C. A. NORELL.

ESCAPEMENT.

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1,023,269.

Patented Apr. 16, 1912.

Fig. 1.

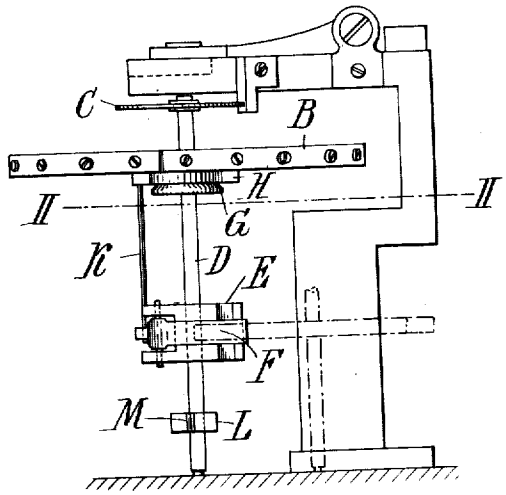


Fig. 4.

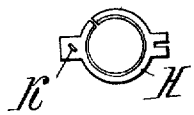


Fig. 5.

Fig. 2.

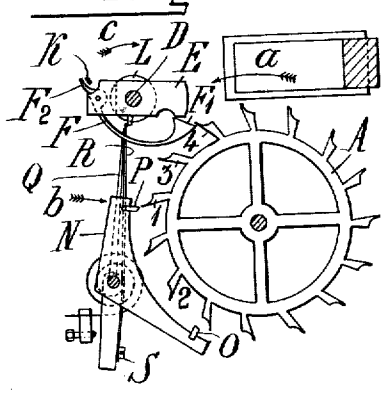
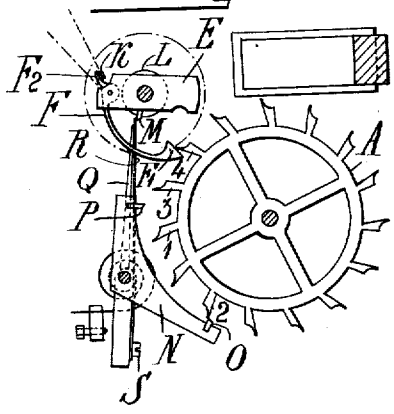


Fig. 3.



Witnesses:
Julia Hudd Dillon.
Mary Elizabeth Collins

Inventor,
Carl August Norell,
By D. Singer.
Attorney.

UNITED STATES PATENT OFFICE.

CARL AUGUST NORELL, OF STOCKHOLM, SWEDEN.

ESCAPEMENT.

1,023,269. Specification of Letters Patent. Patented Apr. 16, 1912.

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To all whom it may concern:

Be it known that I, CARL AUGUST NORELL, a subject of the King of Sweden, residing at Stockholm, Sweden, have invented new and useful Improvements in Escapements, of which the following is a specification.

This invention relates to an escapement of an improved chronometer type, by which is gained an almost perfectly uniform rate, independent of whether the main spring is completely wound or more or less run down. This is effected by making that part of the balance-arbor, on which the impulses fall, in the form of a spring, to which is imparted a constant deflection and consequently a constant force, for every turn of the escapement wheel. In this way it is only necessary to wind the main spring once a week or at even greater intervals, without any irregularities of rate arising from the varying force of the spring.

In the drawings, which illustrate a constructional form of the invention Figure 1 is a side view of the balance-arbor with impulse spring. Figs. 2 and 3 show the escapement-mechanism in two different positions in plan view after line II—III. Figs. 4 and 5 show details.

A, is the escapement wheel, B the balance, C the spiral spring governing the swinging of the balance, D is the balance arbor, on which is fixed an impulse support or bracket E, in the one end of which is pivoted an impulse transmitting member or lever F, the long end F, of which is in the path of the teeth of the escapement wheel A. G is a conical sheave to which the balance B is screwed. On the sheave G is arranged a split ring H (Fig. 4) which is prevented from rotation only by the friction. In ring H is fixed a preferably needle-shaped spring K, which may have rectangular section. The position of spring K may be adjusted by turning the ring H. The lower end of spring K rests against the shorter end F_2 of the lever F, with a slight initial pressure, which may be adjusted by turning ring H. The long arm F_1 of the lever F is consequently resting against the nose shaped end of the bracket E.

