

(No Model.)

S. N. GOLDY.
SASH BALANCE.

No. 444,097.

Patented Jan. 6, 1891.

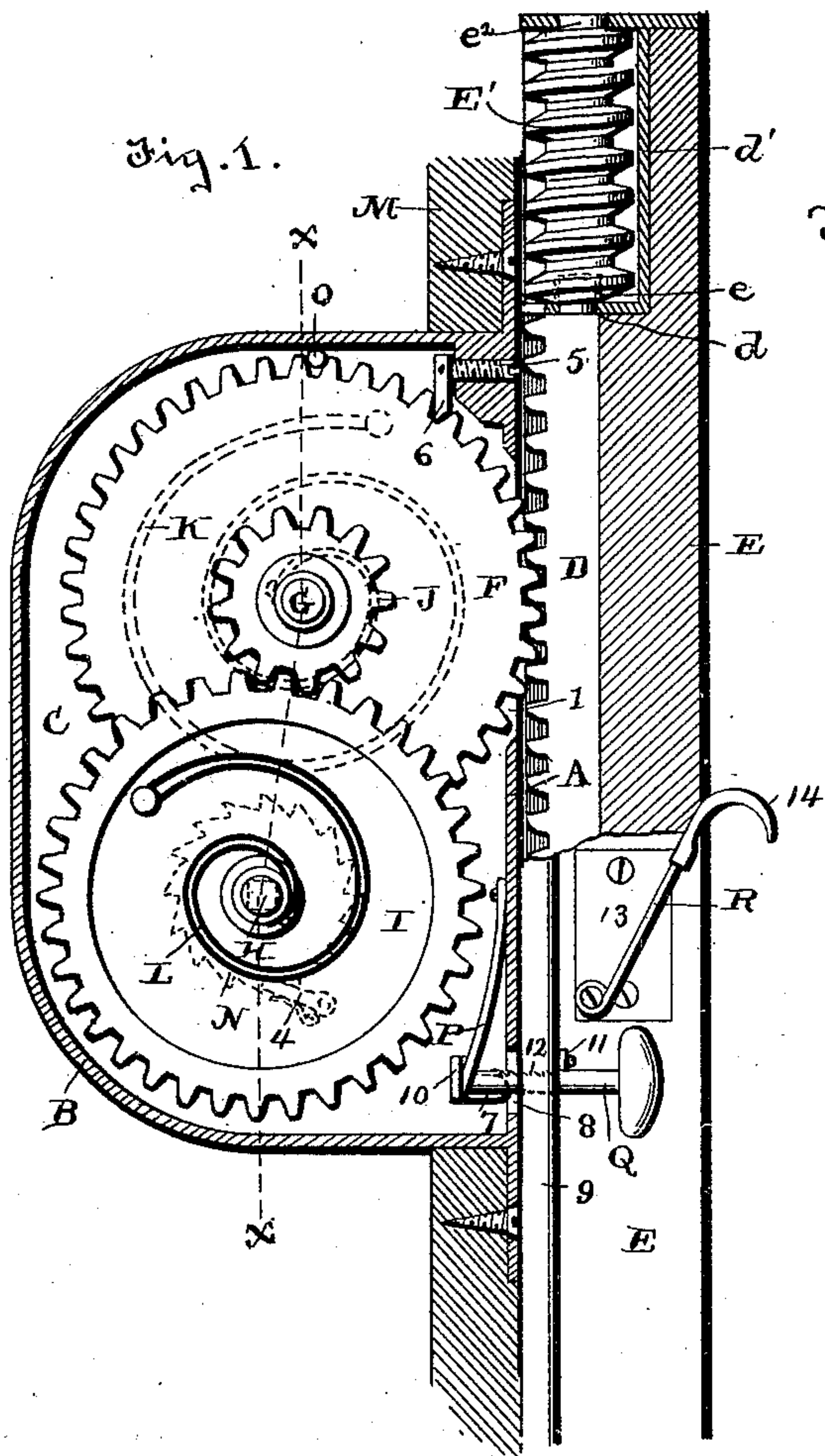


Fig. 2.

