V. S. COREY.

BALANCE STAFF AND ROLLER FOR WATCHES.

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1,025,865. **Patented May 7, 1912.**

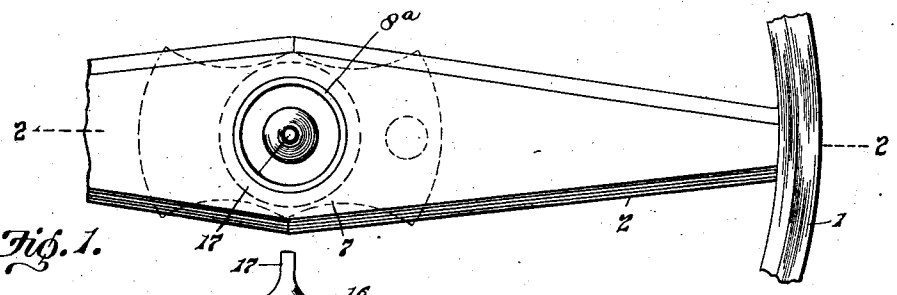

Fig. 1.

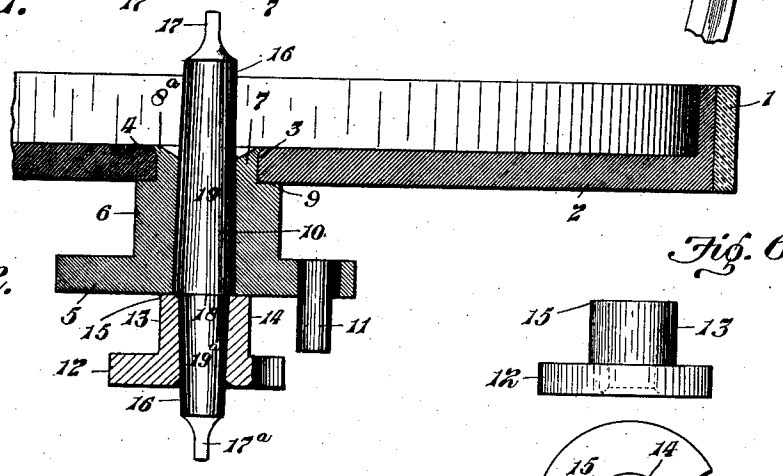

Fig. 2.

Fig. 6.

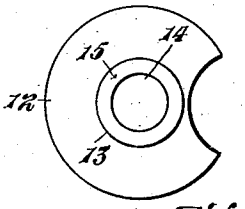

Fig. 7.

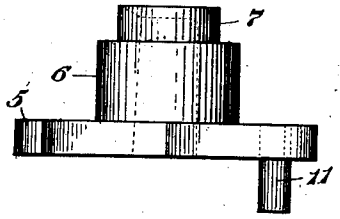

Fig. 3.

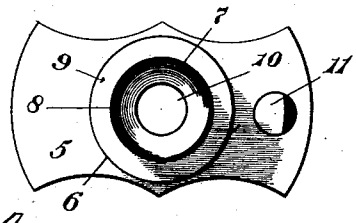

Fig. 4.

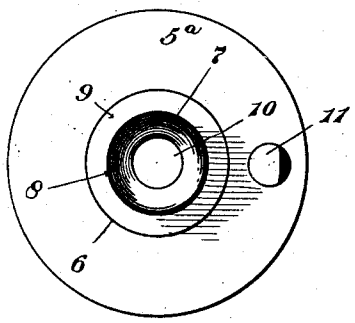

Fig. 5.

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VARIAN S. COREY, OF CANTON, OHIO, ASSIGNOR TO THE HAMPDEN WATCH COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

BALANCE STAFF AND ROLLER FOR WATCHES.

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To all whom it may concern:

Be it known that I, VARIAN S. COREY, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Balance Staffs and Rollers for Watches, of which the following is a specification.

The invention relates to the staff and rollers for the balance wheel of a watch, and pertains to the method of making and assembling the same so that the staff can be readily inserted in the other parts, or detached therefrom and replaced therein, without detaching the table-roller and jewel-pin from the balance arm, and also so that the balance wheel as well as the rollers will always be concentric with and perpendicular to the staff.

It is desirable if not necessary, to temper the pivots harder than can be permitted when the staff is staked or riveted rigidly to the arm of the balance, so that it is practically necessary to make the staff separate from the riveting means. It is also necessary that the balance wheel and the rollers shall be properly spaced apart and shall be circumferentially concentric as well as radially perpendicular to the axis of the staff, and, although the balance wheel may be trued somewhat by a flection or an extension of its arms, the rollers cannot be thus treated; so that it is practically necessary to make and assemble the rollers to be in true relation to the axis of the staff without further adjustment or manipulation. These desirable features of construction and arrangement are attained by the present improvements, of which a preferred embodiment is illustrated on an enlarged scale in the accompanying drawing, forming part hereof, in which—

Figure 1 is a plan view of a balance arm with part of the rim thereon, and showing the staff in place; Fig. 2, a vertical section on line 2—2, Fig. 1; Fig. 3, a side elevation, and Fig. 4 a plan view of one form of the table-roller; Fig. 5, a plan view of a modified form of same; and Fig. 6, an elevation, and Fig. 7 a plan view of a safety roller for a double roller escapement mechanism.

Similar numerals refer to similar parts throughout the drawing.

The balance wheel is composed of the rim 1 and the arm 2, which arm is provided with the cylindric axial aperture 3, the upper edge of which is preferably slightly reamed in the usual manner as at 4.

