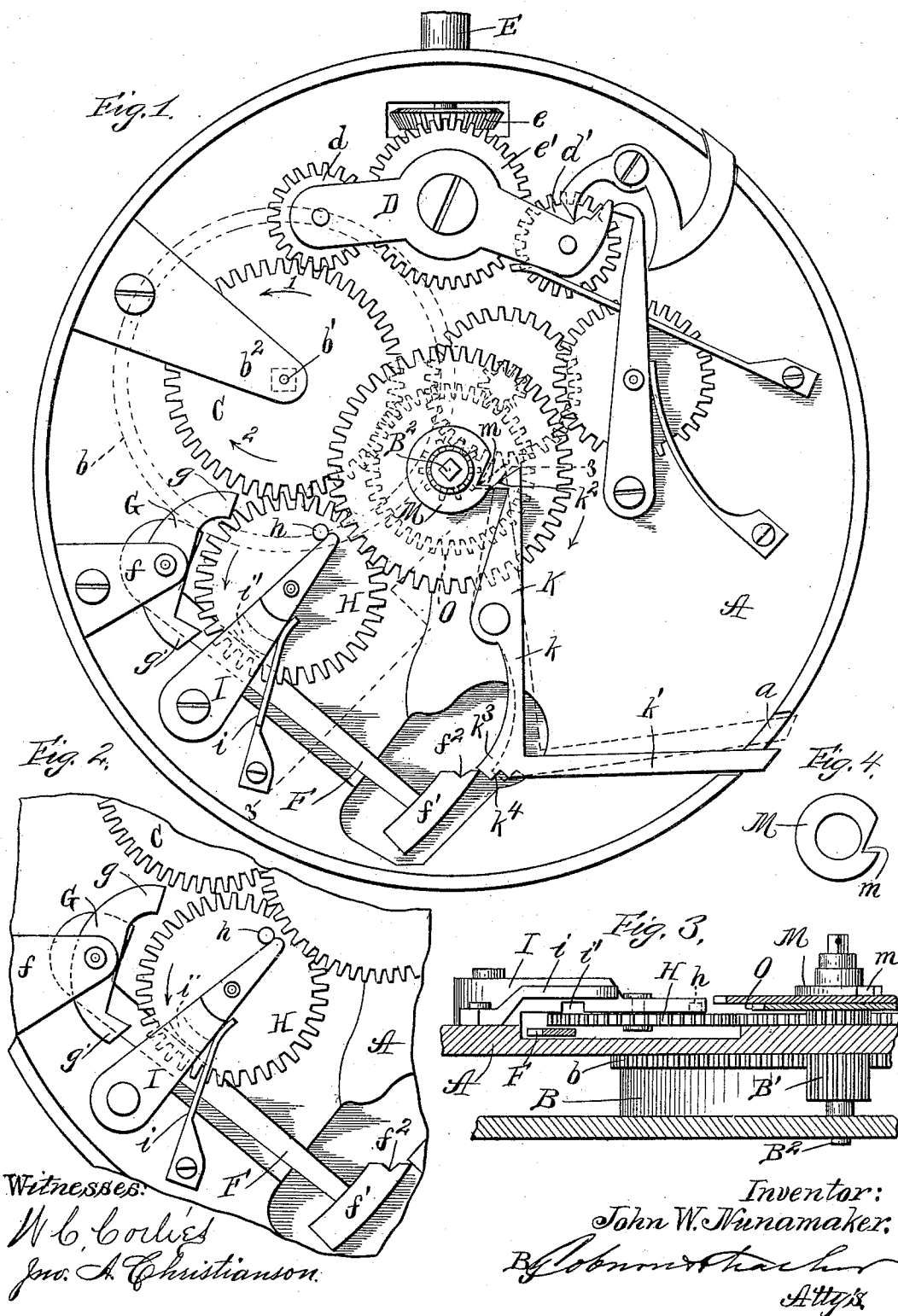


(No Model.)

J. W. NUNAMAKER.  
ALARM FOR WATCHES.

No. 528,790

Patented Nov. 6, 1894.



# UNITED STATES PATENT OFFICE.

JOHN W. NUNAMAKER, OF CHICAGO, ILLINOIS.

