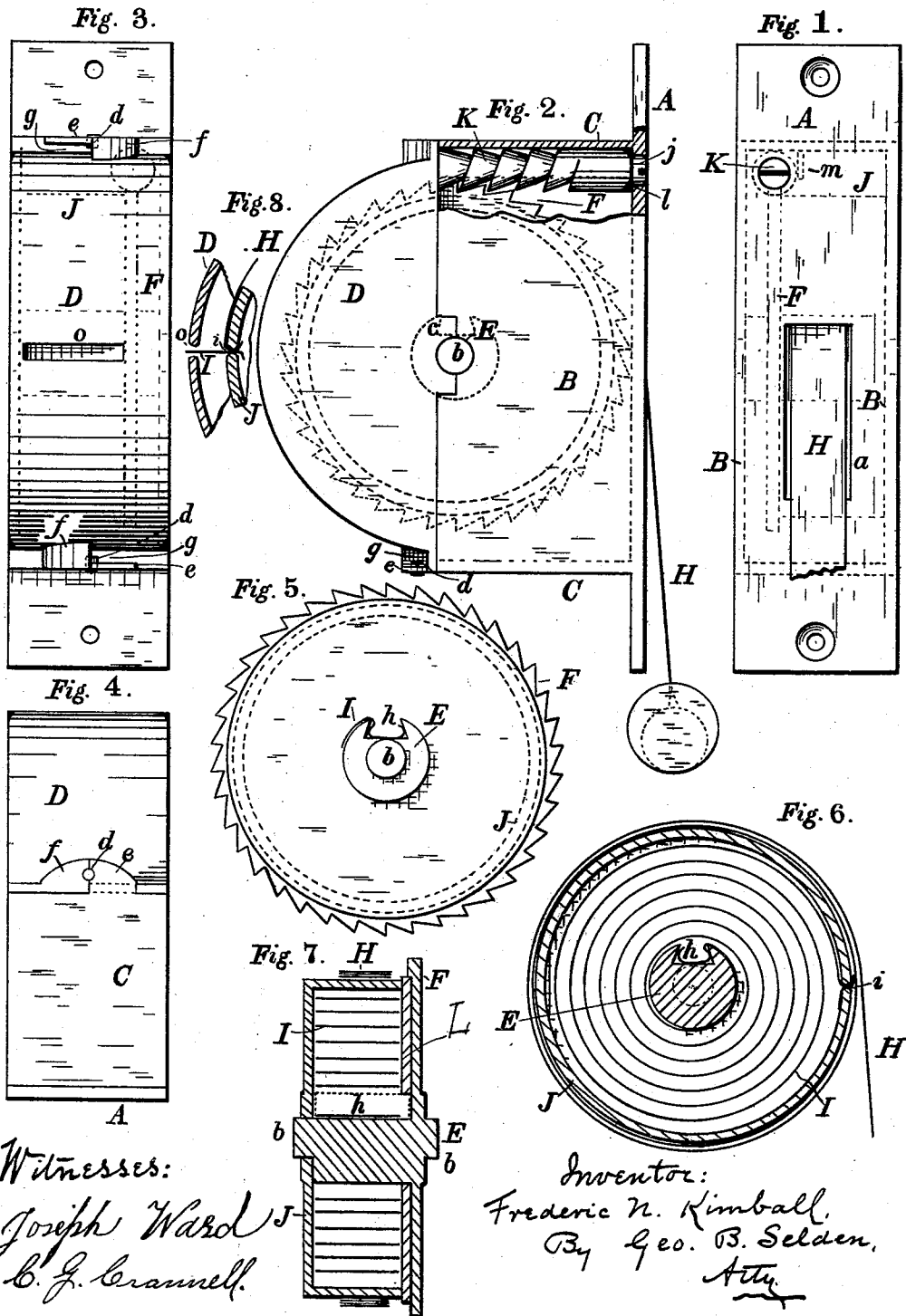


(No Model.)

F. N. KIMBALL.
SASH BALANCE.

No. 479,150.

Patented July 19, 1892.



UNITED STATES PATENT OFFICE.

FREDERIC N. KIMBALL, OF ROCHESTER, NEW YORK.

SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 479,150, dated July 19, 1892.

Application filed March 26, 1892. Serial No. 426,516. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC N. KIMBALL, a citizen of the United States, residing at Rochester, New York, have invented certain
5 Improvements in Sash-Balances, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to certain improvements in the construction of spring sash-balances, which improvements are fully described and illustrated in the following specification and the accompanying drawings, the novel features thereof being specified in the claims annexed to the said specification.

15 My improvements in sash-balances are represented in the accompanying drawings, in which—

Figure 1 is a face view. Fig. 2 is a side elevation. Fig. 3 is a rear view. Fig. 4 is an
20 end view. Fig. 5 represents the ratchet, friction-disk, and spindle detached. Fig. 6 is a section through the drum and spindle. Fig. 7 is a transverse section through the drum and ratchet. Fig. 8 is a partial section through
25 the cover and drum, showing the manner of winding up the spring.

A is the face-plate of my improved sash-balance, which is provided with an opening *a*, through which the tape *H* passes. On the
30 rear side the face-plate is provided with the cheeks *B B* and end pieces *C C*, forming an inclosing casing in connection with the cap or cover *D*, within which the operative parts of the balance are located.

35 *E* is the spindle, and *J* the drum around the exterior of which the tape *H* winds. The spring *I* is placed within the drum, one end being attached to the spindle and the other to the drum.

