# United States Patent [19]

**Kitai**

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[54] **AUTOMATIC SETTING DEVICE FOR A TIMER**


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[30] **Foreign Application Priority Data**

Apr. 21, 1972 Japan ..... 47-40114

[52] **U.S. Cl.** ..... **200/33 R**; 200/35 R; 200/38 A; 200/39 R

[51] **Int. Cl.** ..... **H01h 7/08**; H01h 43/10

[58] **Field of Search** ..... 200/33, 40, 153 J, 33 R, 200/35 R, 38 R, 38 A, 38 F, 38 FB; 74/3.5, 3.52, 3.54



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,597,827 | 5/1952 | Snyder et al. | 200/33 R X |
| 3,015,003 | 12/1961 | Simmons | 200/33 R X |
| 3,152,229 | 10/1964 | Sears | 200/38 FB |
| 3,227,824 | 1/1966 | Saldivar | 200/35 R |
| 3,247,403 | 4/1966 | Riddle et al. | 200/33 R X |
| 3,367,193 | 2/1968 | Rose | 74/3.5 |
| 3,444,340 | 5/1969 | Chaveneaud et al. | 200/38 F |
| 3,575,560 | 4/1971 | Mayer et al. | 200/33 R |



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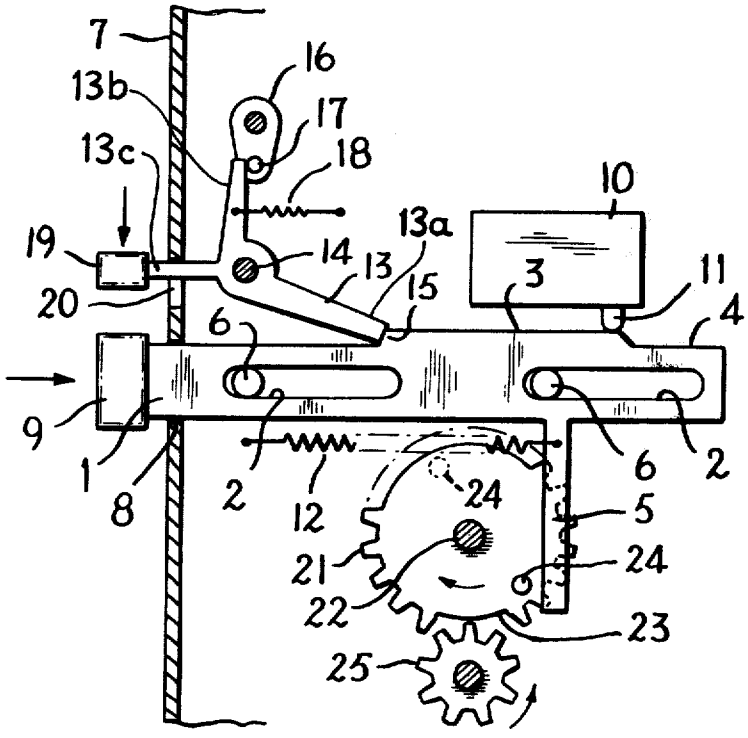
*Attorney, Agent, or Firm*—Robert E. Burns; Emmanuel J. Lobato; Bruce L. Adams



[57] **ABSTRACT**

A timer has a manually shiftable operating member which is shiftable from a reset position to a set position to actuate a switch. A locking lever releasably locks the operating member in the set position and a biasing spring continuously biases the operating member toward the reset position. A return mechanism coacts with the operating member to automatically return the operating member to the set position after each operating cycle.