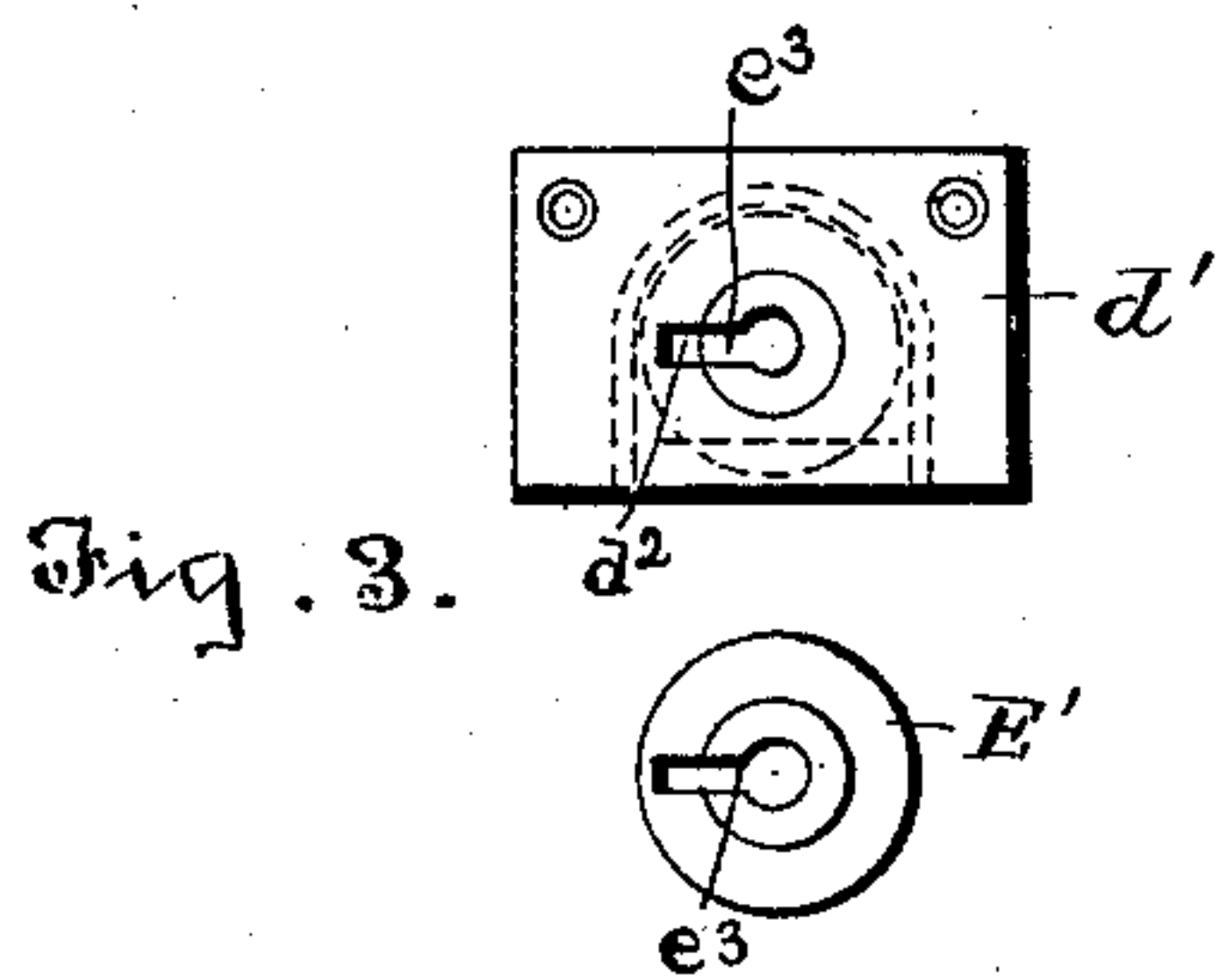
