Nov. 29, 1960 L. J. LAVIANA 2,961,989

TIMER SWITCH

Filed June 13, 1956

FIG. 1

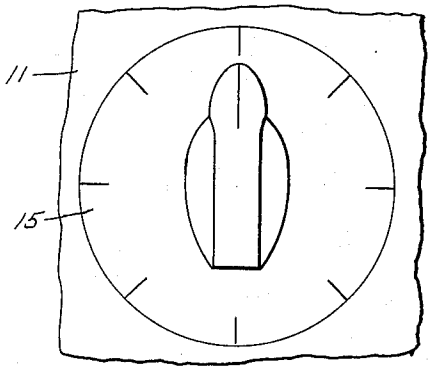


FIG. 2

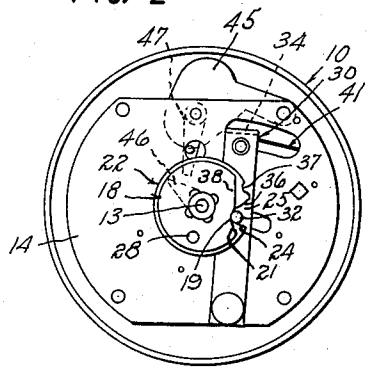


FIG. 3

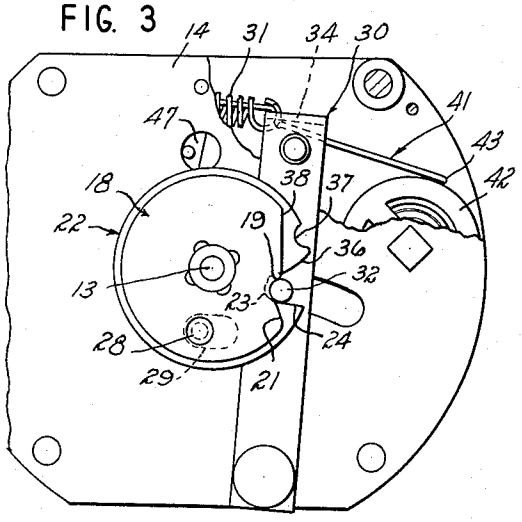


FIG. 4

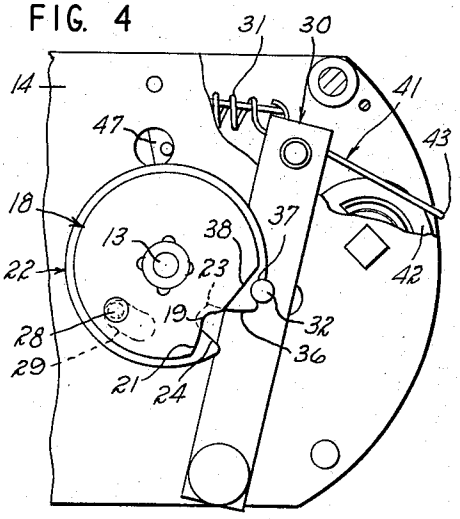


FIG. 5

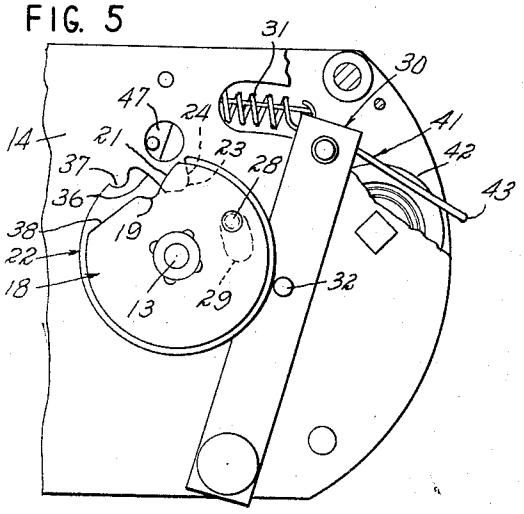
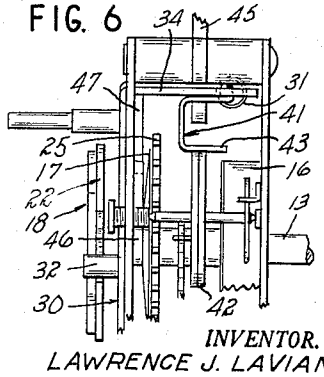


FIG. 6



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United States Patent Office 2,961,989
Patented Nov. 29, 1960

2,961,989

TIMER SWITCH

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Filed June 13, 1956, Ser. No. 591,162

3 Claims. (Cl. 116—67)

This invention relates to timers of the type adapted to actuate an associated mechanism such as an electric switch upon expiration of a predetermined time interval.

