July 9, 1957 A. HEIM 2,798,358

ALARM MOVEMENT

Filed Nov. 24, 1951

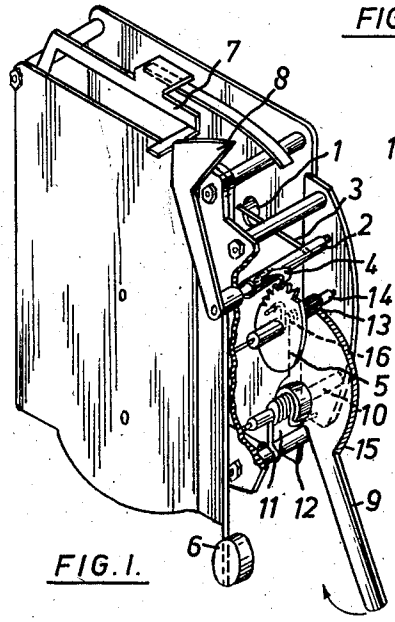


FIG. 1.

FIG. 2.

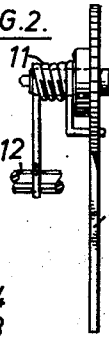


FIG. 3.

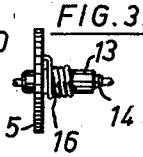


FIG. 4.

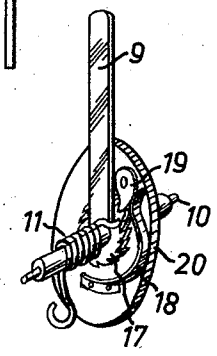


FIG. 5.

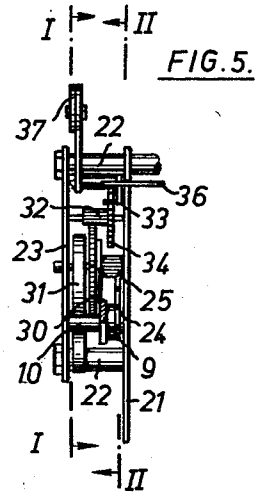


FIG. 6.

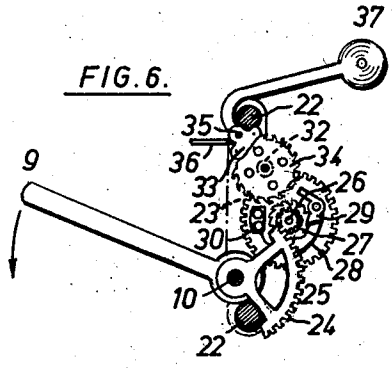
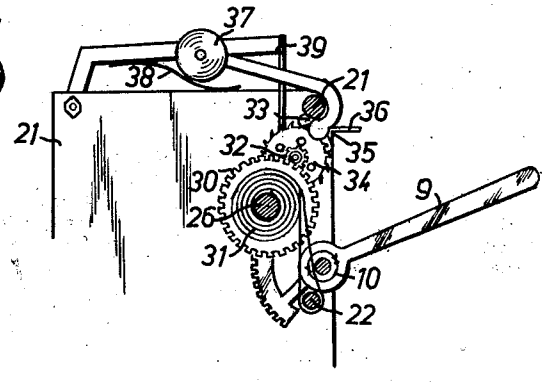


FIG. 7.



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ALARM MOVEMENT

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1 Claim. (Cl. 58—16)

This invention relates to an alarm movement, especially for use with clocks.

The alarm movement of alarm clocks of conventional design is wound by means of a key. The energy is delivered by a spring which is set by winding and which when released causes the alarm to sound.

The main object of my invention is to generally improve alarm movements of clocks. More specifically, my present invention aims at an improved winding mechanism for alarm movements.

To the accomplishment of the foregoing and other more detailed objects which will hereinafter appear, my invention consists in the alarm movement and the relation of the elements of the alarm movement one to the other, as hereinafter are more particularly described in the specification and sought to be defined in the claim. The specification is accompanied by drawings in which:

Fig. 1 is a perspective view of an alarm movement embodying features of my invention;

Fig. 2 illustrates a detail thereof, namely the winding stem with a winding lever and a return spring;

Fig. 3 shows another detail, the escapement;

Fig. 4 is a perspective view of a modified arrangement of the winding lever;

Fig. 5 is a side elevation of a modified alarm movement;

Fig. 6 is a section taken in the plane of the line I—I of Fig. 5; and

Fig. 7 is a section taken in the plane of the line II—II of Fig. 5.

