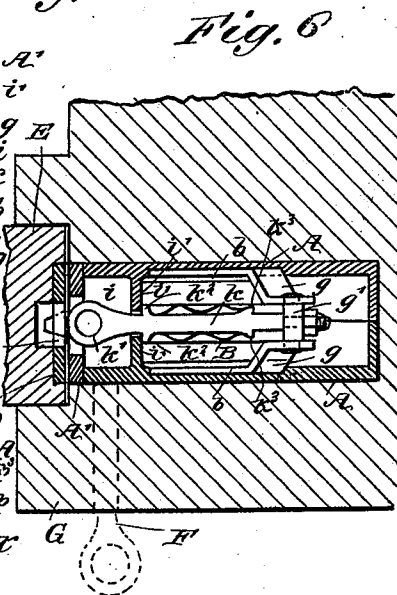
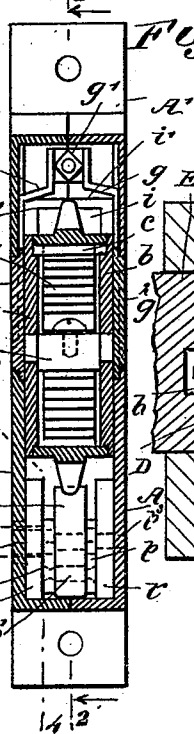
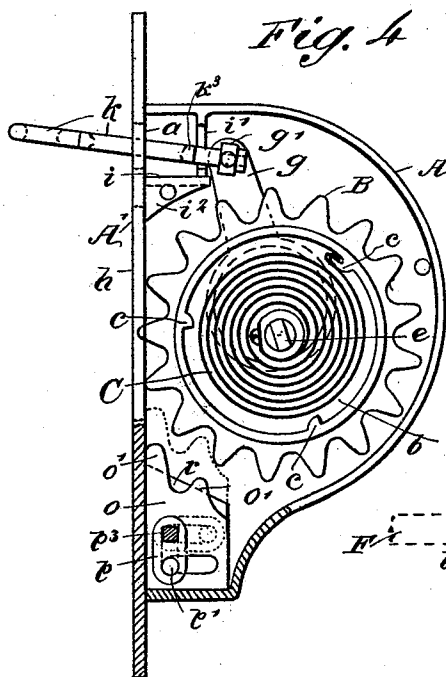
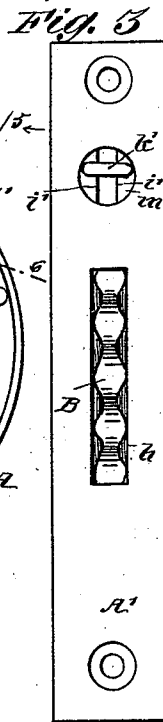
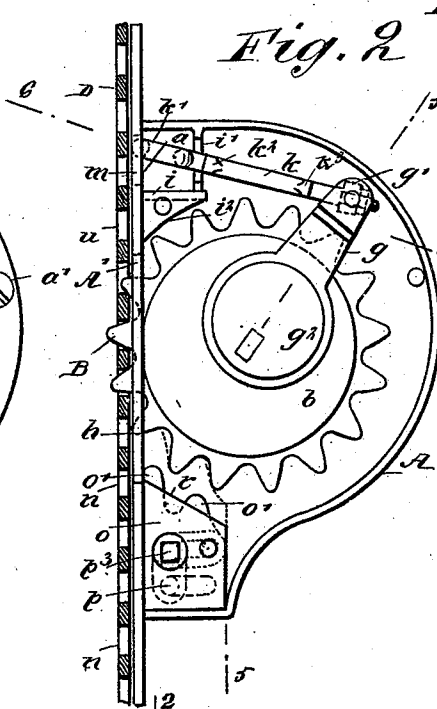
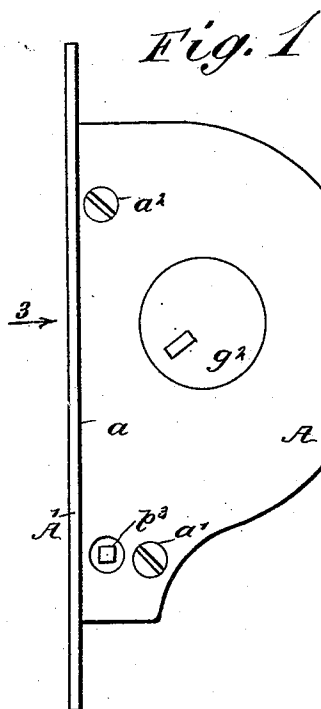


(No Model.)

V. SCHIRMER.  
SASH BALANCE.

No. 516,687.