**5 Claims, 8 Drawing Figures**



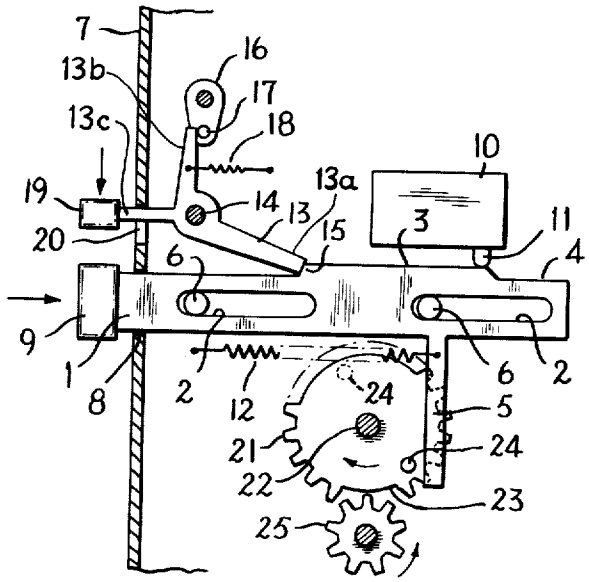



FIG. 1

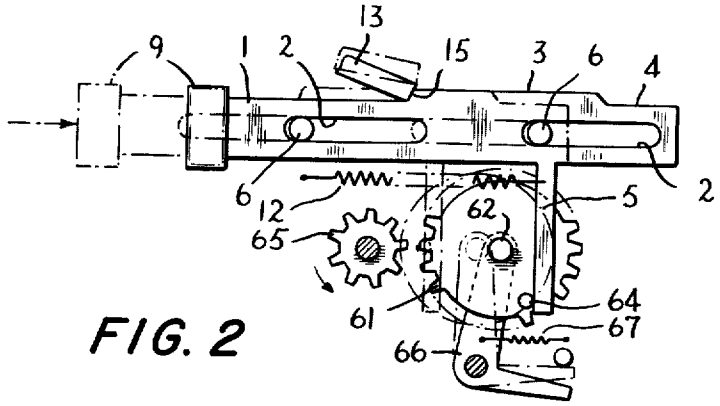



FIG. 2

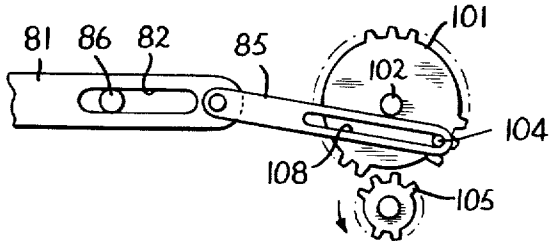



FIG. 3

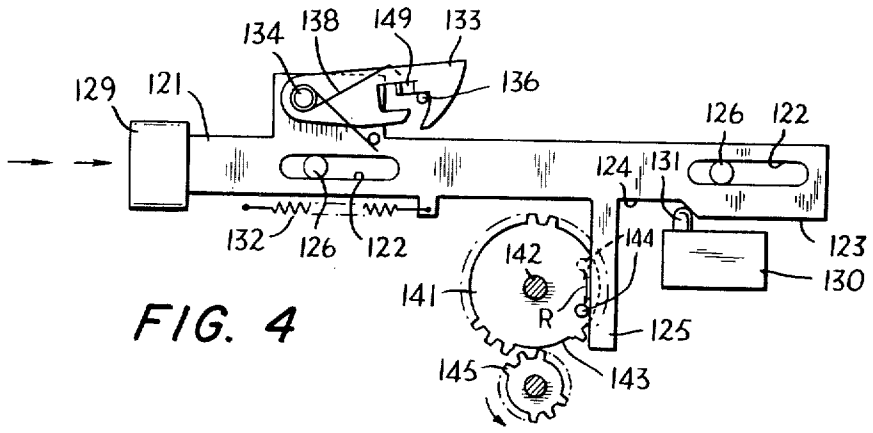



FIG. 4

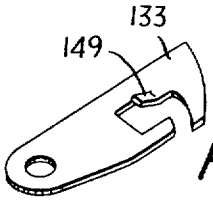



FIG. 4A

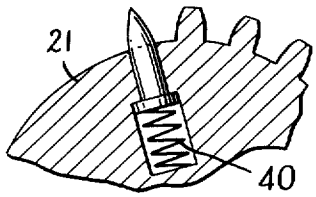



FIG. 6

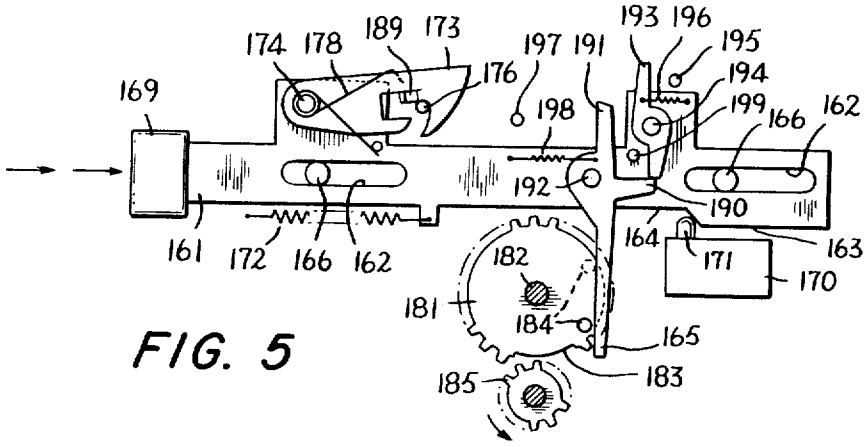



FIG. 5

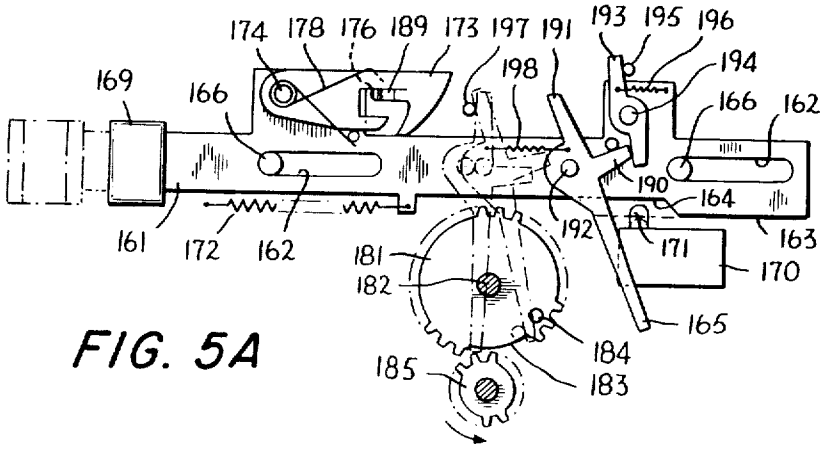



FIG. 5A

# AUTOMATIC SETTING DEVICE FOR A TIMER

The present invention relates generally to timers and more particularly to an automatic setting device for automatically resetting the timer in readiness for operation.

Timers are well known in the art and various types of timers are currently available for controlling the energization time and the duration of energization of electrical appliances such as a radio or a television. Some timers are operable to turn on or off a switch after the expiration of a pre-determined time period, other timers are operable to turn on a switch at a desired preset reference time, and still other timers are operable to perform both of these functions. Unfortunately, the timers which are currently available are not able to automatically reset themselves and once the timer is manually set and the timer operates to perform its function, it is necessary to reset the timer before it may be used again.

It is therefore a primary object of the present invention to provide an automatic setting device for a timer which automatically resets the timer and its set condition after each cycle of operation therby obviating the need to manually reset the timer.

It is a further object of the present invention to provide an automatic setting device for a timer which functions to close a switch and maintain the switch close for a pre-determined constant time period during each cycle of operation of the timer.

It is yet another object of the present invention to provide an automatic setting device for a timer which is simple and rugged in construction yet reliable in operation.

