Dec. 19, 1950 G. B. HAAS 2,534,968

SPRING SASH BALANCE

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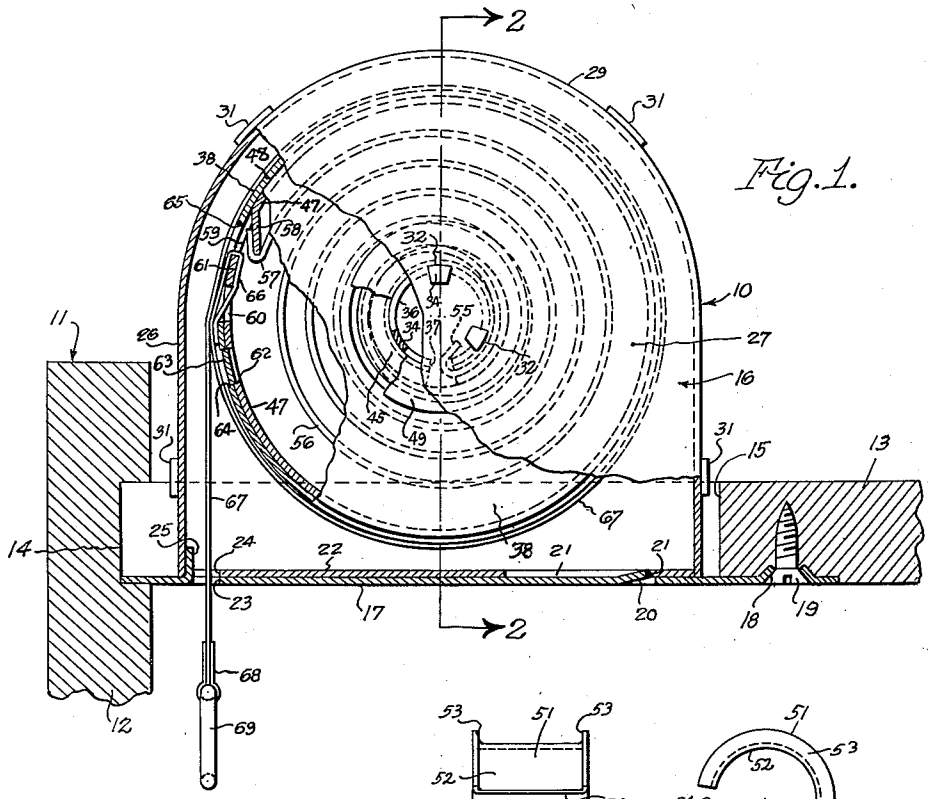


Fig. 1.

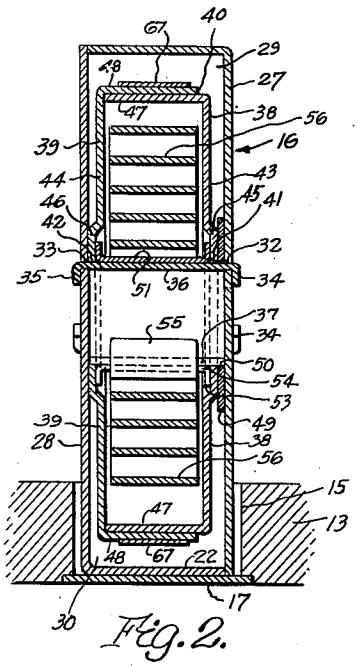


Fig. 2.

Fig. 5.

Fig. 6.

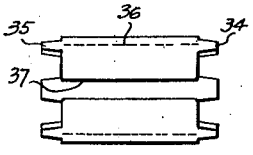


Fig. 3.

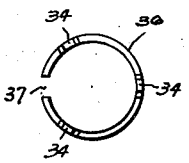


Fig. 4.

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SPRING SASH BALANCE

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4 Claims. (Cl. 16—198)

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This invention relates to building hardware and in particular to sash balances.

One object of this invention is to provide a spring sash balance which will apply a frictional drag to the tape drum so as to counteract the tendency for the sash balance to pull the sash upward slightly and open the window when the sash is in its lowered position.

Another object is to provide a spring sash balance of the foregoing type having a friction washer positioned between the tape drum or cups and the inner wall of the housing so as to apply a frictional drag to the drum or cups and prevent undesired opening of the window.

Another object is to provide a spring sash balance wherein the tape drum is composed of a pair of oppositely-facing nesting cups having inside them a tubular spacer which maintains the walls of the opposed cups at a predetermined spacing, the spacer in turn being rotatably mounted upon an axle, preferably tubular, mounted on and extending between the side walls of the sash balance housing.

