(No Model.)

W. BERRY.

SASH BALANCE.

No. 456,715. Patented July 28, 1891.

Fig. 1.

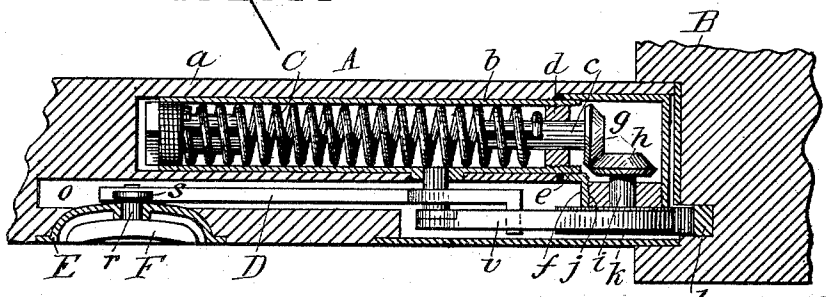


Fig. 2.

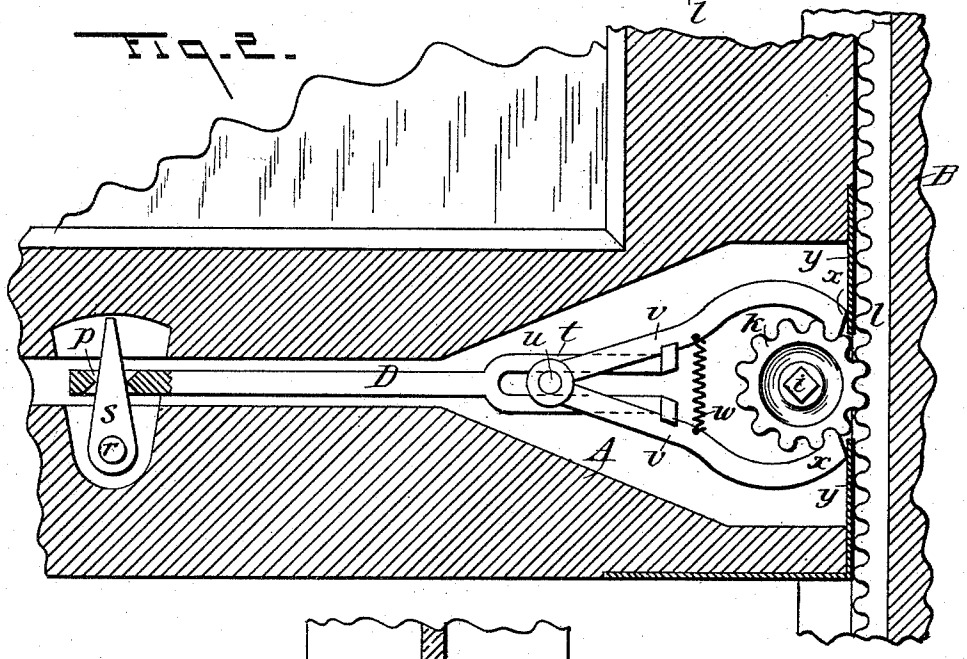
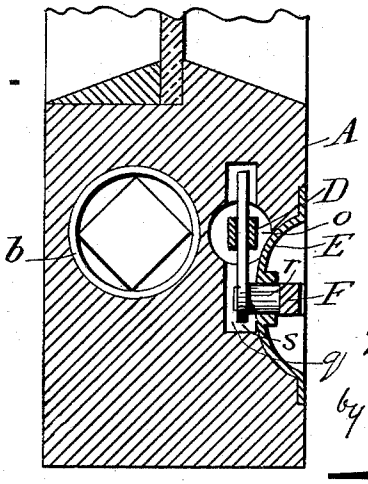


Fig. 3.



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UNITED STATES PATENT OFFICE.

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SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 456,715, dated July 28, 1891.

Application filed October 10, 1890. Serial No. 367,685. (No model.)