The above and other objects of the present invention are carried out by an automatic setting device comprising an operating member mounted for reciprocatory movement along a given path of travel, and actuatable switch disposed along the path of travel and engageable with the operating member to effect opening and closing of the switch, locking means for locking the operating member in its set position, a biasing spring for biasing the operating member into its reset position after the operating member is unlocked, and return means for automatical'y returning the operating member to its set position. The locking means is operable in a manual mode for manually unlocking the operating member at any desired time and is operable in an automatic mode for automatically unlocking the operating member upon the detection of a pre-determined reference time.

The aforementioned objects as well as other objects will become readily apparent to those skilled in the art upon a reading of the present specification and claims which describe the principles, advantages, features and construction of the preferred embodiments of the invention which are described in conjunction with the accompanying drawings, wherein like reference characters denote like parts of the various views, and wherein:

FIG. 1 is a schematic side view of one embodiment of an automatic setting device for a timer;

FIG. 2 is a schematic side view of a portion of another embodiment of an automatic setting device of a timer;

FIG. 3 is a schematic side view of a portion of a further embodiment of an automatic setting device of the timer which is a modification of the FIG. 1 embodiment;



FIG. 4 is a schematic side view of yet another embodiment of an automatic setting device of a timer;

FIG. 4A is a perspective view of a locking lever utilized in the FIG. 4 embodiment;

FIG. 5 is a side view of still another embodiment of an automatic setting device of a timer and this embodiment is a modification of the FIG. 4 embodiment;

FIG. 5A is a schematic view of the FIG. 5 embodiment and showing the components in a different operating position, and

FIG. 6 is a sectional view of a modified form of main gear wheel.

