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SASH BALANCE

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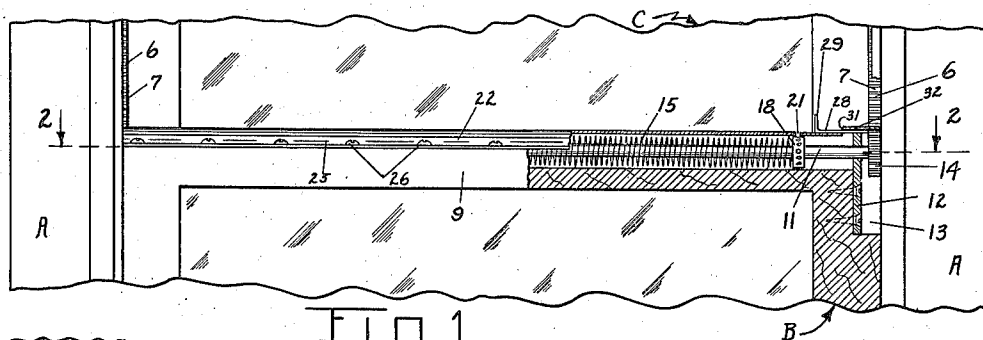


Fig. 1

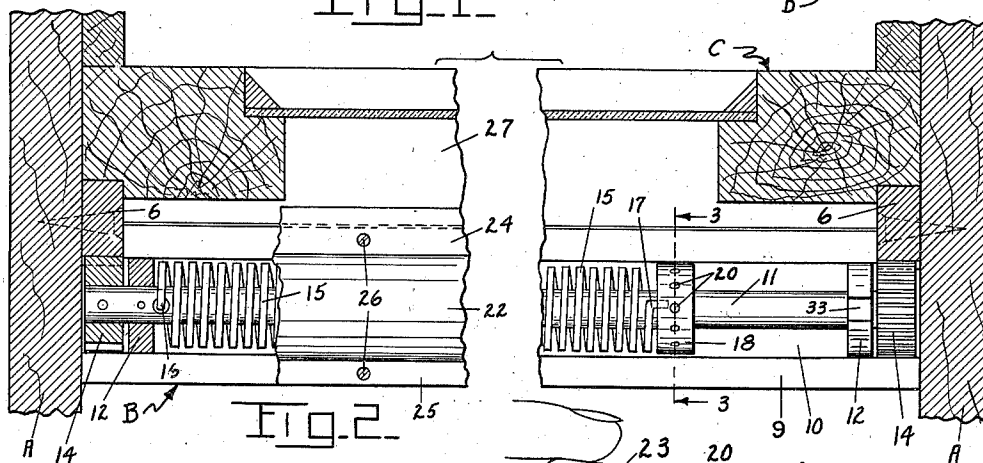


Fig. 2

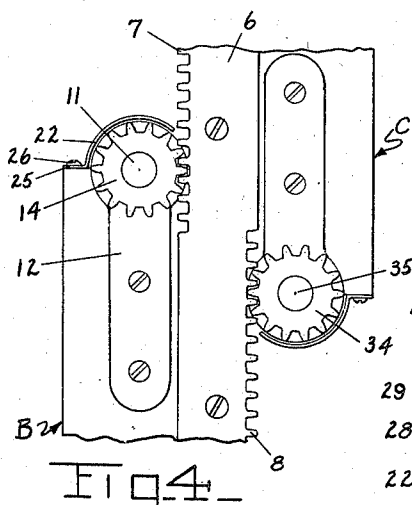


Fig. 3

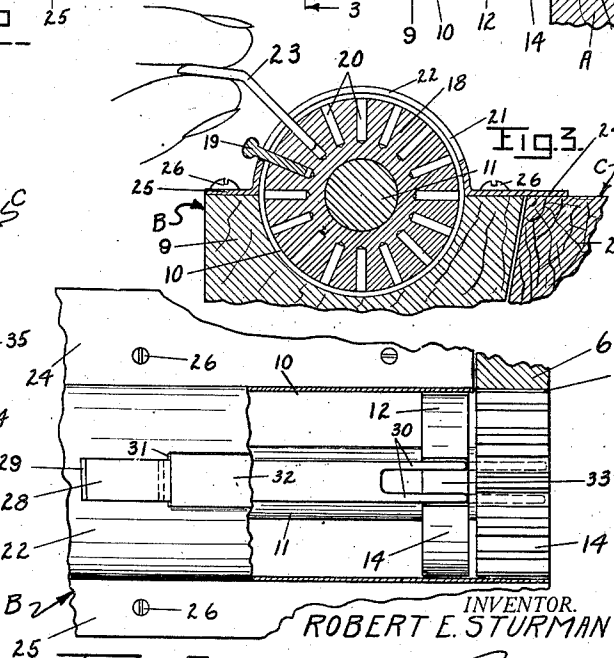


Fig. 4

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SASH BALANCE

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4 Claims. (Cl. 16—201)