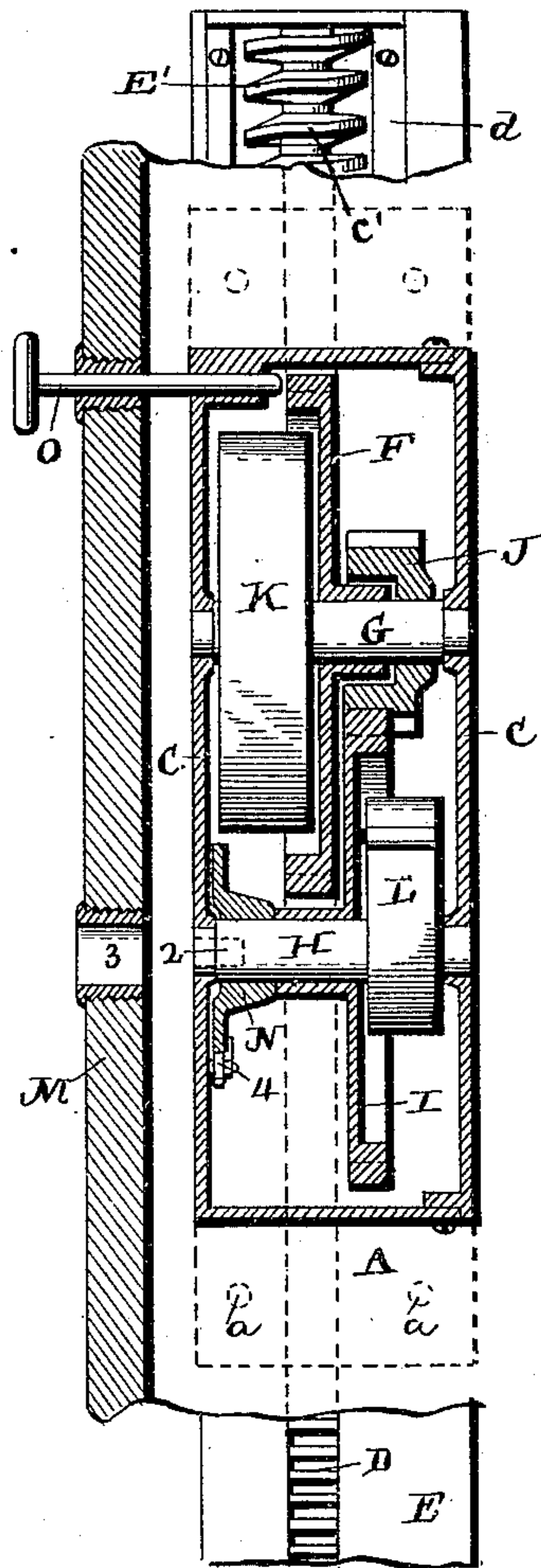
