

F. C. D. McKAY.  
Sash-Balances.

No. 149,940.

Patented April 21, 1874.

Fig. 1.

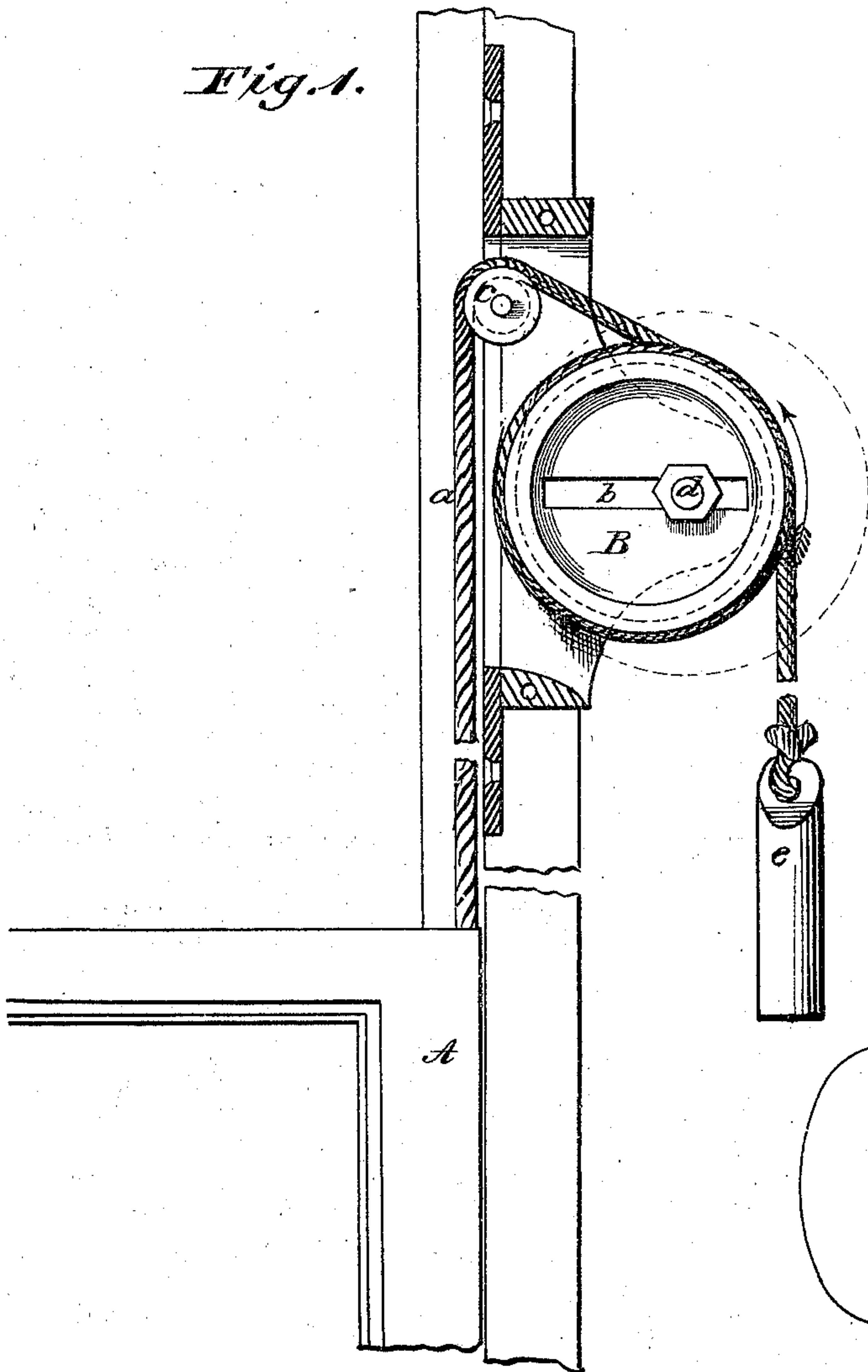


Fig. 2.

