May 20, 1941. A. F. MANTZ 2,242,650

SPRING SASH BALANCE

Filed June 19, 1939

Fig. 1.

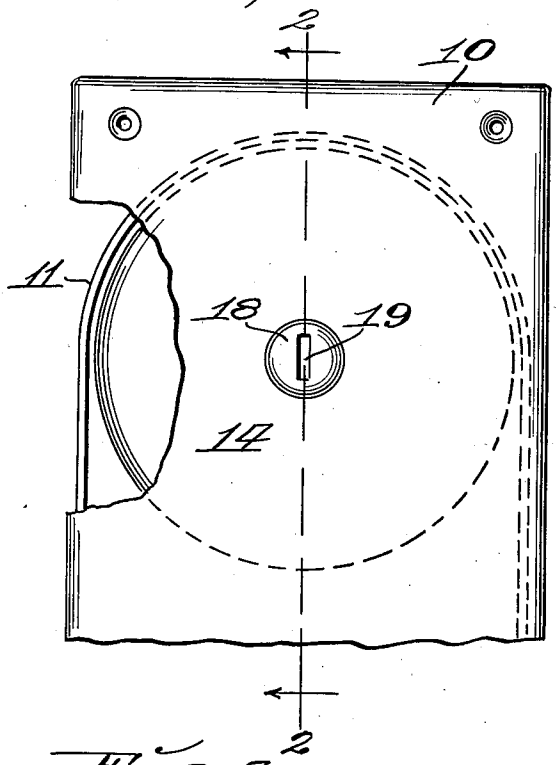


Fig. 2.

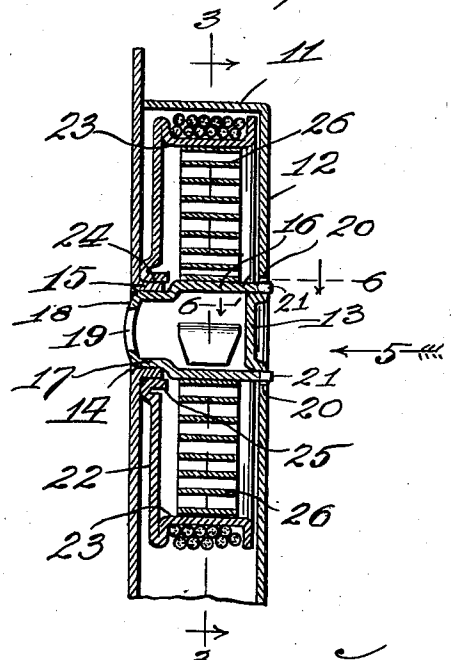


Fig. 3.

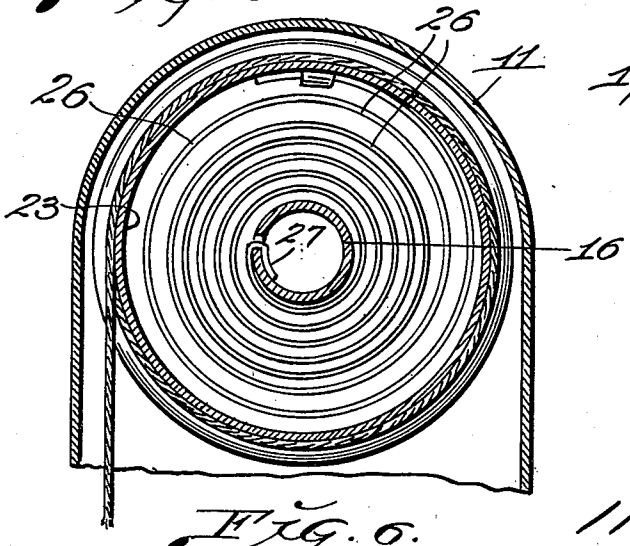


Fig. 4.

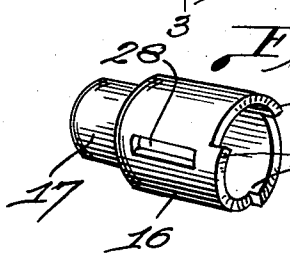


Fig. 5

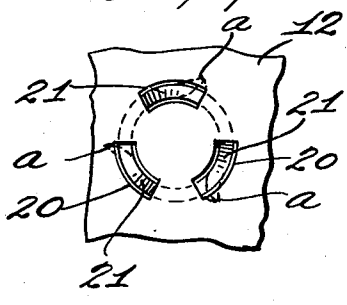
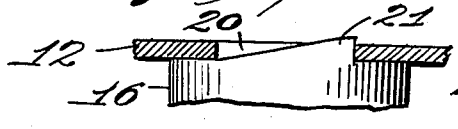


Fig. 6.



