No. 607,145. Patented July 12, 1898.

C. L. TESKE.

WINDING MECHANISM FOR TIMEPIECES.

(Application filed Mar. 8, 1898.)

(No Model.)

Fig. 1.

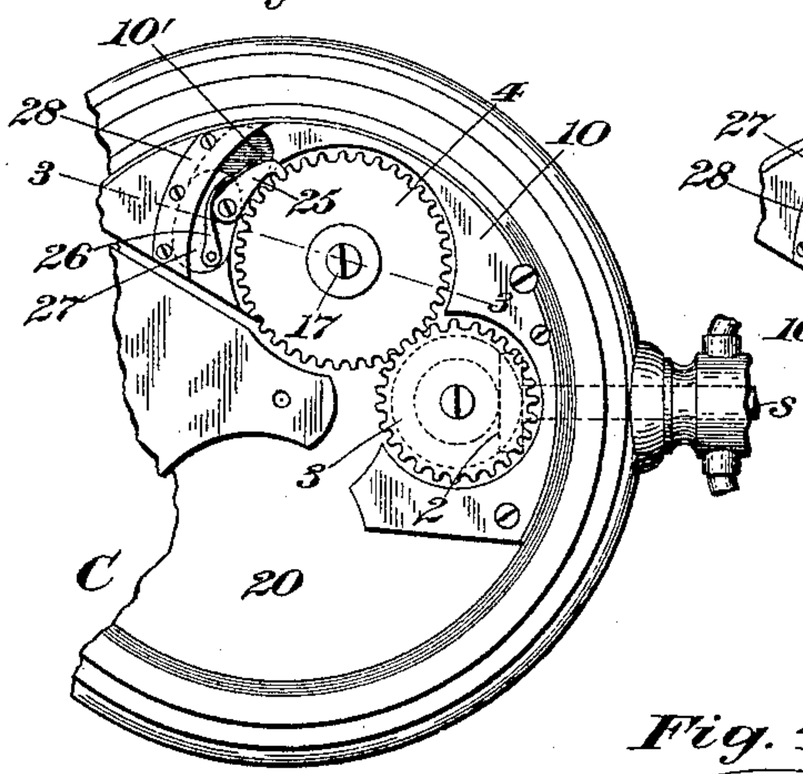

Fig. 2.

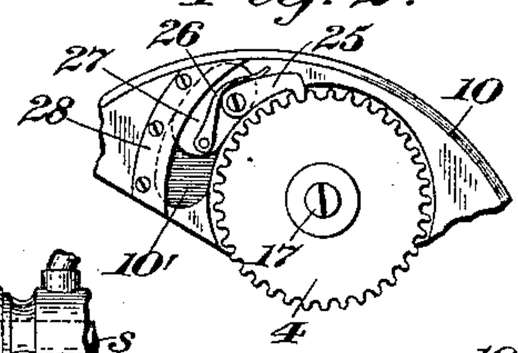

Fig. 3.

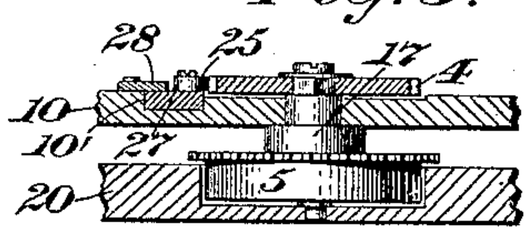

Fig. 4.

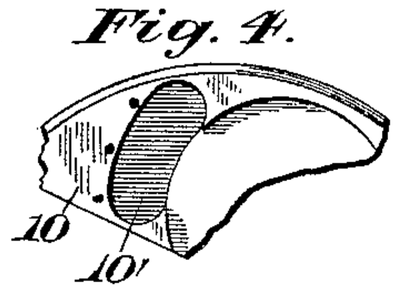

Fig. 5.

Fig. 6.

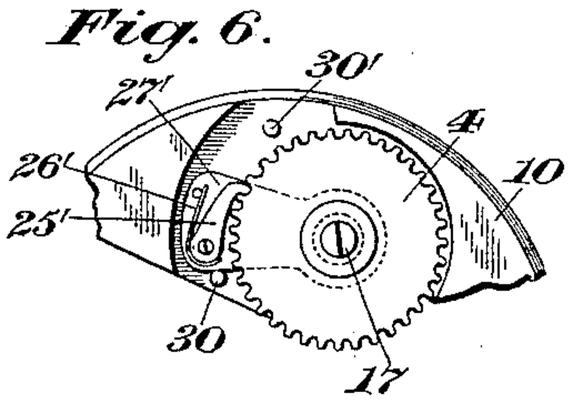

Fig. 7.

