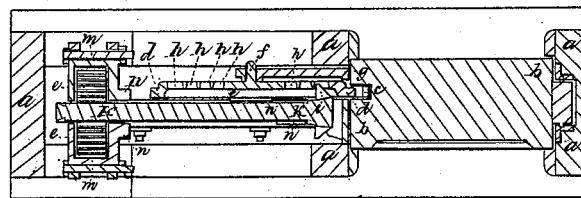
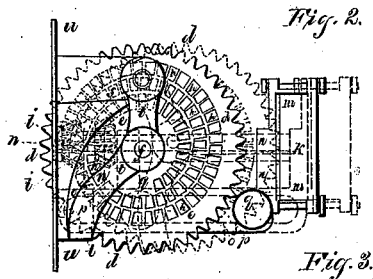
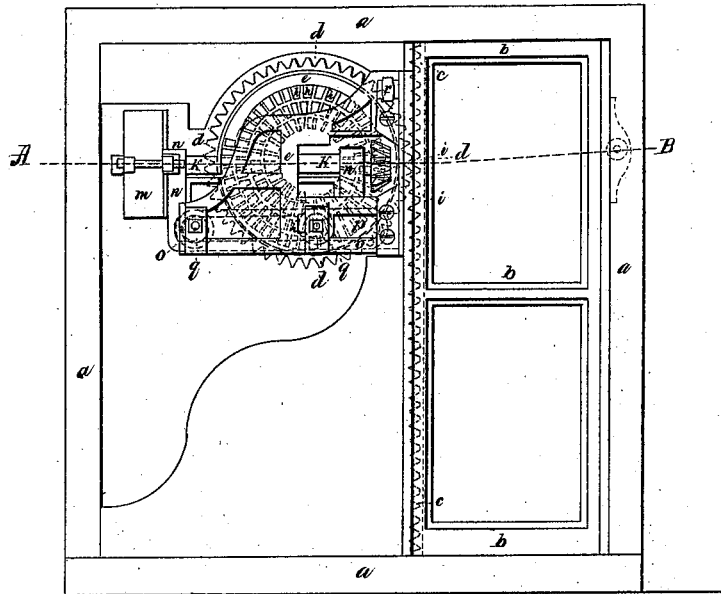


*H. Smith,
Sash Balance.*

N^o 52,333.

*Patented Jan. 30, 1866.
Fig. 1.*



*Witnesses:
M. B. Mansfield
Oliver C. Smith*

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UNITED STATES PATENT OFFICE.

HENRY SMITH, OF SALEM, MASSACHUSETTS.

IMPROVED MODE OF OPERATING WINDOW-SASH.

Specification forming part of Letters Patent No. 52,333, dated January 30, 1866.

To all whom it may concern:

Be it known that I, HENRY SMITH, of Salem, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in the Mode of Operating Window-Sashes and other Similar Devices; and I do hereby declare that the following description, taken in connection with the accompanying plate of drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements, by which my invention may be distinguished from all others of a similar class, together with such parts as I claim and desire to have secured to me by Letters Patent.

The present invention is designed to dispense with the use of weights or ordinary arrangements of springs to balance window-sashes. The objection to the use of weights, such as the length of play they require, &c., is well known, and as a substitute for them devices in which coiled springs have been employed have been applied; but a coiled spring has never, previous to my invention, been practically successful for such purposes, because its power is constantly varying, its maximum force being exerted when first commencing to uncoil and its minimum force when wholly uncoiled, so that a window-sash or other device to be held in position never could be evenly balanced by the use of such a spring.

By my improvements I have succeeded in so combining a coiled spring with certain mechanical devices as to cause the force exerted by the said spring upon a window-sash to be always and uniformly the same, in whatever state of tension the said spring may be.

I accomplish the above-desired result by the combination of a volute or scroll wheel (the teeth of which are arranged in a spiral form upon the said wheel) and a traveling shaft or rod having a pinion on one end that works in the teeth of the said volute gear, and attached at its other end to a coiled spring, the said traveling shaft being so arranged as to be free to move to and from the center of the volute gear, and the box which confines the spring being also susceptible of a lateral motion.

My improvements are represented in the accompanying plate of drawings, of which

Figure 1 is a front elevation of a window-sash with my device for operating the same attached. Fig. 2 is a rear view of the said device, and Fig. 3 is a horizontal longitudinal section taken in the plane of the line A B, Fig. 1.

a a a in the drawings represent the frame of a window, in which is fitted a sash, *b b*. On one side of the sash *b b* is a rack, *c c*, engaging with which is a gear, *d d*, formed on the periphery of a volute gear, *e e*, which turns on a pivot, *f*, in a bearing, *g g*. Engaging with openings *h h h*, which form the scroll of the volute gear *e e*, is a pinion, *i i*, attached to a shaft, *k k*, to the end of which shaft *k k* is fastened one end of a coiled spring, *l l*, inclosed in a case, *m m*, through which case the shaft *k k* extends. Formed on the case *m m*, and attached to the shaft *k k* by the standards *n n*, is a slide, *o o*, formed with a slot, *p p*, which travels on pivots *q q* for the purpose of moving back and forth the shaft *k k* and case *m m* to suit the position of the pinion *i i*, which works in the volute rack *e e*. By sliding in an adjustable bolt, *r*, so made as to engage with the gear *d d*, the sash *b b* is securely fastened in any desired position. Attached to the center of the volute gear *e e*, and pivoted to a standard, *s s*, Fig. 2, may be arranged a curved lever-arm, *t t*, for the purpose of engaging the gear *d d* with or disengaging it from the rack *c c* after the frame *u u* is adjusted to the window-frame *a a a*.

The operation of my improved device for operating window-sashes, &c., is as follows: When the sash *b b* is drawn down the rack *c c*, fitted in its side, engages with the gear *d d* formed on the periphery of the volute gear *e e*, thereby revolving the volute-gear *e e*, the pinion *i i* engaging in the openings *h h h* formed in the volute gear *e e*, and the shaft *k k* attached to the pinion *i i*, and consequently coiling up the spring *l l* attached to one end of the shaft *k k* and inclosed in the box *m m*. As the volute gear *e e* revolves it draws laterally the pinion *i i* and slide *o o* toward its center, thus giving the pinion *i i* more and more leverage in its relation to the rack *c c*, and thereby equalizing the increasing power of the spring *l l* as it is coiled up. The volute gear *e e* being formed in relation to the power of the spring *l l*, the weight of the sash *b b* just balances

the spring *l l*, and the sash *b b* remains in any position in which it is placed.

In the above-described arrangements of a window-sash the most essential feature consists in the functions which the volute gear and its pinion bear to the coiled spring, the leverage afforded by the said gear and pinion being an exact counterbalance to the power of the spring, so that the force exerted by the latter, instead of being, as in ordinary cases, variable, is always and uniformly the same.

Having thus described my improvements, I shall state my claims as follows:

What I claim as my invention, and desire to have secured to me by Letters Patent, is—

1. A window-sash having a rack, *c c*, operated by means of the volute gear, traveling pinion, and spring, all substantially as described.

2. In combination with the foregoing, the sliding bolt *R* for locking the window, as described and shown.

HENRY SMITH.

Witnesses:

OLIVER C. SMITH,
M. B. MANSFIELD.