(No Model.)

P. T. A. RODECK.

CHRONOMETER ESCAPEMENT.

No. 377,839. Patented Feb. 14, 1888.

Fig. 1.

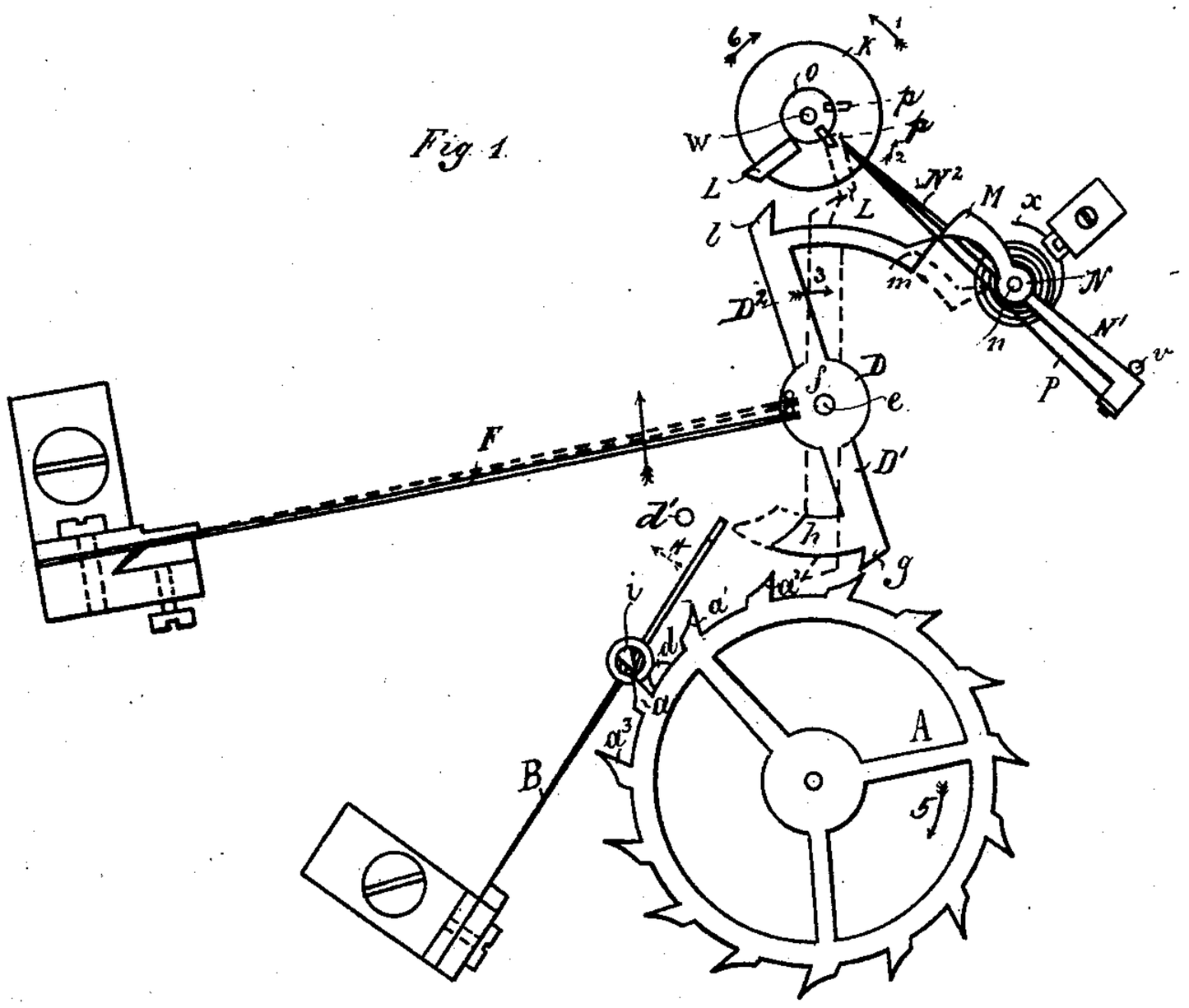
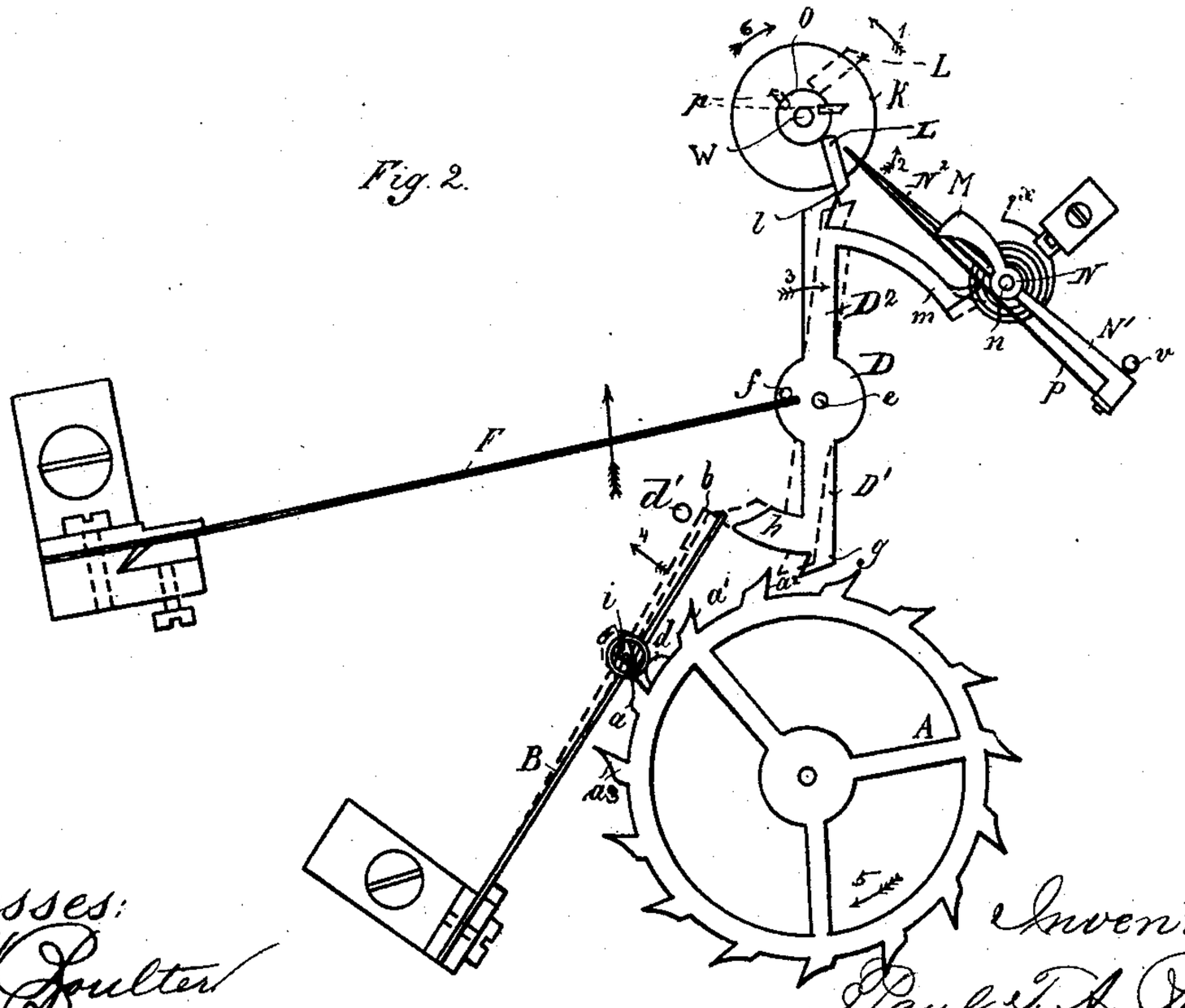


Fig. 2.



