

United States Patent

Dubois

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[54] **TIMER**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 868,312, Oct. 22, 1969, abandoned.

[30] **Foreign Application Priority Data**

Oct. 28, 1968 Switzerland 16048/68

[52] **U.S. Cl.** 58/74

[51] **Int. Cl.** G04f 7/04

[58] **Field of Search** 58/74-79

[56] **References Cited**

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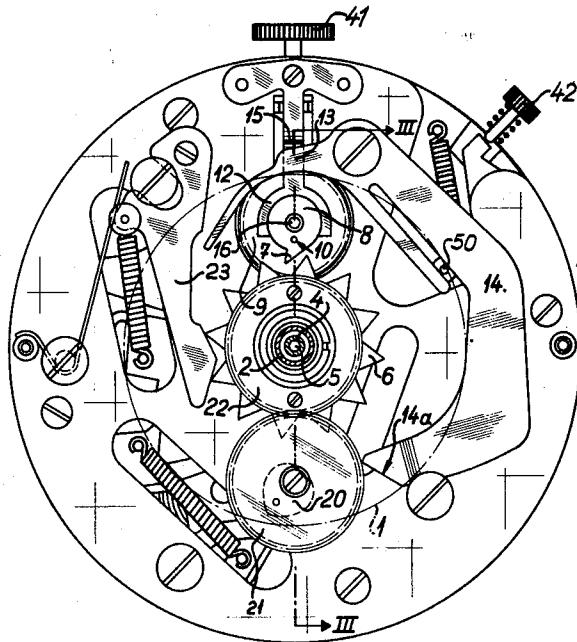
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[57] **ABSTRACT**

A timer has push-piece mechanisms for starting, stopping and returning time indicating members of the timer to a zero position. A zero-setting push-piece acts indirectly on an hours disc through an eccentric wheel carrying a zero-setting cam. The hours disc is driven by a star-wheel intermittently driven by a finger-piece, and held by a jumper. When the zero-setting push-piece is actuated, the finger-piece and jumper are disengaged from the star-wheel.

10 Claims, 4 Drawing Figures



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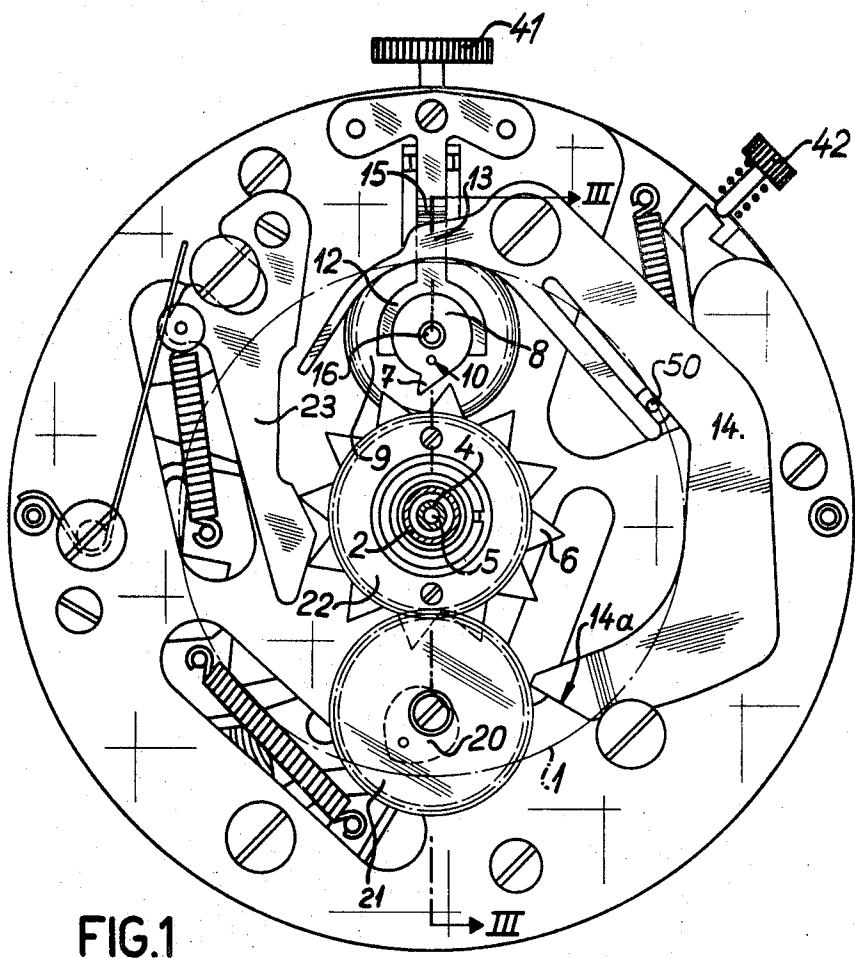