In the drawings:

Figure 1 is a side elevation, partly in vertical section, of a spring sash balance, according to a preferred form of the present invention, as installed in a window frame;

Figure 2 is a vertical cross-section along the line 2—2 in Figure 1;

Figure 3 is a side elevation of a tubular axle used in the sash balance of Figures 1 and 2;

Figure 4 is a right-hand end elevation of the axle shown in Figure 3;

Figure 5 is a front elevation of a tubular spacer used in the sash balance shown in Figures 1 and 2 and mounted on the tubular axle of Figures 3 and 4; and

Figure 6 is a right-hand end elevation of the spacer shown in Figure 5.

Referring to the drawings in detail, Figure 1 shows a spring sash balance generally designated 10 according to a preferred form of the invention as mounted upon a window frame, generally designated 11. The window frame 11, which is conventional, has side members 12 and a top member 13, the side members 12 having grooves 14 for the opposite ends of the top member 13. The latter has a rectangular opening 15 through which the housing, generally designated 16, projects upward.

The housing 16 includes a mounting plate 17 having one end secured in the groove 14 and the other end provided with a hole 18 with tapering side walls for receiving a screw 19 by which the mounting plate 17 is secured to the top member 13 (Figure 1). The mounting plate 17 is provided with a struck-up portion 20, the end of which engages one end of a rectangular aperture 21 in the housing face plate 22, the two ends serving as positioning stops to one another. The

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opposite ends of the mounting plate 17 and face plate 22 are provided with aligned rectangular apertures 23 and 24 respectively. A tab 25 formed by striking it upward from the aperture 23 extends upward through the aperture 24. The tab 25 engages the inner surface of the housing side wall 26, which is of approximately U-shaped form, and which is integral with one of the end walls 27 of the housing 16 (Figure 2). Similarly, the face plate 22 is integral with the opposite end wall 28 of the housing 16 so that these in effect form opposed housing halves 29 and 30 respectively. The housing half 30 is provided with laterally projecting tabs 31 extending from the periphery of the end wall 28 and lying closely adjacent the side wall 26.

The end walls 27 and 28 are each provided with a plurality of spaced slots 32 and 33 (Figure 2) through which pass tongues or tabs 34 and 35 respectively on the opposite ends of a roughly tubular axle 36 (Figure 3) having a slot 37 extending axially thereacross. Rotatably mounted upon the axle 36 are two oppositely-facing and nesting cups or drum halves 38 and 39 which in assembly form the tape drum 40. The cups 38 and 39 are provided with openings 41 and 42 respectively for the passage of the tubular axle 36, and their end walls 43 and 44 are provided with central annular hub portions 45 and 46 respectively projecting outward in axial directions therefrom. The peripheral walls 47 and 48 of the cups or drum halves 38 and 39 telescope or nest with one another.

Mounted between the adjacent surfaces of the end walls 27 and 43 is an annular friction washer 49 (Figure 2) of fibre or other suitable material and having a central opening 50 through which the tubular axle 36 passes. The hub portions 45 and 46 are accurately spaced apart from one another by means of a tubular spacer 51 (Figures 2, 5 and 6) which has a roughly cylindrical body portion 52 with end flanges 53 and an axial slot 54. The spacer 51 fits over the axle 36 with its slot 54 in alignment with the slot 37. Extending through the slots 37 and 54 and hooked around their edges on one side thereof (Figures 1 and 2) is the reversely bent end 55 of a coil spring 56, the outer end of which is reversely bent as at 57. The bent end 57 is hooked around an inwardly-struck lug 58 formed out of an aperture 59 in the peripheral wall 47 of the cup or drum half 38.

The peripheral wall 47 (Figure 1) is provided with a second aperture 60 spaced apart from the aperture 59 so as to provide a bridge portion 61 therebetween. The peripheral wall 47 is provided with a third aperture 62 into which a lug 63 is struck inward from an aperture 64 in the outer peripheral wall 48, thereby accurately positioning the drum halves or cups 38 and 39 circumferentially relatively to one another. Finally, the

peripheral wall 48 of the drum half 39 is provided with an elongated aperture 65 (Figure 1) extending from and overlying the apertures 59 and 60 and bridge portion 61 of the peripheral wall 47.

Secured to and extending around the bridge portion 61 is a loop 66 (Figure 1) on the inner end of a tape 67 of metal or other suitable material. The tape 67 passes outward through the aperture 60 and around the peripheral wall 48, then downward through the apertures 24 and 23. Secured to its lower end, as by the roughly U-shaped clip 68, is a stirrup 69 in the form of an open loop. The stirrup 69 is connected to the window sash in a conventional manner.

