

Feb. 16, 1960

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2,925,478

INTERVAL TIMER

Filed March 17, 1958

2 Sheets-Sheet 1

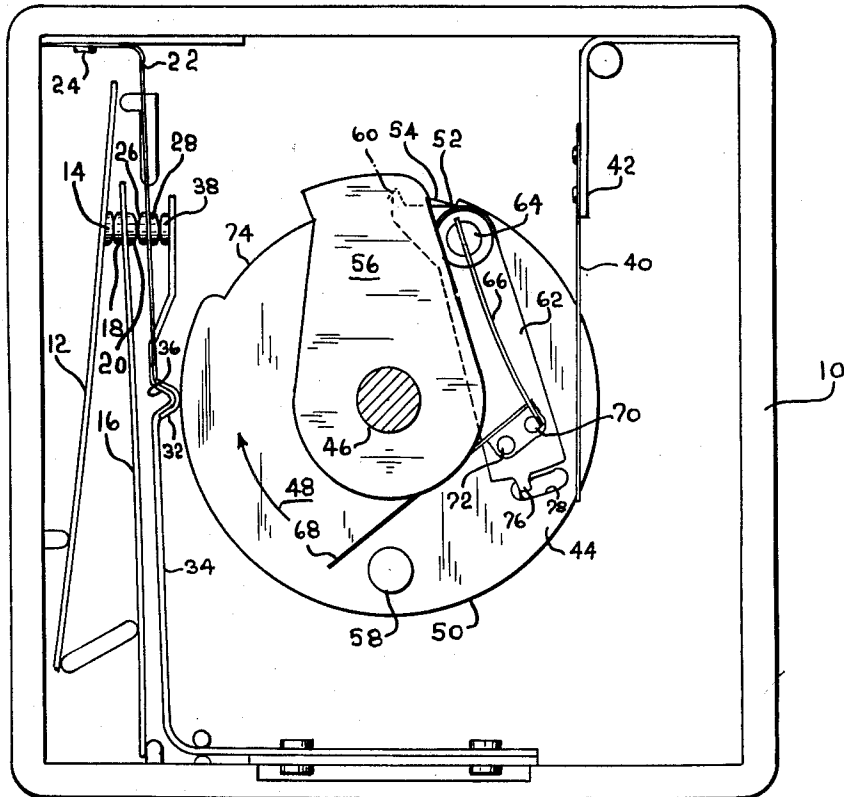


FIG. 1

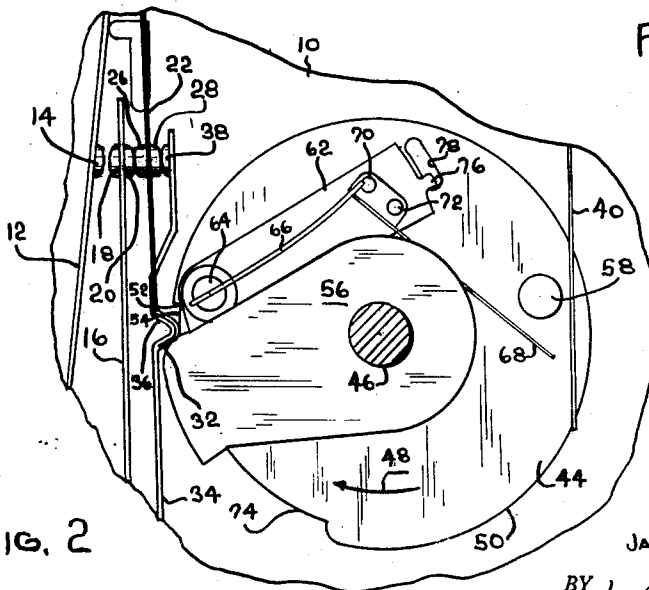


FIG. 2

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2 Sheets-Sheet 2

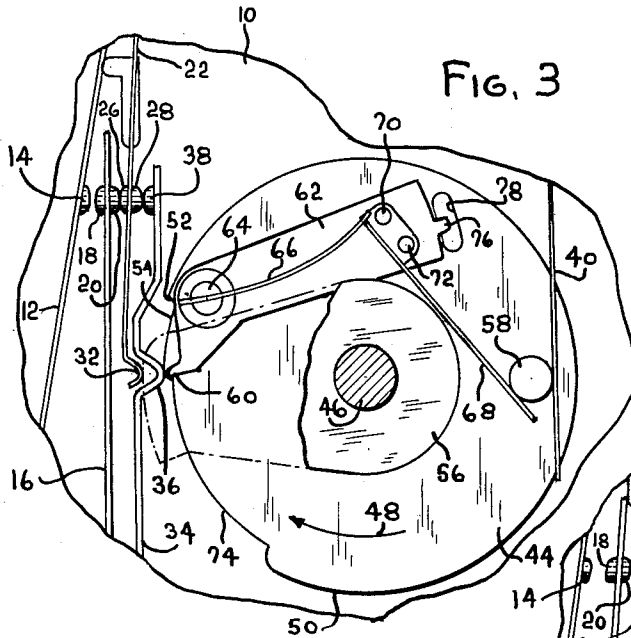


FIG. 3

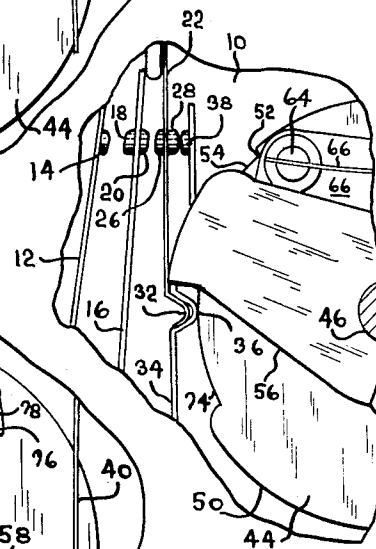


FIG. 5