One embodiment of an automatic setting device constructed in accordance with the principles of the present invention as shown in FIG. 1. The setting device comprises an axially slidable operating member 1 having a plate-shaped configuration. The operating member 1 has a pair of elongated slots 2 therein and the upper surface of the operating member 1 is provided with a cam profile. The cam profile comprises a raised camming portion 3 and a recessed camming portion 4 and these two camming portions coact with a switch, as described hereinafter, to open and close the switch.

An actuating arm 5 is connected to the operating member 1 and depends downwardly therefrom as shown in FIG. 1. The operating member 1 is mounted for axial sliding movement within the timer by means of a pair of pins 6, 6 which extend through the slots 2 and the pin-and-slot connection functions to guide the operating member for movement along a predetermined axial path. The pins 6, 6 are secured to a base plate mounted within the timer.

The timer includes an outer casing 7 which is provided with an opening 8 through which the operating member 1 extends. A manually depressible knob 9 is affixed to the endmost tip of the operating member 1 which projects outwardly from the casing 7 to enable manual depression of the operating member 1 inwardly into the timer. A biasing spring 12 is connected at one end to the actuating arm 5 and at the other end to the base plate and functions to continuously bias the operating member in the leftward direction into the reset position.

A microswitch 10 is disposed along the path of travel of the operating member 1 and more particularly, along the path of travel of the cam surface 3, 4. The microswitch has an open state and a closed state and in this particular embodiment, the microswitch is of the normally closed type so that unless the switch is actuated, the switch remains in the closed state. The microswitch includes a slidable switching button 11 which is constantly biased into a position wherein same projects out from the microswitch and the microswitch is positioned relative to the operating member 1 such that when the operating member is in the set position shown in FIG. 1, the raised camming portion 3 engages the switching button 11 and cams same inwardly to effect opening of the microswitch whereas when the operating member 1 is in its reset or released position, the recessed camming portion 4 engages with the switching button 11 and enables the button to project outwardly to effect closing of the microswitch.

Locking means 13–20 is provided for releasably locking the operating member 1 in the set position until the actual time coincides with the reference time which is manually set into the timer. The mechanism for setting the reference time is well known in the art and such

does not constitute part of the present invention and will not be further described. The locking means comprises a locking lever **13** pivotally mounted upon the base plate by a shaft **14**. The locking lever **13** has three arms including a first or locking arm **13***a* engageable at its distal end with a locking projection **15** provided on the operating member **1**, a second or timing arm **13***b* engageable with a timing mechanism **16, 17**, and a third or actuating arm **13***c*.

The timing arm **13***b* engages with a timing mechanism which includes a driving lever **16** having a pin **17** mounted thereon. The driving lever **16** is connected to a conventional timepiece mechanism so that the driving lever pivots in a clockwise direction when the timer detects the appropriate reference time which is set into the timer and by this clockwise pivotal movement of the driving lever **16**, the pin **17** engages with the timing arm **13***b* and pivots the locking lever **13** in a counterclockwise direction to disengage the locking arm **13***a* from the operating member. A biasing spring **18** is connected at one end to the timing arm **13***b* and is connected at its other end to the base plate and the biasing spring functions to continuously bias the locking lever **13** into the locking position shown in FIG. **1**.

A manually-operated knob **19** is connected to the end of the actuating arm and the actuating arm extends through a slot **20** formed in the casing **7** so that the locking lever **13** can be manually moved in a counterclockwise direction to unlock the operating member by simply pusing downwardly on the knob **19**. Thus the locking means is operable in a manual mode to effect unlocking of the operating member at any desired time and is operable in an automatic mode to automatically unlock the operating member upon detection of the reference time set into the timer.