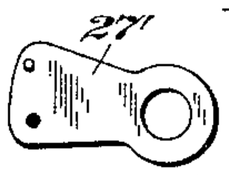

Fig. 8.

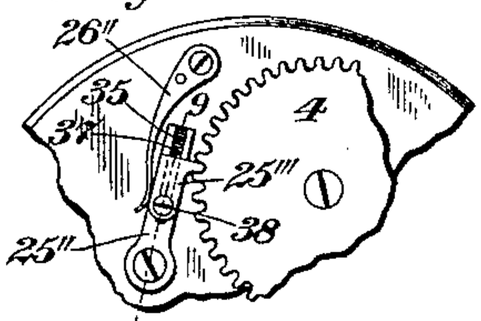

Fig. 9.

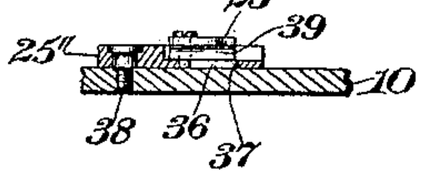

Fig. 10.

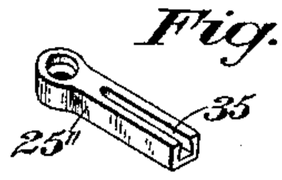

Fig. 11.

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UNITED STATES PATENT OFFICE.

CHARLES L. TESKE, OF HARTFORD, CONNECTICUT.

WINDING MECHANISM FOR TIMEPIECES.

SPECIFICATION forming part of Letters Patent No. 607,145, dated July 12, 1898.

Application filed March 8, 1898. Serial No. 673,112. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. TESKE, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Winding Driving Mechanism, of which the following is a specification.

This invention relates to winding driving mechanism, and especially to a winding mechanism for time-movements or watch-movements of clocks, watches, and other power-driven mechanism in which the movements of the driven member are imparted by force stored up in a previously-wound spring, cord, or other winding device.

The principal feature of this invention is the provision of an improved winding mechanism for clocks, watches, &c., in which the spring, cord, or other winding member can be wound up without straining the same unduly.

As is well known, in clocks and watches as heretofore constructed it has been possible, and, indeed, customary, unless great care has been exercised, to wind up the mainspring to its full extent and until the winding-wheel could be turned no farther. It is obvious that in timepieces of delicate workmanship constructed to keep accurate time within a few seconds per week or month such straining of the mainspring would result in storing up considerable surplus power, which, of course, when released would drive the time-train at an accelerated rate of speed, and thereby impair the accuracy and usefulness of the movement as a timekeeping mechanism. In addition to these extra forces stored up in the mainspring by the overwinding thereof there is usually another force present to increase the speed of movement of the train, and this second surplus force is obtained in watch and clock movements when the pawl or click forcibly locks the last tooth of the winding-wheel, and thereby obtains and maintains a considerable leverage, which of course will be exerted upon the wheels of the time-train to increase the speed-movement of the latter.

The principal object of this invention is to prevent the overwinding of the mainspring or other winding member of a time-movement, and hence prevent the transmission to the driven members of the time-train of a force or forces in excess of that which the spring is designed to impart.

My present invention is in the nature of an improvement upon that shown, described, and claimed in the companion application filed by me of even date herewith, Serial No. 673,111, in which I have represented a pawl having a fixed pivot, this pawl coacting with a ratchet-wheel having a pin-and-slot connection with one of the gear-wheels of the gear-train. In the present case I prevent the unwinding of the spring or other power-accumulating device and the locking up of the pawl by employing a let-off device or pawl shiftable circumferentially of the ratchet-wheel, the preferred construction being one in which the stop pawl or click oscillates bodily about the axis of the ratchet-wheel through a predetermined arc to permit the spring or other device to unwind to the proper extent after it is wound.

