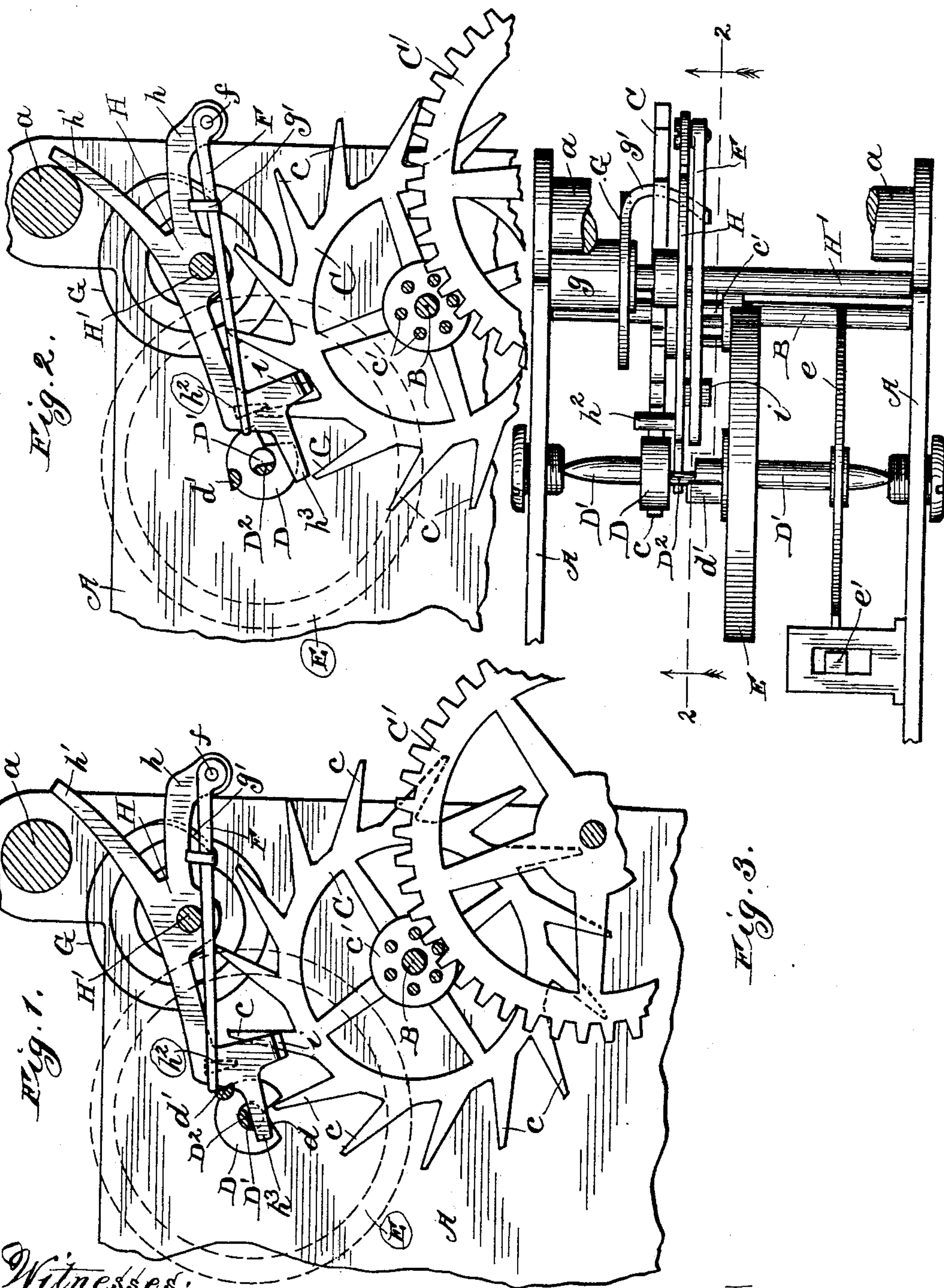


(No Model.)

C. G. CRONWALL.
CHRONOMETER ESCAPEMENT.

No. 560,691

Patented May 26, 1896.



Witnesses:

R. J. Jucker,
C. A. Duggan.

Inventor:

Carl S. Cronwall.

By Chas. C. Tillman
Atty.

UNITED STATES PATENT OFFICE.

CARL G. CRONWALL, OF CHICAGO, ILLINOIS.

CHRONOMETER-ESCAPEMENT.

SPECIFICATION forming part of Letters Patent No. 560,691, dated May 26, 1896.

Application filed January 27, 1896. Serial No. 576,955. (No model.)

To all whom it may concern:

Be it known that I, CARL G. CRONWALL, a subject of the King of Sweden and Norway, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Chronometer-Escapements, of which the following is a specification.

This invention relates to improvements in escapement mechanisms for timepieces, and while it is more especially designed for chronometers yet it is also applicable to watches and clocks; and it consists in certain peculiarities of the construction, novel arrangement, and operation of the various parts thereof, as will be hereinafter more fully set forth and specifically claimed.

The objects of my invention are, first, to provide an escapement mechanism which shall be simple and inexpensive in construction, strong, durable, and effective in operation, and, second, such a mechanism which will be less liable to be thrown out of gear by reason of sudden external motions, jerks or jolts, than the chronometer-escapements now generally in use, thus rendering my improvement adaptable to watches.

