United States Patent

[11] **3,581,026**

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[45] Patented **May 25, 1971**
[73] Assignee **General Electric Company**

[54] **TIMER WITH VISUAL INDICATOR FOR PERIOD OF OPERATION**
10 Claims, 5 Drawing Figs.

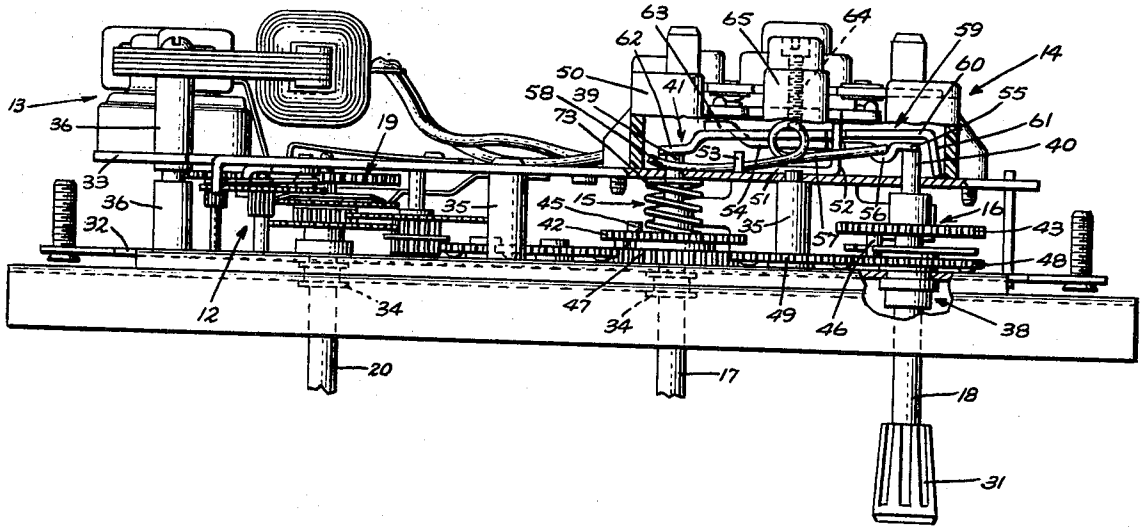
[52] **U.S. Cl.** **200/38R,** 74/3.5
[51] **Int. Cl.** **H01h 7/08,** H01h 43/10
[50] **Field of Search** ..... 200/38 (A), 38 (A)2, 38 (A)3, 38; 236/46, 46 (D); 74/3.5; 337/301—305

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ABSTRACT: A timer includes a switch and a manually adjustable shaft longitudinally movable between a set and an unset position. There is a motor-driven gear for releasing the shaft from its set position to provide time-controlled actuation of the switch. A first visual indicator is movable with the gear to show the proper termination time for a desired period of switch actuation. The shaft is movable relative to the gear when the shaft is in its set position to determine the period of switch actuation. A second visual indicator is movable with the shaft. The first and second visual indicators together show when the desired period of switch actuation has been set.



