(No Model.) 2 Sheets—Sheet 1.

J. P. MAGNEY.

SASH BALANCE.

No. 458,033. Patented Aug. 18, 1891.

Fig. 1.

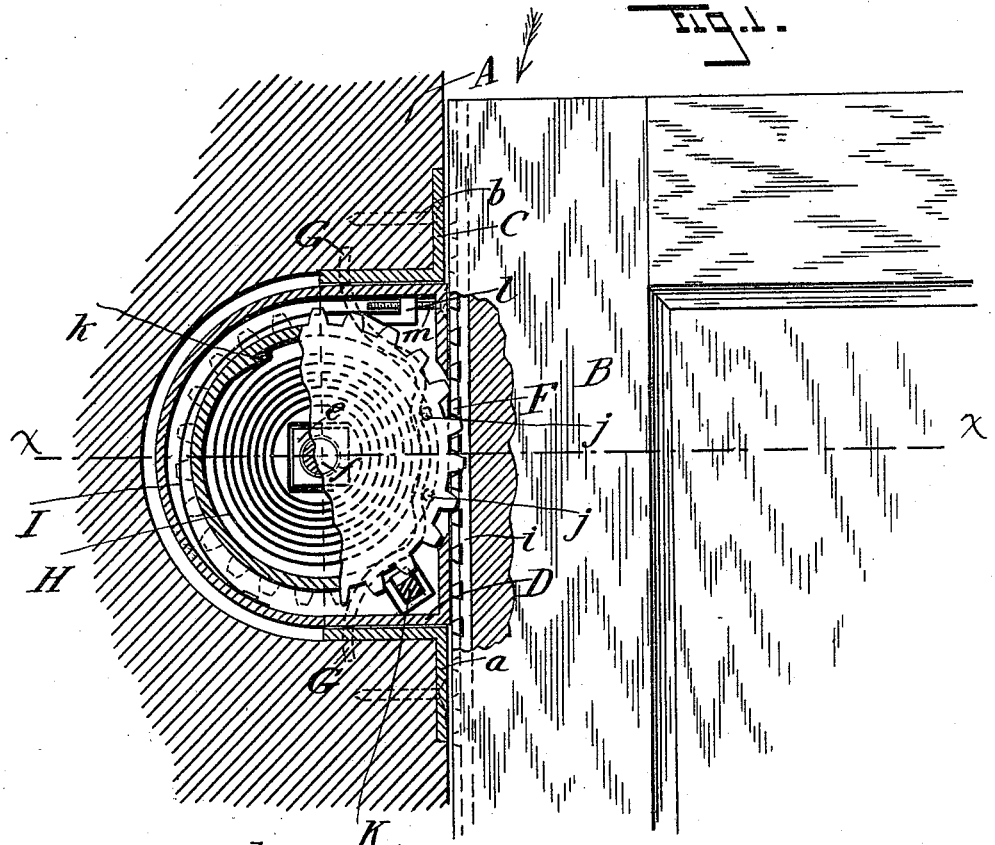
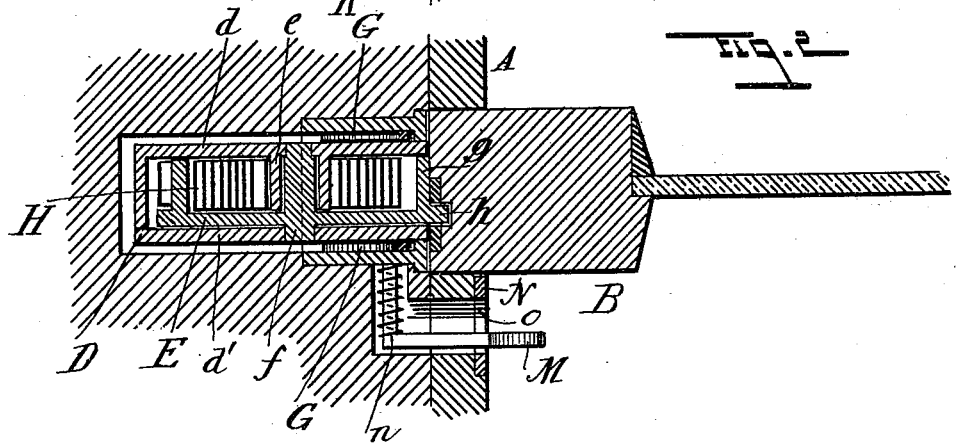


