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W. E. OWEN

2,071,173

TIMER

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Fig. 1.

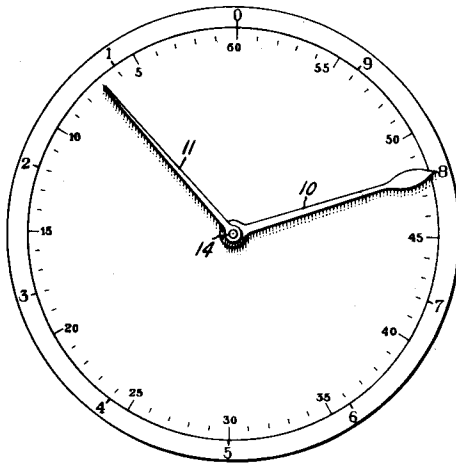


Fig. 2.

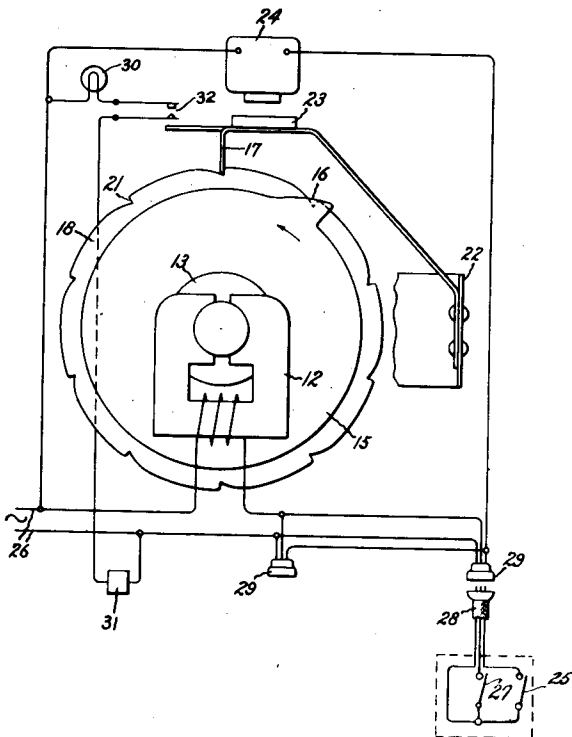
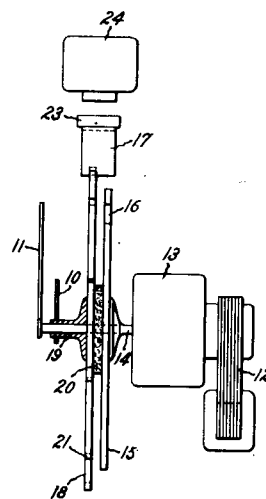


Fig. 3.



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UNITED STATES PATENT OFFICE

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TIMER

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3 Claims. (Cl. 161—17)

My invention relates to a timer suitable for timing processes, athletic events, and the like and its object is to provide an inexpensive reliable timer which is simple to control and capable of quickly being reset to zero from a remote point.

The features of my invention which are believed to be novel and patentable will be pointed out in the claims appended hereto. For a better understanding of my invention, reference is made in the following description to the accompanying drawing showing, in Fig. 1, a face view of my timer as arranged for timing athletic events; Fig. 2 shows a rear view of the device with its control circuits; and Fig. 3 represents a side view of the mechanism shown in Fig. 2.

Referring now to the drawing for a more detailed description, it will be evident from Fig. 1 that I have represented a timer dial suitable for timing athletic events having ten-minute periods. It is assumed that this dial is large enough to be seen from a considerable distance, that is, three or four feet in diameter, and presumably placed in a position not easily accessible, making remote control desirable. For example, the timer may be located at an elevated position in a stadium and the control therefor may be portable and in the hands of the time keeper who walks up and down the side line viewing the contest being timed. The timer has a minute hand 10 cooperating with the minute graduations reading from 0 to 9 in a counter-clockwise direction and a second hand 11 cooperating with the second graduations reading from 0 to 60 in a counter-clockwise direction. The 0 minute and second graduations correspond to 10 and 60 respectively. The two hands rotate in a clockwise direction and indicate the minutes and seconds remaining in the period of play. Thus, the indication shows that there are eight minutes and seven seconds remaining in the ten-minute period.