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UNITED STATES PATENT OFFICE

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SPRING SASH BALANCE

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Application June 19, 1939, Serial No. 279,782

4 Claims. (Cl. 16—198)

My invention relates generally to spring sash balances, particularly of the type patented by me February 21, 1933, No. 1,898,584, also No. 2,117,896 issued May 17, 1938, and my co-pending application for U. S. Letters Patent filed July 5, 1938, Serial No. 217,407.

The principal objects of my present invention are, to generally improve upon and simplify the construction of the spring sash balances forming the subject matter of the above mentioned patents and pending patent application, as well as other similar forms of spring sash balances, and further, to provide comparatively simple, practical, and easily operated means for winding the spiral springs of the balances so as to effectively and accurately regulate the tension thereof.

Further objects of my invention are, to provide in a spring sash balance a simplified and compact construction for regulating the tension of the springs and which improved construction minimizes the production costs of the balances and further, to provide spring tension adjusting means which after operation of the principal adjusting element, the latter and the spring are securely locked so as to make the tension adjustment permanent and unchangeable and further, to provide spring tension adjusting means that is operative only to increase, not decrease the tension, thereby eliminating trouble and inconvenience while installing the balance.

A further object of my invention is, to provide sash balance spring tensioning means which will effectively prevent the spring from being unwound by mechanics or workmen engaged in installing the balances and, also preventing the adjusting means from slipping while the spring is being wound to develop the required degree of tension.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts that will be hereinafter more fully described and claimed and illustrated in the accompanying drawing in which:

Fig. 1 is an elevational view of the upper portion of a sash balance housing, looking against the face plate thereof and with a portion of the housing broken away and in section.

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2.

Fig. 4 is a perspective view of the tubular spindle that is mounted for rotation in the housing and which is connected to the inner end of the spiral spring that is arranged within and connected to the cable winding drum.

Fig. 5 is an elevational view of a portion of the rear side of the sash balance housing and showing the parts seen looking in the direction indicated by the arrow 5 in Fig. 2.

Fig. 6 is an enlarged detail section taken approximately on the line 6—6 of Fig. 2.

Referring by numerals to the accompanying drawing which illustrates a preferred embodiment of my invention, 10 designates the face plate which is secured in any suitable manner to the front edges of the continuous side and end walls 11 of the housing and, which side and end walls are preferably formed integral with and disposed at right angles to the rear wall 12.

A circular portion of the rear wall 12 is pressed inwardly to form a short circular stud 13 that provides a bearing for the rear end of the tubular spindle hereinafter more fully described and, formed through the face plate 10 in transverse alignment with the bearing member or stud 13 is an aperture 14 for the accommodation of the forward end of the tubular spindle.

Formed integral with and projecting inwardly from the face plate 10 around the aperture 14 is a flange 15 that provides a bearing for the forward portion of the tubular spindle.

Mounted for rotation on the bearing member or stud 13 is the rear portion of the main body 16 of the tubular spindle, the forward portion 17 thereof being slightly reduced in diameter and arranged for rotation in the bearing formed by the inwardly presented flange 15. The forward end of this tubular spindle is closed by an integral plate 18 and, formed in the latter is a slot 19 or a non-circular opening adapted to receive the point of a screw driver or like implement that is utilized for rotating the tubular spindle when spring adjustments are made.

Formed in the rear wall 12 of the housing immediately adjacent the bearing stud 13 and concentric therewith is a plurality of, preferably three, short arcuate slots 20 which receive arcuate ratchet teeth 21 that are formed on the rear end of tubular spindle 16. The depth of these ratchet teeth is such that their pointed ends normally project slightly beyond the outer face of rear wall 12 of the housing.

The drum that carries the cable or tape of the fixture is preferably formed from a single piece of sheet metal and comprises a disc 22 having a marginal flange 23 that is channel-shape in cross section that receives the convolutions of the cable or tape that is carried by said drum. In

the present instance, I have shown the drum provided with a cable, one end thereof being fixed to the flange of the drum and the other end detachably secured by conventional means to the window sash with which the balance is associated.

Formed in the center of the disc 22 of the drum is a circular opening 24 for the accommodation of the inwardly presented flange 15 around opening 14 and, formed integral with the disc 22 adjacent the opening therein is an inwardly presented flange 25 that bears upon said flange 15 during rotation of the cable carrying drum.

The outer end of a spiral spring 26 is connected in any suitable manner to flange 23 on the inner face thereof and, the inner end of this spring is connected in any suitable manner to the tubular spindle 16.

In Fig. 3 I have illustrated the inner end of the spring 26 formed into a hook 27 that engages through a short longitudinally disposed slot 28 that is formed in spindle 16. After the parts of the balance have been assembled and it is desired to wind spring 26 so as to impart the desired degree of tension thereto, the point of a screw driver or suitable tool is inserted in aperture 19 in the forward end of the tubular spindle 16 and the latter is rotated by imparting turning movement to the tool.