To all whom it may concern:

Be it known that I, WASHINGTON BERRY, a citizen of the United States, and a resident of Angel Island, Marin county, State of California, have invented certain new and useful Improvements in a Combined Sash-Balance and Lock; and I hereby declare that the following is a full, clear, and exact description of the said invention.

My invention relates to sash-balances of that class in which the weight of the sash is counterbalanced by a spring put under torsional strain when the sash is lowered, and which when the sash is raised exerts its resilience upon a connected mechanism, and thus assists in the lifting of the sash.

The object of my invention is to provide a simple and certain mechanism of this class, and also to combine with it a convenient form of sash-lock, operated by the same handle provided for lifting the sash, so that the operation of releasing the lock and raising the window may be performed at the same time with one hand.

My invention consists in certain features of construction and arrangement which need not be here specifically set forth, but which are fully hereinafter described and claimed, as well as shown in the accompanying drawings, in which—

Figure 1 is a horizontal section through the lower rail of the sash and the window-casing. Fig. 2 is a vertical section through the sash-rail, showing the locking device in front elevation. Fig. 3 is a cross-section of the sash-rail.

A represents a window-sash, and B a window-casing, both of ordinary construction.

I describe herein the application of my invention to the lower sash; but it is evident that it is equally applicable by a simple duplication of parts to the upper sash as well. The bottom rail *a* of the sash is chambered at the corner and is bored out centrally to receive a metallic tubular bushing *b*, Fig. 1, fitted tightly therein, and containing a torsional spring C, one end of which is secured to the bushing or to a fixed plug within the same, and the other to a rotary pin or shaft *c*. This pin is journaled in a threaded plug *d*, which forms a bearing for it, and which is secured by an engagement with an internal thread *e* of the bushing. The use of this bushing constitutes a marked improvement over devices of this class previously used, where the spring has encircled a long central rod, leaving it free to bind by friction upon the surrounding wooden surface of the bore in the sash-rail. The bushing is provided or formed with an elbow *f*, the end of which projects forward at right angles to the sash-rail, as shown.

On the end of the pin *c* is a beveled pinion *g*, which engages with a similar pinion *h* on the pin *i*, the latter being journaled in a threaded bearing *j* at the mouth of the elbow. This pin *i* also carries a spur-pinion *k*, which projects slightly from the chambered sash-rail and engages with a vertical rack *l*, countersunk or embedded near one side of the bottom of the runway of the sash, said pinion *k* thus being upon the same vertical plane as the sash-rail *a*. It is clear, then, that the rotation of pinion *k* and pin *i*, transmitted to the pin *c* by the beveled gears *g* and *h*, will wind up the spring, and thus store up in it a torsional force, which tends to raise the sash. This force is applied to the described connected mechanism when the sash is raised, and the force of the spring and the weight of the sash are so nearly equal that a very slight application of power is required to raise the window to any desired point. In the opposite runway I prefer to place a similar rack and a loose guiding-pinion.

With the devices thus far described I combine an automatic sash-lock, which I shall now describe. In apparatus of this general character heretofore used it has been necessary to unlock the sash with one hand and raise it with the other. By the improved sash-lock connections now to be described I am able to unlock the sash and to raise it at the same time and with the same hand.

Referring to the cross-section, Fig. 3, it will be seen that I provide the casing with a second bored-out chamber *o*, independent of or communicating with the first. This bore is of just sufficient capacity to receive a horizontal rod D, which extends to about the middle of the sash-rail, where it is provided with a slot *p*.

E represents a plate countersunk in the face of the sash-rail at its middle and having a central sink or depression. A hole *q* extends into the rail from the bottom of this depression, which is turned up at right angles and communicates with the chamber *o*.

