No. 639,966. Patented Dec. 26, 1899.

L. E. FAVRE.

ALARM CLOCK.

(Application filed Feb. 2, 1899.)

(No Model.)

Fig. 1.

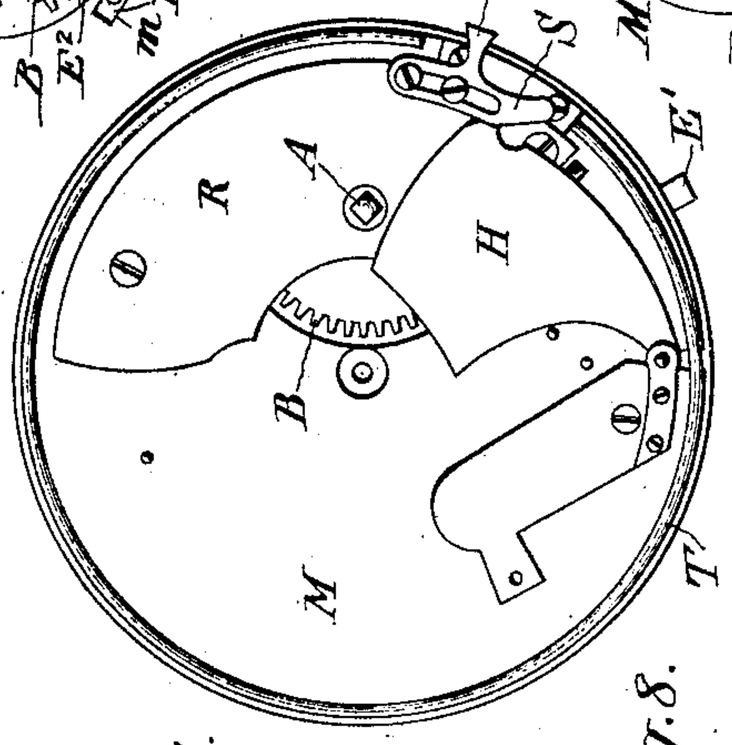

Fig. 2.

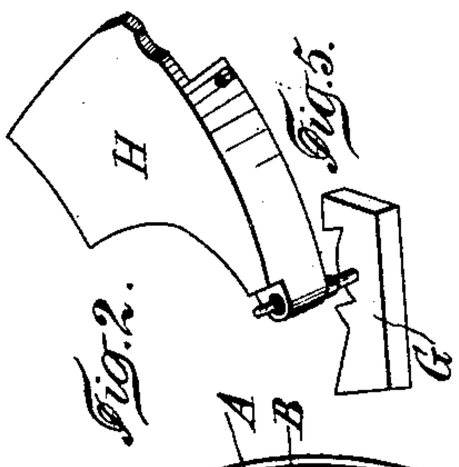

Fig. 3.