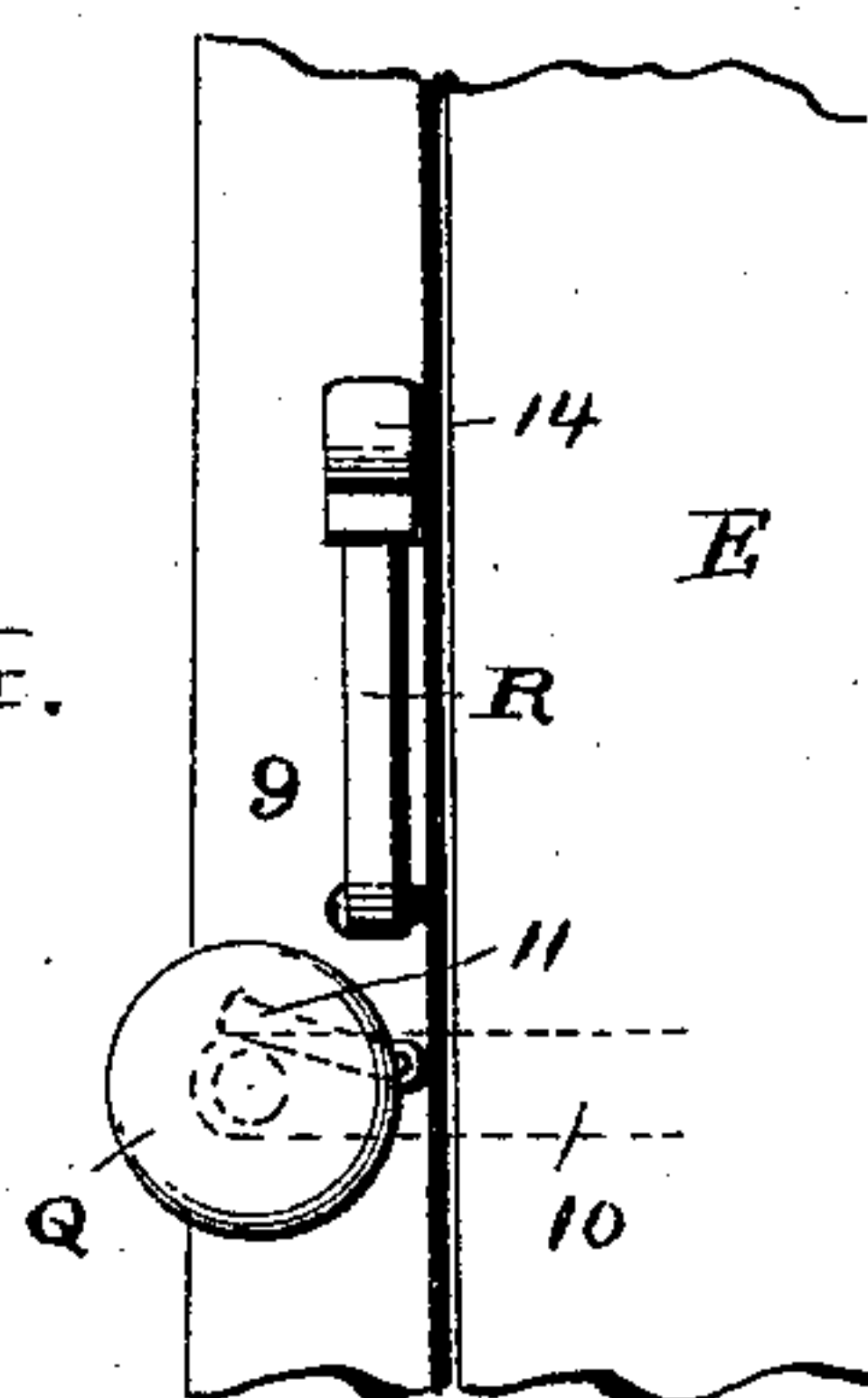


Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

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SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 444,097, dated January 6, 1891.

Application filed October 11, 1890. Serial No. 367,783. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL N. GOLDY, a citizen of the United States of America, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Sash-Balances, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to certain improvements in sash-balances of that class in which a toothed wheel mounted on a shaft journaled in a boxing secured in the window-casing meshes with a rack-bar on the window-sash; and it has for its object to provide an improved mechanism for balancing the sash, resulting in increased efficiency, economy in the first cost of the springs, and a prolongation of the life of the springs, as compared with those heretofore used in other arrangements.

The invention further consists in means for preventing the springs from uncoiling when the sash is removed, for adjusting the springs without the necessity of removing the sash, and for locking the sash in any desired position.

The invention will first be described in connection with the accompanying drawings, and then pointed out in the claims.

Figure 1 of the drawings is a side elevation of the boxing with one side removed to show the operating mechanism, and a portion of the sash partly in section to show the rack-bar. Fig. 2 is a sectional view taken on the line *xx*, Fig. 1. Fig. 3 is a top plan of the screw-gear and the casing for holding the same; and Fig. 4 is a detail view of a portion of the sash, showing the automatic locking mechanism.

Referring to the drawings, A represents the face-plate, B the rim, and C the side plates, of the boxing in which the operating mechanism is housed, the boxing being secured in the window-casing, as usual, by means of screws passed through the holes *a* in the face-plate.

D is a rack-bar secured in the edge of the sash E, and extending from the bottom to within a short distance of the top of the said sash. The upper end of the rack-bar is formed with a shoulder *d*, which extends

through a casing *d'*, mounted in the sash, and engages a recess *e* in a worm E', journaled in the casing, which worm forms a continuation of the rack-bar. A portion of the threads of the worm is cut away, as shown at *c'*, Fig. 2. The upper journal *e*³ of the worm is formed with a key-hole opening *e*³, which normally registers with a recess *d*² in the casing *d'*, which opening is designed to be engaged by a key to admit of the regulation of the spring which balances the sash, as will presently appear.

F is a toothed operating-wheel mounted on a shaft G, journaled in the sides of the boxing, which shaft is so set that the periphery of the operating-wheel extends far enough through a slot I in the face-plate to permit the teeth to engage with the rack-bar.

Beneath shaft G, and a short distance to the rear of a vertical line drawn therefrom, is journaled another shaft H, on which is loosely mounted a gear-wheel I, which meshes with a pinion J, rigidly mounted on shaft G, the number of teeth in wheel I being preferably about three times the number of those in the pinion.

K represents a coil-spring, preferably made double by being bent upon itself; or there may be two springs, one wound within the other. One end of this spring is secured to shaft G and its other end to the rim of gear-wheel F.

L represents a spring constructed similar to spring K with the exception that it may be shorter and more rigid, one end of which is secured to the shaft H and its other end to the rim of gear-wheel I.

The end of shaft H is fitted for a wrench or key, as at 2, for the purpose of adjusting the springs without the necessity of removing the mechanism from the window-frame, the key being inserted through a suitable opening 3 in the side of the frame M.

Rigidly secured to shaft H is a ratchet-wheel N, with which engages a spring-pawl 4, which holds the springs in their adjusted position.

O represents a locking-pin for locking the mechanism to hold the sash elevated, or it may be used to prevent the spring from uncoiling when the sash is removed. This pin is passed through the window-casing, through

the side of the boxing, and into engagement with the teeth of wheel F.

I have also shown in Fig. 1 a device for preventing the uncoiling of the springs when the mechanism is removed from the window-casing, which consists in a screw 5, passed through the face-plate A of the casing and provided on its inner end with a right-angled projection 6, which is thrown into engagement with the teeth of gear-wheel F by a turn of the screw, as will be readily understood.

P represents a leaf-spring secured at its upper end to the inner side of the face-plate A, or it may be secured to a separate plate, so as to place it at any desired position on the window-frame. Upon the lower end of this spring is secured a lug 7, which is designed to project through an opening 8 in the face-plate and engage rack-bar D. The upper edge of this lug and the lower edges of the teeth on the rack-bar are slightly rounded, so that the sash may be pulled down when the lug 7 is partly engaged with the rack-bar; but the under side of the lug and the upper edges of the teeth being square the sash cannot be raised. Thus it is seen that the sash is always locked when closed.

Q represents a pin passing through the stop-bead 9 of the window-frame, and is secured at its inner end to the spring P by a metal strap 10. A gravity-pawl 11, secured upon the stop-bead, engages the notches or ratchet-teeth 12 on the pin Q for the purpose of holding the lug 7 in engagement with the rack-bar when the pin is pulled outward.

R represents a leaf-spring secured at its lower end to a plate 13, its upper end being provided with a curved finger-piece 14. This plate is secured at such a position upon the window-sash that when the window is closed spring R engages the inner side of the head upon the pin Q, and, acting as an inclined plane, draws the pin outward and the lug 7 into engagement with the rack-bar. The spring R being of greater strength than the spring P, the parts are held in this position and the window remains locked. To unlock the window, it is necessary to push the spring R backward by means of the finger-piece 14, which will allow the spring P to draw the lug 7 out of engagement with the rack-bar.