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FIG. 1

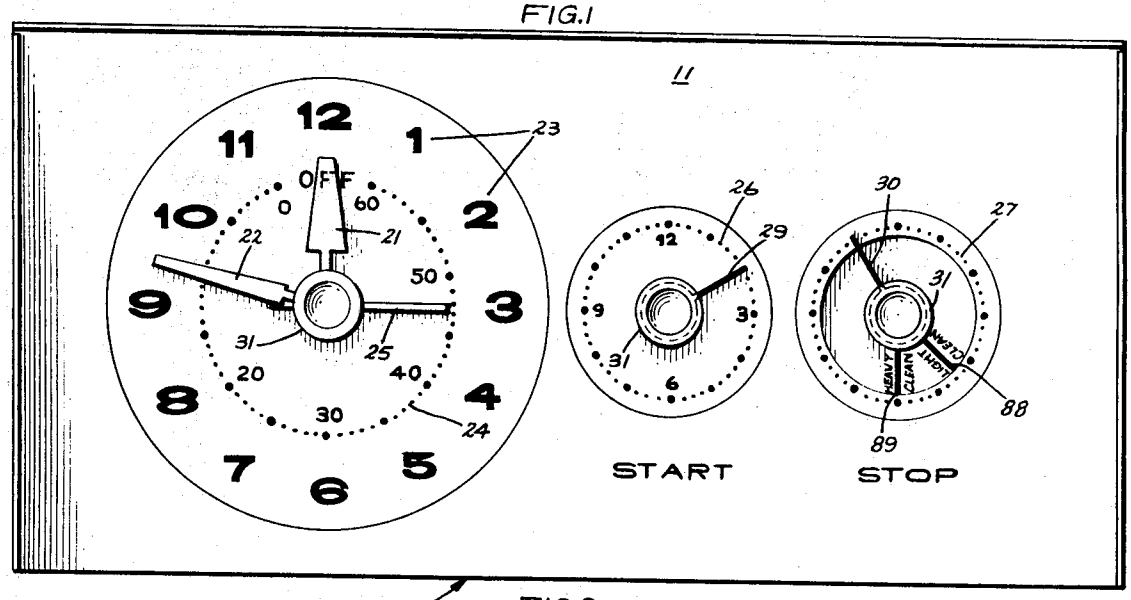


FIG. 2

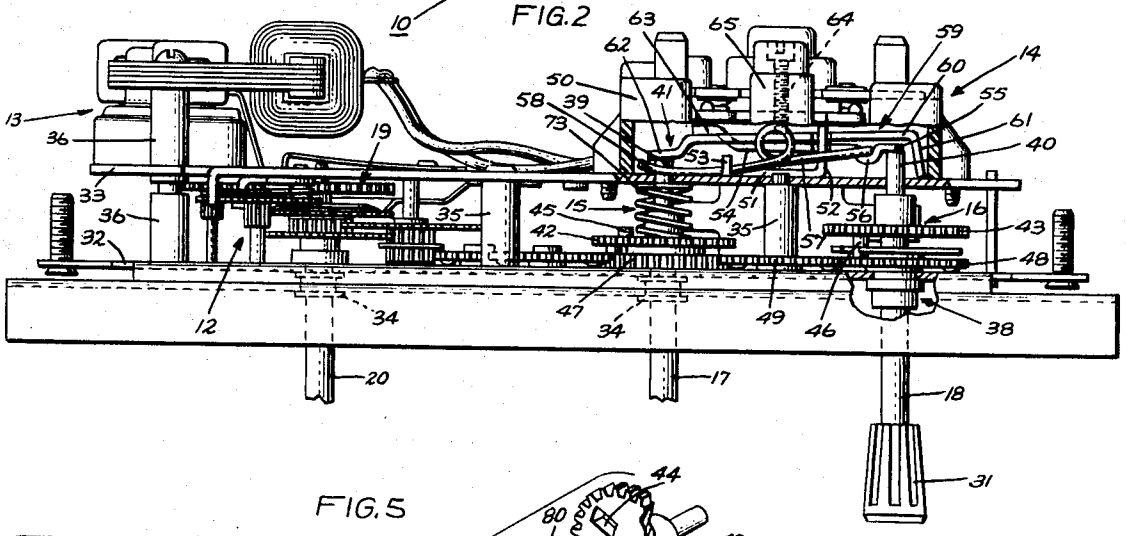


FIG. 5

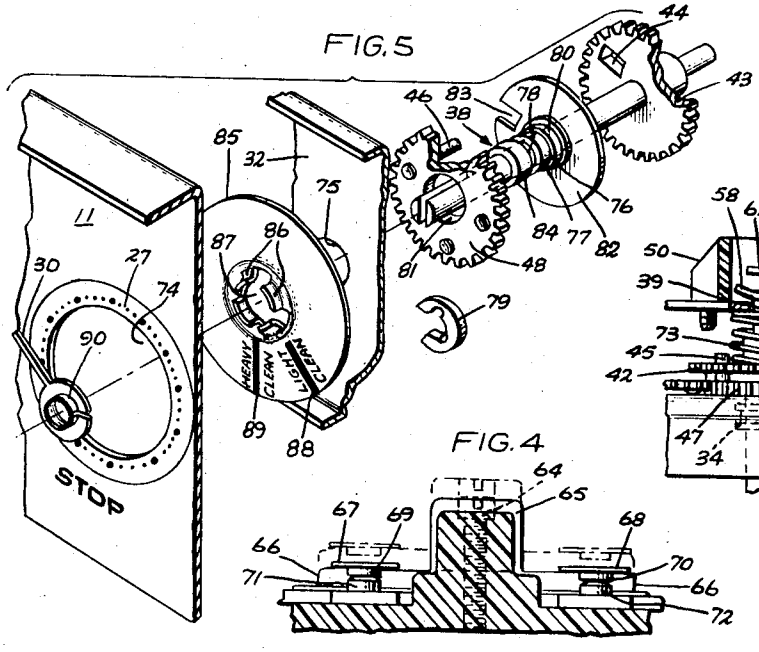


FIG. 3

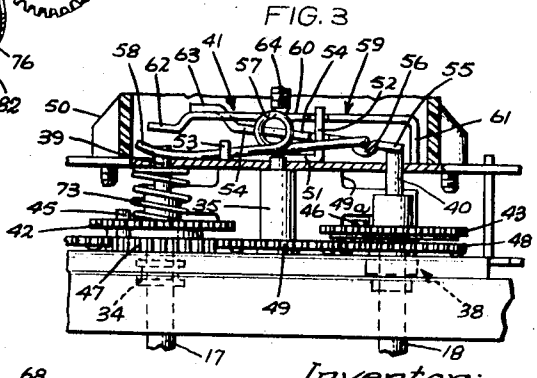


FIG. 4

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TIMER WITH VISUAL INDICATOR FOR PERIOD OF OPERATION

BACKGROUND OF THE INVENTION

This invention relates to an improved timer. More particularly it relates to timers including an improved arrangement for showing when a desired period of switch actuation, and thus a desired timed operation, has been set.

Modern timers of the type used with cooking ranges often include means for setting the "start time," i.e., the time of day at which the oven is to be turned on, and means for setting the "stop time," i.e., the time of day at which the oven is to be turned off. When both of these means have been set, the timer automatically energizes the oven when the "start time" of day is reached and deenergizes the oven when the "stop time" of day is reached. Normally with such timers, when only the "-stop time" means is set the oven is energized immediately and is deenergized when the "stop time" of day is reached. Other simpler timers employ only a control corresponding to the "-stop time" means so that all timed periods of oven energization begin when the control is set and end when the indicated time is reached.

With any of these timers it is necessary for the user to calculate the amount of time the oven is to be energized and then convert this to time of day readings in order to set the timer properly. This may not be an unduly burdensome task for most cooling operations; however, it becomes very burdensome for the user in the case of some modern ranges. Modern ranges incorporating the feature of pyrolysis cleaning of the oven are becoming very popular. Such cleaning operations should be of a timed duration, depending on the degree of soiling of the oven. They are required only periodically and the average user does not remember from one time to the next the appropriate period of operation of the oven for a "self-cleaning" or pyrolysis type.

Thus, in order to use prior art timers to control such an operation, the user must consult the manufacturer's instructions to determine the desired period of operation then convert this to a time of day reading and then set the control to this reading. Often these instructions are in a "Use and Care" booklet which is often stored by the user away from the range and which may become lost.

Accordingly it is an object of this invention to provide an improved timer which simplifies the user's task in setting a desired period of operation.

Another object of this invention is to provide an improved timer including visual indicator means for showing the proper termination time for a desired period of operation.

