(No Model.)

J. E. SWARTHOUT.

BALANCE STAFF FOR TIME KEEPERS.

No. 457,681. Patented Aug. 11, 1891.

Fig. 1.

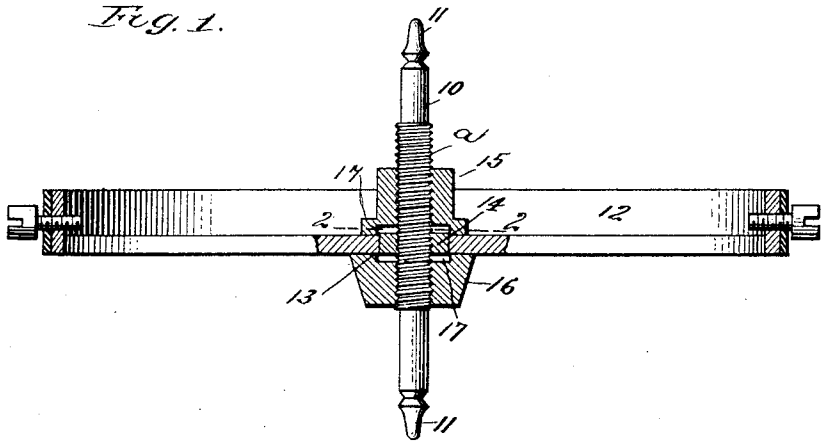


Fig. 2.

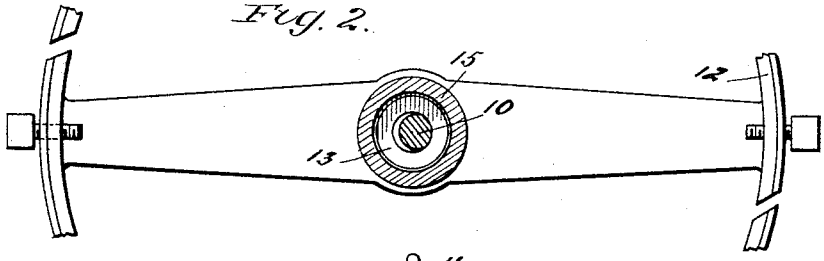
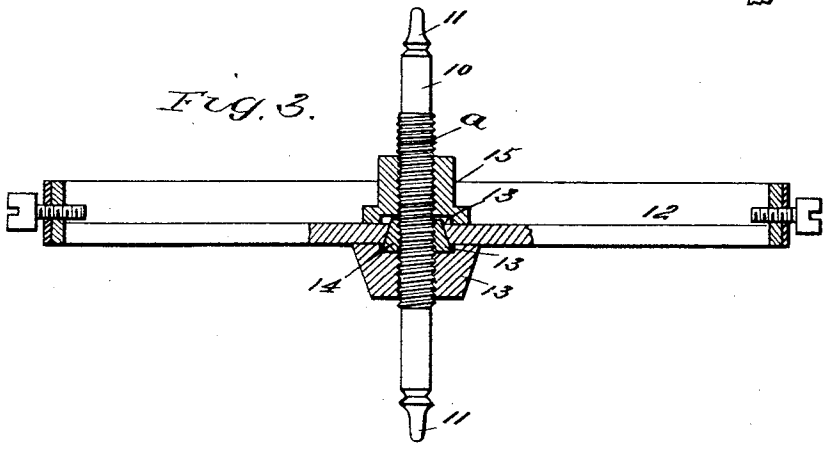


Fig. 3.



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JAMES E. SWARTHOUT, OF ELMIRA, NEW YORK.

BALANCE-STAFF FOR TIME-KEEPERS.

SPECIFICATION forming part of Letters Patent No. 457,681, dated August 11, 1891.

Application filed December 13, 1890. Serial No. 374,543. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. SWARTHOUT, of Elmira, in the county of Chemung and State of New York, have invented an Improvement in Balance-Staffs, of which the following is a full, clear, and exact description.

My invention relates to an improved balance-staff for watches or for chronometers or similar instruments, and has for its object to provide a means whereby the staff, when desired, may be readily removed from the balance-wheel, and whereby, also, the balance-wheel may be conveniently and expeditiously adjusted up or down, as occasion may demand, without interfering with the true horizontal alignment of the wheel.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a central vertical section through a balance-wheel, the staff being in side elevation. Fig. 2 is a horizontal section taken practically on the line 2 2 of Fig. 1; and Fig. 3 is a central vertical section through the balance-wheel, showing the staff in elevation and also illustrating a slight modification in the mode of attaching the balance-wheel to the staff.

The balance-staff 10 is provided at each end with a pivot-point 11 of any approved formation, and the body of the staff is centrally and exteriorly threaded, as illustrated at *a* in the drawings. The balance-wheel 12 is provided in the center of its arms with an opening 13 of much greater diameter than the diameter of the staff, and in the said opening a collar 14 is snugly fitted, which collar is interiorly threaded and is adapted to be screwed upon the threaded portion of the staff. Above the balance-wheel an interiorly-threaded sleeve 15 is screwed upon the staff, the lower end of which sleeve is preferably of greater diameter than the upper portion, and the said lower end has a bearing upon the upper surface of the balance-wheel around its opening 13. A second interiorly-threaded sleeve 16 is also screwed upon the staff, the said sleeve being preferably of greater diameter than the upper sleeve and adapted to have a bearing against the under face of the wheel, also, around its opening.

The collar 14 (shown in Fig. 1) is round, and in the opposed or inner faces of the sleeves 15 and 16 recesses 17 are produced, whereby, if in practice it be found desirable, the collar may be of greater thickness than the thickness of the arms at the point where the opening 13 is produced. When a circular collar is employed, the said collar is preferably of equal thickness with the walls of the opening to which it is fitted.

In Fig. 3 I have illustrated a modified form of the collar, the said collar having a tapering contour, and the opening 13 of the balance-wheel in which it is fitted is correspondingly shaped. When the collar is made thus tapering, it is of greater thickness than the walls of the opening 13. The upper portion of the collar extends upward in the recess of the upper sleeve and the lower portion of the collar downward in the recess of the lower sleeve. It is evident that the balance-wheel by the manipulation of the sleeves may be raised or lowered in true form, as occasion may demand, and also that the staff may at any time be conveniently and expeditiously detached from the wheel.

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

1. The combination, with a balance-staff, of a balance-wheel vertically adjustable on said staff, substantially as described.

2. The combination, with a balance-staff screw-threaded and provided with a collar, of a balance-wheel apertured to receive the collar of the staff, and sleeves on the staff above and below the balance-wheel, substantially as described.

3. The combination, with a balance-staff having a portion of its exterior surface threaded, of a balance-wheel provided with a central opening of greater diameter than the staff, a collar screwed upon the staff, essen-

tially filling the opening of the wheel, and locking-sleeves also screwed upon the staff, one above and the other below the collar.

4. The combination, with a balance-staff provided with an exteriorly-threaded surface, of a balance-wheel provided with an opening in its arms of greater diameter than the staff, a collar screwed upon the staff adapted to snugly fit in the opening of the balance-wheel, and locking-sleeves also screwed upon the staff, one above and the other below the wheel and engaging therewith, the said locking-sleeves being provided with recesses in their inner or opposed faces, substantially as and for the purpose set forth.

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Witnesses:
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