Patented Mar. 20, 1894.



WITNESSES:

*C. Neveu*

*C. Sedgwick*

INVENTOR

*V. Schirmer*

BY

*Munn & Co*

ATTORNEYS.

# UNITED STATES PATENT OFFICE.

VALENTINE SCHIRMER, OF NEW YORK, N. Y.

## SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 516,687, dated March 20, 1894.

Application filed May 10, 1893. Serial No. 473,677. (No model.)

*To all whom it may concern:*

Be it known that I, VALENTINE SCHIRMER, of New York city, in the county and State of New York, have invented a new and useful Improvement in Sash-Balances, of which the following is a full, clear, and exact description.

This invention relates to improvements in sash balances, of a type wherein a volute coiled spring is employed as a counterbalance for the weight of the window sash, and has for its objects to provide a novel and simple device of the character mentioned, which will be adapted for application to window frames of different dimensions, be capable of convenient adjustment for an increase in tensional force of its spring, and be enabled to receive a locking adjustment which will retain the coiled spring from relaxing when the sash balance is prepared to receive and sustain a window sash if used in pairs. Also to adapt the novel mechanism to receive an adjustment which will permit the free introduction and removal of the window sash, and the ready production of a working connection between the sash and the novel counterbalancing devices that sustain said frame in a sliding condition within the window casement.

To these ends, my invention consists in the construction and combination of parts, as is hereinafter described and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side view of the improvement. Fig. 2 is a side view of a main portion of the device with one side wall of its case removed, on the line 2—2 in Fig. 5, showing interior parts adjusted to engage another part of the invention, shown broken and in longitudinal section. Fig. 3 is an edge view of the spring balance device taken opposite the arrow 3, in Fig. 1. Fig. 4 is a side view of parts, exposed when the case side wall is removed, on the line 2—2 in Fig. 5, and partly in section on the line 4—4 in said figure, the mechanism being changed in adjustment from the relative position of said parts shown in Fig. 2.

Fig. 5 is a transverse sectional view of the device, on the line 5—5 in Fig. 2; and Fig. 6 is a plan view, in section on the line 6—6 in Fig. 2, showing the improved sash balance in position for service on a window casement and connected to a sash frame, shown broken and in section.

The external case which is provided to support the principal working parts of the device within it, is preferably cast from metal in two similar half sections A A, these equal portions having a contour substantially as shown, and when joined together as indicated in Figs. 5 and 6, producing a chamber having parallel side walls and a mainly circular edge portion that has a straight edge *a*, joined to the curved part, said half sections of the case being held together by the transverse screws *a' a'*, the heads of which are shown in Fig. 1. Duplicate orifices are oppositely produced in the case side walls A, that are concentric with the curved edge wall of the case, and of such a diameter as will permit the introduction therein of other parts which will presently be described. There is a toothed ring B, provided which is of a diameter proportioned to the interior dimensions of the case walls A, so that it may be moved a suitable degree between the straight wall *A'*, on the case, and its curved edge portion. The peripherally toothed ring B, is provided with the similar side plates *b*, that are circular on the edges and such a relative diameter as will locate said edges near to the teeth of the ring when these parts are assembled, and to properly effect the latter, a suitable number of spaced ribs *c*, are formed on the inner surface of the toothed ring B, and made to project laterally therefrom at each side, providing dowel ends which enter mating holes in the inner sides of the plates *b*, whereby the latter are retained at proper points on the sides of the ring B. The volute spring C, is made of a correct length and strength to afford effective service, which springs should be proportioned in tensional force to the weight of the sash that is to be supported by them, when used in pairs for such service. The inner terminal of the volute spring C, is secured upon the arbor *e*, near the longitudinal center of

the latter, and has its other end that is outermost, bent into hook form, and made to firmly interlock with one of the ribs *c*, as shown in Fig. 4.

5 A yoke frame is furnished for the support of the toothed ring B, and attached parts that have been described, said frame comprising two arms *g*, that are bent toward each other and then upwardly in parallel planes leaving  
10 a space between which is filled by a spacing swivel block *g'*, that is pivoted by trunnion ends in holes formed in the upper end portions of the arms as indicated in Fig. 5. On the lower end portions of the yoke frame-arms  
15 *g*, which are sufficiently spaced apart to loosely embrace the side plates *b*, the similar flat hub plates *g''*, are formed; said hub plates are circular and of a diameter which will permit them to respectively fit into the circular  
20 apertures cut in the side walls of the case pieces A, A, and be adapted for a rotatable movement therein, each hub plate having a radial flange formed on its inner edge, which flanges have a loose contact with the inner  
25 sides of the case pieces A, which will maintain the yoke frame in proper connection with the case of the device. The hub plates *g''*, are secured upon the side plates *b*, eccentrically with regard to the center of the latter, and as indicated in Figs. 2 and 5, said  
30 eccentricity locates the hub plates near the upper edge of the gear ring B, when the parts are assembled for use. The end portions of the arbor *e*, are preferably given a rectangular form and are secured in mating holes  
35 formed in the side plates *b*, and the attached hub plates *g''*, said holes being produced near the centers of the side plates *b*.