A further object of the invention is to provide an improved timer including visual indicator means showing when a desired period of operation has been set.

SUMMARY OF THE INVENTION

In carrying out my invention, in one form, thereof, I provide a timer comprising a switch and a manually adjustable control for actuating the switch. The control has a set position and an unset position. The timer also includes motor driven means for releasing the control from its set position to provide a timed period of actuation of the switch. First visual indicator means is movable with the motor driven means to show the proper termination time for a desired period of switch actuation. The control is movable relative to the motor driven means when the control is in its set position to determine the period of switch actuation and second visual indicator means is movable with the control. The first and second visual indicator means together show when the desired period of switch actuation has been set.

The subject matter which I regard as my invention is particularly pointed out and distinctly claimed in the concluding portion of the specification. The invention itself, however, taken with further objects and advantages thereof, may be best understood by reference to the following description taken in conjunction with the accompanying drawing in which:

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a front elevational view of an improved range timer embodying one form of my invention;

FIG. 2 is a top view, partly broken away and partially is section, of the timer of FIG. 1, showing the control and switch in their set positions, with some elements ommitted for the sake of simplicity;

FIG. 3 is a fragmentary top view similar to FIG. 2, showing the control and switch in their unset positions;

FIG. 4 is an enlarged, fragmentary view of the switch used in the timer of FIG. 1, showing the set and unset positions of the switch contacts; and

FIG. 5 is an exploded, perspective view showing various components of the "stop time" means of the timer of FIG. 1 and incorporating one embodiment of my invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now particularly to FIGS. 1 and 2, my invention is shown in one form embodied in a range timer **10** having a face plate **11**, a clock mechanism **12**, and an electric motor **13** for driving the clock mechanism, and an oven controlling switch **14**. Starting and stopping control members **15** and **16**, respectively, are also provided and these members function as switch-actuating and -setting members for controlling the response of the switch **14** of the clock mechanism **12**. The members **15** and **16** include shafts **17** and **18** respectively, which may be manually adjusted to effect the desired timed response of switch **14**.