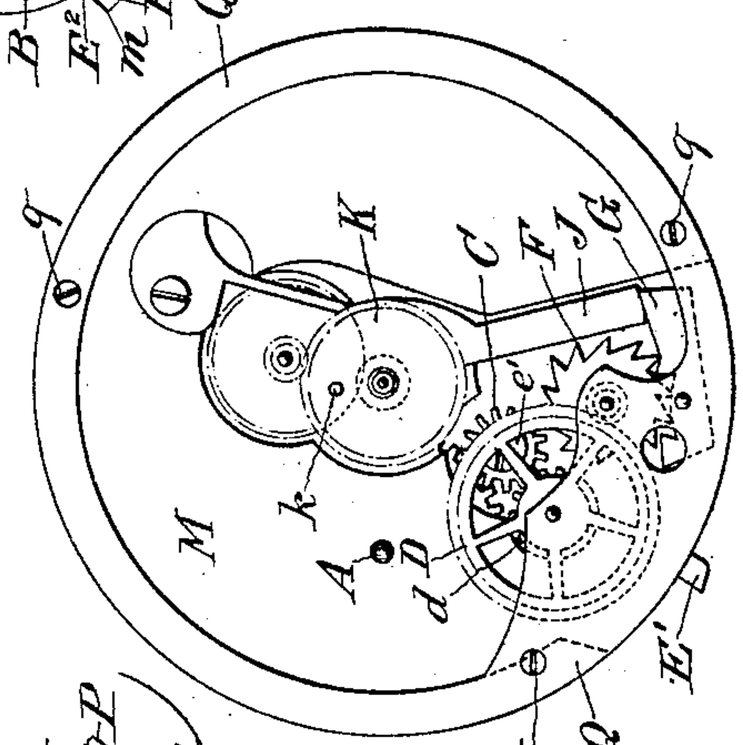

Fig. 4.

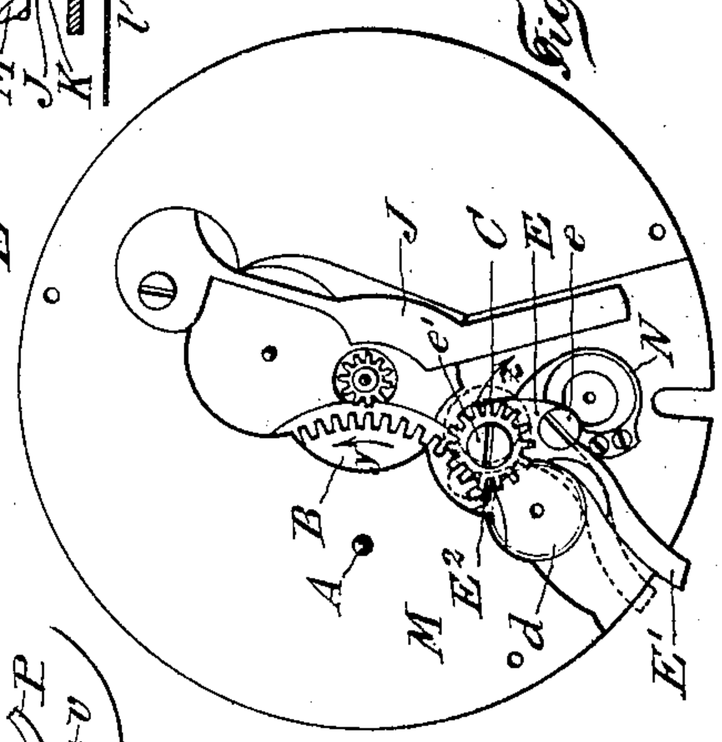

Fig. 5.

Fig. 6.

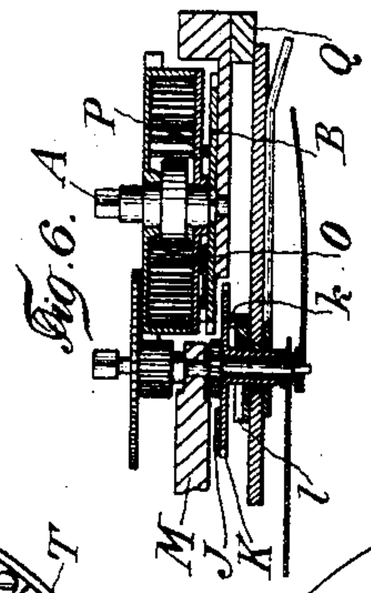

Fig. 7.

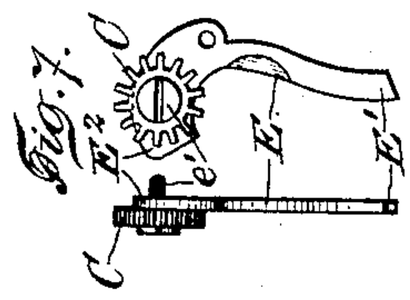

Fig. 8.

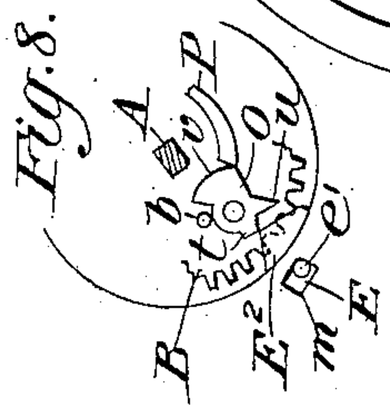

Fig. 9.