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UNITED STATES PATENT OFFICE.

PAUL THEODOR ALBERT RODECK, OF AMSTERDAM, NETHERLANDS.

CHRONOMETER-ESCAPEMENT.

SPECIFICATION forming part of Letters Patent No. 377,839, dated February 14, 1888.

Application filed September 8, 1887. Serial No. 249,125. (No model.) Patented in France August 9, 1887, No. 185,255; in England August 9, 1887, No. 10,916, and in Italy September 30, 1887, XLIII, 468, XXI, 22,151.

To all whom it may concern:

Be it known that I, PAUL THEODOR ALBERT RODECK, a subject of the King of Prussia, residing at Amsterdam, Warmoestraat 36, Netherlands, have invented certain new and useful Improvements in Escapements for Watches, (for which patents have been granted me in France, August 9, 1887, No. 185,255; Great Britain, August 9, 1887, No. 10,916, and in Italy, September 30, 1887, XLIII, 468, XXI, 22,151;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Referring to the drawings, Figures 1 and 2 show in plan view my improved chronometer-escapement in different positions.

The invention relates to chronometer-escapements; and it consists in structural features and in combinations of parts, substantially as hereinafter described, and as set forth in the claims.

In chronometer-escapements as heretofore constructed the oscillations of the balance are affected by the variations either in the tension of the motive-spring or by the variations in the movements of the going-train, to avoid which various means have been devised, and more especially means for compensating variations in the stress of or power exerted by the motive-spring and means for making the oscillations of the balance isochronous.

The object of this invention is to provide means for controlling the oscillations of the balance by a power independent of the going-train and its motive-spring, whereby the usual means for compensating variations in the power exerted by said spring and the necessity of making the oscillations of the balance synchronous may be dispensed with, whereby the oscillations of the balance are not influenced by any variation in the movements of the going-train other than those resulting from the variations in the power exerted by the motive-spring, such as increased frictional resistance resulting from lubricants or from any other cause, and whereby the escapement mechanism may be simplified and cheapened.

In Fig. 1 I have shown the several elements of the escapement in their position of rest.

A indicates the escapement-wheel, which rotates in the direction of arrow 5.

B is the locking-spring, the movement of which in one direction, or from the wheel A, is limited by a stop, *d'*, and in the reverse direction, or toward said wheel, by a stop, *d*. The spring carries a locking tooth or jewel, *i*, adapted to engage the teeth of the wheel A, and serves to lock the wheel against rotation in the direction of said arrow 5.

D indicates the escapement-lever. It is actuated by a flat spring, F, bearing against a pin, *f*, and the tendency of said lever is to rotate under the stress of the spring F in the direction of the arrow 3. At the outer end of the arm D' of the lever is formed a tooth, *g*, that extends into the path of the teeth of the escapement-wheel A, and from said outer end projects a tooth, *h*, adapted to engage the free end of the locking-spring B. At the outer end of the other arm, D^2, of said lever D is formed a tooth, *l*, adapted to engage a pallet or jewel, L, secured to a disk, K, of the balance-staff W, and also an arm the end of which is provided with a tooth, *m*, adapted to engage a locking arm or tooth, M, secured to the fulcrum pin or pivot of the balance-controlling lever N, the tendency of which lever is to rotate in a direction the reverse of that of the escapement-lever D under the stress of its hair-spring *x*. The movement of said lever N in one direction is limited by a stop, *v*, in such manner that the nose of the tooth M will rest on that of the tooth *m* when said parts are in engagement.

To the arm N' of lever N is secured a spring, P, the outer or free end of which projects beyond the end of the arm N^2 of said lever into the path of a pallet or jewel, *p*, secured to a disk, O, also mounted on the balance-staff, the pallets or jewels L and *p* and their supporting-disks being arranged on the balance-staff in a well-known manner.