The timer is driven by a suitable electric motor. If regulated frequency alternating current is available, a self-starting synchronous motor may be used and such a motor is represented at 12 in the rear and side views, Figs. 2 and 3. The casing at 13 represents a gear casing containing suitable gear reduction to obtain a speed of one revolution per minute at the terminal shaft 14 on which the second hand 11 is secured. Also secured to shaft 14 is a cam plate 15 having one cam rise 16 in its periphery which is adapted to momentarily lift a latch member 17 for each revolution of the cam.

Rotatively mounted on shaft 14 is a notched disk 18 connected to a hollow shaft 19 to which

the minute hand 10 is fastened. The disk 18 is urged to rotate with cam plate 15 by reason of a friction coupling 20 between them but is prevented from rotating most of the time by reason of the latch 17 engaging one of the notches 21 in the periphery of disk 18. Once per revolution and once per minute in the example represented, the cam rise 16, rotating in a counterclockwise direction as viewed in Fig. 2, momentarily lifts latch 17 as cam rise 16 moves past this point and allows the notched disk 18 to rotate one-tenth of a revolution in the example given until it is caught by the latch 17 dropping in the next notch 21. It will be noted in Fig. 3 that the latch 17 is made wide enough to overhang cam plate 15 and thus it will be lifted by the rise 16 therein as above described. Where, as here represented, the timing period of the dial is ten minutes, the disk 18 will preferably have ten evenly spaced notches 21 in its periphery. The motor and timer shafts are in alignment and rotate in a counter-clockwise direction as viewed in the rear view Fig. 2 and in a clockwise direction as viewed in Fig. 1.

When the synchronous motor is energized, the second hand 11 rotates continuously at one revolution per minute. The minute pointer 10 is held stationary for about nine-tenths of each minute by the latch 17 and is allowed to rotate in steps of one-tenth of a revolution each during the remaining one-tenth minute immediately following the release of latch 17 by cam rise 16. When thus allowed to rotate, pointer 10 moves in steps between indications 0 and 9, between 9 and 8, etc., about the dial, the movement during each such step being as fast as that of the second hand 11. The minute hand 10 is preferably so rotatively secured to the hollow shaft 19 and notched disk 18 that it comes to rest on the minute graduation marks. Cam rise 16 and the second pointer 11 are secured to shaft 14 in approximately the same rotative position so that, as the second pointer 11 passes the zero graduation, latch 17 is lifted and the minute pointer 10 starts to advance as the seconds pointer leaves the zero graduation. Thus, with both pointers on zero, they would be substantially in alignment and move in unison until the minute pointer stopped opposite minute graduation 9. If desired the minute hand may be arranged to move from 0 to 9 at the end of the first minute instead of at the beginning of the first minute or at the end of the first 30 seconds. Likewise the minute hand may be adjusted to come to rest midway between the minute graduations. The latch 17

is resiliently supported from a bracket 22 constituting the supporting structure of the device and is biased to rest lightly on the periphery of the notched disk 18 so as to drop into a notch when opposite and be easily raised from such notch by the cam rise 16.

In order that the minute hand 10 may be quickly reset to a zero position, I have provided a magnet release of latch 17 controllable from a remote point. Thus, the latch either carries a magnetic armature 23 or itself serves as such opposite an electromagnet 24, the circuit of which may be closed and opened as desired by a switch 25. It will be evident that, when the magnet 24 is energized, latch 17 will be lifted and will remain lifted so long as the magnet is energized during which time, if the motor 12 is running, pointer 10 will rotate continuously at the same rate as the pointer 11. Pointer 10 may thus very quickly be brought around to the zero-indicating position in a resetting operation.

The magnet 24 and motor 12 may receive their electric energy from the same source indicated at 26. A switch 27 is provided in the motor circuit and these control switches 25 and 27 are preferably small switches that may be carried about by the official timer. For this purpose, I have indicated the wires leading thereto as carried by a flexible cable 28 which may be plugged into any one of several outlets 29 conveniently located and leading to the source of supply 26 and timer circuits.