The table roller 5 or 5^a is concentrically formed around the lower end of and integral with the corresponding hub 6, which hub serves to space the roller at the proper distance from the balance arm, and the cylindric connecting boss 7 is concentrically formed on the upper end of and also integral with the same hub, which boss is preferably formed slightly concave on its upper end and is adapted to be entered and secured in the balance-arm aperture by staking or riveting its upper edge 8 outward over the reamed edge of the aperture, as at 8^a, in which relation of the parts the shoulder 9 formed by the upper end of the hub around the boss abuts the lower side of the balance arm around the aperture thereof, thus holding these parts rigidly together.

The axial aperture 10 is provided in the table-roller hub, and is tapered from a larger lower opening to a smaller upper opening; which aperture is formed concentric with the circumference of the boss and the roller, and perpendicular to the shoulder 9 of the hub and to the plane of the roller. And the jewel-pin 11 is secured to the table-roller in the usual manner.

The safety roller 12 is concentrically formed around the lower end of and integral with the corresponding hub 13, which hub serves to space this roller at the proper distance from the table roller; and the axial aperture 14 is provided through the safety-roller hub, and is tapered from a larger upper opening to a smaller lower opening, which aperture is made concentric with the circumference of the roller and perpendicular to the upper end 15 of the hub and to the plane of the roller.

The staff 16 is formed with the usual coni-

cal pivots 17 and 17ª on its ends, and is preferably provided with the square offset or annular shoulder 18 intermediate its ends, thus dividing the staff into two end portions 19 and 19ª each of which portions tapers reversely from a larger diameter in the cross-plane of their junction to a smaller diameter at the bases of the pivots. The lower end portion 19ª of the staff is preferably made as shown, slightly less in diameter than the upper end portion 19, so that the annular shoulder 18, as shown, is formed around the lower end of the upper end portion, but this particular relation of the parts is not essential, nor is the shoulder in the cross-plane of the junction of the end portions of the staff an essential feature of the invention, although it is a desirable means for more certainly and positively positioning the parts on the staff.

The parts are assembled by driving the tapered lower end portion 19ª of the staff into the tapered aperture 14 of the safety-roller hub until the end of the hub reaches the upper end of the lower end portion of the staff, and abuts the annular shoulder of the staff when such a shoulder is used, in which relation of the parts the end portion of the staff is securely wedged in said aperture 14; after which the upper end portion of the staff is driven into the axial aperture 10 of the table-roller hub until the lower end of the table-roller hub reaches the lower end of the upper end portion of the staff and abuts the upper end of the safety-roller hub, in which relation of the parts the upper end portion of the staff is tightly wedged in said aperture 10. By this construction and arrangement of the parts, it is evident that the respective rollers will always be properly positioned on the staff with reference to the balance wheel, and to each other, that they will always be circumferentially concentric and radially perpendicular to the axis of the staff, and that when the balance wheel has once been adjusted on the connecting boss to be circumferentially concentric and radially perpendicular to the axis of one staff, it will always be likewise true to the axis of another staff which may replace the one. And it is furthermore evident that the staff may be readily inserted in and removed from the other parts by drawing or driving it in or out of the respective apertures; and that in these operations the tapered joints will tighten and loosen without a bruising or bending of the parts.

I claim:

1. A balance-staff having each of its end portions tapered from a larger diameter in the cross-plane of their junction intermediate the ends to a smaller diameter toward the ends of the staff, a table-roller hub having a tapered axial aperture wedged on one end portion of the staff and a safety-roller hub having a tapered axial aperture wedged on the other end portion of the staff.

2. A balance-staff having each of its end portions tapered from a larger diameter in the cross-plane of their junction intermediate the ends to a smaller diameter toward the ends of the staff, a table-roller hub having a tapered axial aperture wedged on one end portion of the staff and a safety-roller hub having a tapered axial aperture wedged on the other end portion of the staff, the ends of the hubs abutting each other.

3. A balance-staff having an annular shoulder intermediate its ends and each end portion tapered from a larger diameter at the shoulder to a smaller diameter toward the ends of the staff, a table-roller hub having a tapered axial aperture wedged on one end portion of the staff and a safety-roller hub having a tapered axial aperture wedged on the other end portion of the staff, the end of one hub abutting the shoulder and the end of the other hub.

4. A balance-staff having an annular shoulder intermedate its ends and each end portion tapered from a larger diameter at the shoulder to a smaller diameter toward the ends of the staff, a table-roller hub having a tapered axial aperture wedged on one end portion of the staff and a safety-roller hub having a tapered axial aperture wedged on the other end portion of the staff, the end of the safety-roller hub abutting the shaft shoulder and the end of the table-roller hub.

5. In an escapement-mechanism, a balance-staff having an annular shoulder intermediate its ends and each end portion tapered from a larger diameter at the shoulder to a smaller diameter toward the ends of the staff, the hub of one escapement-mechanism part having a tapered axial aperture and being wedged on one end portion of the staff and the hub of another escapement-mechanism part having a tapered axial aperture and being wedged on the other end portion of the staff, the end of one hub abutting the shoulder and the end of the other hub.

6. In an escapement-mechanism, a balance-staff having each of its end portions tapered from a larger diameter in the cross-plane of their junction intermediate the ends to a smaller diameter toward the ends of the staff, the hub of one escapement-mechanism part having a tapered axial aperture and being wedged on one end portion of the staff and the hub of another escapement-mechanism part having a tapered axial aperture and being wedged on the other end portion of the staff, the ends of the hubs abutting each other.

7. In an escapement-mechanism, a balance-staff having each of its end portions tapered from a larger diameter in the cross-plane of their junction intermediate the ends to a smaller diameter toward the ends of the staff, the hub of one escapement-mechanism part having a tapered axial aperture and being wedged on one end portion of the staff and the hub of another escapement-mechanism part having a tapered axial aperture and being wedged on the other end portion of the staff.

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