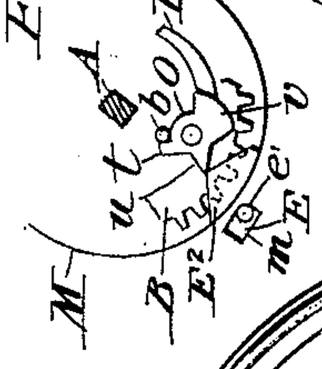

Fig. 10.

WITNESSES:

M. Hegny Hentzel

Geo. L. Schneloch

INVENTOR

Louis Eugène Favre

BY Samuel Wagner

ATTORNEYS.

UNITED STATES PATENT OFFICE.

LOUIS EUGÈNE FAVRE, OF CORMORET, SWITZERLAND.

ALARM-CLOCK.

SPECIFICATION forming part of Letters Patent No. 639,966, dated December 26, 1899.

Application filed February 2, 1899. Serial No. 704,270. (No model.)

To all whom it may concern:

Be it known that I, LOUIS EUGÈNE FAVRE, manufacturer, a citizen of the Republic of Switzerland, residing in Cormoret, Switzerland, have invented an Improved Alarm Mechanism Applicable to All Kinds of Watches or Clocks, of which the following is a specification.

This invention relates to improvements in alarm mechanisms of watches, clocks, &c.; and the object of the same is to provide a simple and strong alarm mechanism which is reliable in action and in which the alarm-train forms a click-pawl for the mainspring of the watch-movement, so that the usual click spring and pawl are dispensed with, and, further, to provide means for permitting the ringing of the alarm for a longer period of time than in alarm watches or clocks of ordinary construction.

The invention consists in certain details of construction and combinations of parts, to be more fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, which illustrate by way of example the application of my invention to a watch and in which only those parts of the watch-movement which are indispensable to a clear understanding of the alarm mechanism are illustrated, Figure 1 is a plan view of one side of the watch-movement, the alarm mechanism being stopped and portions of the movement removed. Fig. 2 is a similar plan view, but with certain other portions of the mechanism removed. Fig. 3 is a plan view of the opposite side of the watch-movement—*i. e.*, the side intended to be covered by the dial (not shown) of the watch. Fig. 4 is a similar plan view to Fig. 3, but with certain parts of the mechanism removed. Fig. 5 is a perspective view of the anchor and hammer of the alarm mechanism. Fig. 6 is a sectional view through the watch-movement, taken on a line intersecting the central arbor of the movement and the winding-arbor of the mainspring. Fig. 7 shows in side view and front elevation a rocking bridge and pinion which are arranged in the assembled watch in combination with other parts of the alarm mechanism, and Figs. 8, 9, and 10 illustrate in different positions details of the alarm mechanism.

Similar letters of reference indicate corresponding parts.

The shaft A of the mainspring-barrel is represented in the drawings as being intended to be wound by means of a key. It may, however, be combined with any other suitable winding mechanism. Upon the shaft or arbor A is mounted at one side of the mainspring-barrel the main gear-wheel B of the alarm mechanism. A rocking bridge E is pivoted at *e* to the pillar-plate M and is provided at one end with a lever-arm E′, which extends through the watchcase, and at its opposite inner end with a rounded nose E^2 and a pinion C, which is pivoted to the rocking bridge by means of a screw *e′*, which extends through the bridge E and into a slot *m* in the pillar-plate, the inner end of said screw serving thereby to limit the movement of the bridge. A spring N serves to keep the pinion C normally in engagement with the main gear-wheel B and also in mesh with a pinion *d*, arranged on the arbor of the gear-wheel D of the alarm-train. The wheel D is in mesh with a toothed wheel F, which acts in the well-known manner upon the anchor G, fixed on the shaft of the hammer H, so as to actuate the hammer and cause the same to strike the bell-wire T.