Before the start of a contest, the pointers 10 and 11 are set on zero with the motor switch 27 and resetting magnet switch 25 open. At the start of the contest, switch 27 is closed and the second hand 11 starts to rotate. As each full minute passes, pointer 10 will step around, indicating the minutes remaining to play. If at any moment "time out" is called, the time-keeper opens switch 27 and closes it again when play is resumed. The device thus accurately and conveniently serves to keep account of and indicates the remaining period of play. Let us assume with the pointers in the positions shown in Fig. 1, that it becomes desirable to quickly reset the timer to the zero indication. With switch 27 closed and the device in normal operation, switch 25 is closed to energize magnet 24. This releases pointer 10 and it rotates continuously at the same rate with pointer 11. As pointer 10 passes minute indication 1 and approaches zero, switch 25 is opened whereupon pointer 10 will be stopped on zero by latch 17 falling into the next notch that arrives at this point. Then, as the second pointer next approaches and reaches zero, the motor circuit is opened at switch 27. It will be evident that this resetting operation requires not more than a minute at the most. If desired, the second hand may be stopped before reaching the zero point so that, in starting the next contest period, the timer is first started and the exact beginning period indicated by firing a gun or the like as the second hand passes the zero indication.

I may also provide a signaling circuit containing one or more signals such as shown at 30 and 31, the signaling circuit being closed by contacts 32 when the latch 17 is lifted. This will then produce an additional short signal, automatically indicating the passage of each full minute of time when the timer is in operation. The signal may be audible or visible or of both types and may be located at any desirable point or points. Such signals will also be useful to

an official when the timing device is not in actual use as he may operate the signal circuit to transmit prearranged signals by opening and closing the switch 25. For example, he may thus transmit a prearranged signal to warn players and officials that play is about to start or to give precautionary warnings relative to the time taken for time-out periods before a penalty is due.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention together with the apparatus which I now consider to represent the best embodiment thereof but I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A timer comprising a timer motor, a hand driven directly thereby at a definite speed, a graduated dial with which said hand cooperates to indicate the passage of time, a second hand indicating on said dial and having the same axis of rotation as the first hand, means for driving said second hand from said motor in the same direction of rotation as the first hand including a friction clutch, a notched wheel rotated with said second hand, a latch resting on the periphery of said notched wheel and biased to engage a notch therein to normally hold said wheel and second hand from rotation, a cam member driven with the first hand for momentarily lifting said latch once for each revolution of said cam member to permit the notched wheel to rotate a distance corresponding to the distance between the notches in its periphery, and electrical means controllable from a distance for disengaging said latch from the notched wheel to permit the second hand to rotate continuously.

2. A timer comprising a time-graduated dial, minute and second hands rotatively mounted at the center of said dial for indicating thereon, an electric timer motor for driving said second hand continuously at the rate of one revolution per minute when said motor is energized, a friction clutch through which the minute hand may be driven by said motor at the same rate and in the same direction as the second hand, means for normally holding said minute hand from rotation comprising, a notched disk connected to the minute hand and a latch resting against the periphery of said disc and engaging a notch therein, the notches in said disc being evenly spaced, a cam driven with the second hand arranged to momentarily lift said latch once per minute to allow the disc to rotate a distance corresponding to the spacing of the notches in the disc, an electromagnet which, when energized, also lifts said latch and allows the notched disc to rotate when the motor is running, and means controllable at a distant point for selectively energizing said motor and electromagnet.

3. A timer comprising a dial graduated in second and minute time graduations, second and minute-indicating hands rotatively mounted at the center of said dial and indicating thereon, a self-starting synchronous motor for driving said second hand at the rate of one revolution per minute when the motor is energized, a disc connected to said minute hand and having evenly spaced notches about its periphery equal in number to the minute graduations about said dial, a friction clutch through which said disc may be driven by said motor, a latch resting against

the periphery of said disc for engaging a notch therein to normally prevent said disc from rotating, means driven by said motor for momentarily disengaging said latch from a notch once per minute, thereby allowing the disc to rotate until the latch engages the next notch, an electromagnet which, when energized, also disengages and holds said latch in its disengaged position,

a signaling circuit having contacts which are controlled by the movement of said latch from the engaged to the disengaged position and vice versa, and switching means at a point remote from said timer for selectively energizing and deenergizing said synchronous motor and said electromagnet. 5

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