Referring to the drawings, and more particularly to Figs. 1 to 3, the alarm is set for the proper time in the conventional way by means of an alarm hand. This causes a nose of a releasing spring 1 to press against an arresting arm 3 protruding from and fastened, for example, by riveting to a pallet arbor 2. The position of the pallet arbor is thus fixed. The pallet 4 prevents an escapement wheel 5 from running down under the influence of the driving power. Also mounted on the pallet arbor are a hammer 6 and a locking lever 8 which cooperates with a resiliently arranged alarm stop 7 which in turn may be controlled by a push button. So far, the arrangement of the alarm clock is known.

According to the invention, the alarm movement is wound by a lever 9 which is made to project to the outside through a slot in the clock case. The winding lever 9 is mounted on a rotatable shaft 10 and is subject to the force of a return spring or the alarm mainspring which has to be overcome when the lever is pressed down (in the direction of the arrow shown in Fig. 1). As a mainspring, I use, for example, a coil spring 11 which lies around the shaft 10, with one end of the spring engaging the lever 9 and with the other end being fastened, for example, to a pillar 12.

The winding lever 9 is geared to a pinion 13 on the shaft 14 of the escapement. In the embodiment shown in Fig. 1, the winding lever 9 is designed to form a

toothed segment 15 which meshes with the pinion 13, if necessary by means of intermediate wheels. The escapement wheel 5 must not move when the lever 9 is pressed down. To achieve this purpose, a special member is provided between the escapement wheel 5 and the pinion 13, which member causes the escapement wheel to move in one direction only, namely, in the working direction. This member may simply be a friction spring which is formed as a coil spring 16 to surround the shaft 14, and one end of which engages the escapement wheel 5. The coil spring 16 is wound in such a direction that it will only loosely surround the shaft when the alarm is wound so that the spring and the escapement wheel will not turn. When, however, the alarm runs down, the friction spring will tighten around the shaft so that the spring and the escapement wheel will move along.

When the winding lever 9 is pressed down in the direction of the arrow (see Fig. 1) in order to wind the alarm movement, the alarm mainspring 11 will be set. The shaft 14 turns in such a direction that it does not take along the escapement wheel 5. The mainspring 11 cannot pull the lever 9 back because the pallet 4 holds the escapement wheel 5 fast, and the latter is firmly coupled to the shaft 14 by the friction spring 16. As soon as the pre-set alarm time is reached, the releasing spring 1 is pulled off the protruding stop arm 3 and the alarm mainspring 11 is then no longer prevented from exerting its force. The pallet arbor 2 is now free to move and the alarm movement is free to run down, thereby returning the lever 9 to its initial position. When moving in the working direction, the escapement wheel 5 remains firmly coupled to the shaft 14.

The alarm stop 7 is actuated by depressing same against the action of a spring (not shown) which normally urges the alarm stop into its upper position. When depressed, the alarm stop gets behind the noselike end 40 of the locking lever 8, the latter being, in the embodiment of the invention shown in Fig. 1, under the action of the spring 11 and being, therefore, pressed against the alarm stop 7. If the alarm stop is in the arresting position and the lever 9 is pressed down, the locking lever discontinues to press against the alarm stop 7 and the latter will be released, this being due to the opening of the connection between the shaft 14 and the escapement wheel 5. The alarm stop will be moved by its spring to the upper or unlocking position. Thus, by winding the alarm movement, the alarm stop which has been set by the user is automatically withdrawn and everything is set to permit the running down of the alarm movement as soon as the alarm movement is released by the time movement.

In the modification shown in Fig. 4, the winding lever 9 is connected with a toothed wheel 20, which starts the running down of the alarm, by motion-controlling means. The winding lever may, for example, be rigidly connected with a ratchet wheel 17 the teeth of which are engaged by a click 19 of the toothed wheel 20 which is freely turning on the shaft 10. The click 19 is acted upon by a spring 18. The wheel 20, as has been explained with respect to the toothed segment 15 (Fig. 1), meshes with the pinion on the shaft 14. Since the wheel 20 will not move when the winding lever 9 is pressed down and the shaft 14 of the escapement is not turned either, the friction spring 16 is unnecessary, the escapement wheel 5 being rigidly mounted on the shaft 14. With the releasing spring 1 withdrawn and the pallet arbor 2 free, the ratchet wheel 17 which is acted upon by the mainspring 11 can take along the wheel 20 which then causes the alarm movement to run down in the same way as the toothed segment 15 does.

In the embodiment of the invention shown in Figs. 5 to 7, a flat helical mainspring, as generally used in the manufacture of timepieces, is employed instead of the coil spring 11. This makes possible a very close arrangement of the parts of the alarm movement. The helical mainspring, as described hereinafter, is preferably used in connection with a shaft carrying a ratchet wheel with pawl. The shaft is geared to the winding lever. In this way, a very soft helical spring may be used which will work noiselessly.