In accordance with the present invention, return means is provided for automatically returning the operating member **1** to its original set position after the operating member undergoes one cycle of operation thereby eliminating the need for resetting the operating member as is conventional in the prior art timers. The return means comprises a main gear wheel **21** rotatably mounted on the base plate by a shaft **22**. The main gear wheel is provided with a set of gear teeth around a major peripheral portion thereof and a minor peripheral portion **23** of the gear wheel is left free of teeth. The minor peripheral portion **23** is recessed to form a cut-out area which functions to disengage the main gear wheel **21** from a driving pinion **25**, as described hereinafter. A pin **24** projects outwardly from the main gear wheel **21** at a location adjacent the recessed portion **23**. The dashed line showing of the pin **24** depicts the pin position during the operating cycle and such will be described hereinafter with reference to FIG. **2**. The pin **24** engages with the actuating arm **5** and functions to return the operating member **1** in the rightward direction back to the original set position shown in FIG. **1** in response to rotation of the main gear wheel **21**. The driving pinion **25** is rotationally driven by a conventional timepiece mechanism (not shown) and the main gear wheel **21** remains in meshing engagement with the driving pinion **25** except during the time that the recessed portion **23** is moved into opposition with the teeth on the driving pinion **25**.

The operation of the FIG. **1** embodiment will now be described and FIG. **1** shows the components in their set state wherein the operating member **1** has been depressed into its set position so that the raised camming portion **3** cams open the microswitch **10**. Thus in this condition, the radio, television, or other appliance which is connected to the timer will be deenergized since the microswitch **10** is open. When the timer detects the desired reference time set into the timer, the driving lever **16** is immediately driven in a clockwise direction causing the pin **17** to pivot the locking lever **13** in a counterclockwise direction thereby unlocking the operating member **1** whereupon the biasing spring **12** shifts the operating member **1** in the leftward direction to the reset position. As the operating member **1** moves leftwardly, the camming projection **3** is moved out of contact with the switching button **11** which then moves into contact with the recessed camming portion **4** thereby closing the microswitch **10**. Upon the closing of the microswitch, the appliance connected to the timer is energized.

As the operating member **1** moves leftwardly, the actuating arm **5** engages with the pin **24** of the return means and the return motion of the operating member drives the main gear wheel **21** in the clockwise direction until the gear teeth on the main gear wheel are brought into meshing engagement with the gear teeth on the driving pinion **25**. Upon engagement of the main gear wheel **21** with the driving pinion **25**, the driving pinion then proceeds to rotationally drive the main gear wheel **21** at a definite speed and it should be noted that the recessed portion **23** is suitably dimensioned and the pin **24** is suitably arranged relative to the recessed portion to enable the operating member **1** to shift leftwardly a sufficient amount to effect closing of the microswitch **10** prior to the time that the gear teeth on the main gear wheel **21** engage with the gear teeth on the driving pinion **25**.

During rotation of the main gear wheel **21**, the pin **24** is driven through one cycle of rotation and after the pin **24** reaches its leftmost position relative to the casing **7**, the pin **24** then commences to return the operating member **1** to its set position. In other words, as the main gear wheel **21** rotates in the clockwise direction, the pin **24** drives the actuating arm **5** in the rightward direction until the recessed portion **23** advances into opposition with the driving pinion **25** whereupon the two gear wheels are temporaily disengaged. During return movement of the operating member **1** to its set position, the locking lever **13** engages with the locking projection **15** of the operating member to releasably lock the operating member in the set position. Thus the microswitch **10** remains closed for the duration of time it takes for the main gear wheel **21** to make one complete rotation and is then automatically closed due to the return movement of the operating member **1**.

In the event it is desired to close the microswitch **10** prior to the reference time set into the timer, the knob **19** is depressed downwardly to manually unlock the operating member **1** whereupon the operating member travels through the cycle of operation in a manner identical to that described above the exception that the locking means is operated in its manual mode rather than its automatic mode.

Another embodiment of the present invention is shown in FIG. **2** and in this embodiment, the main gear wheel **61** is not provided with a recessed portion and instead, includes a continuous set of gear teeth around its periphery. The main gear wheel **61** is rotatably mounted upon a pin **62** and the gear wheel has a pin **64**

mounted thereon which corresponds in function to the pin **24** in the FIG. **1** embodiment. The main gear wheel **61** is mounted upon a bell crank lever **66** for movement into and out of engagement with a driving pinion **65** and a biasing spring **67** continuously biases the bell crank lever **66** in a clockwise direction to maintain the main gear wheel **61** out of engagement with the driving pinion **65.**

During operation of the FIG. **2** embodiment, the actuating arm **5** drives the pin **64** in a clockwise direction from its solid line position to the dashed line position during leftward movement of the operating member **1** to thereby engage the main gear wheel **61** with the driving pinion **65.** The driving pinion **65** then proceeds to rotationally drive the main gear wheel **61** through one cycle during which time the operating member **1** is returned to its set position and the microswitch **10** is again opened.