FIG.1

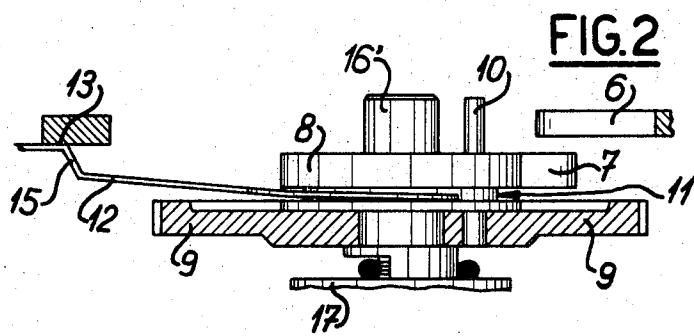


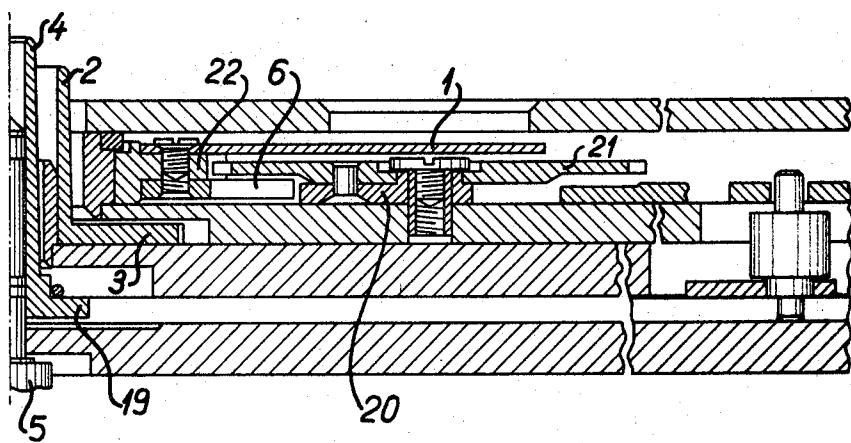
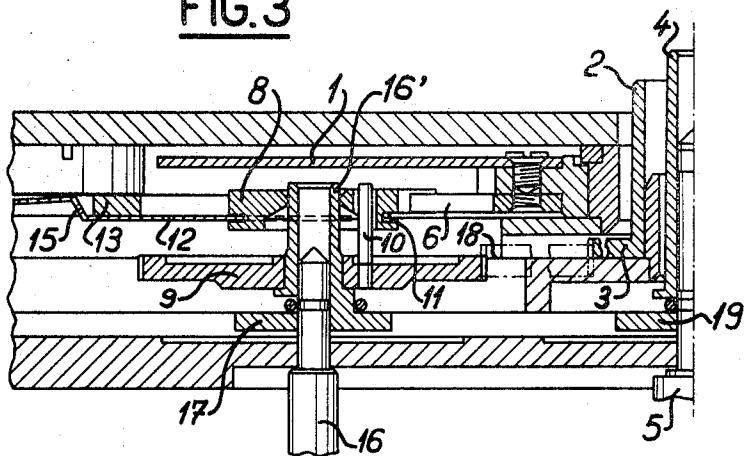
FIG.2

