section is located at the top and is journaled in a suitable bearing in the outturned end 5 of the bracket 1. A slotted head 7 is provided on top of the short section of the tension rod above the bracket 5 and a sleeve or bushing 8 surrounds the tension rod section on the under side of the bracket end and is suitably fastened to the rod.

An extension of the sleeve or bushing 8 provides a socket to have the upper end of the long section 6B of the tension rod telescopingly engage thereinto and be suitably fastened thereto for its pivotal support on the bracket 1. In this way the under side of the slotted head 7 and the upper end of the sleeve or bushing 8 provide thrust collars which hold the tension rod against endwise movement in the bracket while allowing rotation thereof for a purpose that will presently appear.

Secured to the lower end of the tension rod 6 is a sleeve or bushing 9 to which in turn is fastened the lower end of the torsion spring 10. This spring surrounds the tension rod 6 and its upper end is fastened to the sleeve or bushing 11 which freely surrounds the tension rod below the sleeve or bushing 8. An upwardly projecting partial extension of the bushing 11 is offset therefrom to contact the spiral sleeve 12 as illustrated in Figure 4 and provides an anchoring flange 11A with which the sleeve or bushing 11 is fastened to this element.

The spiral sleeve is formed of thin and flexible sheet material and is wound to provide a substantially wide spiral groove 13 of relatively coarse pitch. A short spiral element or nut 14 made substantially the same as the spiral element 12 slidably engages into the spiral groove 13 to have the spiral sleeve move up and down thereon and cause the latter's rotation thereby.

The short spiral element is held fixed in sleeve 15 carried by the elongated bracket 16 which is offset therefrom for attachment to the window frame by means of a suitable screw 17. The sleeve 15 with its spiral element 14, while held against endwise movement, is thus free to adjust itself laterally to any slight variation in the location of the spiral element 12 as it moves endwise with the window sash.

The outturned end 5 of the bracket 1 is provided with a pair of holes 18, 18 which are uniformly spaced from the center of rotation of the tension rod 6. The slotted head 7 rotates over these holes to register therewith and permit the

insertion of the locking pin 19 thru the slot in the head into engagement with one or the other of the holes 18.

After the sash balance is attached in the manner described and as illustrated in the figures of the drawing, the tension rod is adjusted by withdrawing the locking pin 19 and rotating the slotted head 7 by means of a suitable screw driver in order to give the tension rod several turns in a clockwise direction. This turns the lower end of the torsion spring 10 and since the upper end of the spring is secured to the spiral element 12, which in turn is held against rotation by the spiral element 14, a torsional force is created and stored up in the spring. A predetermined tension may thus be provided in the spring and when this tension is reached, the locking pin 19 is inserted thru the slot in the head 7 for engagement with one of the holes 18 in the bracket 5. This locks the tension rod against rotation and thereby holds the spring tensioned which is, of course, increased or decreased by the rotation of the spiral sleeve 12. The tension of the spring provides a torsional force which tends to rotate the spiral sleeve in a direction in which it would thread itself upwardly on the fixed spiral element 14 with a force which substantially supports the window sash by counterbalancing the weight thereof. The adjustment of the tension rod may be made to counterbalance various weights of window sash by varying the initial tension of the spring as above pointed out.

As above described and illustrated in the figures of the drawing, the spiral sleeve is formed up of thin flexible stock and its spiral groove is open at both ends. The torsional force of the spring thus continually tends to twist the spiral sleeve around the outside of the spring from the top to the bottom and contracts it thereagainst to thereby set up a gripping action between the spiral sleeve and the spring.

I claim:

1. In a sash balance for a window sash movable in a window frame, the combination of a tension rod; a contractible spiral sleeve spacedly surrounding said tension rod; a helically wound torsion spring interposed between said spiral sleeve and said tension rod with one end of the spring fastened to the tension rod and the other end of the spring fastened to the spiral sleeve; said spring being tensioned between said tension rod and said spiral sleeve to cause said spiral sleeve to contract and grip said spring; means for supporting said tension rod on said window sash; and a spiral member carried by said window frame in threaded engagement with said spiral sleeve to cause the torsional force of said spring to urge rotation of said spiral sleeve on said spiral member and control the contraction of said spiral sleeve by said spring.

2. In a sash balance for a window sash movable in a window frame, the combination of a supporting bracket carried by said window sash; a tension rod rotatably adjustable on said bracket; a contractible spiral sleeve spacedly surrounding said tension rod; a helically wound torsion spring interposed between said spiral sleeve and said tension rod with one end of said spring attached to said tension rod and the other end of said spring attached to said spiral sleeve for tensioning between said sleeve and said rod on the rotation of said tension rod on said bracket to contract said sleeve and grip said spring; and a spiral element mounted on said window frame in threaded engagement with said spiral sleeve to control the contraction of said spiral sleeve by said spring.

3. In a sash balance for a window sash movable in a window frame, the combination of a supporting bracket carried by said window sash; a tension rod rotatable in said bracket; a head on said tension rod; a locking pin carried by said head for locking engagement with said bracket; a contractible spiral sleeve spacedly surrounding said tension rod; a helically wound torsion spring interposed between said tension rod and said spiral sleeve with one end of the spring attached to said spiral sleeve and normally held tensioned between them by said locking pin to cause contraction of said spiral sleeve to grip said spring; and a spiral element mounted on said window frame in threaded engagement with said spiral sleeve to cause the torsional force of said spring to urge rotation and endwise movement of said sleeve on said spiral element and control the contraction of said spiral sleeve.

4. In a sash balance for a window sash movable in a window frame, the combination of a bracket carried by said window sash; a tension rod having one end thereof rotatably supported by said bracket and its other end held freely suspended thereby; a sleeve rotatably supported on said tension rod for independent rotation on the rotatably supported end of said tension rod; a spiral sleeve spacedly surrounding said tension rod and held freely suspended from said rotatably supported sleeve; a helically wound torsion spring interposed between said tension rod and said spiral sleeve and attached to the free end of said tension rod with one end thereof and to said rotatable sleeve with the other end thereof for tensioning of the spring between them; means connecting said rotatable sleeve with said spiral sleeve for support on said tension rod and connection with said spring; and a spiral element carried by said window frame in threaded engagement with said spiral sleeve.

5. In a sash balance the combination as set forth in claim 2 in which said spiral element comprises a bracket mounted on said window frame, a sleeve carried by said bracket embracing said spiral sleeve and a spiral member within said sleeve and held thereby in threaded engagement with said spiral sleeve.

DEWITT TAPPAN.