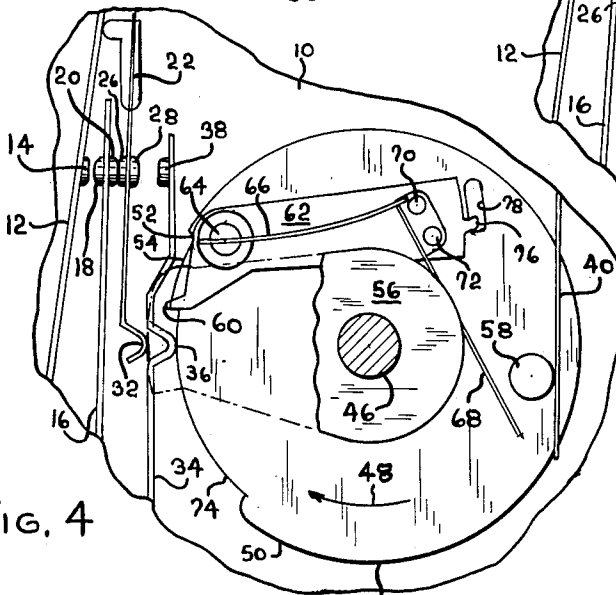


FIG. 4

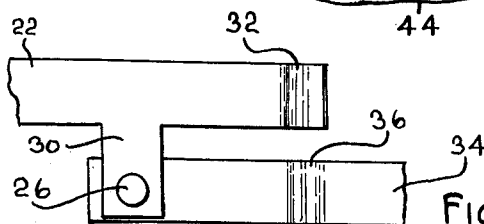


FIG. 6

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INTERVAL TIMER

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10 Claims. (Cl. 200—38)

This invention relates to an interval timer and particularly to providing a short interval in a creep type timer and to providing for completion of a circuit upon de-energization of the timer.