The straight edges *a* of the two case half  
40 sections A, A, are provided to receive the escutcheon plate A' that is a part of the case when secured to the sections mentioned, and consists of a flat metallic piece of elongated rectangular form, the length of which is so  
45 proportioned to the vertical dimensions of the parts A, that when joined to them said plate A', will project a proper distance beyond the case proper at its top and bottom sides, screw holes being formed in said projecting  
50 portions, to permit the plate A', to be affixed upon a window stile when the device is placed thereon. A longitudinal slot *h* is formed in the escutcheon plate A', at the transverse center, which slot is intended to permit a portion  
55 of the toothed ring B to pass outwardly through it as represented in Fig. 2. The escutcheon plate A', has a bracket flange *i*, projected from its face that engages the straight edges *a* of the case sections A, said flanges having such a location as will permit the similar  
60 lateral flanges *i'*, to have a loose contact with its top surface; these lateral flanges being projections from the inner surfaces of the case sections A, A, join at the transverse center of the bracket flange and together form a vertical wall, thus producing a small box-like

inclosure above the horizontal wall of the bracket flange *i*, as represented in Fig. 2. There is an upright slot formed in the flanges *i'*, where they impinge, that is of a correct  
70 size to admit the pull bar *k* to pass through and freely reciprocate therein, which bar has its inner end loosely secured to revolve in the trunnioned swivel block *g'*, the outer end of the bar having a ring eye *k'*, formed on it.  
75 The bracket flange *i*, has two similar depending portions *i''*, formed on it as shown in Figs. 2 and 4, which flange portions are oppositely perforated for the passage of the screw *a''*, that serves to retain the upper part of the escutcheon plate A', secured to the case portions A, the lower parts of the latter being clamped on the escutcheon plate in a way that will be hereinafter explained. It will be seen  
80 that if the pull bar *k*, is drawn outwardly through an orifice *m*, formed in the plate A', the yoke frame and toothed ring B, will be rocked from the slot *i*, and the entire ring with the frame will be caused to recede from the escutcheon plate.  
90

A flat plate D, is provided for each spring balance, which plate is perforated at spaced intervals as indicated at *n*, in Fig. 2, where a part of said plate is shown, the degree of separation and form of these perforations adapting the plate D, to serve as a rack with which  
95 the teeth of the ring B, may be caused to engage.

It is intended that a rack plate such as D, of a suitable length, be furnished for each  
100 side edge of a window sash E which is to be balanced with duplicate devices such as has been described, which racks D, are affixed so that the spring balance devices may be caused to have an opposite meshed engagement with  
105 them, and so support the sash that it may be slid in the casement. The rack plates D are used in preference to racks having projecting teeth, as this construction of the racks takes up but little room between the stiles and sash, and affords smooth surfaces for the reciprocation of the sash.  
110

The connection of the volute spring C, with the arbor *e*, and toothed ring B, is such as will cause the weight of an imposed sash to wrap  
115 said spring more closely on its arbor, and to prepare said spring for service as a sash balance, a loose rack plate D, is applied to the projected teeth of the ring B, and drawn downwardly thereon, which will increase the supporting power of each spring so wound, which  
120 should be equally effected in a pair of the improved sash balance devices that are required to sustain sash and facilitate its free reciprocation as before mentioned.  
125

It is necessary to provide means for the retention of the toothed ring B, in meshed connection with a rack plate such as D, and also to adapt such a locking device for a quick and convenient release therefrom. To this end,  
130 the pull bar *k*, has two opposite ribs *k''*, formed on it at a proper point to impinge on the inner