An advantageous feature of the FIG. **2** embodiment is that the actual working time during which the microswitch **10** is closed is a constant and definite time period regardless of when the timer is shut off. For example, in the FIG. **1** embodiment, if the timer is stopped by manually depressing the operating member **1** inwardly during the time that the main gear wheel **21** is being rotationally driven by the driving pinion **25,** the locking means will lock the operating member in the position shown in FIG. **1** and the main gear wheel **21** will be stopped in a position wherein the pin **24** is in the dashed line position and the pin **24** will not return to its original position shown in solid lines. When the locking means is then again actuated to unlock the operating member **1** during the next cycle of operation, the pin **24** will start its return action from the dashed line position rather than from its original position and therefore the working time of the timer will be shortened. This problem is obviated in the FIG. **2** embodiment since the pin **64** is always shifted to its foremost position at the time the main gear wheel **61** is moved into engagement with the driving pinion **65** and therefore the main gear wheel **61** always commences its working rotation from the same position and thus the working time of the timer is a constant time.

It should be noted that the bell crank lever **66** may be replaced by another mechanism for effecting linear reciprocal movement of the shaft **62** rather than the pivotal movement of the shaft as effected by the bell crank lever. For example, the shaft **62** can be slidably mounted in an elongated slideway.

FIG. **3** shows another embodiment of return means for a setting device. In this embodiment, the operating member **81** is mounted for axial sliding movement by means of a pin-and-slot connection **82, 86.** An actuating arm **85** is pivotally connected at one end to the operating member **81** and is connected by a pin-and-slot connection to a main gear wheel **101.** The pin-and-slot connection comprises a pin **104** affixed to the main gear wheel and a slot **108** provided in the actuating arm **85.** The main gear wheel **101** is rotatably mounted upon a shaft **102** and engages with a driving pin **105** in a manner similar to that of the FIG. **1** embodiment.

Another embodiment of an automatic setting device is shown in FIG. **4** and such comprises an operating member **121** having slots **122** therein and the operating member has a raised camming portion **123** and a recessed camming portion **124.** An actuating arm **125** projects outwardly from the operating member and the member is mounted for reciprocatory movement by means of pins **126** extending through the slots **122.** A manually depressible knob **129** is attached to the endmost portion of the operating member **121** and a biasing spring **132** constantly urges the operating member into its reset position.

A main gear wheel **141** is rotatably mounted by means of a shaft **142** upon the base plate and the gear wheel has a recessed portion **143** which is free of gear teeth. A pin **144** is secured to the main gear wheel **141** and coacts with the actuating arm **125** to effect return movement of the operating member **121.** A driving pin **145** is rotatably mounted adjacent the main gear wheel **141** and engages with the main gear wheel to rationally drive same at a predetermined speed.

A microswitch **130** is disposed along the path of travel of the operating member **121** and a slideable switching button **131** engages with the cam surface of the operating member to effect opening and closing of the microswitch in response to reciprocatory movement of the operating member **121.** All of the components described so far with reference to the FIG. **4** embodiment function in a manner similar to the corresponding components shown in the FIG. **1** embodiment.

The locking means employed in the FIG. **4** embodiment comprises a locking lever **133** pivotally and tiltably mounted on the operating member **121** by means of a pin **134.** The locking lever **133** has the configuration shown in FIG. **4A** and includes an inclined portion **149** which coacts with a detection shaft **136** to effect locking of the operating member in its set or charged position. A biasing spring **138** constantly urges the locking lever **133** downwardly to engage with the detection shaft **136.** The details of the locking lever **133** and its coaction with the detection shaft **136** are not necessary for an understanding of the present invention and reference is herein made to copending application Ser. No. 307,866 entitled ACTUATOR DEVICE FOR USE WITH AN INTERVAL TIMER, filed on Nov. 20, 1972, now U.S. Pat. No. 3,774,458 for a disclosure of the locking lever **133** and its mode of operation.