## ALARM FOR WATCHES.

SPECIFICATION forming part of Letters Patent No. 528,790, dated November 6, 1894.

Application filed June 29, 1894. Serial No. 516,113. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. NUNAMAKER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Alarms for Watches, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a plan view of a watch movement embodying my invention, looking upon the front plate; Fig. 2, a similar plan showing a portion of Fig. 1, with positions of some parts changed; Fig. 3, a detail cross-section taken on the line 3—3 of Fig. 1; and Fig. 4, a plan view of the stop disk of the alarm detached.

My invention relates to an alarm mechanism designed for application to watches of a general type, the same as shown in my prior Letters Patent No. 492,611, dated February 28, 1893, my present invention being an improvement upon the construction shown in the said Letters Patent.

A full description of so much of a watch movement embodying my invention as is necessary to an understanding of the latter will now be given, and the special improvements which I believe to be new and desire to secure by Letters Patent will then be set forth more specifically in claims.

In the drawings A, represents an ordinary front plate of a watch movement, and B, the barrel of the main spring, on which is the usual gear, *b*, engaging with a pinion, *B'*, fixed on the main arbor, *B*<sup>2</sup>.

The arbor, *b'*, of the barrel is journaled at its upper end in a bearing arm or bracket, *b*<sup>2</sup>, and on this arbor is secured a toothed wheel, *C*, arranged between the bracket and the barrel.

It will be understood, of course, that the main spring is inclosed within the barrel, one end being fastened to the barrel itself, and the other to its arbor.

A known mechanism for winding is here shown, and requires only brief reference.

A yoke, *D*, is pivotally mounted on the plate a little within the end of the stem, and carries at one end a pinion, *d*, and at the other a similar pinion, *d'*. This is usually known as the winding yoke, and the first

named pinion, *d*, is arranged to engage with the toothed wheel, *C*, on the main spring arbor when the yoke is turned down at this end in proper position for this purpose. The other pinion is used for setting, and its movement need not be explained here. The stem, *E*, is of the ordinary winding type and provided at its inner end with a pinion, *e*, fixed thereon, which engages with a gear, *e'*, journaled on the pivot pin of the yoke and engaging with the respective pinions thereon.

When the pinion, *d*, is in mesh with the wheel, *C*, obviously the watch may be wound up by the turning of the stem as usual, and arrow 1 indicates the direction in which the wheel, *C*, is turned for this purpose.

The alarm arm or lever, *F*, is pivotally mounted at one end on a bracket, *f*, the other end of this arm being provided with a hammer, *f'*, having a notch, *f*<sup>2</sup>, cut in its face. At its pivot end the hammer lever is provided with a pallet, *G*, the engaging points of which are marked respectively *g*, and *g'*. A toothed wheel, *H*, is journaled upon a bracket lever, *I*, which is pivoted to the front plate at one end near the outer edge of the plate and extends inward therefrom over the alarm lever toward the center of the plate, the journal of this wheel, *H*, being near the inner or free end of this pivoted support. The arrangement of these parts is such that when the pivoted bracket is in proper position the toothed wheel, *H*, is in engagement with both the wheel, *C*, and the pallet, and is, therefore, a kind of escapement wheel.

A spring, *i*, is mounted back of the pivoted bracket, *I*, with its free end resting against the said bracket, the normal action of which is to hold the wheel up into position to engage with the two parts as mentioned above. The escapement wheel is also provided with a short pin, *h*, on its face, which is arranged within the plane of the projecting end of the pivoted bracket so that it will come in contact therewith, as seen in the drawings. Obviously this wheel, therefore, can make only about one revolution, either in one direction or the other, the pin on its face coming in contact with the end of the pivoted bracket on one side or the other and thereby preventing further rotation of the wheel in that direction; but obviously this wheel may be

oscillated within the range of about one rotation for each oscillation. To provide for this movement, the pivoted bracket being straight, is cut away to provide a notch or groove,  $v'$ , of circular form in the under side of the bracket, for the pin on the wheel to pass through and so move from one side of the bracket to the other in the oscillation of the wheel.