The escapement wheel A, on which the main spring acts in direction of arrow *a*, is governed by the balance, by means of the usual discharging pin M, carried by a holder L and the anchor N, which has two teeth O, P. The leaf spring R is pressed against the rigid part Q by screw S and projects into the path of the discharging pin M. The anchor N is pressed by a spiral-spring N′ in direction of the arrow *b*, so that one tooth of the escapement wheel rests normally on the tooth P. When the balance swings in direction of the arrow *c* (Fig. 2) the discharging pin M engages the spring R, causing the anchor N to swing out and release the tooth, say "1," of the escapement wheel, which then turns nearly one tooth distance, until one preceding tooth 2 engages the anchor tooth O. When the anchor returns tooth 2 is released and tooth 3 engaged by anchor tooth P.

The novelty of the invention is the arrangement to impart to the balance a constant impulse during every double swinging, independent of the momentaneous force of the main spring. This purpose is attained by means of the lever F and the spring K.

The spring K is practically inactive against lever F, shown in Fig. 2, with a slight initial pressure against the short arm F_2. The anchor tooth P has just released the tooth 1 and the escapement wheel is on the point of moving the tooth 2 into engagement with the other tooth O, which motion takes place with great acceleration, and consequently in a very short time. Meanwhile the tooth 4 catches the long arm F, leads it along and as the velocity of the tooth 4 is very much greater than that of the arm F_1, the latter swings out from the bracket E and takes the position, shown in Fig. 3. The lower end of the spring K is then moved to the right and the spring is tensioned. The spring K being comparatively weak and the impulsion of the same almost instantaneous the direct reaction on the balance is practically nought. In this moment the parts are in the position shown in Fig. 3 and then the bracket E, is moving in direction of the arrow C catching up with the arm F_1. In the same time the spring K straightens and gives its energy to the balance. As in this way, independent of the acceleration of the escapement wheel effected by the momentary tension of the main spring, the arm F_1 always swings a constant angle and consequently the impulsion spring K for every swinging of the balance in direction of the arrow C gets a constant deflection, and then the force transmitted to the balance—the impulsion—is also constant. A further advantage gained by this movement is, that there is no shock at all, as on the contrary

the spring K evenly and during a comparatively long time returns its energy, gained in a moment, to the balance.

The details may be varied, without departing from the idea of the invention. For example it is not necessary to use a needle shaped spring. In some cases on account of small space other forms may be preferable. Furthermore the lever F may be omitted and the teeth of the escapement-wheel act directly on the spring K.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is.

1. An escapement mechanism comprising in combination with a balance wheel and an arbor therefor having a pin, an escapement wheel, an anchor engaging said pin and escapement wheel, an element rigid on the arbor, a lever pivoted on said element with one end engaging the teeth of said escapement wheel, and a spring frictionally anchored on the balance engaging the free end of said lever.

2. An escapement mechanism comprising in combination with a balance wheel and an arbor therefor provided with a pin, an escapement wheel, an anchor engaging said pin and escapement wheel, an element rigid on said arbor and provided with a lever pivoted thereon with one end engaging the escapement wheel, and a spring carried by the balance and engaging the free end of said lever.

3. An escapement mechanism comprising in combination, an escapement wheel, an anchor coacting therewith, balance mechanism including a pin for engaging the anchor and an impulse support with an impulse transmitting member mounted thereon and coacting with said escapement wheel, and a spring frictionally mounted on the balance mechanism and coacting with said transmitting member.

4. An escapement mechanism comprising in combination, an escapement wheel, an anchor coacting therewith, a balance mechanism including a pin for engaging the anchor and an impulse support with an impulse transmitting member mounted thereon and coacting with said escapement wheel, and a spring carried by said balance mechanism and coacting with said transmitting member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CARL AUGUST NORELL.

Witnesses:
S. HENRIKSSON,
A. SPÅNG.