The operation of the escapement may be briefly described as follows: In the position of the several elements of the escapement

shown in Fig. 1, if the balance-staff W rotates in the direction of arrow 1, the pallet *p* on disk O strikes the spring P and carries the latter and the lever N in the direction of arrow 2 against the stress of spring *x*. The tooth *m* slips off tooth M, and the lever D, under the stress of its spring F, moves in the direction of arrow 3, as shown in dotted lines. In this movement of lever D the tooth *l* on arm D^2 engages the pallet L and imparts to the balance-staff a further oscillation in the direction of its rotation, the force of which impulse depends solely upon the power exerted by the spring F, the parts, when the tooth *l* of lever D strikes the pallet L of disk K, being in the position shown in the full lines in Fig. 2. During these movements the lever N returns into its normal position of rest, the pallet *p* having snapped over the end of the spring P, the lever D and balance-staff continuing their motion in the direction of arrows 3 and 1, respectively, until they reach the position shown in dotted lines, Fig. 2, the tooth or arm *h* on arm D′ of lever D impinging on spring B and moving the same in the direction of arrow 4 to disengage the tooth *i* from the tooth *a* of the escapement-wheel, the latter rotating in the direction of arrow 5. In its rotation the tooth a^2 of wheel A engages the tooth *g* of lever D and turns said lever back sufficiently to bring its tooth *m* in contact with the tooth M on the pivot of the controlling-lever N, the lever D being again in its position of rest, and the tooth *i* again locks the escapement-wheel by engagement with the tooth a^3. At the same time the balance-staff returns into its normal position in the direction of arrow 6. In this movement of the balance-staff the small pallet *p* snaps again over the end of spring P, without, however, moving the lever N from its position of rest, it being held against such motion by the stop *v*.

It will be readily seen that the work performed at each oscillation of the balance-staff is the same. In the oscillation of the staff in one direction the unvarying or constant stress of the spring *x* and the friction between the teeth *m* and M must be overcome. In the oscillations of the balance in a reverse direction the constant or unvarying stress of the spring P must be overcome.

The impulses imparted to the balance-staff through the medium of the spring P are also the same for each oscillation, since there is no variation in the tension of the said spring. The oscillations of the balance are therefore absolutely independent of the going-train or motive power, which latter influences the spring F only after each escapement of the lever D.

From what has been said it will be readily seen that it is immaterial, so far as the correctness of the time-piece is concerned, whether there are any variations in the power exerted by the motive-spring or in the movements of the going-train; hence all mechanism for correcting such variations may be dispensed with and the construction of the time-piece materially simplified and cheapened. Nor is it necessary to make the oscillations of the balance synchronous, as hereinbefore stated, and which has heretofore been necessary, especially in chronometers used at sea.

Instead of the lever N and its spring P, a locking-spring of known construction may be employed—for instance, one similar to the spring B; and a spiral spring may be used instead of the flat or leaf spring F.

Having described my invention, what I claim is—

1. In a chronometer-escapement, the combination, with the balance-staff, the escapement-wheel, and a locking-tooth for controlling the rotation of the wheel, of an escapement-lever adapted to control the locking-tooth of the escapement-wheel and oscillate the balance-staff in one direction, and adapted to be itself impelled by the escapement-wheel in one direction, a driving element for impelling the lever in a reverse direction, and a locking-tooth controlled by the movements of the balance-staff and adapted to control the oscillations of the escapement-lever when impelled by the escapement-wheel, substantially as and for the purpose specified.

2. The combination, substantially as herein described, of the balance-staff W, the pallets L*p*, connected therewith, the escapement-wheel A, and the spring-actuated locking-tooth *i* B, of the escapement-lever D, provided with teeth *l m g* and the arm *h*, the spring-actuated lever N, the spring P, secured thereto, and the locking-tooth M on the lever-pivot, said parts being adapted for operation substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

PAUL THEODOR ALBERT RODECK.

Witnesses:
AUGUST SIEGFRIED DOCER,
GERRIT VAN DER MUELLER.