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

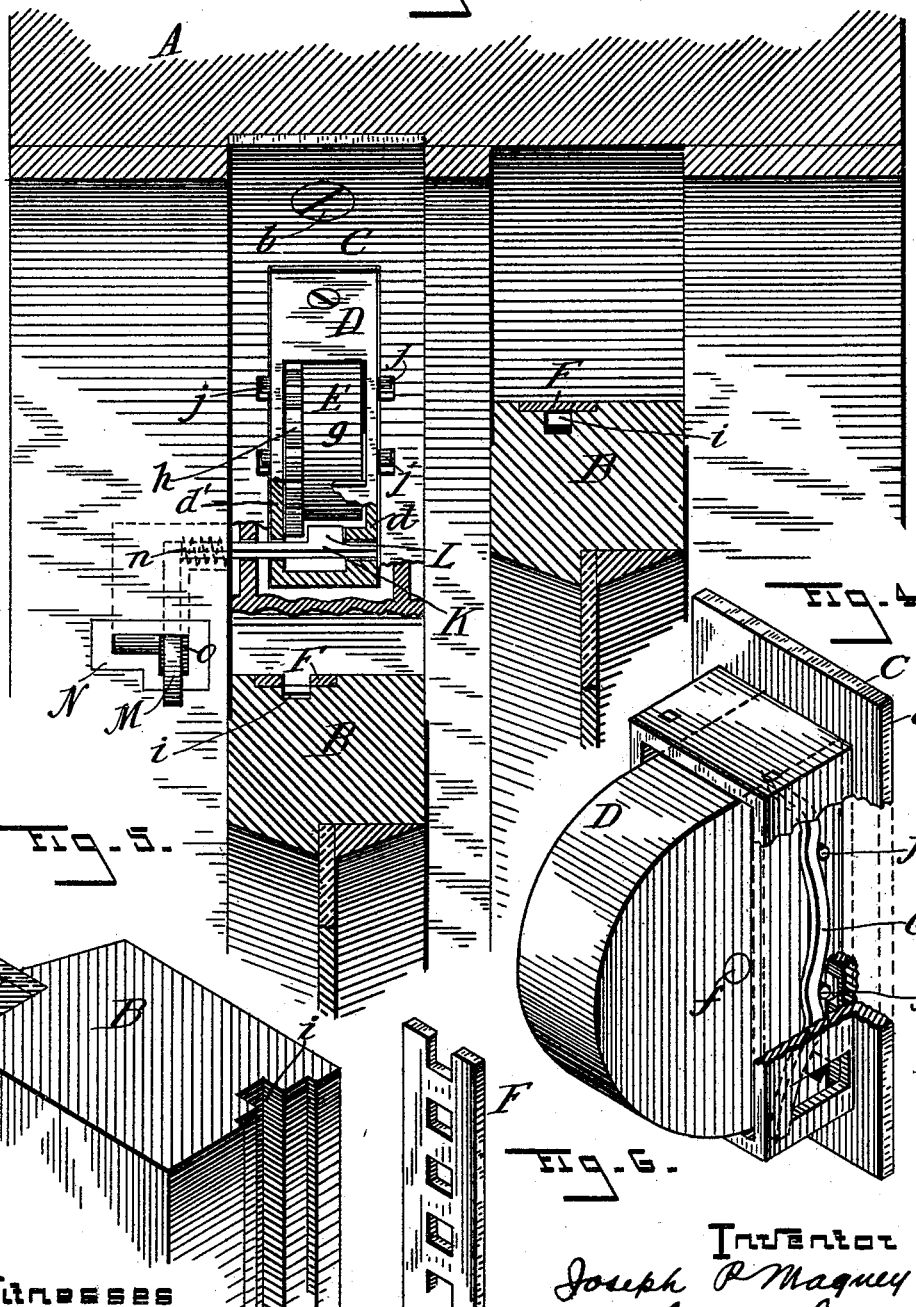

Fig. 4.