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FIG. 3

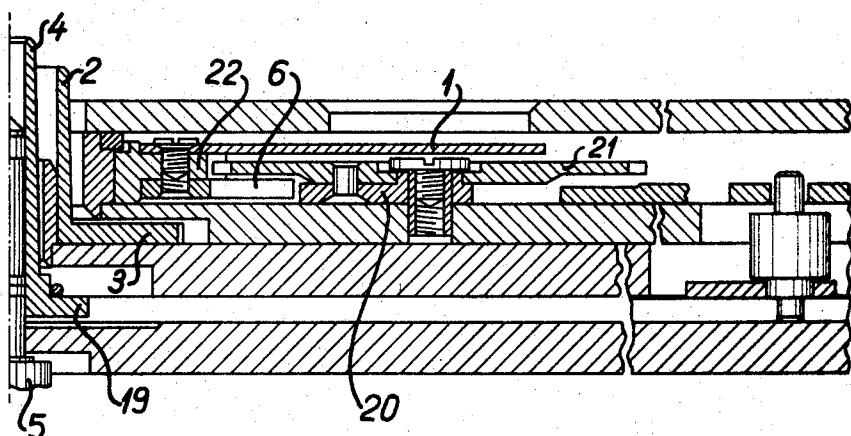
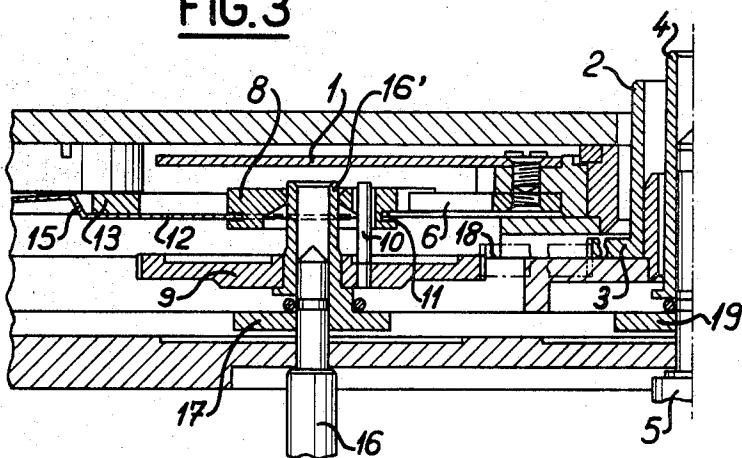


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FIG.3



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TIMER

This application is a continuation-in-part of abandoned application Ser. No. 868,312 filed on Oct. 22, 1969.

This invention relates to timers comprising push-piece mechanisms for starting, stopping and returning to zero the various indicator organs. Various timers of this type are known, for example that disclosed in U.S. Pat. No. 3,045,418.

It is an object of the invention to provide a timer comprising a push-piece for starting and stopping the timer and a push-piece for returning the time indicating members of the timer to a zero position, the said push-piece for starting and stopping the movement being provided with the means for winding the motor spring of the timer. The zero-setting push-piece acts indirectly on an hours disc through an eccentric wheel carrying a zero-setting cam.

One aspect of the invention concerns a timer comprising a first push-piece for starting and stopping the timer, a second push-piece movable between an inoperative position and an operative position for returning time-indicating members of the timer to a zero position, an hours-indicating member driven by means of a star wheel having a plurality of teeth, means engageable with the teeth of the star wheel for intermittently driving the star wheel, and a spring-urged member applied between adjacent teeth of the star wheel to normally hold the star wheel in a position corresponding to any given hour indication of the hours-indicating member. The improvement provided by the invention comprises an eccentric wheel in driving relationship with the star wheel, and a zero-setting cam angularly fixed to the eccentric wheel, movement of the second push-piece from the inoperative position to the operative position actuating:

- a. means for disengaging said driving means from the teeth of the star wheel;
- b. means for disengaging the spring urged member from between adjacent teeth of the star wheel; and
- c. means cooperating with said zero-setting cam to return the star wheel hours indicating member to a zero position.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a plan view, from the dial side, of the first bridge of a timer mechanism according to the invention, with the dial and hours-disc removed;

FIG. 2 is an elevational view partly in cross-section, of a detail of FIG. 3 but in another position;

FIG. 3 is an enlarged cross-sectional view along line III-III of FIG. 1; and

FIG. 4 is a partial plan view of the timer mechanism but with the first bridge removed.

The timer shown comprises time indicating members composed of a schematically indicated hours disc 1 carrying digits visible through apertures in the dial (not shown), a minutes-hand, not shown, mounted on the pipe 2 of a minutes-wheel 3, and a seconds-hand, not shown, mounted on the pipe 4 of a seconds wheel staff 5.