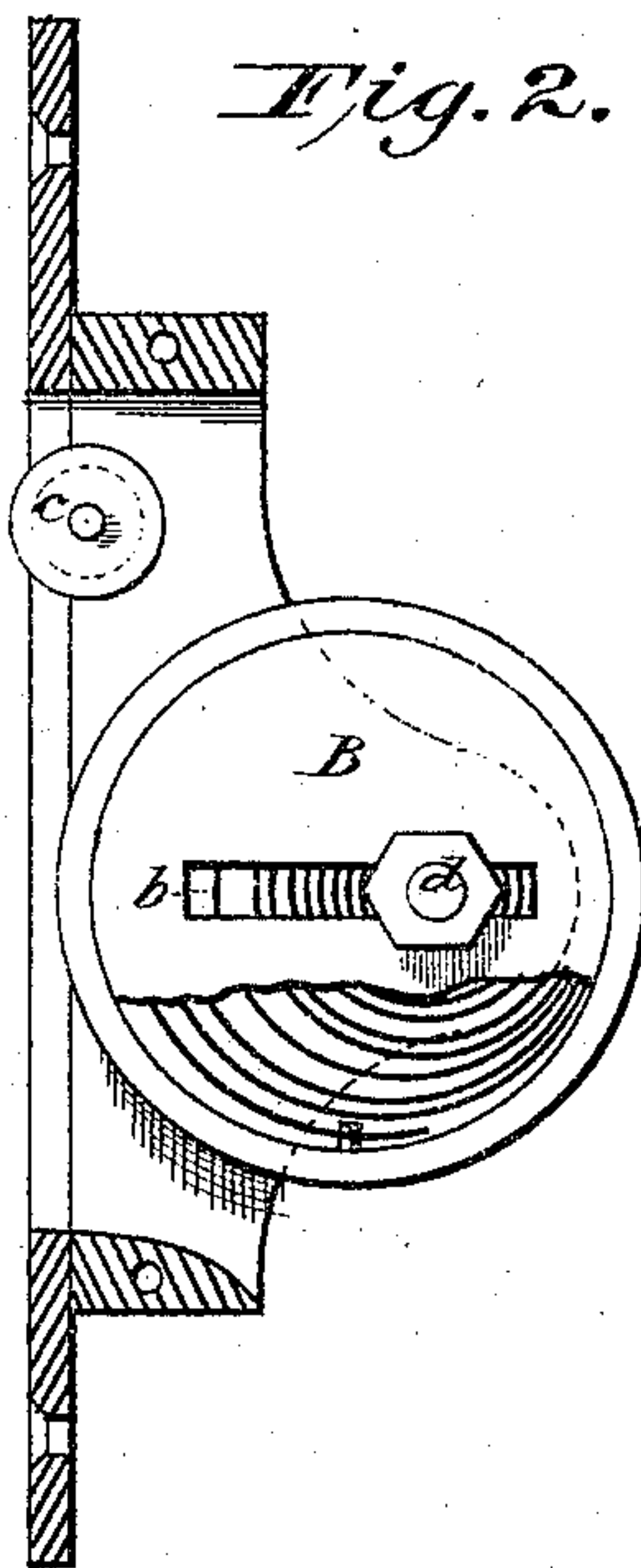


Fig. 3.