This invention relates to a sash balance, and the primary object is to provide means of a novel, efficient, and practical nature for counterbalancing or offsetting the weight of the respective, vertically movable sashes, to thereby eliminate the use of sash weights and other devices commonly employed, while at the same time providing means for releasably securing the sash units in any desired selected positions. A further object is to provide in conjunction with the sash retainer a device for locking the lower sash either in opened or closed positions so that it cannot be further opened or tampered with from the outside of the building. A further object is to provide a sash retainer that will be operative to insure proper vertical movement of the sash and prevent movement at one side in advance of the other, which, particularly in relatively wide windows, frequently causes the sash to bind in the frame. Still other and more detailed objects will be disclosed in the course of the following specification, reference being had to the accompanying drawing, wherein:

Fig. 1 is an elevation, partly in section, of a portion of a window structure embodying my invention, as seen from the back of the window or inside of the building.

Fig. 2 is an enlarged detail section substantially as on line 2—2 in Fig. 1, and with a central portion of the device broken away.

Fig. 3 is an enlarged detail section on the line 3—3 in Fig. 2.

Fig. 4 is a detail side elevation of the adjacent sash ends and rack, as seen when removed from the window frame.

Fig. 5 is an enlarged detail view, partly in section, showing the sash lock feature of the invention.

Referring to the drawing more particularly and by reference characters, A designates a window frame in which are vertically slidable a lower inner sash B and an upper outer sash C. The sashes are separated at both sides of the window frame by parting strips 6 suitably secured to frame A, and in the present instance are comprised of metal bars having upper and lower rows of teeth forming inner and outer gear racks 7 and 8, respectively.

The upper rail or cross bar 9 of the inner or lower sash, B, is longitudinally recessed, as at 10, to accommodate the sash retaining device. This device includes a shaft 11 which is rigid throughout its length and is journaled at its ends in suitable bearing supports. In the present instance such supports consist of bearing

plates 12 which are secured to the sash in suitable recesses 13 (see Fig. 1). Outwardly of these bearing plates the shaft 11 is provided with gear pinions 14 which are rigid on the shaft and with respect to each other. These pinions mesh with the racks 7 to cooperate therewith as the sash is raised and lowered, and as the pinions must revolve in unison it will follow that both sides of the sash must move in unison and consequently there will be no lateral tilting or twisting of the sash causing it to bind or stick in the frame.

Surrounding the shaft 11, within the recess 10, is a spiral torsion spring 15, one end of which is secured to the shaft, as at 16 (Fig. 2), while the other end is anchored, at 17, in a ring or collar 18 near the other end of the shaft and rotatable with respect thereto. This collar 18 is turned to twist the spring 15 until it produces the necessary or desired torsional resistance in the shaft 11, which resistance is in a direction to act upon the pinions 14 and tend to move them upwardly on the racks 7, thus offsetting or counterbalancing the weight of the sash; and the spring is of sufficient size and strength to maintain the sash in any vertical position to which it may be adjusted.

The collar 18 is releasably secured against accidental rotation by a pin 19 (Fig. 3) adapted to engage in any one of an annular series of radially disposed holes 20 in the collar. The pin 19 has a headed end which projects beyond the collar and through a slot 21 in a shield 22, and the torsional action of the spring 15 causes the pin 19 to stop in one end of the slot 21 to prevent rotation of the collar 18 under the spring action. The collar is also operative to adjust the tension of the spring 15, and when this is to be done some suitable device, such as a key 23 (Fig. 3) is inserted in one of the holes 20 and is then moved, lengthwise in slot 21, and in either direction of rotation depending upon whether the spring is to be tightened or loosened. Before such adjustment is made it will of course be necessary to remove the pin 19 which is subsequently reinserted when the adjustment has been completed, or even during a step by step adjustment should the same be of substantial character.