The hour disc 1 is formed in one-piece with a star-wheel 6 having twelve teeth which is intermittently driven in rotation by a finger-piece 7 of a wheel 8. The

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star wheel is normally held in a position corresponding to the display of one of the digits on the hours wheel by means of a spring loaded jumper 23 which applies between adjacent teeth of the star wheel. Wheel 8 is mounted on and axially movable along a cannon 16' of an eccentrically mounted center wheel 9 and is driven with the wheel 9 by means of a pin 10 fixed in the wheel 9 and which penetrates in a hole in the wheel 8. Additionally, the wheel 8 has a groove 11 into which a pliable fork 12 fits, this fork being fixed on the first bridge and being movable by an extension 13 of the hours-hammer 14.

The flexible fork 12 tends to raise the wheel 8, the position of this fork being adjusted by the extension 13 which, by moving along this fork when the hour-hammer 14 is actuated, bears on the inclined plane 15, and thus lowers the fork 12, displacing the finger-piece 7 out of the path of the star-wheel 6, as shown in FIG. 2.

Wheel 9 drives the minutes-wheel 3 by means of an intermediate wheel 18 (FIGS. 3 and 4). Wheel 9 and its cannon 16' are friction-mounted as known on a staff 16 (FIGS. 3 and 4) and the cannon 16' is fitted with a conventional zero setting heart-piece 17 for the minutes-hand.

On the seconds-wheel staff 5 is friction-mounted, as known, the seconds-wheel pipe 4, fitted with a conventional zero-setting heart-piece 19, FIGS. 3 and 4.

A central push-piece 41 aligned along the 12 o'clock axis has a knurled head for winding up the main spring of the timer (not shown) which is carried out, as known by means of a pinion 43 (FIG. 4) meshing with a barrel wheel, not shown. Push-piece 41 also serves for starting and stopping the timer and for this purpose works through a lever 44 with a standard column-wheel 45 which actuates a flirt 46 to stop the balance 47. By pressing in the push-piece 41, the lever 44 is pressed down, and the column wheel 45 causes the flirt to block the balance. When the push-piece 41 is moved out again, the flirt moves back to the position shown in FIG. 4 and the balance 47 is freed so that the timer starts operating again.

The other push-piece 42 is used to set the timer to zero, and can operate only when the timer is stopped column wheel 45 serving to prevent actuation of the push-piece 42 when the timer is running. Zero-setting of the seconds-hand and minutes-hand is standard and takes place by means of the hammers 48 and 49 which act on the zero-setting heart pieces 19 and 17 respectively when the push-piece 42 is actuated.

The hour-disc is returned to zero, while the timer is stopped, by means of the zero-setting push-piece 42 which acts by means of a pin 50 on the hammer level 14 (FIG. 1), the hammer 14a of which comes into contact with the heart-piece 20 which is fixed to a zero-setting wheel 21 which meshes with a wheel 22, the latter being fixed to and coaxial with the star-wheel 6 carrying the hour-disc 1.

At the moment when the hammer 14a touches the heart-piece 20, the extension 13 of the hammer lever 14 comes into contact with the inclined plane 15 of the fork 12 and lowers the wheel 8 to the position shown in FIG. 2 where it is out of the trajectory of the star-wheel 6. At the same moment, the two other hammers 48 and 49 bear on the heart-pieces 17 and 19, returning the

minutes-hand and the seconds-hand to zero, as known, while the hammer 14a turns the heart-piece 20, wheel 21, and wheel 22 to bring the hours disc back to the zero position.

While the timer is being set to zero, the end of extension 13 moves the jumper 23 of the star wheel 6 out of contact with the star wheel 6, thus permitting a particularly smooth return to zero.

Once the zero-setting push-piece is released, the timer can be restarted by means of the central push-piece 41.