In a creep (continuous motion) type timer the speed of the timing cams makes provision of very short intervals very difficult. This is not a problem in the usual usage of such timers (such as dishwashers, clothes dryers, etc.) but where an audible signal is desired at the end of the cycle a short interval is desirable; otherwise the signal would last three or four minutes and would be objectionable. Provision of short intervals has heretofore resulted in resorting to more costly timers of the step type.

The principal object of this invention is to provide, at low cost, a short interval on a creep type timer.

In some timer's uses it is desired to have a light, for example, turn on when the cycle has been completed. Rather than resort to a redesigned timer for such uses, it is desirable to design the basic timer for ready, inexpensive modification to accomplish this function. The present timer is easily modified to do this with only a simple added cam.

The secondary object of this invention is to provide a creep type timer which can be readily modified to close a circuit upon de-energization of the timer.

Other objects and advantages will be pointed out in, or be apparent from, the specification and claims, as will obvious modifications of the single embodiment shown in the drawings, in which:

Figure 1 is a plan view of the interior of the timer (for a clothes dryer) showing the parts in the positions occupied shortly after the start of a cycle with the timer and dryer motors energized and the heat and light circuits completed;

Figure 2 is a fragmentary view similar to Figure 1 but shows the parts in the positions occupied shortly before completion of the cycle with the dryer heater de-energized;

Figure 3 shows the positions of the parts at the moment the buzzer circuit is completed and also shows the manner in which the light holding circuit cam has moved into position to continue the energization of this circuit upon completion of the cycle;

Figure 4 shows the position to the parts when only the light circuit is complete;

Figure 5 shows the position of the parts when all the circuits are open; and

Figure 6 is a fragmentary side view of two of the blades.

Referring to the drawings now in detail, Figure 1 shows the timer case 10 with a number of flexible blades mounted therein. It will be understood each blade is brought out of the case either directly or indirectly to and in a terminal. The details of such construction are of no consequence insofar as the present invention is concerned. Blade 12 carries a contact 14 on its free end and is adapted to be connected in a dryer heater circuit,

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for example. Blade 16 is adapted to carry line voltage and has double contacts 18, 20 on its free end. Blade 22, adapted to be connected to the dryer light circuit, is anchored to the case at 24 and carries contacts 26, 28 on the depending finger portion 30 which serves to align the contacts 26, 28 with the other contacts in the stack of contacts. The free end of blade 22 is formed as shown to provide a cam follower portion 32. The other blade in the stack of contacts in the upper left portion of Figure 1 is blade 34 which has a formed follower portion 36 and carries contacts 38 on its free end. This blade is adapted to be connected in the dryer motor circuit and in the timer motor circuit. The other blade fixed in the casing is blade 40 carried on bracket 42 which is adapted to be connected in the dryer buzzer or chime circuit. It will be appreciated that all the blades are electric conductors.

Follower 36 on blade 34 is adapted to ride on the periphery of the phenolic cam disc 44 mounted on shaft 46 for rotation in the direction of arrow 48 by means of the timer motor (not shown). In Figure 1 the follower 36 is riding on the maximum rise cam portion 50 of the disc. In this position contact 38 on blade 34 is moved against the contacts carried by blade 22 which, in turn, move against the contacts carried by blade 16 which moves against blade 12 to stack all the contacts, and, therefore, energize all the circuits connected with the blades. Thus, the hot or line voltage blade 16 can now close the circuits to the dryer motor, the timer motor, the dryer light and to the dryer heater.