To furnish an interval or minute timing signal for the operator, an interval or minute timer **19** is also provided, the mechanism thereof actuating a buzzer sound at the end of a timed interval which is preset by an adjustment of a shaft **20**. Time of day indication for the user is obtained from the clock mechanism **12** by means of the shaft **20** with hour and minute hands **21** and **22** mounted thereto. The hour and minute hands rotate about a time indicating embossment **23** which is formed on the face plate **11** and may be conveniently divided into 12 hourly designations. An interval time embossment **24** is formed within the time of day embossment **23** and conveniently may be divided into 60 minute designations. An interval timer hand **25** is mounted on the shaft **20** and cooperates with the interval timer embossment **24** to indicate the time of the interval timer. As is well known in the art, the shaft **20** is manually movable between axial outer and inner positions. When in its axially outer position, rotation of the shaft **20** sets the interval timer **19** and moves the hand **25** so as to indicate the setting of the interval timer. When in its axially inner position, rotation of the shaft **20** causes the clock mechanism **12** to be rotated and the hands **21** and **22** to be moved therewith so as to set the time of day reading of the clock mechanism.

A start time indicating embossment **26** and a stop time indicating embossment **27** are each formed in the face plate **11** and conveniently may be divided into quarter-hour designations. The starting and stopping shafts **17** and **18** have an indicating hand **29** and **30** respectively attached thereto to indicate the times at which the oven is to be turned on and off respectively by the switch **14**. Knobs, such as those indicated at **31**, are mounted on each of the shafts **17**, **18** and **20** se that they may easily rotate the associated shaft for a proper setting of that portion of the timer mechanism.

For supporting all the various mechanism of the range timer, front and rear plates **32** and **33** respectively are provided. Face plate **11** is attached to the outer side of the front plast **32** by some suitable means such as the bushings **34**, which are mounted around the shafts **17** and **20** to firmly hold the plates **11** and **32** in their spaced-apart relationship while allowing free movement of shafts **17** and **20**. Spacers **35** and **36** are mounted to and extend between the front plate **32** and the rear plate **33** with the spacers **36** extending beyond the rear of rear plate **33** so that the motor **13** may be mounted to the spacers **36** by some suitable means, such as screws **37**.

The shafts 17 and 20 are supported within the timer mechanism by being rotatably journaled in the bushings 34 and by having their inner end portions extending through the rear plate 33 to provide additional bearing support. The mounting of shaft 18 will be discussed in more detail with regard to the discussion of FIG. 5 below.

To set starting and stopping timers for actuation of the switch 14, so as to control the starting and stopping time of an associated device such as an oven, the starting and stopping shafts 17 and 18 are rotatably journaled for axial movement, the shaft 17 being journaled within one of the bushings 34 and the shaft 18 being journaled within a bushing 38. The inner ends 39 and 40 of the shafts extend through the rear plate 33 to actuate a switch cocking or lever mechanism 41 and thereby open and close the switch. The shafts 17 and 18 have gear-shaped discs, 42 and 43 respectively, mounted on a portion of each shaft between the front plate 32 and rear plate 33. Each of the gear-shaped discs 42 and 43 has an aperture formed on the surface thereof. The aperture 44 for disc 43 is shown in FIG. 5, and a similar aperture (not shown) is provided in disc 42. These apertures serve to provide a preset timed retention of the starting and stopping members 15 and 16 in their axially inner or set positions by engagement with projecting noses or fingers 45 or 46 or driven gears, 47 and 48 respectively. The gears 47 and 48 are journaled for coaxial rotative movement around the shafts 17 and 18 respectively. To continuously drive gears 47 and 48, gear 47 is continuously driven by the clock mechanism and continuously meshes with an idler gear 49 which, in turn, continuously meshes with gear 48.