Due to the arrangement of the ratchet teeth 21 in the arcuate slots 20, the spindle can be rotated in only one direction and thus, a careless workman or person not having a complete understanding of the balance and particularly the operation necessary to impart tension to the spring, may wind the spring only in one direction and which is the proper direction in which to wind the convolutions of the spring about the spindle so as to increase the tension of said spring. Further, this particular construction prevents slipping and reverse rotary movement of the spindle while the same is being rotated to wind the spring.

While rotary movement is imparted to the spindle to wind the spring the teeth 21 must necessarily move from one aperture 20 to the other and, during such movement the comparatively long inclined faces of the ratchet teeth 21 bear on the rear wall of the housing 12 between the openings 20 therein, thereby producing sufficient pressure against the rear wall 12 and also against the flange 15 on the face plate to cause said rear wall and face plate to flex outwardly a sufficient distance to permit the high points of the teeth to readily pass from one opening 20 to another.

Inasmuch as the face plate 10 and rear wall 12 of the housing are formed from thin sheet metal having a certain degree of resiliency, this flexing movement takes place without permanent distortion of the face plate and rear wall and without in any way affecting the proper functioning of the spring carrying spindle.

Under normal conditions the points of the teeth 21 project slightly beyond the outer face of the rear wall 12 of the housing and, if it is found desirable to secure the spindle against rotation after the proper degree of tension has been imparted to the spring 26, the projecting ends of the teeth 21 may be upset in either direction radially of the axis of the spindle, as shown by dotted lines *a* Fig. 5, and when thus upset and riveted down, it is impossible for the spindle 16 to be rotated in either direction.

Thus it will be seen that I have provided a spring sash balance and particularly spring tension adjusting means that is relatively simple in construction, inexpensive of manufacture and very effective in performing the functions for which it is intended.

It will be understood that minor changes in the size, form and construction of the various parts of my improved spring sash balance, may be made and substituted for those herein shown and described, without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. In a spring sash balance, a housing having front and rear walls at least one of which is characterized by a spring-like flexibility, a spindle bearing in one of the said walls and radially arranged slots in the other, the bearing and arrangement of the slots having a common axis, a spindle formed with a thrust member at one end and ratchet teeth at the other, the spindle being mounted with the ratchet teeth engaging the slots and the other end in the bearing, a drum mounted for rotation about the spindle, a spiral spring within the drum having one end connected to the spindle and the other end to the drum, means carried on the periphery of said drum for attachment to a sash, and means for applying a tool to turn the spindle for tensioning the spring, the thrust member being adapted to exert an outward pressure on the walls to flex at least one of the same as the ratchet teeth pass through successive slots in their path of rotation.

2. In a spring sash balance, a housing having front and rear walls at least one of which is characterized by a spring-like flexibility, an inturned annular flange on one wall defining a spindle bearing, radially arranged slots in the other wall, the bearing and arrangement of the slots having a common axis, a spindle formed with a thrust member at one end and ratchet teeth at the other, the spindle being mounted with the ratchet teeth engaging the slots and the other end in the bearing, a drum mounted for rotation about the spindle, a spiral spring within the drum having one end connected to the spindle and the other end to the drum, means carried on the periphery of said drum for attachment to a sash, and means for applying a tool to turn the spindle for tensioning the spring, the thrust member being adapted to exert an outward pressure on the walls to flex at least one of the same as the ratchet teeth pass through successive slots in their path of rotation.

3. In a spring sash balance, a housing having front and rear walls at least one of which is characterized by a spring-like flexibility, one of the walls being provided with an inturned annular flange defining a spindle bearing and a drum bearing, radially arranged slots in the other wall, the bearings and arrangement of the slots having a common axis, a spindle formed with a thrust member at one end and ratchet teeth at the other, the spindle being mounted with the ratchet teeth engaging the slots and the other end in the spindle bearing, a drum mounted on the drum bearing for rotation about the spindle, a spiral spring within the drum having one end connected to the spindle and the other end to the drum, means carried on the periphery of said drum for attachment to a sash, and means for applying a tool to turn the spindle for tensioning the springs, the thrust member being adapted to exert an outward pressure on the walls to flex at least one of the same as the ratchet teeth

pass through successive slots in their path of rotation.

4. In a spring sash balance, a housing having front and rear walls at least one of which is characterized by a spring-like flexibility, a spindle bearing in one of the said walls and radially arranged slots in the other, the bearing and arrangement of the slots having a common axis, a spindle having a reduced end mounted in the said spindle bearing and incorporating a shoulder adapted to function as a thrust member, the said spindle being provided with ratchet teeth at the other end engaging the said slots, a drum mounted for rotation about the spindle, a spiral spring within the drum having one end connected to the spindle and the other end to the drum, means carried on the periphery of said drum for attachment to a sash, and means for applying a tool to turn the spindle for tensioning the spring, the said shoulder being adapted to exert an outward thrust on the walls to flex at least one of the same as the ratchet teeth pass through successive slots in their path of rotation.

ALOYSIUS F. MANTZ.