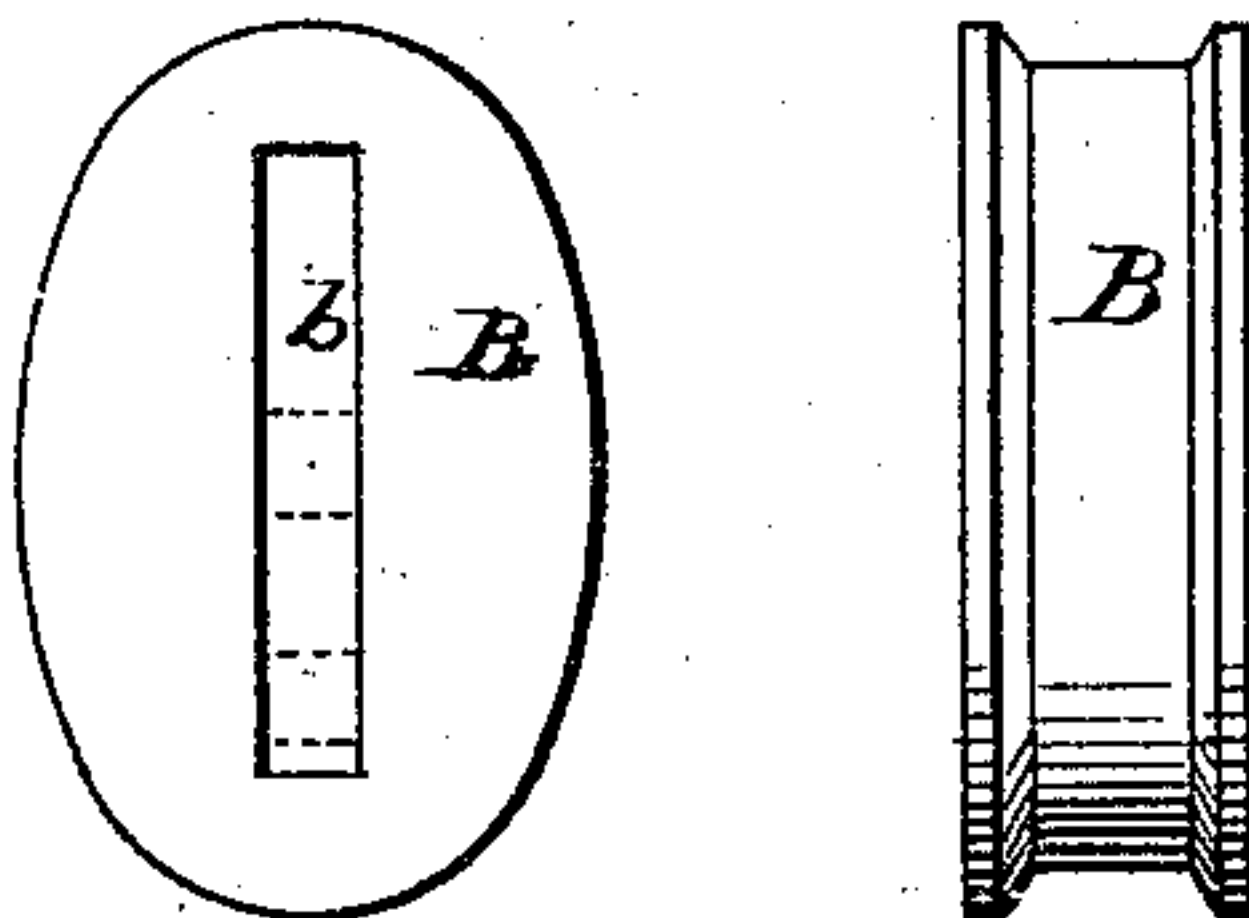


Fig. 4.

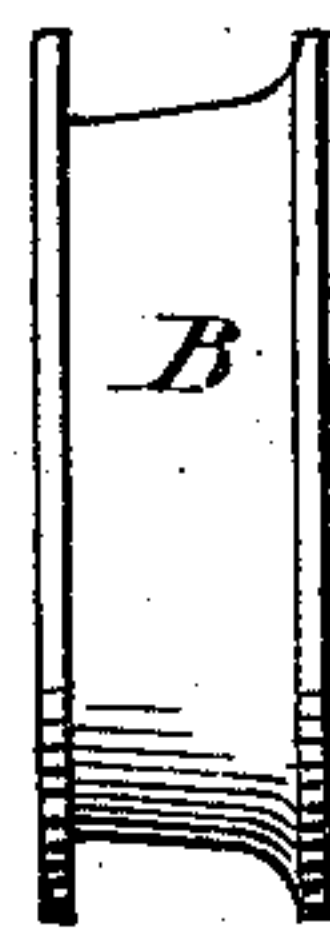
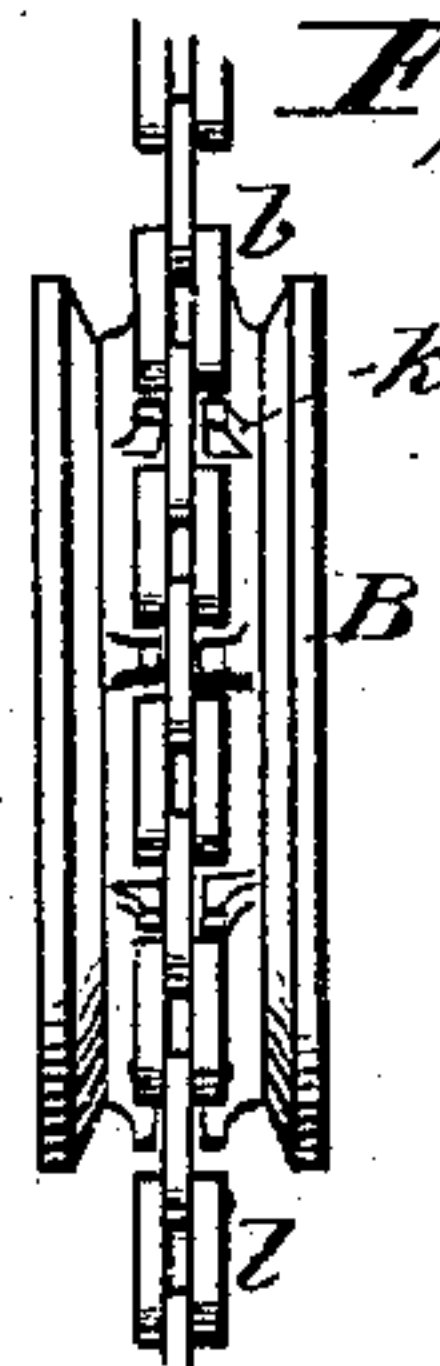


Fig. 5.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

FERDINAND C. D. McKAY, OF ELMIRA, NEW YORK.