In certain applications where timers of the type described are used it may be desired to selectively actuate a mechanism or close an electrical circuit, controllable by the timer, for an indefinite period. For simplicity of installation and operation and economy of structure, it is desired and it is an aim of this invention to provide a means for selectively actuating for an indefinite interval a mechanism or circuit associated with a timer of the type described by a novel improvement in the control elements of the timer which are normally used to set and determine a predetermined time cycle.

Other objects will be in part obvious, and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangements of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings:

Fig. 1 is a front elevational view of a typical timer embodying this invention mounted in a panel or housing;

Fig. 2 is a rear elevational view of the timer of Fig. 1;

Fig. 3 is an enlarged fragmentary view of Fig. 2 with a portion of the timer cut away and with the control elements of the timer in an "off" position;

Fig. 4 is a view similar to Fig. 3 with the control elements in an "on" position;

Fig. 5 is a view similar to Fig. 4 with the control elements in a "timing" position; and

Fig. 6 is a fragmentary cross sectional view of the timer of Fig. 3 illustrating one of the features of the invention.

Referring to the drawings, a timer constructed in accordance with the present invention is comprised of a casing 10 adapted to be mounted in a panel or housing 11 and in which is contained the timer driving mechanism. A main shaft or winding arbor 13 for the driving mechanism is journaled in a plate member 14 secured to the casing. In the specific embodiment, and with reference to Fig. 6, the shaft 13 is connected to a main spring 16 of a clock motor whereby rotation of the shaft in a counterclockwise direction as shown in Fig. 3 will wind the spring and whereby the spring will drive the shaft in a clockwise direction. Mounted on the shaft 13 for rotation therewith is a friction disc 17 which is engageable with a gear 25, which is the initial gear in the gear train of the timer, thereby forming a yieldable drive between the gear train of the timer and the shaft 13 permitting rotation of the shaft 13 in either direction relative to the gear 25 while providing a driving connection between the shaft and timer.

One end of the shaft 13 extends forwardly of the panel or housing 11 and carries an operating knob 15. On the other end of the shaft a control cam 18 is mounted for rotation therewith and is provided with a peripheral notch 19 having a sloping side 21. Coaxial of the cam 18 and rotatably mounted on the shaft 13 is a disc 22 of slightly larger diameter than the cam 18 and provided with a peripheral notch 23 having a radial side 24. The disc 22 and cam 18 are connected by a pin 28 on the cam which is received and engaged in a slot 29 in the disc to provide a limited lost motion driving connection therebetween. A lever 30 is pivotally mounted at one end on the plate member 14 and is biased toward the cam 18 and disc 22 by a spring 31 connected at one end to the free end of the lever 30 and at the other end fixed relative to the casing 10. A follower 32 is carried by the lever and when the shaft 13 is rotated so that the notches 19 and 23 and the follower 32 are aligned at a predetermined rotated position of the disc, the follower will be received in the notches in the position shown in Fig. 3.

When the timer is set for a timing operation the shaft 13 is rotated by means of knob 15 in a counterclockwise direction as viewed in Figs. 2 to 5 to cause the follower 32 to be cammed out of the notches by the sloping side 21 of the notch 19 of the cam 18 whereupon further rotation of the shaft in the same direction will cause the cam 18 to pick-up the disc 22 and position the follower 32 with respect to the disc in the position shown in Fig. 5. In the rundown of the timer the shaft will be driven in a clockwise direction in a time controlled manner to rotate the cam 18 relative to the disc 22 to the relative position shown in Fig. 3 whereupon the disc will then be rotated until the follower 32 rides off the radial side of and into the notch 23, permitting movement of the lever 30 to the position shown in Fig. 3. It is intended that an associated switch be operated by the lever 30, for example, in a manner similar to that shown in my copending application Ser. No. 488,293 entitled "Switch Assembly for Timers." From the foregoing description it can be seen that the lever 30 may be used to open a switch while in the position shown in Fig. 3 and in the positions shown in Fig. 5 may be used to close a switch.