Dics 42 and 43 are securely mounted to their respective starting and stopping shafts 17 18 to form the starting and stopping control members 15 and 16 respectively. When shafts 17 and 18 are axially depressed they are biased outwardly and, since discs 42 and 43 are attached to shafts 17 and 18 respectively, the discs are axially biased toward the coaxially arranged driven gears 47 and 48. When in its inner or set position, each of the shafts 17 and 18 are manually rotatable independent of gears 47 and 48. Such manual rotation establishes an angular spacing between the aperture in its associated disc, 42 and 43 respectively, and the finger of the corresponding gear, 47 and 48 respectively. The fingers 45 and 46 will ride on the adjacent surfaces of the discs 42 and 43 to restrain the members 15 and 16 from axial movement to their outer or unset positions until the preset switch-actuating times have been reached. With respect to stop control member 16 this is when finger 46 comes into alignment with aperture 44. When the preset actuating time is reached, the aperture in the discs 42 and 43 is in alignment with mating finger or nose 45 and 46, and starting member 15 or stopping member 16 moves outwardly. When either of the shafts 17 and 18 is in its axially inner or set position, the notched edge of the associated discs 42 and 43 are engaged by a detent spring 49*a*. This spring controls the rotation of members 15 and 16 in setting starting and stopping times.

The axial positioning of the shafts 17 and 18 determine the positioning of the switch-cocking mechanism. Switch-cocking mechanism 41 opens and closes associated contacts of the switch 14 for energizing and deenergizing an associated device, such as oven, in accordance with preselected movements of the shaft 17 and 18. This cocking mechanism is arranged on the outer surface of the rear plate 33, adjacent to the inner ends 39 and 40 of the shafts 17 and 18 and is protected by the switch-insulating base 50. To support and guide the other components of the cocking mechanism a support 51 is secured to the outer surface of the rear plate 33 between the shafts 17 and 18. Adjacent to the inner end 40 of shaft 18 the support 51 is turned outwardly so as to project away from the plate 33 in the form of a short U-shaped flange portion 52. The other end of support 51 projects outwardly away from the rear plate 33 in the form of a flange 53. To provide a snap-acting biasing force for the switch-cocking mechanism and also to bias the stop control member 16 to its outer or unset position, a lever 54 is pivotally mounted on the support 51. In particular it is mounted in the U-shaped flange portion 52 for movement toward and away from the rear plate 33. One end 55 of the lever 54 is disposed to engage the inner end 40 of the shaft 18 and a groove 56 is formed in the lever 54 adjacent the end 55. The groove 56 receives the center portion of a U-shaped spring 57 while the arms 58 of the spring extend through openings (not shown) in the flange 53. Thus the spring 57 provides a biasing force for the switch-cocking mechanism by resiliently acting upon the lever 54.

The cocking mechanism 41 also includes a switch-actuating lever or arm 59. The arm 59 includes a generally flat portion 60 and a shoulder 61 which is bent angularly from the portion 60 in a generally perpendicularly direction thereto and which rests upon the outer side of rear plate 33. The flat portion 60 extends across the support 51 and lever 54. The end 62 of the arm 59 remote from the shoulder 61 is offset toward the rear plate 33 and is disposed to be engaged by the inner end 39 of the shaft 17. The other end 63 of the lever 54 extends upwardly through an opening (not shown) in the flat portion 60 and is bent over so as to be supported by the flat portion. The engagement of the end 63 of the lever 54 adjacent the opening in the flat portion 60 of the arm 59 transmits the biasing force of the spring 57 to the switch-actuating arm 59. The spring 57 urges the groove 56 of the lever 54 downwardly (seen in FIGS. 2 and 3) to provide a clockwise moment of biasing force about the fulcrum provided by the U-shaped flange portion 52. This moment is transmitted by the lever 54 to the switch-actuating arm 59 and provides a biasing moment on that arm in a counterclockwise direction about the shoulder 61.

The flat portion 60 of the switch-actuating arm 59 is in contact with an actuating pin 64 which is threadily mounted in an insulating member 65. The insulating member is mounted in the switch-insulating base 50. As best seen in FIG. 4 the insulating member 65 has a rib 66 disposed to engage a pair of resilient arms 67 and 68. The resilient arms carry movable contacts, 69 and 70 respectively, so as to bias the contacts to the lower or solid line position (as shown in FIG. 4) where they will come into engagement with stationary contacts 71 and 72 respectively to energize an associated device such as an oven. Upward movement of the switch-actuating arm 59 from its position shown in FIG. 2 to its position shown in FIG. 3 raises the actuating pin 64 and thus the insulating member 65 to the dotted line position of FIG. 4. This causes the rib 66 to move the resilient arms 67 and 68 and thus the movable contacts 69 and 70 to their dotted line positions of FIG. 4 so as to deenergize the oven. Obviously other contacts could be provided to control other operations of an associated device.