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

JOSEPH P. MAGNEY, OF OAKLAND, CALIFORNIA.

SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 458,033, dated August 18, 1891.

Application filed January 9, 1891. Serial No. 377,262. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH P. MAGNEY, a citizen of the United States, and a resident of Oakland, Alameda county, State of California, have invented certain new and useful Improvements in Sash Balances and Locks; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to sash balances and locks, and more particularly to that class of sash-balances in which a helical spring in the window-frame, wound up by one movement of the sash, is permitted to exert its stored-up tensional force during the opposite movement upon a wheel which engages with the edge of the window-sash.

The object of my invention is to make a simple as well as effective device of this character which can be manufactured cheaply enough to be a substitute for the ordinary cord-and-weight balances; and my invention consists in certain novel features of construction which need not be specified here, but which are fully hereinafter described and claimed, and are shown in the drawings accompanying this specification, in which—

Figure 1 is a vertical section of a window-casing, showing a window-sash broken away and my sash-balance in position. Fig. 2 is a horizontal section on the line $x\,x$. Fig. 3 is a perspective view of sash and casing, looking in the direction of arrow in Fig. 1. Fig. 4 is a perspective of frame and case for the pinion. Fig. 5 is a detailed view of the grooved window-sash. Fig. 6 is a detail view of the rack used in connection therewith.

A represents the frame of an ordinary window, and B a portion of the sliding sash, supposed in this case to be the upper left-hand corner of the lower sash.

C is a rectangular box or frame, open at front and rear and secured to the edge of the casing in the bottom of the sash-run by means of flanges a and screws b passing through them. The window-frame is cut through completely, or, if of sufficient thickness, is chambered out, as shown in the drawings, to admit a hollow case D, the front portion of which is inclosed by and bears at top and bottom upon the frame C, which thus forms a guide for the case, the latter having a slight longitudinal movement. The rear portion of the case is preferably semicircular in longitudinal section, as shown, and the whole case is cast in two parts $d\ d'$, riveted or otherwise secured together. The part d of the case is cast with a central stud e, made square externally, but having a round central hole extending entirely through it. In this hole and in bearings in the parts d and d', communicating with it, is journaled the axle or pin f of the hollow wheel E, said wheel and axle being cast solid in one piece, as shown. By forming the wheel and its axle in one piece I get two bearings for the pin separated by the full width of the case, whereas if a stationary pin and loose wheel of the same shape were used the single bearing would be too narrow to keep the wheel true and steady, especially as it would be located off the longitudinal middle line of the wheel.

The wheel E has the greater portion of its periphery formed into a smooth frictional bearing-surface g, the remainder of the periphery being a narrow projecting spur-gear h. As hereinafter described, the wheel (for which I use the term "pinion" as synonymous) and the case are constantly pressed outward, so that the friction-surface, which projects slightly beyond the edge of the case, bears upon the edge of the sash, while the teeth h engage with a rack F, countersunk in a T-shaped groove i in the sash. The rack F is a simple strip of metal having holes punched in it at regular intervals and secured by screws or rivets in the groove i, the T shape of the groove permitting the teeth of the pinion to project entirely through the rack, so that the friction-surface cannot fail to bear against the sash. This construction is mainly advantageous from its cheapness, which is one of the first considerations in this class of devices, which are intended to take the place of cord-and-weight balances. In addition the friction-contact is noiseless and the narrow rack and pinion practically so, whereas a rack-and-pinion movement of the full width of the wheel is always more or less audible when the window is being raised or lowered. The rack in this case need only be wide enough to act as a holding device and prevent any slipping of the friction-surface, such slipping of course permitting the actuating-spring to unwind a little, causing a loss of tension that,

constantly accumulating, must in time destroy the effectiveness of the device as a sash-balance.