In accordance with the invention, the control elements of the timer, that is the cam 18 and disc 22, are formed to provide a means to position the lever 30 to close a switch independently of operation of the timer driving mechanism for an indefinite time interval at the will of the operator. To this end the notch 23 in the periphery of the disc 22 is provided with a sloping side 36 and as can be seen from the drawings and particularly Figs. 3 and 4 when the shaft 13 is rotated in a clockwise direction as viewed in Figs. 3 and 4 the cam 18 and disc 22 will both turn with the shaft causing the follower 32 to be cammed up the sloping side 36 of the notch 23, thereby positioning the lever as shown in Fig. 4 to close the switch. The periphery of the cam 18 is cut away as at 38 in a chordwise manner to prevent the cam from obstructing movement of the follower 32 as last described.

Further in accordance with the invention, it has been found that when the mechanism driving the timer is a spring driven clock mechanism, it is possible that there will be sufficient energy stored in the mainspring of the clock so that at the end of a timing cycle with the follower in the position shown in Fig. 3, the clock mechanism may continue to operate and drive the cam and disc further in a clockwise direction to move the follower and lever to the position shown in Fig. 4, thus undesirably closing the switch. In order to preclude such an occurrence a stop member 41 which, in the specific embodiment, is formed of stiff resilient wire, is mounted at one end on the lever 30 and provided with a portion 43 at its other end which, when the lever is in the position shown in Figs. 3 and 6 engages the periphery of the escapement balance wheel 42 of the timer to impede movement thereof, and render the driving mechanism in-

operative. With the lever **30** in either the positions in Figs. 4 and 5, the end portion **43** is spaced out of engagement with the balance wheel to permit operation of the timer. Thus, it can be seen that with the lever in the position shown in Fig. 3 with the follower **32** received in the notches of the cam and disc, the clock mechanism is prevented from operating to rotate the disc and move the follower into the position shown in Fig. 4.

As can be seen in Figs. 2 and 6, a clapper **45** is pivotally mounted at one end relative to the casing **10** and is smartly engageable intermediate its ends by the bent-over end **34** of the lever **30** when the lever is moved from the position shown in Fig. 5 to the position shown in Fig. 3 to cause the clapper to strike the casing **10** which acts as a bell to provide an audible indication of the expiration of the timing cycle. In order to provide an audible indication of the positioning of the lever **30** in the position shown in Fig. 4 a second notch **37** is provided in the periphery of the disc **22** closely adjacent the outer end of the sloping side **36** of the notch **23**.

It should be apparent that when the follower is moved either from the position shown in Fig. 3 to that of Fig. 4 or vice versa the spring **31** will snap the follower into the notch **37** or **23**, respectively, resulting in the lever **30** causing the clapper to strike the casing. Thus, if the shaft is inadvertently turned in the wrong direction from the position of Fig. 3 when it is desired to set the timer for a predetermined timing cycle, or if the shaft is inadvertently turned in a clockwise "off" direction from a position such as that shown in Fig. 5 beyond the position of Fig. 3, there will be provided an audible signal warning the operator that the switch has been closed.

In this specific embodiment the shaft is limited in its rotation in either direction by conventional means such as a finger **46** mounted for rotation with the shaft **13** and a finger **47** mounted for limited pivotal movement on the plate member **14**. The fingers are angularly disposed relative to each other and to the disc **22** such that the disc may not be rotated in a counterclockwise direction to bring the follower **32** into engagement with the notch **37** on the disc, thus possibly preventing time controlled rotation of the disc when such is desired. Conversely, the fingers **46** and **47** prevent rotation of the disc in a clockwise direction beyond a rotated position where the follower **32** will be received in the notch **37**, thus preventing an operator from thinking he has set the timer for a time cycle when in truth he has not.