The shield 22 is of semi-cylindrical or arcuate form so as to neatly cover and protect the mechanism within the channel 10, and is also preferably of such length as to cover the pinions 14 so as to operate as a guard to prevent a person's fingers from getting injured by the gear and rack mechanism. The shield or guard plate 22

has side flanges 24 and 25 to accommodate fastener screws 26, and it is to be noted that the flange 24 projects beyond the rail 9 of sash B to project over the adjacent lower rail 27 of upper sash C and thereby assists in sealing the opening or crack between the sash bars 9 and 27 against the weather.

The device is provided with means for releasably locking the shaft 11 against rotation, and this locking means may be used either for the purpose of locking the window sash B in its vertically adjusted position, or may be used to merely prevent rotation of the shaft 11 and pinion 14 under the action of the spring 15 when it is necessary for repair or other purposes to remove the sash from the window frame; for at such time the pinions 14, becoming disengaged from the rack bar parting strips, would leave them and the shaft 11 free to rotate under the rotating action of the spring 15. The locking device in question consists of a narrow slide 28 having an upstanding finger gripping flange 29 at one end, and having a pair of prongs 30 at its other end for engagement between teeth of the pinion 14 at one end of the shaft 11, as shown particularly in Figs. 1 and 5. The slide 28 is movable through a narrow slot 31 in the shield 22, and is guided in a shield recess formed by an upwardly punched portion 32 of the shield. The forked or prong end of the slide is also guided in a notch 33 in the upper end of the bearing plate 12.

Under normal operating conditions the slide 28 is in the inactive position shown by full lines in Fig. 5, and when the lock is to be used either for safety or removal purposes, the slide 28 is moved into the dotted line position, as shown in Fig. 5, at which time the prongs 30 engage the pinion 14 to prevent rotation of the shaft 11.

The structure as thus described is substantially duplicated insofar as the outer and upper sash C is concerned, except of course that the device is located in the lower horizontal rail of the sash C, and is inverted so that the pinions 34 of shaft 35 will properly engage the outer and lower rack 8 of the parting strip 6.

It is understood that suitable modifications may be made in the structure as disclosed, provided such modifications come within the spirit and scope of the appended claims. Having now therefore fully illustrated and described my invention, what I claim to be new and desire to protect by Letters Patent is:

1. A sash balance for a window having a frame and a sash slidable in the frame, a pair of toothed

racks secured to the frame adjacent opposite sides of the sash, a shaft journaled to the sash and extending transversely thereof, pinions mounted on the ends of the shaft and meshing with the respective racks, a collar on the shaft, a torsion spring encircling the shaft with one end secured thereto and with the other end secured to the collar, an arched shield overlying the shaft and having an arcuate slot extending transversely thereof in line with the collar, said collar having a circumferential series of radial sockets therein adapted for selective reception of a peripherally projecting pin positionable therein through the arcuate slot in the shield for securing the collar in rotatably adjusted positions by engagement with an end wall of the slot for holding the shaft under the desired tension afforded by the torsion spring.

2. A sash balance as set forth in claim 1, characterized by said collar being rotatably adjustable for varying the tension of the torsion spring by means of an implement adapted to be extended through the shield slot for reception in a socket in the collar to constitute an operating lever for the collar.

3. A sash balance for a window having a frame and a sash slidable in the frame, a pair of toothed racks secured to the frame adjacent opposite sides of the sash, a shaft extending transversely of the sash, bearings in which the opposite ends of the shaft are journaled, pinions mounted on the ends of the shaft and meshing with the respective racks, a collar on the shaft, a torsion spring encircling the shaft with one end secured thereto and with the other end secured to the collar, an arched shield overlying the shaft and bearings therefor and having an arcuate slot therein in line with the collar, means selectively positioned peripherally of the collar and engaged with an end wall of said slot for tensioning the torsion spring and means for releasably locking the shaft against rotation including a portion struck-up from said shield adjacent one end thereof to form a guide-way, a key slidable in said guide-way and said key being bifurcated at its outer end to provide a pair of prongs for engagement with the teeth of the pinion upon the adjacent end of the shaft.

4. A sash balance as set forth in claim 3, characterized by the bearing for the shaft end beneath the sliding key having a groove in its upper end forming a guide support for the bifurcated end of the key.

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