F is a handle within the face-plate and fixed to a pin *r*, upon the inner squared end of which is an arm *s*, which engages with the slot *p* of the rod D. By slightly turning the handle F the rod D is moved longitudinally in its chamber. At its other end said rod D is provided with a slotted head *t*, through which passes a pin *u*, upon which are loosely pivoted two pawls *v*, connected together by a tension-spring *w*, which tends to draw them together. The spur-pinion *k* is of sufficient diameter to permit these pawls to engage with it, and in addition to the lock thus provided the pawls are formed with projecting corners *x*, which bear above and below the pinion upon the face-plate *y*, which closes the chamber of the sash, and by frictional contact assists to keep the pawls in engagement with the pinion. The pawls are unlocked by slightly turning the handle F, and thus moving the rod D, the slotted head *t* of which bears upon both pawls and thus spreads them. The sash may then be raised by the handle F to the desired point. When the handle is released, the spring *w* draws the pawls together, and the pinion *k* is thus instantly locked against further movement. The corner of the sash is of course chambered out sufficiently to contain the locking mechanism and the gearing.

It will be noticed that instead of having independent sash-lifting and lock-releasing handles I combine the two devices in one, and by placing the handle at the middle of the sash-rail the window is easily lifted with the hand by which the lock-releasing rod is also operated.

It is possible to dispense with the tubular bushing for the chambered sash-rail and to place the spring within such chamber and secure it at one end to the wood; but as considerable friction is likely to result from contact of the spring-coils with a wooden surface, and as, in addition, the bushing affords a simple and convenient means for supporting the bearings for the rotary portions of the apparatus, I prefer to use it.

It is also evident that in heavy windows the balancing and locking devices may be applied to the rack and pinion at the opposite side of the sash.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a sash-balance, the combination of a window-casing having a vertical rack in the sash-runway, a chambered sash-rail having a torsional spring adapted to be wound up by lowering the sash, a spur-pinion engaging with said rack, and beveled gearing intermediate between said spring and pinion for transmitting to the pinion the torsional force stored in said spring, substantially as set forth.

2. In combination, the window-casing with a vertical rack, the chambered sash-rail, a torsional tension-spring, a rotary pin *c*, connected to one end of said spring, a spur-wheel, a pin *i* at right angles to the pin *c*, said pin carrying the spur-wheel, the beveled pinions between the pins, and a bushing for the spring and gearing having an elbow, substantially as described.

3. The combination, in a sash-balance, of a rack and pinion, a torsional spring in the sash-rail, in connection with and acting upon the pinion, a sash-lifting handle, locking-pawls with means for holding them normally in engagement with said pinion, and a rod for releasing said pawls connected to said sash-lifting handle, substantially as set forth.

4. In a sash-balance, the combination, with a pinion adapted for constant engagement with a rack on the window-casing and with the sash-balancing spring for acting upon said pinion, of a pair of pivoted pawls connected by a tension-spring to secure their normal engagement with said pinion, and a sliding rod having a slotted head for holding the pawls, the projecting ends of said head bearing upon the pawls to release them simultaneously, substantially as described.

5. In a sash-balance composed of a rack and pinion and a spring to act upon said pinion by torsion, a pair of pivoted pawls with means for holding them normally in engagement with said pinion, a slotted rod sliding on a guide-pin which is also the pivot for said pawls and having a head bearing upon both of said pawls, and a handle connected to said rod, all substantially as set forth.

6. In combination, a window-casing having a rack, a sash having a pinion engaging with said rack, a locking device consisting of two pawls, one engaging with the pinion on the upper side and the other on the lower side, and a tension-spring whereby the pinion is locked at the same time against movement in both directions, and an operating-handle connected to both pawls for operating them simultaneously, substantially as described.

7. In combination, a window-casing having a vertical rack, a spur-pinion in the sash-rail and in the same plane as the latter, engaging with said rack, a torsion-spring in the sash-rail connected by beveled gearing to said spur-pinion, and a sash-lock in the same sash-rail engaging the teeth of the pinion and connected to a combined sash-lifting and lock-operating handle, substantially as set forth.

In witness whereof I have hereunto affixed my signature, this 2d day of October, 1890, in the presence of two witnesses.

WASHINGTON BERRY.

Witnesses:
S. W. SEELY,
LEE D. CRAIG.