During the operation of the FIG. **4** embodiment and during return movement of the operating member **121** to its set position by the return means, the locking lever **133** engages with the detection shaft **136** whereupon the device is placed in the set condition. When it is desired to actuate the timer in the manual mode before the reference time is detected by the timer, the knob **129** is depressed inwardly a short distance to cause the locking lever **133** to move rightwardly relative to the detection shaft **136** and as soon as the inclined portion **149** slides past the detection shaft, the biasing spring **138** pivots the locking lever **133** downwardly so that the underside of the inclined portion **149** abuts against the top of the detection shaft **136.** When the knob **129** is released, the biasing spring **132** urges the operating member leftwardly back to its reset position and during leftward movement of the operating member, the locking lever tilts so that the inclined portion **149** rides over the top of the detection shaft **136** thereby freeing the engagement between these two members so that the biasing spring **132** can shift the operating member to its reset position thereby actuating the microswitch **130.**

A further embodiment of the automatic setting device according to the present invention as shown in FIGS. **5** and **5A** and this embodiment is generally simi-

lar to the FIG. 4 embodiment except for the type of return means employed to return the operating member to its set position. In this embodiment, an operating member **161** has a raised camming portion **163** and a recessed camming portion **164** and is provided with a pair of slots **162**. A pair of pins **166** are slideably received in the slots **162** and thereby mount the operating member for axial sliding movement. A manually depressible knob **169** is secured to the endmost portion of the operating member **161** and a microswitch **170** having a slideable button **171** is positioned adjacent the operating member so that the camming portions **163**, 164 may open and close the microswitch.

A biasing spring **172** urges the operating member into its reset position and a locking lever **173** is pivotally mounted by a shaft **174** upon the operating member **161** and a biasing spring **178** urges the locking lever downwardly so that an inclined portion **189** of the locking lever engages with a detection shaft **176**. A main gear wheel **181** is rotatably mounted on the base plate by a shaft **182** and the main gear wheel has a recessed portion **183** which does not contain any gear teeth. A pin **184** is affixed to the main gear wheel **181** and a driving pin **185** is disposed beneath the main gear wheel. All of these components function in a manner similar to the corresponding components described with reference to FIG. 4 and thus their function will not be further described.

The basic difference between the FIG. 5 embodiment and the FIG. 4 embodiment resides in the return means. The return means in the FIG. 5 embodiment comprises a three-pronged actuating lever coacting with a locking lever **193** to effect return movement of the operating member **161**. The actuating lever is pivotally mounted upon the operating member **161** by means of a pin **192** and comprises a first arm **190** and a second arm **191** extending at generally right angles to each other and an actuating arm **165** which coacts with the pin **184** on the main gear wheel **181**. A biasing spring **198** biases the actuating lever in a counterclockwise direction and a pair of pins **197, 199** engage respectively with the arms **191, 190** to limit the extent of pivotal movement of the actuating lever in the counterclockwise direction in a manner to be described hereinafter.

The locking lever **193** has a pair of oppositely extending lever arms one of which engages with the actuating lever to releasably lock same in a locked position and the other of which engages with a pin **195** affixed to the base plate. A biasing spring **196** continuously urges the locking lever in a clockwise direction to maintain the locking lever in engagement with the actuating lever depending upon the position of the operating member **161**.

The operation of the FIG. 5 embodiment will now be described assuming that the components are initially occupying the positions shown in FIG. 5 and that the operating member **161** is being depressed to set the device into its set or charged state. As the operating member **161** moves rightwardly, the locking lever **193** engages with the stationary pin **196** and the pin pivots the lever in a counterclockwise direction to disengage the locking lever **193** from he actuating lever whereupon the biasing spring **198** pivots the actuating lever in a counterclockwise direction. This condition is shown in solid lines in FIG. 5A.

When the locking lever **193** is then disengaged from the detection shaft **176**, the main biasing spring **172** advances the operating member **161** in the leftward direction back to its reset position and during this leftward movement, the stationary pin **197** engages with the arm **191** thereby pivoting the actuating lever in a clockwise direction and enabling the actuating arm **165** to engage with the pin **184** whereupon the gear teeth on the main gear wheel are brought into meshing engagement with the teeth on the driving pinion **185**. The driving pinion then rotationally advances the main gear wheel **181** through one cycle during which time the pin **184** effects return movement of the operating member **161** to its set position.