In all alarms for watches or clocks it is, of course, necessary to provide means for stopping and locking the mechanism from action until a certain moment when it is desired that the alarm should be sounded. The device shown here for this purpose is a lever, K, right-angled or bell-crank in form, and pivoted by one of its arms,  $k$ , to the movement plate at a point between the alarm hammer or head and the main arbor at the center of the movement. The other arm,  $k'$ , of this lever extends directly outward and passes through a recess or long notch,  $a$ , in the rim of the plate, projecting out beyond the latter slightly so as to provide means whereby the lever may be vibrated on its pivot by the holder of the watch. The inner arm,  $k$ , of this lever extends directly from the recess in which the hammer is located to the main arbor, or rather to one side of the latter, where it terminates in a hook or catch,  $k^2$ , this hook, as shown in the drawings, having its contact or engaging face at right angles to the straight edge of the arm, and inclined or beveled backward or outward from the engaging point of the hook.

An alarm stop in the form of a disk, M, is mounted on the main arbor,  $B^2$ , being loose on the arbor but held by friction to the hour-wheel, O, so as to normally turn with said wheel, but at the same time adjustable on the arbor with reference to the wheel. In the outer rim of this disk there is provided a notch,  $m$ , shaped like the hook or catch on the end of the lever-arm,  $k$ . This hook end of the lever-arm,  $k$ , is arranged to rest normally against the edge of the disk, and except at the point of the notch in the latter, the position of the lever will be as shown in full lines in Fig. 1, in which position the inner or notched end of the hammer will rest upon the inner end of the arm,  $k$ , which is curved inward slightly, thus providing a kind of projection,  $k^3$ , curving inward toward the hammer. On this projection the end of the hammer rests normally, and owing to the curve of the arm at this point, the pressure of the hammer through the spring force which is constantly bearing upon it, will tend to throw the angle end of the lever outward, and so hold the hook end up firmly against the disk. In this adjustment the lever, therefore, becomes a stop for the hammer, thus holding the hammer arm from vibration and retaining the pallet in fixed engagement with the escapement wheel, H, the latter being held up into this engagement by the action of the spring on its swinging support, as explained

above; but in this position the escapement wheel is also in engagement with the winding wheel, C, which is under the constant impulse of the main spring to turn back, the main spring being attached at one end to the arbor on which this wheel is mounted. There is no pawl or any other like device provided to engage with this winding wheel to resist this backward action of the main spring, but the escapement wheel performs this function, so long as it is in engagement with the said wheel and the alarm hammer is stopped as explained above; for the hammer being held against all movement, the escapement wheel is held stationary by the fixed position of the pallet engaging therewith, and, therefore, the escapement wheel becomes the stop for the winding gear. The stop lever, K, of the alarm is also provided at the junction angle and on its outer edge with a notch,  $k^4$ , just outside or back of the curved projection,  $k^3$ .

The operation is as follows: The watch being wound, the alarm stop lever is pushed in to the adjustment shown in full lines in Fig. 1, thereby stopping the hammer and fixing the pallet in engagement with the escapement wheel, and so fixing the engagement of the latter with the winding gear, thus holding all the parts in a fixed position as required for the ordinary operation of the watch. This adjustment is shown in Fig. 1 of the drawings. The notched disk or set-off of the alarm is turned on the main arbor to adjust it to the proper point for releasing and sounding the alarm at the moment desired, being connected with the ordinary devices for this purpose in alarms for clocks and watches. The disk now travels around with the hour-wheel, the hooked end of the stop lever pressing lightly against the edge of the disk, and the parts remain in the adjustment described above, as seen in Fig. 1, until the notch in the disk is brought around to the hook of the lever, when the pressure of the hammer upon the curved projection of the lever, as described above, causes the hook end to engage promptly with the notch, and the vibration of the lever thus produced throws the projection at the angle thereof outward and thus disengages it from the hammer, as seen in dotted lines in Fig. 1. The stop to the action of the main spring upon the winding gear is thus removed, and the effect will be at once to turn the winding gear backward in the direction indicated by arrow 2 in Fig. 1, and this force is transmitted immediately to the escapement wheel, thereby giving a rapid vibration to the hammer-arm and sounding the alarm. In this action the escapement wheel will be rotated, of course, in the direction indicated by the arrow thereon in Fig. 1, and the operation will continue until this wheel has made just one revolution, when the pin on its face passing around underneath the swinging support for the wheel strikes the latter on the opposite edge, thereby stopping the further rotation of the escapement wheel and so arrest-