In placing my sash-balances in the window-casing I prefer to set the one for the lower sash slightly below the meeting-rail and the one for the upper sash slightly above the meeting-rail, thereby bringing the locking-pins O of both sashes within convenient reach of a person standing on the floor.

The operation of my sash-balance will be apparent from the drawings; and therefore description is unnecessary. However, I desire to call attention to the feature shown in the arrangement of the springs. As the sash is raised and the wheel F revolves, the spring K is unwound, and were it not for my arrangement when the wheel F had made several revolutions the spring would have greatly

lost its tension; but as K uncoils the spring L instantly gives out its power, and as the latter, geared as it is, has such a slight movement, the tension of the former must remain the same regardless of the position of the sash, which would not be the case if the gears F and I were rigidly secured to their shafts. Further, if the gears F and I were rigidly secured to their shafts both springs could not be wound at the same time, which is another advantage of my arrangement. When it is desired to adjust the springs without the necessity of removing the sash, it is simply necessary that the gear-wheel F should be brought in mesh with the worm-gear d' , when by inserting a key in the opening e^3 in the end of the worm-gear and turning the same while winding the springs by means of a key or wrench, as before described, the gears F and I are allowed to revolve. The key in the end of the worm-gear cannot be removed until the opening in the gear and the recess d^3 in the casing register, which assures the worm-gear being left in the proper position after the springs have been adjusted. With the springs being made double, as shown, they can be made much thinner to produce the same power, which adds to their durability and lessens the liability of fracture.

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

1. In a sash-balance, the combination, with the window-frame, of a boxing carrying two shafts, gear-wheels loosely mounted thereon, a pinion carried by one of the shafts and engaging one of the gear-wheels, a spring carried by each of the said gears and exerting pressure in opposite directions, and a rack-bar carried by the sash and engaging with one of the gear-wheels, substantially as and for the purpose specified.

2. In a sash-balance, a sash carrying a rack-bar constructed of a stationary and a revoluble portion, in combination with the window-frame carrying two spring-actuated gear-wheels, one of which meshes with the said rack-bar, and means for operating the revoluble portion of the rack-bar to increase or diminish the tension of the spring on the gear meshing therewith, substantially as described.

3. In a sash-balance, the combination, with the window-frame, of a boxing carrying two shafts, gear-wheels loosely mounted thereon, springs connecting the gears and shafts, a pinion rigidly mounted on one of the shafts and engaging the gear-wheel on the other shaft, ratchet-and-pawl mechanism for increasing or diminishing the tension of the springs, and a rack-bar carried by the sash and engaging one of the gear-wheels, substantially as described.

4. In a sash-balance, a window-frame carrying two spring-actuated gear-wheels, a spring provided with a lug, and a pin secured to the spring, in combination with the sash

5 carrying a rack-bar meshing with one of the gear-wheels, and a spring adapted to engage the said pin and draw the lug into engagement with the said rack-bar, substantially as described.

10 5. In a sash-balance, the combination, with the window-frame, of a boxing carrying two shafts, gear-wheels loosely mounted thereon, springs connecting the wheels and shafts, a rigid pinion carried by one of the shafts and engaging the gear-wheel on the other shaft, ratchet-and-pawl mechanism carried by the latter shaft, and means for operating the same to regulate the tension of the two springs, 15 substantially as described.

20 6. In a sash-balance, the combination, with the window-frame having a casing carrying two spring-actuated gear-wheels, a spring provided with a lug, and a pin having teeth secured to the spring, of the sash carrying a

rack-bar engaging one of the said wheels, a spring adapted to engage the pin to draw the lug into engagement with the rack-bar, and a pawl engaging the teeth on the pin, substantially as and for the purpose specified. 25

7. In a sash-balance, the combination, with the window-frame carrying two spring-actuated gear-wheels, of a rack-bar secured to the sash and engaging one of the said wheels and a revoluble worm carried by the rack-bar 30 and a portion of the threads of which is cut away to form a continuation of the rack-bar, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL N. GOLDY.

Witnesses:

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JAMES L. KING.