The case D and pinion E are pressed constantly forward by two bow-shaped springs G, one on each side of such case, Fig. 2, having their ends passing through the frame C and their middle portion bearing upon pins or studs *j*, cast with the case D. (Dotted lines in Fig. 1.) The pressure of these springs is equal from top and bottom, and hence the pinion is forced outward by a sliding movement of the whole case, so as to bring the point on the periphery in horizontal line with the center of the pinion in contact with the sash.

The sash-balancing spring H is a helical coil contained in the hollow pinion E. One end of the spring is secured to the case by giving it a whole or partial turn around the square stud *e*. The other end is simply hooked over a cast projection *k* on the interior of the pinion, the coils substantially filling its hollow portion. The pinion may then be turned sufficiently to give the required tension to the coil, such tension being of course proportioned to the weight of the sash to be lifted. When the rack and pinion are in engagement and the frictional surfaces are in contact, the lowering of the window will wind up the spring, and thus store up in it a force which, acting on the pinion, is nearly sufficient to raise the sash, leaving a very slight manual effort to be expended in lifting. As the pinion and spring are inclosed in a riveted case and the spring put under tension at the time of manufacture, I have provided a special device for holding and maintaining this tension on the spring up to the time when it is applied to the window. Without some such device there is liability of the spring being allowed to slip and unwind completely before the pinion is engaged with the rack, and such an accident would completely ruin the device. The device referred to is a brake-strap I, of thin spring metal, secured at one end to the inside of the case D, passing around the interior of the case in proximity to the frictional surface of the pinion and terminating in a threaded nut *l*, engaged by a screw *m*, which enters the front of case D. When the proper tension has been given the spring, the screw is turned so as to bring the brake down upon the friction-wheel sufficiently to prevent any back movement of the wheel, and when the device is in place in a window and the pinion in engagement with the rack a few turns of the screw will release the brake, which assumes the position shown in Fig. 1.

In connection with the devices thus far described, I have devised an exceedingly simple self-acting sash-lock, which is more fully illustrated in Figs. 3 and 4. This is a plain bar K, having a feather L upon one side, which extends through the case D below the pinion. A spring *n* forces the bar constantly in the same direction, so that the feather will slide and be held between two teeth of the pinion. A handle M at right angles to the bar projects through a slot *o*, formed in the window-frame adjacent to the sash, Fig. 2, by which the bar may be moved. When the handle is pressed inward, as in Fig. 3, the feather is disengaged from the pinion-teeth and comes opposite its friction-surface. In this position it may be held by making the slot-opening *o* of L shape and turning the handle down, as shown in Fig. 3. N is an escutcheon or face-plate for the slot.

It will be understood that the construction of my sash-balance is the same for the upper sash as for the lower, the balancing devices for the upper sash being preferably placed near the lower corner thereof, or about opposite the same device in the lower sash when both sashes are closed, and it will be generally found advisable to use these balancing devices in both sides of the window-frame, so as to secure an equilibrium of balance.

What I claim is—

1. In a sash-balance, the combination of an open box or frame secured to the window-casing, a box or case sliding therein, a hollow wheel in said casing having a helical spring, and a pair of bow-shaped springs connected at both ends to the window-casing and bearing at intermediate points upon the sliding box or case, as and for the purposes set forth.

2. In a sash-balance, the combination, with the sliding box or case D, having the hollow boss or stud, of a hollow wheel or pinion fixed to an axle, such axle passing through said boss and having bearings on said sliding box, and a helical spring in said hollow wheel connected to said hollow boss and to said pinion, substantially as set forth.

3. In a sash-balance, the wheel and its casing, the helical spring within the wheel and casing, said casing having a hollow boss to receive the axle of the wheel, said boss having an angular or rectangular exterior, the end of the spring being bent angularly about said boss and held thereby, substantially as described.

In testimony whereof I have hereunto affixed my signature, in the presence of two witnesses, this 20th day of December, 1890.

JOSEPH P. MAGNEY.

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