ing the operation of all the connecting parts. The yielding movement of the escapement wheel support is to provide for winding. Obviously, if the devices were rigidly held in the adjustment shown in Fig. 1, it would be impossible to wind the watch; but owing to the freedom of the pivoted support for the escapement wheel to move backward against its holding spring, when the winding mechanism is put in operation, the winding gear being turned in the direction indicated by the arrow 1, will have the effect to force the escapement wheel backward, which force is brought against the end of the pivoted support by the pin on the wheel, and the whole device is turned backward against the spring and disengaged from the winding gear and pallet, as seen in Fig. 2, when, obviously, the winding mechanism is left perfectly free for ordinary operation. As soon as the winding is completed and the winding gear stops, the actuating spring of the pivoted support will immediately throw the latter forward and bring the parts into engagement again, as seen in Fig. 1.

It will be seen from this explanation of the operation that an alarm mechanism is provided which is operated by the reaction influence of the main spring, and that this operation of the main spring through the winding gear is stopped by the stopping and locking of the alarm devices proper, a member of these devices forming the stop for the winding gear, this member itself being stopped by the locking of the alarm lever. Now, it is desirable to provide for an adjustment at times which will entirely prevent the operation of the alarm. This is effected by the notch,  $k^4$ , in the stop lever. When it is desired to stop the alarm permanently, this lever is pushed inward by the arm,  $k'$ , until the projection passes in over the projection on the hammer and the notch in the lever receives this projection on the hammer, while the curved projection on the lever passes into the notch,  $f^2$ , on the hammer and thereby permanently locks the alarm until a release is made by readjusting the stop lever.

As described above, when the alarm device is released and put in action, its operation continues only the short time required for a single revolution of the escapement wheel, when it is stopped by the pin on this wheel coming around and striking the back or outer side of the bracket. The wheel is returned to its former and normal position at the commencement of winding, when obviously the first effect will be to rotate this wheel back until the pin thereon strikes the bracket on

the front side again, its normal position as seen in the drawings.

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

1. In an alarm for watches, the winding gear, in combination with a pivoted alarm lever provided with pallets, a pivoted supporting bracket, a toothed escapement wheel journaled on said bracket and arranged to engage normally with both the winding gear and the alarm lever pallets, a stop device for arresting the rotation of the escapement wheel on its journal, and an elastic device acting upon said pivoted bracket to hold the escapement wheel in engagement with the winding gear and pallets, but yielding to permit said wheel to be disengaged from these parts by the winding operation, substantially as described.

2. In an alarm for watches, the winding gear, in combination with a pivoted alarm lever provided with pallets, a bracket lever pivoted at one end and extending inward, a toothed escapement wheel journaled on said bracket lever some distance from its free end and provided with a pin,  $h$ , arranged to contact with the projecting end of the bracket on either side thereof, and a spring,  $i$ , arranged at the back of the said lever to normally hold the escapement wheel in engagement with the winding gear and alarm lever pallets, substantially as described.

3. In an alarm for watches, a winding gear, in combination with a pivoted alarm lever provided with pallets, a pivoted bracket,  $I$ , provided with a transverse channel or groove,  $i$ , in its under side, a toothed escapement wheel,  $H$ , journaled on said bracket a little distance from its free end and provided with a short pin,  $h$ , on its face, and an actuating spring,  $I$ , mounted back of the pivoted bracket, substantially as described.

4. In an alarm for watches, a winding gear, in combination with a toothed escapement wheel normally engaged therewith, an alarm lever pivoted at one end and provided with pallets engaging with the escapement wheel and having at its other end a hammer,  $f'$ , with a notch,  $f^2$ , on its face, and the stop lever,  $K$ , provided with a curved projection,  $k^3$ , arranged to stop the alarm hammer normally and a notch,  $k^4$ , just back of this projection adapted to engage with the notch on the hammer face and thereby permanently lock the latter, substantially as described.

JOHN W. NUNAMAKER.

Witnesses:

LE OTIE LEIB,

ALLAN A. MURRAY.