In the drawings accompanying and forming part of this specification, Figure 1 is an enlarged elevation of a portion of a watch containing a movement illustrating one embodiment of my present invention, parts being removed to illustrate the construction clearly, this view showing the pawl or click in its normal position. Fig. 2 is a detail of the pawl-and-ratchet mechanism illustrated in Fig. 1 and shows the position which the pawl assumes when the watch is wound. Fig. 3 is a sectional detail, the section being taken in line 3 3, Fig. 1. Fig. 4 is a detail illustrating the guideway in which the pawl-carrier works. Fig. 5 is a detail illustrating the pawl-carrier. Fig. 6 is a detail of a pawl-and-ratchet mechanism, illustrating a modification of my invention. Fig. 7 is a detail of the pawl-carrying arm shown in Fig. 6. Fig. 8 is a detail illustrating another modification of my invention, in which an extensible pawl is used. Fig. 9 is a section of the same, the section being taken in line 9 9, Fig. 8. Figs. 10 and 11 are perspective details of the extensible pawl.

Similar characters designate like parts in all the figures of the drawings.

My present invention may be applied, as before stated, to many different forms of driving mechanism, whether these be the time-movements of clocks, watches, &c., or any of

the several modifications illustrated in the drawings of this application.

The essential feature of my present improvements is the provision between the winding device and the part to be wound of a let-off device in the form of a holding member or pawl shiftable circumferentially of its coacting toothed or ratchet wheel to permit the spring or other part to unwind partially after it is wound.

Referring first to the construction illustrated in Figs. 1 to 5, inclusive, I have shown my invention in connection with an ordinary stem-winding watch the case of which is designated by C. In this case the usual crown (not shown) is connected to a stem *s*, carrying a pinion 2, meshing with one wheel of a gear-train between the winding-stem and the mainspring of the watch, the pinion in this case engaging the crown-teeth of the usual crown and intermediate wheel 3, by which the movements of the winding pinion and stem may be transmitted to the usual winding-wheel 4, secured to the barrel containing the mainspring. (Not shown.) This barrel is indicated at 5, Fig. 3, and is of the well-known type. The winding-wheel is secured directly to the usual winding-arbor for movement in unison therewith. This winding-arbor, which is designated by 17, is journaled in the well-known manner in a main plate 20 and a bridge 10, secured to the main plate, as by screws.

In order to provide for the partial unwinding of the mainspring, hereinbefore referred to, I make use of a pawl or click, which coacts with the winding-wheel 4, but the point or pivot of which is capable of movement about the winding-wheel. In the type of pawl indicated in these views this holding device or click, which is shown at 25, oscillates about a pivot in a pawl-carrier shiftable circumferentially with respect to the winding-wheel. The pawl will preferably be of the usual spring-pressed type, the spring therefor being indicated by 26.

The pawl-carrier, which is designated by 27, will in this construction be guided in some suitable manner, preferably on the bridge 10, so as to oscillate about the axis of the winding-wheel 4. The guide for this pawl-carrier may be of any suitable type; but I prefer to cut in the face of the bridge 10 a groove 10′ of the same width as the pawl-carrier 27, this groove of course being somewhat longer than said carrier. The pawl-carrier may be held in place in this groove in any suitable manner—as, for instance, by a light keeper-plate, such as 28, secured to the bridge 10, as by means of set-screws, and overlapping one edge of the pawl-carrier, so as to hold the latter firmly in place in the guide-groove 10′. This construction permits the pawl-carrier and the pawl to move freely, while preventing excessive movement of the parts or displacement thereof.

It will be noticed now that if the watch is wound up by turning the stem *s* in the usual manner motion will be transmitted to the winding-wheel 4, whereupon the teeth of said wheel will pull on the point of the pawl or click, which of course is held up to the winding-wheel by the spring 26, and said wheel will draw the pawl and the pawl-carrier from the position shown in Fig. 1 to that illustrated in Fig. 2 before the stop-wall at the end of the groove 10′ becomes effective to prevent the oscillation of the pawl-carrier. As soon as the pawl-carrier reaches the position shown in Fig. 2 the tooth of the winding-wheel by which the pawl and its carrier were actuated will disengage itself from the pawl and continue its movement, leaving the pawl in the position shown in Fig. 2, and hence moving relatively to said pawl.

When the crown of the winding-stem is let go, the tension upon the mainspring will of course cause the winding-wheel and the mainspring to fly back to the position shown in Fig. 1, and the winding-wheel will carry with it the pawl and its carrier to the position shown in Fig. 1 into contact with the other stop-wall of the groove 10′, which checks the movement of the pawl-carrier, whereupon the click will become effective to prevent further unwinding of the mainspring and movement of the winding-wheel and the barrel. The extent of the unwinding movement will of course be determined by the relative lengths of the pawl-carrier and the groove in which it works.