surface of the lateral flanges  $i'$ , after the pull bar is pushed rearwardly a proper degree and the teeth of the gear ring B, are sufficiently projected, said engagement of the ribs being produced by a rotatable movement of the pull bar that will dispose the ribs vertically, a quarter turn of the pull bar releasing the same and permitting the yoke frame and ring B, to be rearwardly moved a proper degree to retract the latter and locate it entirely within the case A, A', as represented in Fig. 4; the ribs  $k^3$ , being projected from the pull bar at a proper point to lock the bar extended as shown in said figure. When the volute spring C, is coiled to increase its tensional force, it is necessary at times to retain it from a recoil movement; for this purpose a locking device for the toothed ring B, is provided, consisting of the sliding plate  $o$ , that has teeth  $o'$ , formed on its upper edge, said plate resting against the escutcheon plate A', is seated when not in use, upon the bottom of the case A. The sides of the plate  $o$ , are loosely embraced by the twin crank arms  $p$ , which are joined together at their outer ends with a journal pin  $p'$ , which loosely engages a horizontal slot  $p^2$ , that is cut in the plate  $o$ , in parallel with the lower edge of the latter, as represented in Fig. 4. The crank arms  $p$ , are each furnished with a trunnion  $p^3$  which projects oppositely and loosely engage perforations in the parallel bracket flanges  $r$ , that project from the escutcheon plate A', and have a loose contact with the sides of the case sections A, and crank arms  $p$ , between which parts these flanges are inserted. A single screw hole is formed in each bracket flange  $r$ , which holes are aligned with opposite screw holes formed in the sides of the case sections A, A, so that a screw  $a'$ , may be inserted from one side of the case through the holes in the flanges  $r$ , and be screwed into a tapped hole in the other side wall of the case, which will attach the lower end portion of the escutcheon plate A', firmly upon the straight edges of the case sections near the lower edges of the latter. One trunnion  $p^3$ , is squared on its outer end and projects within a perforation oppositely formed in the side wall of a case section A, the squared portion of said trunnion being adapted for the reception of a key F, shown in dotted lines in Figs. 5 and 6, which by a rotatable movement will project the toothed edge of the locking plate  $o$ , into engagement with the teeth of the ring B, as represented by dotted lines in Fig. 4, or remove these teeth from a locking engagement with a toothed ring as indicated by full lines in the same figure, so that when a spring C, has been sufficiently wound upon its arbor  $e$ , by use of a rack plate D, the force of the spring may be prevented from relaxing by an interlocking connection of the plate  $o$ , with the toothed ring B.

When the improved sash balancing device, is to be secured in pairs upon the stiles of a window casement, there is a suitable excavation produced in each stile G, as indicated in

Fig. 6, which will permit the complete embedment of the case of the device, and the seating of the plate A', in a shallow recess made for it. The plates A', should then be screwed fast to the stile G, and as the sash balances are oppositely located, it will be seen that when a window sash that is designed to traverse the casement is placed within and its racks D, engaged with the toothed rings B, the sash may be slid and supported by the balancing devices.

The provision of the locking plate  $o$ , and its connections that adapt it for an elevation or depression, is of particular advantage when the springs of a pair of the improved sash balancing devices are adjusted for the weight of the sash, that has not as yet been placed in the casement of the window.

The introduction of which sash may be readily effected, if the toothed rings B, are retracted, which will permit the sash to be laterally slid into place, and the terminals of the attached plates D, brought opposite the slots in the escutcheon plates A', when the pull bars  $k$ , may be manipulated to project the toothed rings B, outwardly through the slots in the plates A', and then be turned to retain them so adjusted, which will throw the weight of the sash upon the springs C, that will counterbalance it, and permit its free vertical movement.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A sash balance, comprising a case slotted at the front, a toothed ring within, eccentrically supported on side plates arranged to rock in opposite perforations of the case sides, a volute spring within the ring and connected by one end thereto, a transverse arbor fastened to the spring and at the ends to the side plates, and a device to rock the ring on its eccentric supports and project it through the case or retract it, substantially as described.

2. A sash balance, comprising a bisected case, and an attachable slotted escutcheon plate, a toothed ring, side plates therefor, an arbor, a volute spring within the ring, a yoke frame eccentrically connected to the ring and a rotatable pull bar adapted to rock the toothed ring toward or from the slotted plate, and by a partial rotation of said bar lock the ring projected or retracted, substantially as described.

3. A sash balance comprising a bisected case, an attachable slotted escutcheon plate, a toothed ring within, side plates interlocked with the ring, a volute spring in the ring and attached by one end thereto, a transverse arbor fast to the inner end of the spring and secured to the side plates, and a yoke frame, hub plates of which are eccentrically secured on these side plates, and loosely engage opposite apertures in the sides of the case, substantially as described.

4. In a sash balance, having a spring pressed toothed ring within a case, and adapted for

a partial rotary and rocking movement toward or from a slotted plate that is the front of said case, a locking device for the toothed ring comprising a toothed slide plate, and  
5 two trunnioned crank arms having a connecting cross-pin engaged with a slot in the slide-plate and adapted by manipulation to move

the teeth of the slide plate toward or from the toothed ring, substantially as described.

VALENTINE SCHIRMER.

Witnesses:

WM. P. PATTON,  
E. M. CLARK.