What is claimed is:

1. In a timer having time indicator members comprising an hours-disc, a minutes-hand and a seconds-hand mounted concentrically, a first push-piece for starting and stopping the timer and a second push-piece for returning the time indicator members to zero, the improvement comprising means for locking said second push-piece while the timer is running, resetting means actuated by said second push-piece including an eccentric wheel carrying a zero-setting cam and engaging a wheel concentric with and rotating with said hours-disc, means for driving said hours-disc in rotation comprising a star-wheel angularly fixed thereto and a finger-piece on a driven wheel rotated by an eccentrically mounted center wheel, said driven wheel being axially movable in relation to said center wheel between an operative position in which the finger-piece is engageable with the star wheel and an inoperative position in which the finger-piece is spaced apart from the star wheel, and means for moving the driven wheel from the operative position to the inoperative position upon actuation of the second push-piece to return the time indicator members to zero.

2. In a timer having time indicator members comprising an hours-disc, a minutes-hand and a seconds-hand mounted concentrically, a first push-piece for starting and stopping the timer and a second push-piece for returning the time indicator members to zero, the combination of means for driving said hours-disc comprising a star wheel rotationally coupled with said hours-disc and a driven wheel carrying a finger piece engageable with teeth of said star wheel to advance it step-by-step, said driven wheel being movable axially relative to said star wheel to disengage said finger piece from said star wheel, spring jumper means engageable with said star wheel to retain it in the position to which it is advanced by said finger piece, means for resetting said time indicator members comprising heart cams rotationally coupled with said hours-disc, minutes-hand and seconds-hand respectively and hammer means actuatable by said second push-piece and engageable respectively with said heart cams to return said time indicator members to zero, means actuatable by said second push-piece for moving said driven wheel axially relative to the star wheel to disengage said finger piece from said star wheel when said second push-piece is actuated to return said time indicator members to zero, and means for locking said second push-piece while the timer is running.

3. A timer according to claim 2, further comprising means actuatable by said second push-piece to disengage said spring jumper means from said star wheel when said second push-piece is actuated to return the time indicator members to zero.

4. A timer according to claim 2 in which said heart cam for resetting said hours-disc is coaxial with and fixed relative to a gear wheel eccentric of said hours-disc and meshing with a second gear wheel concentric with and fixed relative to said hour-disc.

5. In a timer comprising a first push-piece for starting and stopping the timer, a second push-piece movable between an inoperative position and an operative position for returning time-indicating members of the timer 10 to a zero position, an hours-indicating member driven by means of a star wheel having a plurality of teeth, means engageable with the teeth of the star wheel for intermittently driving the star wheel, and a spring-urged member applied between adjacent teeth of the star wheel to normally hold the star wheel in a position corresponding to any given hour indication of the hours-indicating member, the improvement comprising an eccentric wheel in driving relationship with the star wheel, and a zero setting cam angularly fixed to the eccentric wheel, movement of the second push-piece from the inoperative position to the operative position actuating:

- means for disengaging said driving means from the teeth of the star wheel;
- means for disengaging the spring-urged member from between adjacent teeth of the star wheel; and
- means cooperating with said zero-setting cam to return the star wheel and hours indicating member to a zero position.

6. Timer according to claim 5, comprising means for locking the second push-piece in the inoperative position while the timer is running.

7. Timer according to claim 5 in which the push-piece for starting and stopping the timer comprises 35 means for winding a motor spring of the timer.

8. Timer according to claim 5, in which the means for driving the star wheel comprise a finger-piece on a driven wheel rotated by an eccentrically mounted center wheel, said driven wheel being axially movable 40 in relation to said center wheel between an operative position in which the fingerpiece is engageable with the star wheel and an inoperative position in which the finger-piece is spaced apart from the teeth of the star-wheel.

9. Timer according to claim 8, comprising a pivotally mounted hammer lever having first and second ends, a hammer at the first end of said hammer lever and an extension at the second end of said hammer lever, means for pivoting said hammer lever between an inoperative 50 position and an operative position upon movement of the second push-piece between the inoperative position and the operative position respectively, said hammer being spaced apart from the zero-setting cam in the inoperative position of the hammer lever and engaging 55 with the zero-setting cam in the operative position of the hammer lever; said driven wheel being mounted on a flexible arm, said extension cooperating with the flexible arm to move the driven wheel from the operative position to the inoperative position when the hammer lever is moved from the inoperative position to the operative position.

10. Timer according to claim 9, in which said extension forms the means for disengaging the spring-urged member from between adjacent teeth of the star wheel.