In order to enable others skilled in the art to which my invention pertains to make and use the same, I will now proceed to describe it, referring to the accompanying drawings, in which—

Figure 1 is a sectional view of the escapement mechanism and a portion of the driving-gear of a chronometer, taken on line 2 2 of Fig. 3, but showing the parts in a different position from that illustrated in said figure. Fig. 2 is a similar view taken on line 2 2 of Fig. 3; and Fig. 3 is a plan view of the device as illustrated in Fig. 2.

Similar letters refer to like parts throughout the different views of the drawings.

A represents the side pieces of the frame or casing, between which the operating mechanism is secured and in which its various shafts have their bearings. These plates are fastened together by means of suitable bolts *a*, which are usually located near each of the corners of the plates. At a suitable point in the plates is journaled a shaft B, upon which is mounted the escape-wheel C, which is provided with a number of teeth *c*, usually fif-

teen in number, which teeth are set tangentially and engage with the impulse-roller D, which is secured on a shaft D', pivoted in the sides of the frame or casing. This impulse-roller is formed as shown in Figs. 1 and 2, with a cut-out part *d*, within which the teeth *c* of the escape-wheel pass. The escape-wheel C is provided on one of its sides with a gear *c'*, which meshes with a cogged gear C' of the driving mechanism, which may be of the ordinary or any preferred construction, and for this reason only a part of the same is shown. On the shaft D' is mounted the balance-wheel E and an actuating-spring *e*, which has one of its ends secured to said shaft and its other end to a suitable projection *e'* on the casing. The hub of the balance-wheel is provided with a projection or pallet *d'* on its surface adjacent to the impulse-roller D to engage the detent F, which is pivotally secured at its outer end to the lower arm *h* of the lever II, which is mounted on a shaft II', located above the shaft B, on which the escape-wheel is mounted. As shown, the lever II is formed at its outer portion with lower and upper arms *h* and *h'*, respectively, which diverge, as shown, the upper one being adapted to strike the bolt *a* when the inner portion of the lever is in its lowered position. On the inner portion of the lever II and on its surface adjacent to the impulse-roller D is formed or provided a projection or pallet *h''*, which, as shown by dotted lines in Figs. 1 and 2, is wedge-shaped in cross-section, and is adapted to engage the teeth *c* of the escape-wheel and lock it in its movement. Around the shaft II', upon which the lever II is mounted or secured, and usually to a boss *g* on one side of the casing, is secured one end of a spring G, which has its other end bent to form an arm *g'*, which rests under the detent F and holds it in substantially the position shown in Figs. 1 and 2, yet permits it to move freely on its pivot-point *f* in the lower arm of the lever.

By reference to the drawings it will be seen and clearly understood that the shaft D', upon which the balance-wheel E and impulse-roller D are mounted, is formed with a cut-away part or recess D² between said roller and balance-wheel for the reception and operation of the horn *h''* on the inner end of the lever II, which projects into the cut-away portion D² of the

shaft D', as shown in Fig. 1 of the drawings, thereby preventing the parts becoming dislocated by reason of sudden external motion, jerks, or jolts.

5 From the foregoing and by reference to the drawings it will be seen and readily understood that as the escape-wheel is operated by means of the driving mechanism and the balance-wheel being actuated by means of the
 10 spring upon its shaft, that the pallet d' , thereon, will strike the inner end of the detent F, which will raise the inner portion of the lever H until the projection or pallet h^2 thereon will be disengaged from the tooth of the escape-
 15 wheel, and that the next tooth thereof will engage with the cut-away portion d of the impulse-roller, while the horn h^3 of the lever H will extend into the cut-away portion D² of the shaft D', upon which the balance-wheel
 20 and impulse-roller are located, as shown in Fig. 1; but as soon as the tooth of the escape-wheel is freed from the cut-out part d of the roller that the locking-pallet h^2 on the lever H will lock the escape-wheel until the pallet
 25 d' on the balance-wheel is returned to contact with the inner end of the spring-actuated detent F, which will cause the operation above described to be repeated. It will be observed
 30 that the detent F lies under the shaft H', and when its inner end is raised by means of the pallet d' on the balance-wheel the said shaft

acts as a fulcrum-point, and thus causes the inner portion of the lever H to be raised and its outer portion or arms to be correspondingly lowered, the upper one of which is normally
 35 held in contact with the bolt a by reason of the spring G, the arm g' of which supports the detent F, as above stated.

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

The combination of an escape-wheel, with a balance-shaft pivoted in the casing and having a recess or cut-away part near its middle, a balance-wheel provided with a pallet on one
 45 of its sides and mounted on said shaft, an impulse-roller on said shaft and having means to engage the teeth of the escape-wheel, a lever fulcrumed in the casing, and provided at its inner portion with a pallet to engage
 50 the teeth of the escape-wheel, and a projection to extend into the recess of the said shaft, and arms at its outer part, a detent pivoted to the lower arm of the lever, adapted to engage the pallet on the balance-wheel, and a
 55 spring to normally hold both the lever and detent, substantially as described.

CARL G. CRONWALL.

Witnesses:

CHAS. C. TILLMAN,
 E. A. DUGGAN.