From the position shown in Figure 1, the timer motor drives shaft 46 and the associated cam 44 in a clockwise direction until the drop 52 is reached, at which time follower 36 will drop to cam surface 54 and permit the stack of contacts to move away from the heater contact 14 on blade 12 (Figure 2). This de-energizes the heater in the dryer prior to shutting the dryer down. It will be understood that during the time the heater has been energized the actual energization of the heater per se can be controlled by a thermostatic control in the heater circuit. Thus, even though the heater circuit is closed in the timer throughout the entire period of time it takes to reach the drop 52, the heater element in all likelihood has been operating in an on-off manner under control of the usual thermostatic control. In the position shown in Figure 2 it will be noted that cam 56, which is also mounted on shaft 46 for rotation therewith, is starting to act on the cam follower portion of blade 22. This, however, has no immediate effect upon the circuits controlled by the timer, but does have the effect of starting what might be termed a holding circuit for the light, as will be apparent hereinafter.

As the cam assembly continues to rotate from the position in Figure 2 to the position shown in Figure 3 the conductive post 58 mounted on cam disc 44 comes into contact with flexible blade 40 and rides along the blade. Upon reaching the position shown in Figure 3 the follower 36 on blade 34 acts on the nib 60 of crank or lever 62 to rock the lever in a counter-clockwise direction about pivot 64 against the bias of spring 66 staked to the fixed pivot 64 and having its free end bearing against the resilient contact 68 riveted to the end of crank 62 at 70, 72. Prior to the follower 36 acting on the nib 60, the lever 62 occupied the position shown in either Figure 1 or Figure 2, but upon being actuated as shown in Figure 3 the contact blade 68 carried by lever 62 swings to move the blade against the post 58. It will be apparent that when blade 68 touches the post electricity may flow from the hot blade 16 through the stack of contacts into blade 34 and nib 60, through the metallic lever 62 to the contact blade 68 which, in turn, makes

contact with post 58 which has already established contact with blade 40 in the buzzer or chime circuit.

It will be noted that nib 60 is so formed as to have a cooperating camming action with the follower portion 36 of blade 34. It will also be noted that the crank 62 is mounted to impart a motion multiplying action to contact blade 68. This construction, coupled with the small tip portion of nib 60, insures only a very brief completion of the buzzer or chime circuit.

Directly underneath the following or flat portion of nib 60 there is a cam drop which allows follower 36 to drop down to cam surface 74. As this occurs it will be noted the contact 38 carried by blade 34 moves away from the "hot" blade 16 to break the circuit to the dryer motor and to the timer motor, thus shutting down the apparatus. In order to retain the light in the dryer energized cam 56 has now moved under follower 32 to hold blade 22 and its contact 26 against contact 20 on blade 16. The only portion of the dryer still energized is the light inside the dryer. If it is desired to turn off this light the shaft 46 is manually rotated by means of a knob (not shown) connected thereto so as to rotate cam 66 away from follower 32 so the light circuit blade 22 can move away from the hot blade 16. This position is shown in Figure 5.

From the above description, it should be noted that the arrangement of crank 62 on the phenolic cam permits a brief energization of the buzzer circuit even though the timer is of the creep type. The construction provides a motion multiplying factor so only the very maximum motion imparted to crank 62 will be effective to move blade 68 against post 58. The nib 60 can be formed small enough so as to receive the maximum actuation from follower 36 for but a very brief time. Finally, the positioning of the cam drop directly below the follower portion of the nib aids in achieving a rapid breaking of the buzzer circuit since the follower, upon reaching the drop, tends to push the cam disc ahead faster than the motor while going through the drop portion.

It will be appreciated that the present timer can readily omit the light holding circuit cam 56 without altering the basic cycle arrangement beyond omitting the feature of having the light in the dryer stay on after the cycle has been completed. An advantage in the construction including the cam 56 is that the drag inherent in engagement of the cam with its follower is not felt until the drag on the main cam disc is reduced by reason of passing the cam drop 52. This results in a smaller torque requirement and permits use of a less expensive drive motor.

A final point to note with respect to the construction of the lever 62 is the provision of the small projecting depending finger 76 which rides in the slot 78 in the phenolic cam to limit motion of the lever.

It would be possible in some cases to eliminate a conducting post 58 and let the lever carried blade 68 make direct contact with the stationary blade 40, but the present construction is preferred since it makes it possible to achieve high contact pressures and avoids accurate shaping of blades 68 and 40.