A locking-spring J, similar to that usually employed in alarm mechanism, serves to prevent movement of the anchor G when the pin *k* of the hour-wheel K is not located in the notch *l* of the nave of the alarm-hand. This construction is the same as that existing in most alarm mechanism and need not be particularly described here. It will be understood that if the hour-hand fixed to the hour-wheel reaches the hour to which the alarm-hand has been set the pin *k* enters the notch *l*, and the locking-spring J consequently raises the hour-wheel K and moves at its extremity out of engagement with the anchor, leaving the same free to play.

Upon the main gear-wheel B of the alarm mechanism is arranged a stop device for limiting the duration of the sounding of the alarm. This stop device comprises a cam-wheel O, pivoted at *o* to the gear-wheel, a pin *b* upon the gear-wheel and in engagement with the cam-wheel, and a spring P, which serves to retain the cam-wheel in whatever

position it may be set. The nose E^2 of the rocking bridge extends, as shown in Fig. 2, so as to engage the cam-wheel.

The operation of my improved alarm mechanism will be readily understood from the drawings. When the alarm mechanism has been released, the main gear-wheel B is moved by the mainspring of the watch-movement in the direction of the arrow x in Fig. 2.

In Fig. 2 the cam-wheel O is shown in position ready for the operation of the alarm mechanism. When the alarm mechanism is released in the manner described, the main gear-wheel B is turned by the mainspring in the direction of the arrow x, Fig. 2, and the tooth t of the cam-wheel O rides up and over the nose E^2, as shown in Fig. 8, at the same time causing the spring P to ride up on the shoulder v of the cam-wheel. With the cam-wheel in this position the gear-wheel B makes one rotation. The movement described of the cam-wheel has, however, also brought the tooth u of the same into such a position that its point projects sufficiently to engage the nose E^2 upon the completion of the rotation of the gear-wheel. The tooth u therefore now rides up and over the nose E^2, as shown in Fig. 9, and the tooth t is by this movement brought up against the stop-pin b. The shoulder v moves beneath the spring P. With the cam-wheel in this position the gear-wheel B makes the second rotation. The movement last described of the cam-wheel has, however, also brought the shoulder v into such a position that it projects sufficiently to engage the nose E^2 upon the completion of the rotation. This it does; but as the tooth t is already abutting against the stop-pin b the cam-wheel cannot turn further, and by the abutting of the immovable shoulder v against the nose E^2 the gear-wheel is stopped and the sounding of the alarm discontinued. The gear-wheel is thus permitted to make two revolutions before the cam-wheel has been so far moved as to bring the pin b into engagement with the shoulder v on the cam-wheel, and thereby prevent further rotation of the parts. The alarm mechanism is then locked and prevented from sounding even though the locking-spring J is out of engagement with the anchor G.

In winding up the watch the direction of the main gear-wheel B is reversed. The anchor G of the alarm mechanism, however, is in engagement with the wheel F and prevents the backward turning of the alarm-train. The forcible turning of the gear-wheel B therefore causes the pinion C to be moved with the rocking bridge in outward direction, as indicated by the arrow z and dotted lines in Fig. 4, against the tension of the spring N, so that the pinion C, while remaining in mesh with the teeth of the gear-wheel B, escapes tooth by tooth from the pinion d, so that the locked alarm-train by its pinion d forms a click-pawl for the mainspring of the watch.