Engagement of the end 55 of lever 54 with the inner end 40 of the shaft 18 biases the shaft 18 and thus the stop control member 16 to its axially outer or unset position. Any number of ways could be used to bias the starting member 15 to its axially outer or unset position. I found it convenient to use a coil spring 73 which is positioned between the rear plate 33 and the disc 42.

As thus far described the timer shown is illustrative of many range control timers which are currently commercially available. Additional details of construction and operation of one timer of this general type, particularly the switch, may be had by reference to U.S. Pat. No. 3,038,041, issued to W. S. Zagorski on June 5, 1962, and assigned to General Electric Company, assignee of the present invention.

With timers of this type the user may easily time an operation of up to 1 hour in duration by use of the interval timer 19. At the end of the set period of operation of the interval timer a buzzer is sounded warning the user that it is time to return and terminate the operation of the oven. Predetermined automatic operation of the oven may be provided by use of the start and stop control members 15 and 16. When the start control shaft 17 is pushed inwardly and rotated, the inner end 39 of shaft 17 moves inwardly to hold the switch actuating arm 59 in its inward position against the actuating pin 64 until gear 47 has been rotated sufficiently by the timer motor to release the disc

42 and allow the shaft 17 to be returned to its axially outer or unset position by the spring 73. When stop control member 16 is pushed inwardly and rotated so as to assume the position shown in FIG. 2, the inner end 48 of the shaft 18 bears against the end 55 of the lever 54 and moves it inwardly to the position shown in FIG. 2. Shaft 18 then holds the end 55 of lever 54 in the position shown in FIG. 2 until the gear 48 as been driven through gears 49 and 47 from the timer motor to a position where the finger 46 is in alignment with the aperture 44 to release the disc 43 and allow the shaft 18 to move to its axially outer or unset position, as shown in FIG. 3. Thus, when the user desires to have a timed cooking operation, it is merely necessary to determine the length of time the operation is to go on, push inwardly on shaft 17 and rotate it until the indicating hand 29 comes into register with the appropriate start time embossment to indicate the time of day the cooking operation is to begin, and then push inwardly on the stop shaft 18 and rotate it until the indicating hand comes into register with the appropriate stop time embossment 27 to indicate the subsequent time of day the cooking operation is to cease. The oven is not energized until gear 47 has been rotated sufficiently to release the disc so that the shaft 17 moves back to its position in FIG. 2, at which time the oven will be energized. The oven will perform a cooking operation until the time subsequent thereto when gear 48 has been rotated sufficiently to bring finger 46 into alignment with aperture 44 in disc 43 to release the disc 43. This will allow the shaft 18 to be brought to its axially outer or unset position. These movements cause the movable contacts 67 and 68 to come into engagement with the stationary contacts 71 and 72 of the switch at the start time and to be moved up (as seen in FIG. 4) away from the stationary contacts at the stop time.

It will be understood that a timed cooking operation may be caused to start and proceed for a predetermined period of time and then automatically terminate by using only the stop control member 16, if it is desired for the timed operation to begin immediately. The switch cocking or lever mechanism 41 will be in the position shown in FIG. 2 either by setting only the stop shaft 18 to its axially inner or set position or after shaft 17 has returned to its outer position when both shafts have been moved to their inner or set positions. The setting of only the stop control member 16 will cause a timed operation to begin immediately and terminate at the time indicated by the indicating hand 30.

For operations which are conducted only occasionally, the user very likely will not remember the appropriate length of time for the operation. In order to use the timer to provide an automatically timed operation, it becomes necessary for the user to go to a manual to look up the period of time involved, then to transform that period into time of day settings and then set the control. As an important aspect of the present invention I have provided an improved arrangement which is employed in conjunction with the stop control member to continuously visually indicate the correct stop time for a predetermined period of switch actuation and to indicate when the control has been set to provide this period of switch actuation. For instance with a range timer this arrangement is very useful for controlling the duration of switch actuation to provide a heat-cleaning or self-cleaning cycle for the oven.