Although but one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. An interval timer including, a motor driven cam, a conductive post mounted on said cam, a blade having a cam follower riding on the cam, lever means pivoted on the cam and having a portion projecting beyond the cam periphery to lie in the path of the cam follower, means biasing the lever means to project beyond the cam, a second blade mounted independent of the cam and engageable with said conductive post prior to actuation

of the lever means by said blade, the cam follower acting on the lever means so another portion of the lever means swings into contact with the conductive post as the projecting portion of the lever means is moved flush with the cam.

2. A timer according to claim 1 in which the lever means has a motion multiplying effect whereby the motion imparted by the cam follower moves said another portion of the lever means a greater distance.

3. An interval timer including, a motor driven shaft, a non-conducting disc mounted on the shaft for rotation therewith and having cams on the disc periphery, a blade including a cam follower riding on the periphery of the disc for actuation by the cams, said blade being a conductor and adapted to open and close electric circuits in accordance with the motion imparted thereto by the cams, a second conductive blade mounted to overlie the disc, lever means mounted on the disc with one end projecting beyond the disc periphery to be moved flush with the periphery as the disc moves under the cam follower, means biasing the lever means to project beyond the disc, a conductive post on the disc which makes contact with the second blade, another portion of the lever means being moved into electric contact relationship with the conductive post when the lever means is moved by the cam follower whereby the second blade receives electric current from the first blade through the lever means and conductive post.

4. A timer according to claim 3 in which the lever means multiplies the motion imparted thereto by the follower.

5. A timer according to claim 3 in which the lever means includes a resilient blade which contacts the post.

6. An interval timer including, a motor driven shaft, a non-conducting disc mounted on the shaft for rotation therewith and having cams on the disc periphery, a blade including a cam follower riding on the periphery of the disc for actuation by the cams, said blade being a conductor and adapted to open and close electric circuits in accordance with the motion imparted thereto by the cams, a second conductive blade mounted to overlie the disc, lever means mounted on the disc with one end projecting beyond the disc periphery to be moved flush with the periphery as the disc moves under the cam follower, means biasing the lever means to project beyond the disc, another portion of the lever means being moved into electric contact relationship with the second blade when the lever means is moved by the cam follower whereby the second blade receives electric current from the first blade through the lever means, and a cam drop on the disc periphery adjacent the point where it is desired to release the lever means whereby a quick release of the lever means is obtained.

7. An interval timer including, a casing having a motor driven shaft mounted therein, a non-conducting disc mounted on the shaft for rotation therewith and having cams on the periphery thereof, a resilient blade mounted in the casing and having a follower thereon riding on the cams on the disc and including a contact portion, a second resilient blade mounted in the casing and having a cam follower spaced from the first follower parallel to the shaft axis and including a contact portion depending adjacent the contact portion of the first blade, a third blade fixed in the casing with a contact portion in general alignment with the contact portions of the first and second blades, the cams on the disc being adapted to move the first blade contact portion against the second blade contact portion and the second blade against the third blade contact portion, a second cam disc axially spaced on the shaft and rotatable therewith for engagement with the follower on the second blade to retain the second blade contact portion against the third blade contact portion when the first disc cams permit the first blade to move away from the second blade.

8. A timer according to claim 7 in which the second

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disc can move to a position in which the second blade moves away from the third blade and does not contact the first blade.

9. A timer according to claim 8 in which the third blade is adapted to carry current at all times.

10. A timer according to claim 7 in which a fourth blade is mounted in the casing to overlie the first disc, conducting lever means pivotally mounted on the disc with one end projecting beyond the periphery of the disc to be moved flush with the periphery when passing under the first follower, the other end of the lever means being adapted to make electric contact with the fourth blade

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when the one end is flush with the periphery, the lever means acting to pick up electric current from the first blade and conduct the current to the fourth blade.

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