In the modification of the let-off mechanism illustrated in Figs. 6 and 7 the winding-wheel 4 is supported in substantially the manner before described by the winding-arbor 17 and is disposed above the bridge, as in the first-described construction. Here, however, the pawl is not supported on a pawl-carrier guided in a groove in the bridge, but is mounted for oscillation on an arm loosely supported for oscillation about the axis of the winding-wheel. This arm or carrier is designated by 27′ and supports thereon a spring-pressed stop pawl or click 25′, substantially similar to that shown in the preceding views. Here the arm 27′ swings through an arc of predetermined length and has its movements limited in any suitable manner, as by means of stops 30 and 30′, the bridge being cut away to a sufficient extent to permit the carrier-arm to swing freely. Manifestly the operation of this mechanism is substantially the same as that of the devices shown in Fig. 1.

In Figs. 8 to 11, inclusive, I have illustrated another modification of the let-off device, in which the pawl is duplex and of the "extensible" type. Here the toothed wheel with which the pawl coacts is indicated by 4. In this case the main pivot of the pawl is a fixed point on the bridge, and the pawl proper or holding-point of the click is movable circumferentially with respect to the toothed wheel 4, substantially in the manner hereinbefore described. The main member of this duplex

pawl is indicated by 25″, while the other member of the pawl is indicated by 25‴ and is slidable on the main part 25″, so that the two form together an extensible pawl or click. The two members of this pawl may be connected in any suitable manner; but in this case the main member 25″ has a dovetailed groove 35 in its upper side and a slot 36 in its under side, which slot leaves a stop-wall 37 at the outer end thereof, against which a stop or pin, such as 38, carried by the member 25‴ and working in the slot 36, may engage to prevent disconnection of the two parts of the click. The pawl-point or pawl proper, 25‴, has a dovetailed rib or tongue 39 projecting from the under side thereof and of such size as to coact properly with the dovetailed groove 35. The manner in which this duplex or extensible pawl operates will be obvious from these views. A spring, such as 26″, may be employed to keep the pawl in engagement with the teeth of the wheel 4.

It is obvious that my invention may be applied to the combined crown and intermediate wheel or to any other suitable wheel of the winding-train, if deemed desirable.

In all of the several constructions in which my invention may be embodied, as shown herein, it will be seen that provision is made for permitting the mainspring of the watch-movement to unwind to a predetermined extent after being wound, thereby preventing the straining of the mainspring and locking up of the click at the end of the winding operation. When this let-off device is used in connection with stem-winding watches of the usual type, the partial unwinding of the mainspring after it is wound causes the winding stem and pinion to turn in the opposite direction from that in which they are moved when the watch is being wound, and hence it becomes unnecessary to turn the winding-stem forcibly in the reverse direction to that for winding the spring.

Having described my invention, I claim—

1. In a driving mechanism, the combination, with a winding device and with a power-accumulating device to be wound, of connecting means between said devices and embodying a toothed wheel, and a holding device coacting with said wheel and embodying a carrier shiftable circumferentially thereof to permit partial unwinding of the power-accumulating device after the latter is wound.

2. In a time-movement, the combination, with a winding device and with a mainspring, of connecting means between the winding device and said spring and embodying a toothed wheel; a pawl-carrier shiftable circumferentially of said wheel; and a pawl coacting with said wheel and shiftable with said carrier to permit partial unwinding of the spring after it is wound.

3. In a time-movement, the combination, with a winding device and with a mainspring, of connecting means between the winding device and said spring and embodying a toothed wheel; a pawl-carrier oscillatory about the axis of said wheel; and a pawl coacting with said wheel and shiftable with said carrier to permit partial unwinding of the spring after it is wound.

4. In a time-movement, the combination, with a winding device and with a mainspring, of connecting means between the winding device and said spring and embodying a toothed wheel; a pawl-carrier oscillatory about the axis of said wheel; and an oscillatory spring-pressed pawl coacting with said wheel and shiftable with said carrier to permit partial unwinding of the spring after it is wound.

5. In a time-movement, the combination, with a winding device and with a mainspring, of connecting means between the winding device and said spring and embodying a toothed wheel; a guide concentric with said wheel; an oscillatory pawl-carrier guided by said guide; and a pawl coacting with said wheel and shiftable with said carrier to permit partial unwinding of the spring after it is wound.

6. In a watch-movement, the combination, with a winding stem and pinion, of a crown and intermediate wheel; a mainspring, a winding-wheel; and a stop-pawl coacting with said winding-wheel and having its pivot shiftable circumferentially of said winding-wheel to permit partial unwinding of the spring after it is wound.

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