No. 681,864. Patented Sept. 3, 1901.

J. H. WALLACE & A. G. HILTON.

SASH BALANCE.

(Application filed June 7, 1900.)

(No Model.)

Fig. 1.

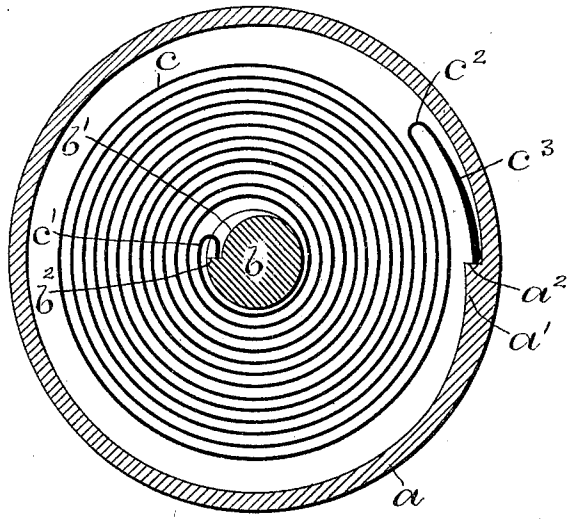
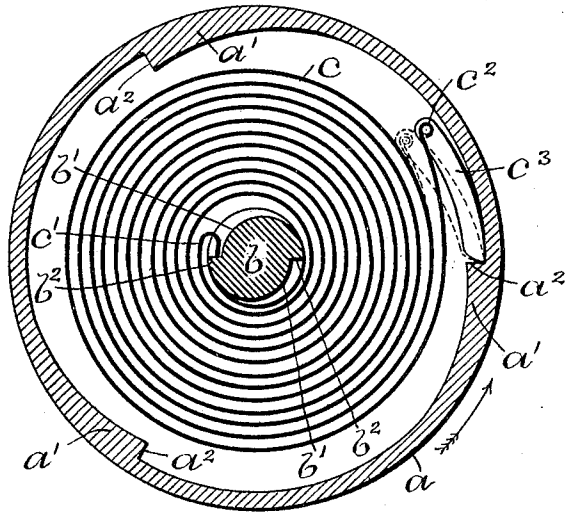



Fig. 2.




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# UNITED STATES PATENT OFFICE.

JAMES H. WALLACE AND ARTHUR G. HILTON, OF PROVIDENCE, RHODE ISLAND, ASSIGNORS TO THE INTERNATIONAL BURGLAR PROOF SASH-BALANCE AND LOCK COMPANY, INCORPORATED, OF SAME PLACE.

## SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 681,864, dated September 3, 1901.

Application filed June 7, 1900. Serial No. 19,402. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES H. WALLACE and ARTHUR G. HILTON, citizens of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Springs and Cases for Sash-Balances, of which the following is a specification.

In window-sash balances and other devices used in the arts helically-coiled springs are used to impart rotary motion when required to the case or to the spindle. The ends of these coiled springs are usually connected one end to the central spindle and the other end to the peripheral wall of the case. When the ends are permanently secured, the momentum exerted by the unwinding of the spring is liable to carry the moving part beyond the point where the coiled spring exerts the power and the spring near the point where it is secured is liable to bend and become weakened or broken.

The object of this invention is to provide a casing and construct a coiled spring so that the spring is free to turn in the case, but will be held as soon and as long as the tension of the spring is resisted.

The invention consists in the peculiar and novel construction of the case and the ends of the spring, whereby the spring will automatically connect with the case when strain is applied, as will be more fully set forth hereinafter.

Figure 1 is a sectional view of the case and the spring, showing the connection of the ends of the coiled spring with the case. Fig. 2 is a sectional view of the case and the coiled spring, illustrating the action of the arm at the outer end of the coiled spring when strain is exerted on the spring.

In the drawings, $a$ indicates the peripheral wall of the case; $a'$, the inwardly-curved enlargement of the peripheral wall of the case forming the abutment $a^2$, against which the outer end of the spring bears; $b$, the central post or shaft, and $b'$ the helical surface on the same, terminating in the abutment $b^2$.

