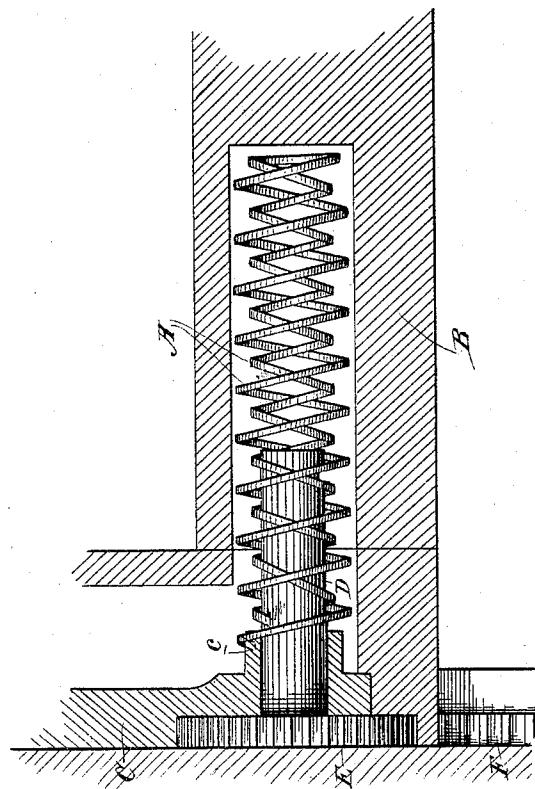


(No Model.)

A. JOHNSON.
SASH BALANCE.

No. 433,596.

Patented Aug. 5, 1890.



Witnesses,
Geo. H. Strong.
J. H. House

Inventor
Axel Johnson
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altz

UNITED STATES PATENT OFFICE.

AXEL JOHNSON, OF OAKLAND, ASSIGNOR TO THE MARSHALL IMPROVED
WINDOW FURNITURE COMPANY, OF SAN FRANCISCO, CALIFORNIA.

SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 433,596, dated August 5, 1890.

Application filed March 26, 1890. Serial No. 345,342. (No model.)

To all whom it may concern:

Be it known that I, AXEL JOHNSON, a citizen of the United States, residing at Oakland, Alameda county, State of California, have invented an Improvement in Sash-Balances; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to sash-balances and to that class of springs therein used known as "spiral;" and it consists in a spiral spring returned upon itself, so as to form independent layers, the one within the other.

The general object of my invention is to provide for the maximum strength or tension with the minimum length of spring and to better equalize the power of the spring.

The particular use to which at present I intend to put my spring is its employment in that form of sash-balance set forth in Letters Patent of the United States, No. 420,425, issued to Benjamin Marshall January 28, 1890, to which said patent reference is hereby made for a better understanding of the utility of my invention.

Referring to the accompanying drawings for a more complete explanation of my invention, the figure is a section of a corner of a window-sash, showing my spring in elevation, its coils being here shown as distended more than they would be in practice, in order to show their outward and return course.

My spring A is made of any suitable material, of any proper shape in cross-section, and of suitable dimensions. The course is spirally outward from one end to the other; but instead of stopping at the outer end it turns back upon or within itself, being still directed spirally, and returns to the first end, where it may stop or be carried back again, if desired. Thus there are formed independent layers, the one within the other.

I get a spring with the maximum tension and strength with the minimum length, and its power is better distributed and equalized. For its particular use I intend to place it in a bore made in the sash-rail B. To the edge of the sash is secured a plate C, with which, at c, one end of the spring is connected. In this plate is journaled a short turn-rod D, and

to the inner end of this rod the other end of the spring is attached. The rod carries a pinion E, which meshes with a rack F, fixed to the window-casing. In operation, as the sash is moved to a closed position the spring is wound up, and so serves as a balance or an assistance in raising the sash. The particular advantage of my spring in this use is that I need not have a very long spring. A shorter one is more convenient and can be better applied to the sash. If I used an ordinary spiral spring, it would have to be a very long one, in order to get the necessary power, and a very deep bore would have to be made in the sash to receive it. It would also have a tendency to bend and kink; but my spring is short, and yet has the necessary power, and it remains perfectly straight under any required tension. Another great advantage in this connection is that its power is better distributed and equalized, and it affects the sash about equally in all positions.

I do not confine my invention to the particular use I have described, as it may be used in other connections and for other purposes.

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

1. In a sash-balance or analogous device, an axially-moving rod and a rack and pinion for operating the same, in combination with a torsional spring returned within itself, having one of its ends secured to the axially-moving rod and the other fixed to a non-rotary piece, substantially as herein described.

2. In a sash-balance or analogous device, the torsional spring herein described, consisting of a single coiled piece returned within itself, having one of its ends fixed to a non-rotary bearing and the other secured to a piece that has a rotary movement.

In witness whereof I have hereunto set my hand.

AXEL JOHNSON.

Witnesses:

RALPH O. IVES,
BENJAMIN MARSHALL.