## IMPROVEMENT IN SASH-BALANCES.

Specification forming part of Letters Patent No. 149,940, dated April 21, 1874; application filed September 30, 1873.

*To all whom it may concern:*

Be it known that I, FERDINAND C. D. McKAY, of Elmira, in the county of Chemung and State of New York, have invented certain new and useful improvements in Sash-Pulleys, of which the following is a specification:

My invention relates to certain improvements in pulleys for balancing window-sashes; and consists in constructing a sash-balance, with a pulley adjustably connected or mounted upon its axis, so that the distance from the circumference of the pulley to its axis or fulcrum, with respect to each other, can be regulated, whereby a varying eccentricity and leverage of the pulley can be secured, said pulley operating in respect to a surrounding cord or chain, and spring or weight, as will be described hereafter.

In the accompanying drawing, Figure 1 is a vertical section, showing a circular pulley, arranged eccentrically, applied to a window-sash and operated by a weight. Fig. 2 represents a pulley operated by a spring. Fig. 3 represents a side view and a face view of an elliptical pulley. Fig. 4 shows a pulley having its face inclined to one side, to prevent too much friction of the cord when wound around the pulley. Fig. 5 shows a pulley provided with projections for engagement with a chain.

A represents a window-sash, with a cord, *a*, attached in the usual manner. B is a pulley, journaled in a bracket, set into a recess in the window-jamb. The cord *a* passes over a small pulley, *c*, journaled in the upper part of the bracket, and thence over and once around the pulley B, and has a weight, *e*, at its lower end. The pulley B has a slot, *b*, cut through its disk, and running diametrically across it. In this slot *b* is fitted a sleeve, through which runs the rod or bolt *d* which forms the axis of the pulley.

By means of the sleeve working in the slot *b*, the pulley B may be arranged to rotate upon its axis, either concentrically or at desired degree of eccentricity.

When the sash to be balanced is very heavy, and it is desired to use a weight much lighter than the sash itself, in order to balance it, the pulley is arranged eccentrically, the degree of eccentricity depending upon the weight of the sash and of the counter-balance, as the heavier the sash and the lighter the counter-balance the greater must be the degree of eccentricity.

With a pulley thus constructed and ar-

ranged, a sash weighing fifty pounds may be balanced by a weight of twenty-five pounds, when at certain points and in certain positions with relation to each other. Thus, when the parts are in the position shown in Fig. 1, the sash A, weighing twice as much as the counter-balance *e*, the leverage is in favor of the sash, and enables it to raise the counter-balance until the pulley B makes one-half revolution and arrives at the dead-point, where the leverage is in favor of the counter-balance *e*, and the parts are held in equilibrium. By this arrangement the weight *e* is made to balance the sash A at certain points, the distance of which from each other is equal to one-half of the circumference of the pulley around which the cord passes. This distance may be varied by using an elliptical pulley, as shown in Fig. 3, there being one dead-point in a circular or elliptical pulley, eccentrically arranged, two dead-points in an elliptical pulley arranged concentrically.

When it is desired to use a spring instead of a weight, the pulley B is made hollow, and the spring is placed inside thereof, as shown in Fig. 2. The outer end of the spring is attached to the inner side of the face portion of the pulley, and the inner end is attached to the sleeve which works in the slot *b*, and through which the axis *d* passes. When a cord is passed around the pulley, the face of the pulley is inclined toward one side, as shown in Fig. 4, to prevent too much friction of the cord.

When a chain is used instead of a cord, the pulley B is provided with projections *k*, for engagement with the links of the chain *l*, as shown in Fig. 5.

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

A sash-balance constructed with a pulley adjustably connected with its axis, so that the distance from its circumference to its axis or fulcrum can be regulated to increase or diminish its eccentricity, to operate in connection with a surrounding cord or chain, and weight or spring, substantially as herein shown and described.

In testimony that I claim the foregoing, I have hereunto set my hand this 13th day of September, 1873.

F. C. D. McKAY.

Witnesses:

JAMES L. NORRIS,  
A. H. NORRIS.