When the watch is wound, the gear-wheel B is turned in a direction opposite to that of the arrow x in Fig. 2, and the movements of the cam-wheel are reversed—that is to say, on completing the first backward rotation (the cam-wheel being in the position shown in Fig. 10) the tooth u passes over the nose E^2, but the shoulder v rides up and over the nose, turning the cam-wheel a little. On the next rotation the tooth u engages with the nose and turns the cam-wheel, so that the shoulder v abuts against the pin b. On its next rotation the tooth t of the cam-wheel abuts against the nose E^2, (on the opposite side of the same from that shown in Fig. 2,) and the further backward turning of the gear-wheel and winding up of the mainspring would be prevented were it not for the fact that the nose E^2 is not stationary during the winding up of the gear-wheel, but is moved slightly nearer the periphery of the wheel B, when the entire bridge E is moved on its pivot, as indicated in Fig. 4, to permit the escaping of the teeth of the wheel C from the teeth of the pinion d. The nose during the backward turning of the gear-wheel B is not stationary in the position described, but rapidly oscillates as the teeth of the wheel C escape from those of the pinion d. The shoulder v, however, and the tooth u are intercepted, as described, by the nose E^2, its oscillation being so rapid that the said shoulder and tooth cannot pass the nose between oscillations of the same, but are engaged and the cam-wheel thereby turned in the manner described. Upon the following rotation, however, the tooth t attempts to pass the nose. Further turning of the cam-wheel is impossible because of the pin b. The tooth t, however, passes onward without interruption of the turning of the gear-wheel by reason of the fact that the nose is oscillating and not stationary, the only effect of the said tooth in its passage being to curtail the length of a few oscillations of the nose, yet permitting oscillations of sufficient length to bring the teeth of the wheel C into mesh at each oscillation in the usual manner with the teeth of the wheel d. This operation is repeated at each succeeding rotation of the gear-wheel B in winding up the watch. On ceasing to wind the cam-wheel may not have just passed the nose, as indicated in Fig. 2, but may be farther along. Upon the release of the alarm mechanism, however, it is moved by the turning of the wheel B into the position shown in Fig. 2, from which point the gear-wheel makes, as described, two revolutions before the interruption of the alarm. The sounding of the alarm for at least two revolutions of the gear-wheel is thereby always insured.

The movement of the alarm mechanism is pivoted on one side to a pillar-plate M and on the other side to a bridge Q, fixed to said pillar-plate by means of screws.

On the barrel-bridge R a sliding bolt S is fixed, which when in the position indicated by Fig. 1 prevents the striking of the hammer against the alarm-spring T. The tail or

operating-handle *s* of the bolt S extends through the inner shell of the watchcase, so as to be accessible when the outer watchcase is opened.

My improved alarm mechanism is applicable to all kinds of watches and clocks and forms a reliable and durable mechanism for striking the alarm. It possesses the further advantage of replacing the click-pawl with which the mainspring-barrel is usually provided in watches and clocks, so that no such separate click device is required.

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

1. The combination, with a watch-movement, of an alarm mechanism, consisting of a main gear-wheel actuated by the mainspring, a spring-actuated rocking bridge, a pinion on said bridge, an alarm-train, means for preventing a backward movement of said alarm-train, said pinion being normally in engagement with said gear-wheel and alarm-train, and a lever-arm extending from said bridge through the case of the watch for operating the bridge, substantially as set forth.

2. The combination, with a watch-movement, of an alarm mechanism consisting of a main gear-wheel actuated by the mainspring, a spring-actuated cam-wheel pivoted to said main gear-wheel, a pin on said gear-wheel in engagement with said cam-wheel, an alarm-train, a spring-acuated rocking bridge provided with a nose entering the path of said cam-wheel, and a pinion on said rocking bridge in mesh with said gear-wheel and alarm-train, substantially as set forth.

3. The combination, with a watch-movement, of an alarm mechanism consisting of a main gear-wheel actuated by the mainspring, a spring-actuated cam-wheel pivoted to said gear-wheel, a pin on said gear-wheel in engagement with and adapted to permit a partial rotation of said cam-wheel, an alarm-train, a spring-actuated rocking bridge provided with a nose entering the path of the cam-wheel, and a pinion on said rocking bridge in mesh with said gear-wheel and alarm mechanism, said cam-wheel, pin and nose being adapted to interrupt and prevent further movement of the gear-wheel after a number of turns of the same in the direction for ringing the alarm, and to be returned to their original position on winding up of the watch, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

LOUIS EUGÈNE FAVRE. [L. S.]

Witnesses:

ARMAND TERRCLET,

MARCEL GENTIL.