The FIG. 5 embodiment is a modification of the FIG. 4 embodiment. In the FIG. 4 embodiment, the main gear wheel **141** effects opening of the normally open microswitch **130** during the time that the pin **144** moves within the arcuate region R. Thus during the time that the pin **144** moves from the dashed line position to the solid line position, the operating member **121** is moved rightwardly to move the raised camming portion **123** out of contact with the switching button **131** to thereby open the microswitch. A drawback of the FIG. 4 embodiment is that if the knob **129** is depressed during the time that the pin **144** is positioned within the region R, the pin **144** prevents leftward movement of the operating member thereby preventing closing of the microswitch. This drawback has been overcome in the FIG. 5 embodiment since the actuating arm **165** is temporarily pivoted in a counterclockwise direction away from the pin **184** and thus will not engage with the pin nor prevent closing of the microswitch **170** regardless of the position of the pin **184** at the time the knob **169** is released. It will be evident to those skilled in the art that the return mechanism disclosed in FIG. 5 is suitable for use with the embodiment shown in FIGS. 1 and 2.

In accordance with another aspect of the present invention, the first tooth of the main gear wheel **21** in the FIG. 1 embodiment as well as in the other embodiments can comprise a resiliently biased tooth. As seen in FIG. 6, the first tooth comprises a slidable pin having a conically tapered end tip configured roughly in the shape of the remaining gear teeth and the pin is slidable within a bore provided in the main gear wheel. A biasing spring **40** constantly urges the pin in an outward direction so that the tapered end tip projects out of the gear wheel. This feature is desirable in that is cushions and dampens the initial impact between the engagement of the main gear wheel with the driving pinion thereby preventing unnecessary shock from being imparted to the device. Such a resiliently biased gear tooth is not necessary in the FIG. 2 embodiment since the main gear wheel in that embodiment does not have a recessed portion which is free of gear teeth. In addition, the engagement between the driving pinions and the main gear wheels may be obtained through friction wheels rather than gear wheels.

What I claim is:

**1.** An automatic setting device for a timer comprising: a slidably mounted operating member manually slidable in one direction along a given path of travel from a reset position to a set position; locking means for releasably locking said operating member in said set position and automatically relocking it when returned to said set position; biasing means continuously biasing

said operating member in a direction opposite to said one direction toward said reset position; actuatable switching means disposed along said given path of travel having first and second switching states and coacting with said operating member when same is in said set position to switch into said first switching state and coacting with said operating member when same is in said reset position to switch into said second switching state; automatic return means for automatically returning said operating member in said one direction from said reset position to said set position to automatically effect switching of said switching means into siad first switching state, said locking means comprising a pivotally mounted locking lever engageable with said operating member to lock same in said set position and having a first arm manually depressible during use of the device to pivot said locking lever out of engagement with said operating member and a second arm coacting with a timing mechanism during use of the device with a timer to pivot said locking lever out of engagement with said operating member at a preselected reference time, said automatic return means rotatably driven means comprising a main rotary wheel having a pin projecting outwardly therefrom, a driving rotary wheel rotationally driven during use of the device at a constant speed, means for effecting engagement between said main rotary wheel and said driving rotary wheel to transmit the rotary motion of said driving rotary wheel to said main rotary wheel, and an actuating arm connected to said operating member and engageable with said pin during rotation of said main rotary wheel whereby said pin pushes said operating member in said one direction against the force of said biasing spring to automatically return said operating member to said set position.

**2.** An automatic setting device according to claim **1**; wherein said means for effecting engagement between said main and driving rotary wheels comprises gear teeth on said wheels.

**3.** An automatic setting device according to claim **1**; including means mounting said main rotary wheel for pivotal movement into and out of engagement with said driving rotary wheel.

**4.** An automatic setting device according to claim **1**; including means mounting said actuating arm for pivotal movement towards and away from said pin in response to sliding movement of said operating member along said given path of travel.

**5.** An automatic setting device according to claim **4**; further including a locking lever pivotally mounted on said operating member and pivotal into engagement with said actuating arm to releasably lock same in position to engage with said pin, a biasing spring biasing said actuating arm out of the position wherein same can engage with said pin when said locking lever disengages from said actuating arm, and means for pivoting said locking lever out of engagement with said actuating arm during movement of said operating arm in said one direction.

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