In the assembly of the sash balance of this invention, the tape 67 which has previously been cut to length and provided with a loop at one end, is inserted in the cup 38 with its loop placed over the bridge portion 61. The spring 56, which has previously been cut to length and provided with the hook portions 55 and 57 at its opposite ends, is wound on a winding machine and likewise positioned within the cup 38 with its hook portion 57 hooked over the lug 58. The axle 36, surrounded by the spacer 51, is then inserted in the cup 38 with the slots 54 and 37 in registry and the end 55 of the spring 56 is hooked through these slots into the axle 36 (Figure 1). The outer cup 39 is then positioned over the inner cup in nesting relationship therewith. The free end of the tape 67 is then inserted through the openings 23 and 24 in the plate 17, which has been previously spot-welded to the housing portion 22 with the apertures 23 and 24 in registry. The stirrup 69 is then secured to the end of the tape 67 by means of the clip 68. The tape is then wound around the periphery of the above assembly until the stirrup approaches the apertures 23, 24, and the tabs 35 are inserted through the slots 33 in the housing end wall 28. The friction washer 49 is then placed in contact with the cup 38 with the axle 36 passing through its central opening 50, after which the housing half 30 is superimposed upon the entire assembly with the tabs 34 passing through the slots 32. With the housing halves 29 and 30 in engagement in this manner (Figure 2), the tabs 34 and 35 are bent over and clinched, thereby holding the entire assembly in position.

In the operation of the invention, the sash balance is secured to the top member 13 of the window frame 11 in the opening 15 thereof. Let it be assumed that the sash balance is in a position corresponding to the raised position of the window sash (Figure 1). When the sash is pulled downward to close the window, the tape 67 is unwound from the drum half 39, rotating the latter and winding up the coil spring 56. When the window sash reaches its lowest position, the friction washer 49 by exerting a friction drag between the hub portion 45 and the end wall 27 prevents the undesired lifting of the window sash before it is raised by the operator. When the operator lifts the sash, however, he overcomes the drag of the friction washer 49 and opens the window, the force of the spring 56 counterbalancing the weight of the sash.

What I claim is:

1. A sash balance comprising a housing structure, an approximately tubular axle mounted in said housing structure, a flexible connector drum rotatably mounted on said axle in said structure and having axially spaced opposite sides, a spring element interconnecting said drum and housing structure and adapted to store up energy upon rotation of said drum, an elongated flexible connector interconnecting said drum and sash and adapted to be wound upon said drum, and an approximately tubular spacer within said drum and encircling said axle, said spacer having opposite end portions engageable with the inner surfaces of said opposite sides to hold said sides apart from one another in predetermined spaced relationship.

2. A sash balance comprising a housing structure, an approximately tubular axle mounted in said housing structure, a flexible connector drum rotatably mounted on said axle in said structure and having axially spaced opposite sides, a spring element interconnecting said drum and housing structure and adapted to store up energy upon rotation of said drum, an elongated flexible connector interconnecting said drum and sash and adapted to be wound upon said drum, and a spacer within said drum and encircling said axle, said spacer having opposite end portions engageable with the inner surfaces of said opposite sides to hold said sides apart from one another in predetermined spaced relationship, said spacer comprising a tubular element mounted on said axle and having drum-contacting portions at its opposite ends.

3. A sash balance comprising a housing structure, an axle mounted in said housing structure, a flexible connector drum rotatably mounted on said axle in said structure and having axially spaced opposite sides, a spring element interconnecting said drum and housing structure and adapted to store up energy upon rotation of said drum, an elongated flexible connector interconnecting said drum and sash and adapted to be wound upon said drum, and a spacer within said drum with its opposite end portions engageable with said opposite sides to hold said sides in predetermined spaced relationship, said spacer comprising a tubular element mounted on said axle and having drum-contacting portions at its opposite ends and having an aperture therethrough for the passage of said spring element.

4. A sash balance comprising a housing structure, a flexible connector drum rotatably mounted in said structure and having axially spaced opposite sides, a spring element interconnecting said drum and housing structure and adapted to store up energy upon rotation of said drum, an elongated flexible connector interconnecting said drum and sash and adapted to be wound upon said drum, a spacer within said drum with its opposite end portions engageable with the inner surfaces of said opposite sides to hold said sides in predetermined spaced relationship, and a friction drag device interposed between and frictionally engaging the inner surface of said housing structure and the outer surface of one of the opposite sides of said drum whereby to retard rotation of said drum.

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