Thus it can be seen that there has been provided in a timer of the type described, a novel arrangement whereby the timer may be used as an "on-off" switching mechanism as wall as a timer which is extremely simple and economical to fabricate and which does not require the addition of any external control member on the timer other than that normally employed. The mechanism is also simple in operation and will provide trouble-free service over long periods of frequent use.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim:

1. In a timer having a driving mechanism, a shaft, a rotatable control cam mounted for rotation with the shaft, a yieldable drive connecting the shaft to the driving mechanism for rotation of the shaft by the driving mechanism in one direction and for manual rotation of the shaft in either direction, a disc rotatably mounted on the shaft coaxially of the cam and connected to the cam for rotation therewith by lost motion means, means providing a pair of registrable notches in the periphery of the cam and disc, and and actuator member pivotally mounted for movement relative to the disc in the plane of rotation of the disc and having a fixed follower thereon engageable in said registrable notches at a predetermined rotated position of the disc and cam, one side of the notch in the disc sloping outwardly and in a direction opposite said one direction of rotation of the shaft and one side of the notch in the control cam sloping outwardly of the cam and in said one direction whereby said one side of the cam notch will cam said follower out of notch engagement in response to rotation of the cam in the direction opposite said one direction from said predetermined position of the cam and whereby said one side of the disc notch will cam said follower out of notch engagement in response to manual rotation of the disc in said one direction beyond said predetermined position thereof, the other side of the notch in the disc extending generally radially thereof, said cam being chordally relieved from adjacent the bottom of the other side of the notch therein to preclude interference of the cam with said follower during movement of the disc in said one direction beyond said predetermined position thereof.

2. In a timer having a casing forming a bell, a rotatable shaft, a clockwork driving mechanism connected to the shaft for rotating the shaft in one direction toward an initial starting position, means to rotate the shaft manually in a direction opposite said one direction from said starting position, a switch actuator mounted for movement radially of the shaft, a clapper mounted in the path of movement of said switch actuator so as to be movable thereby into engagement with the casing, a spring urging said actuator toward the shaft for effecting engagement of the clapper and casing, a control disc connected to the shaft for rotation thereby and having a notch in its periphery into which said actuator is movable in response to rotation of the disc in either direction into said starting position, means to cam said actuator out of said notch and into engagement with the periphery of the disc exteriorly of said notch in response to rotation of the disc in either direction out of said starting position, said disc further having a second notch of substantially lesser depth than the first notch disposed closely adjacent to and in retard of said first notch.

3. In a timer having a rotatable shaft, time controlled driving means for returning the shaft in one direction to an initial starting position, and manually operable means for turning the shaft in said one and the opposite direction from said initial starting position, a control disc connected to the shaft for rotation thereby, an actuator member mounted for movement relative to the control disc, a follower on the actuator member engaging the control disc, said disc having a notch in which said follower is engageable in response to movement of the shaft into said initial position and means to cam the follower out of said notch in response to movement of the disc in the directions corresponding to said one and said opposite directions of shaft movement, said follower being engageable with the disc exteriorally of said notch in response to movement of the shaft in said oposite direction to position said actuator member in a second position relative to the disc spaced from said first position, said disc having a follower engageable second notch of lesser depth than the first notch spaced in retard of said first notch, said follower being engageable with said second notch in response to shaft movement in said one direction from said initial starting position to position the actuator member in a third position relative to the disc spaced from and intermediate said first and second positions.

(References on following page)

References Cited in the file of this patent

UNITED STATES PATENTS

801,306	Emerson	Oct. 10, 1905
2,088,499	Warner	July 27, 1937
2,274,635	Rhodes	Mar. 3, 1942
2,315,266	Lurtz	Mar. 30, 1943
2,398,007	Hunter	Apr. 9, 1946
2,577,004	Darnell	Dec. 4, 1951
2,671,191	Braski	Mar. 2, 1954
2,689,006	Lindsay	Sept. 14, 1954
2,852,072	Alfery et al.	Sept. 16, 1958