The alarm movement is arranged between the back plate 21 of the clock movement and a plate 23, these plates being connected by pillars 22. The winding stem 10 carries the winding lever 9 which projects to the outside through a slot in the clock case and is connected with a toothed sector 24. The sector 24 meshes with a pinion 25 mounted on a shaft 26 which also carries a ratchet wheel 27. A click 29, which is held against the ratchet wheel by a flat spring 28, is pivotally mounted on a wheel 30 rotatably mounted on the shaft 26. The inner end of a helical spring 31 is attached to the shaft 26, and the free end of the spring may be fastened, for instance, to one of the pillars 22. The wheel 30 meshes with a pinion 32 mounted on the same shaft as an escapement wheel 34 checked by a pallet 33 in the usual way. The pallet arbor 35 is connected as usual with an arresting arm 36, for example, by riveting, and carries a hammer 37. A stop lever 39, which is connected with a push button and is under the influence of a disengaging spring 38, engages the ratchet wheel 34 (see Fig. 7).

In order to wind the alarm movement, the winding lever 9 is moved down in the direction of the arrows shown in Figs. 6 and 7. The shaft 26 is thereby made to turn and the spiral spring 31 is set. The wheel 30 is prevented from moving because of the escape wheel 34 being held by the pallet 33. As soon as the alarm time is reached, the arm 36 is released in a known way, and the movement is permitted to run down under the influence of the force of the helical spring 31. The spring 31 can turn the shaft 26, whereby the winding lever 9 returns to its original position, and the ratchet wheel 27 moves the wheel 30 by means of the click 29. This also causes the escape wheel 34 to turn, and the pallet 33, which is no longer held, to operate. The shaft 35 moves the hammer 37.

If the lever 39 is in the stopping position shown in Fig. 7 at the time the alarm movement is wound, the stopping condition will be released when the winding lever 9 is pressed down since the coupling between the wheel 30 and the shaft 26 is opened, and the engagement between a tooth of the escapement wheel 34 and the alarm stop lever 39 eliminated, so that the latter is moved away from the escapement wheel 34 under the force of its spring 38.

It is believed that the invention and the many advantages thereof will be fully understood from the foregoing description. The alarm movement is wound by means of a winding lever which is swung against the returning force of a spring. The winding of the alarm

movement is greatly simplified and made more convenient. To wind the alarm movement, it is no longer necessary to pick up the clock; it is sufficient to press a finger against the winding lever which is made to protrude, for instance, from the side of the clock case. My invention is of particular importance for clocks, the time movement of which need not be wound every day, that is, for clocks with a running time of several days.

The alarm movement of the invention may be used with clocks of any kind and of any running time. Due to the elimination of the winding key and due to the possibility of winding by simply swinging a lever, my alarm movement is also suitable for installations in hanging and in mantle clocks. In many cases, this will make the purchase of a separate alarm clock unnecessary.

It will be apparent that while I have shown and described my invention in preferred forms, many changes and modifications may be made without departing from the spirit of the invention defined in the following claim.

I claim:

In an alarm clock equipped with a time movement to be wound by a key, the clock including a separate alarm movement, a return spring constituting the driving power for the alarm movement, winding means for the alarm movement, and supports for the return spring and winding means, the alarm movement including a pallet arbor, a pallet carried by the arbor, means blocking the arbor and set to release the arbor at a given time, an escapement wheel, a pinion, and a shaft carrying the escapement wheel and the pinion, the pallet cooperating with the escapement wheel, said winding means including a two-armed lever and a single gear member operably connected with the lever, the gear member being formed as a toothed segment, the toothed segment being integrally formed with said lever to mesh with said pinion, the lever being adapted to be swung in winding direction against the force of the return spring and, upon the release of the pallet arbor and under the influence of the return spring, to run down and to drive the escapement wheel, the lever being supported or fulcrumed so as to provide a relatively long arm for the exercise of the winding power and a relatively short arm for the application to the gear in mesh with said gear member, the clock further including a member arranged between the escapement wheel and the pinion to allow the escapement wheel to operate in the running down direction only.

References Cited in the file of this patent

UNITED STATES PATENTS

319,145	St. John	June 2, 1885
847,689	Porter	Mar. 19, 1907
1,396,842	Hodge	Nov. 15, 1921

FOREIGN PATENTS

36,008	Austria	Jan. 25, 1909
75,468	Switzerland	Aug. 1, 1917
256,478	Italy	Dec. 21, 1927