To this end it will be seen from FIG. 5 that the stop time embossment 27 is provided around the outside of a rather large opening 74 provided in the face plate 11. The stop control shaft 18 is mounted to project through the center of the opening 74 and through an aligned opening 75 provided in front plate 32. To this end the stop shaft 18 is rotatably received within a bushing 38, and the bushing 38 is sized to fit snugly but rotatably within the opening 75 with a shoulder 76 abutting against the back side of the front plate 32. The bushing includes a cylindrical land 77 which is in front of shoulder 76 and is only slightly wider than the thickness of the front plate 32. Then a groove 78 is provided to be positioned just in front of the front surface of front plate 32. The groove 78 receives a clamping member in the form of a C-ring 79. Thus the bushing is rotatably mounted on the front plate 32. A second cylindrical land 80 is provided just rearwardly of the shoulder 76 and provides a seat for the gear 48. That is, the central opening 81 of the gear 48 fits loosely about the land 80. A disc 82 is securely mounted to the rear most portion of the bushing 38 and is provided with a slot or aperture 83 to receive the finger 46. With this arrangement of parts, the gear 48, the disc 82 and the bushing 38 rotate together as the disc 48 is driven from the motor 13 through timer mechanism 12. A cylindrical land or collar 84 is provided at the outer end of the bushing 38 so as to be positioned between the front plate 32 and the face plate 11 when the timer is assembled. A disc 85 is assembled on the collar 84 and is tightly held there by some suitable means such as the split arms 86 which surround the central opening 87 of the disc 85. Thus the collar 84 is received in the opening 87 with the arms 86 resiliently engaging the collar to hold the disc in position relative to the gear 48. With this arrangement the outer surface of the disc 85 may be seen by the user through the opening 74 in the face plate 11. Suitable indicia are provided on this disc 85 to indicate the appropriate time for the termination of the period of switch actuation. For instance, for a range control for a self-cleaning oven, one line 88 may be provided and labeled light clean and a second line 89 provided and labeled heavy clean. Since the disc 85 at all times rotates with the gear 48 it may be initially placed on the collar 84 so that the indicia 88 and 89 always point to that portion of the stop time embossment 27 which is the period of time later than the presently indicated time of day at which an immediately initiated oven-cleaning operation should terminate, for either a lightly soiled oven or a heavily soiled oven respectively.

A second visual indicia means is provided in the form of indicating hand 30, which has a split ring 90 so that it may be pushed over the end of shaft 18 and will thereafter retain its angular position upon the shaft. The hand 30 is mounted on the shaft 18 so as to be in alignment with the aperture 44. With this arrangement, when the shaft 18 is in its axially inner position the hand 30 will indicate the time of day at which the finger 46 will come into alignment with the aperture 44 and thus the shaft will be released for movement to its axially outer or unset position. As described above, this is also the time of day at which a timed operation of the oven will be terminated.

To automatically control a period of self-cleaning of a range using the timer shown, the user would merely push axially inwardly on the shaft 18 and then rotate the shaft so as to bring the hand 30 in alignment with either the indicia 88 or the indicia 89 respectively, depending upon whether the oven was lightly soiled or heavily soiled. Since the shaft 17 is in its axially outer or unset position, the switch-cocking mechanism 41 will assume the position of FIG. 2 and the oven will immediately be energized to proceed through a heating cycle for cleaning the oven. During this cycle the motor 13 will rotate the gear 48 through the gears 49 and 47 and the timer mechanism 12. This causes the finger 46 to move across the under surface of the gearlike disc 43 and eventually bring the finger 46 into alignment with the aperture 44. At this time the disc 43 will be released and the shaft 18 would be moved to its axially outer or unset position (as shown in FIG. 3) and the contacts of the switch 14 will be opened to deenergize the oven.

With the arrangement of parts shown in this visual indicia 88 and 89 of disc 85 continuously point to appropriate stop time embossment 27 indicating the time of day at which an immediately initiated cycle of operation should be terminated. Also, once the shaft 18 is pushed inwardly and rotated, the hand 30 will point to the appropriate stop time embossment 27 indicating the time of day at which an operation will terminate. Thus, by setting the shaft 18 so that the hand 30 is in alignment with either the light clean indicia 88 or the heavy clean indicia 89, the user will know that the appropriate period of operation has been set for cleaning the oven without the necessity of going to a reference manual to learn the length of operation and then calculate the time of day setting.

It will be obvious that certain structural modifications could be made in the arrangement illustrated without departing from the spirit and scope of my invention. For instance, the bushing could be formed integrally with the gear **48** in which case the disc **82** should be eliminated. The arrangement shown is particularly desirable since it is the least departure from presently utilized structures and can be implemented with the least cost.