40 *F* is a ratchet-wheel connected to or formed in one piece with the spindle, and *K* a worm which meshes with the teeth of the ratchet and by which the tension of the spring is adjusted. The worm *K* projects through the
45 face-plate, as indicated in Fig. 1, its front end being provided with a slot for a screw-driver or otherwise arranged so that the worm may be revolved by a suitable instrument from the outside when the balance is in place in the
50 window-casing.

The spindle *E* is provided on each end with the projecting journals *b b*, which are fitted

into suitable openings formed half in the cheeks *B B* and half in the cover *D*, as indicated in Fig. 2. The cover is preferably provided with projections *c*, which engage in
55 notches in the cheeks *B B* to prevent lateral movement of the cover. At the ends the cover is fastened to the case by the pins *d d*, which fit an opening formed partially in the
60 lug *f* on the cover and partially in the flange *e* on the end wall *C*. A space *g* is left between the cover and the flange *e*, so that the pins *d d* may be forced out by the introduction of a suitable instrument into the space.
65 The pins may be tapered, if preferred. The holes for the pins are drilled while the cover and case are held together.

The circular wall of the drum is provided with a transverse slot *i*, Fig. 6, into which the
70 tape and spring are secured by being driven in sidewise. This arrangement forms a simple and convenient mode of attachment for the tape and spring. The slot is cast in making the drum, so that the construction is very
75 cheap. The inner end of the spring is fastened to the spindle by being bent double and inserted in the beveled slot *h*, formed lengthwise of the spindle, as indicated in Fig. 5. Any other suitable means of attaching
80 ing the spring to the spindle may, however, be adopted. The spindle and spring are normally prevented from turning with the drum as the tape is wound up or unwound by the engagement of the teeth of the ratchet *F*
85 with the worm *K*. The worm, however, enables me to turn the spindle so as to vary the tension of the spring to adapt the balance to sash of different weights. The worm is provided at its outer end with a journal *j*, Fig.
90 2, of reduced diameter, so that a shoulder *l* is formed, which bears against the inner surface of the face-plate, so as to prevent end-wise movement of the worm. At its other end the worm bears against the cover. Any
95 preferred shape may be given to the teeth of the worm, the form shown being preferred for convenience in casting. The worm is located in the corner of the case, a flange *m*, Fig. 1, being cast on the inner surface of the
100 end piece *C* to hold the worm in place.

Between the drum *J* and the ratchet-wheel *F* is placed the friction-disk *L*, which is formed of rawhide, leather, or other suitable

material. The edge of the circular wall of the drum bears against the friction-disk. It will be observed from Fig. 7 that the drum is supported on the spindle only on the side
 5 away from the friction-disk, so that the strain of the tape on the drum when it occurs increases the friction between the edge of the drum and the disk. This arrangement secures an equable movement of the sash, prevents jerks, and equalizes the power of the
 10 spring. This arrangement may be employed without the ratchet and worm.

By my improvement of the ratchet and worm I am enabled to adjust the spring for a variation in the weight of the sash of upward of
 15 ten pounds, thus reducing the number of different sizes of balances which the manufacturer is required to make in order to meet the demands for all weights of sash.

20 In Fig. 8 I have represented in section the cover and the circular flange of the drum, showing the manner of winding up the spring by turning the spindle by means of the ratchet and worm. The spring passes into the drum
 25 through the slot *o* in the cover and the slot *i* in the drum. The inner end of the spring is secured to the spindle, which is then caused to revolve, so that the spring is coiled up inside the drum until its end, which is provided with
 30 a hook or bend, engages with the flange at one side of the slot *i*, after which the drum, being now free to revolve, will be turned by the continued revolution of the spindle and the tape will be wound upon the drum. Any other
 35 suitable means of revolving the spindle may be employed; but the ratchet-wheel and worm furnish a convenient way of doing this.

I claim—

1. The combination, in a sash-balance, of
 40 the face-plate A, having cheeks B B, the cover D, and a spring-drum and suspension carried by a central spindle having journals supported in bearings formed in the meeting edges of the cheeks and cover, a ratchet-wheel attached
 45 to the central spindle, and a worm meshing

with the ratchet and capable of being revolved from the exterior of the face-plate, substantially as described.

2. The combination, in a sash-balance, of the face-plate A, having cheeks B B, the cover
 50 D, and the spindle E, the spring-drum J, having tape H thereon, supported on the spindle on one side only and arranged to bear on a suitable friction-surface on the opposite side, and a ratchet-wheel attached to the central
 55 spindle, and a worm meshing with the ratchet and capable of being revolved from the exterior of the face-plate, substantially as described.

3. The combination, in a sash-balance, of 60 the face-plate A, having cheeks B B and end plate C, provided with inwardly-projecting flange *m*, the spring-drum J, tape H, spindle E, ratchet F, and worm K, located in the angle between one of the cheeks and the end
 65 plate and supported laterally by the flange *m*, substantially as described.

4. The combination, with the mechanism of a spring sash-balance, of the face-plate A and casing B C, having lugs *ee*, and the removable
 70 cover D, having lugs *ff* and the pins *d d*, substantially as described.

5. The combination, in a sash-balance, of the face-plate A, having cheeks B B, the cover
 75 D, and a spring-drum and suspension carried by a central spindle having journals supported in bearings formed in the meeting edges of the cheeks and cover, substantially as described.

6. The combination, in a sash-balance, of 80 the face-plate A, having cheeks B, the cover D, having slot *o*, and the slotted spring-drum J, and means for revolving the spindle to wind up the spring by drawing it through the slots, substantially as described.

FREDERIC N. KIMBALL.

Witnesses:

JOSEPH WARD,
 C. G. CRANNELL.