The helically-coiled spring $c$ is formed of a flat steel band. The inner end $c'$ of the steel band forming the coiled spring is bent to form a U-shaped hook. The end of the spring forms one arm of the U-shaped hook. The outer part near the end of the coiled spring $c$ is abruptly bent at $c^2$, the end of the spring-blade forming the arm $c^3$, which has in the preferred form a length of about one-third the inner diameter of the case and in the preferred form is made somewhat thicker than the rest of the spring-blade. The U-shaped hook $c'$ is preferably made as rigid as possible, so as to practically retain its shape under any strain the spring may be subjected to, while the bend $c^2$ is made as flexible as possible, so that the arm $c^3$, integral with the spring $c$, as shown in Fig. 1, may act in the same manner as the arm $c^3$, pivotally secured at $c^2$, shown in Fig. 2, and indicated in broken lines bearing against the coiled spring.

We will now more fully describe the operation of the coiled spring with relation to the case.

When applied to a window-sash balance, the peripheral wall $a$ will form a support of a gear and the post $b$ will be stationary and fixed in the frame, the case revolving around the post $b$. The case is usually supported in the frame of the window, the gear engaging with a rack on the sash. When the sash is lowered, the case revolves in the direction indicated by the arrow shown in Fig. 2, thereby winding up the coiled spring and increasing the tension on the same. When the sash is raised, the case revolves in the direction opposite to the direction indicated by the arrow and the coiled spring unwinds and follows the case until the tension of the spring is expended, and if the case is rotated beyond this point the U-shaped hook $c'$ of the spring may slide around the post $b$ or the arm $c^3$ slide along the inner surface of the peripheral wall $a$ and pass one or more of the curved enlargements, if more than one is used, as is shown in Fig. 2. As soon as the rotation of the case is reversed the hook $c'$ will engage with the abutment or one of the abutments $b^2$ and the arm $c^3$ with the abutment or one of the abutments $a^2$ on the inner surface of the case. In Fig. 2 three abutments $a^2$ on the case and two abutments

$b^2$ on the post are shown. If the coiled spring is used in a stationary case and the post $b$ is to be rotated, the post $b$ becomes the central shaft, which may be rotated to wind up the spring or rotated by the spring without permanently securing the same with the post or shaft or with the case and without the risk of breaking or injuring the spring. In practice we find that the hook $c'$ to reliably engage with the abutment should have the limb of the U formed by the end of the spring practically parallel with the other limb, so as to bear fairly on the abutment and prevent the straightening out of the hook.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a mechanism operated by a helically-coiled spring, the combination with the case inclosing the spring, the central post and an abutment on the central post, of an abutment formed by the inward extension of the curved inner surface of the case, and a helical spring having its inner end formed into a U-shaped hook and its outer end bent backward to form an arm longer than the distance between the inner surface of the case and the coil of the spring when said spring is wound up or contracted, whereby a spring disconnected from the case may engage with the abutments, as described.

2. In a sash-balance or similar device, a spring-case having an inward-extending abutment formed by the inward extension of the curved inner surface of the case, in combination with a spring having an arm at its outer end of a length greater than the space between the outer coil of the spring and the inner face of the case when said spring is wound up or contracted, whereby the case may rotate unrestrained by the spring in one direction and is restrained when rotating in the opposite direction, as described.

3. In a sash-balance or similar device, a rotatable spring-case having two or more inward-extending abutments formed by the inward curving of the inner surface of the case, and a central fixed post provided with two abutments in combination with a helically-wound spring loose in the case and provided at the inner end with a U-shaped hook and at the outer end with an arm of a length greater than the distance between the outer coil of the spring and the inner surface of the case when said spring is wound up or contracted, as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JAMES H. WALLACE.
ARTHUR G. HILTON.

Witnesses:
B. M. SIMMS,
J. A. MILLER, Jr.