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

1. A timer comprising a switch; a manually adjustable control for actuating said switch; said control having a set position and an unset position; motor driven means for releasing said control from its set position to provide a timed period of actuation of said switch; first visual indicator means movable with said motor driven means to show the proper termination time for a desired period of switch actuation; said control being movable relative to said motor driven means when said control is in its set position to determine the time at which said control will be released from its set position; and second visual indicator means movable with said control; said first and second indicator means together showing when the desired period of switch actuation has been set.

2. The invention as set forth in claim **1** wherein said timer includes a motor driven clock for showing the time of day; said motor driven means being connected to said clock for movement thereby so that said first indicator means will be moved by said clock through said motor driven means to show the time subsequent to that shown by the clock when a desired period of switch actuation should end.

3. The invention as set forth in claim **1** wherein said first visual indicator means includes a member rotatable with said motor driven means and having indicia means exposed to view for showing the proper termination time of a desired period of switch actuation; and said second indicator means is rotatable with said control so that the setting of the desired period of switch actuation will be shown by moving said control to bring said second indicator means into angular alignment with said indicia means of said first visual indicator means.

4. In a timer including a switch; a manually adjustable control for actuating the switch, the control being longitudinally movable between a set position and an unset position; motor driven means cooperating with the control to release the control from its set position when the control and motor driven means are in a predetermined angular relationship, the control and the motor-driven means being interconnected for concurrent motor-driven rotation when the control is in its unset position and being freed for independent manual rotation of the control and motor-driven rotation of the motor-driven means when the control is in its set position, so that the degree of manual rotation of the control in its set position will determine the period of rotation of the motor-driven means necessary to reach the predetermined angular relationship and thus determine the period of switch actuation; first visual indicator means movable with the motor-driven means to show the proper termination time for a desired period of switch actuation; and second visual indicator means movable with the control, said first and second visual indicator means together showing when the desired period of switch actuation has been set.

5. The invention as set forth in claim **4** wherein the timer includes a motor-driven clock for showing the time of day; the motor-driven means being connected to the clock for movement thereby so that said first indicator means will be moved by the clock through the motor-driven means to show the time subsequent to that shown by the clock when a desired period of switch actuation should end.

6. The invention as set forth in claim **4** wherein said first visual indicator means includes a member rotatable with the motor-driven means and having indicia means exposed to view for showing the proper termination time of a desired period of switch actuation; and said second indicator means is rotatable with the control so that the setting of the desired period of switch actuation will be shown by moving the control to bring said second indicator means into angular alignment with said indicia means of said first indicator means.

7. A timer comprising a switch; a control for actuating said switch, including a manually adjustable shaft longitudinally movable between a set position and an unset position; motor-driven means mounted for free rotational movement about said shaft and cooperating with said control to release said control from its set position when said shaft and said motor-driven means are in a predetermined angular relationship; said control and said motor-driven means being interconnected for concurrent motor-driven rotation when said control is in its unset position and being freed for independent manual rotation of said shaft and motor-driven rotation of said means when said control is in its set position, so that the degree of manual rotation of said shaft in its set position will determine the period of rotation of said motor-driven means necessary to reach the predetermined angular relationship and thus determine the period of switch actuation; first visual indicator means rotatable with said motor driven means to show the proper termination time for a desired period of switch actuation; and second visual indicator manes rotatable with said shaft, said first and second visual indicator means together showing when the desired period of switch actuation has been set.

8. The invention as set forth in claim **7** wherein a sleeve is mounted for free rotation about said shaft, said motor-driven means being mounted on said sleeve for rotation therewith and said first visual indicator being mounted on said sleeve for rotation therewith; whereby said first visual indicator rotates with said motor-driven means.

9. The invention as set forth in claim **8** wherein said motor-driven means includes a motor-driven member loosely mounted on said sleeve and a finger projecting from said member longitudinally of said shaft; a second member is connected to said sleeve for movement therewith, said second member defining an opening therein, said finger projecting through said opening so that said motor-driven member and said sleeve rotate together.

10. The invention as set forth in claim **9** wherein a third member is connected to said shaft for rotation herewith; said third member defining a surface for engagement with the distal end of said finger to restrain and control in its set position and an aperture in said surface to receive said finger when said motor-driven member and said shaft are in the predetermined angular relationship thereby to release said control from its set position.