

Aug. 20, 1957

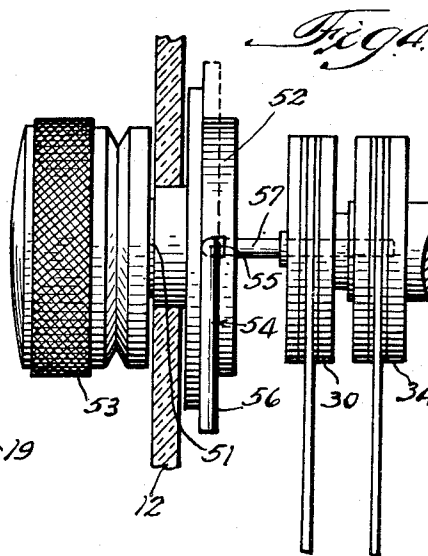
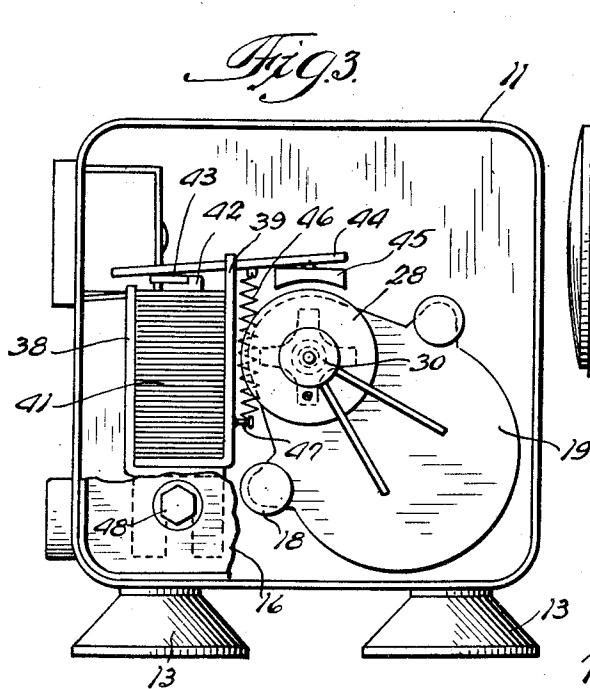
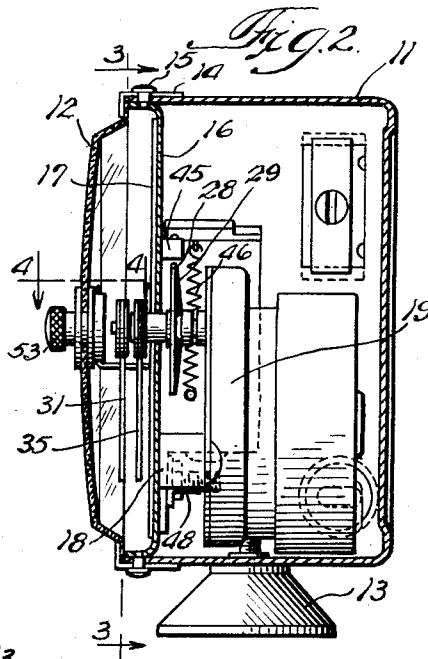
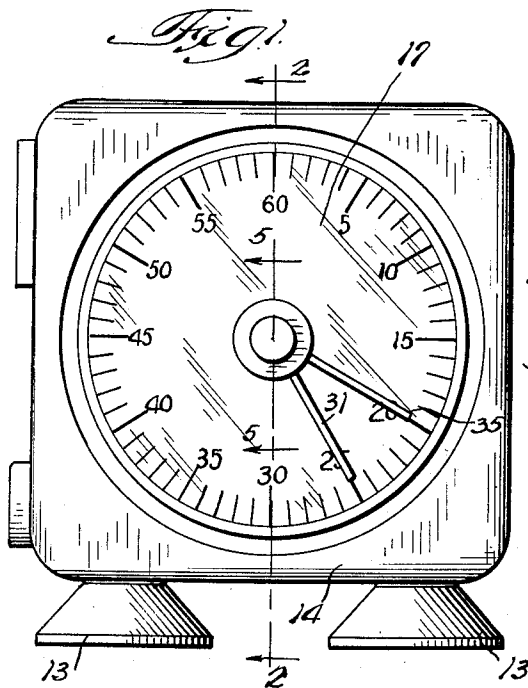
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2,803,300

ELECTRIC TIMER

Filed Oct. 1, 1953

2 Sheets-Sheet 1



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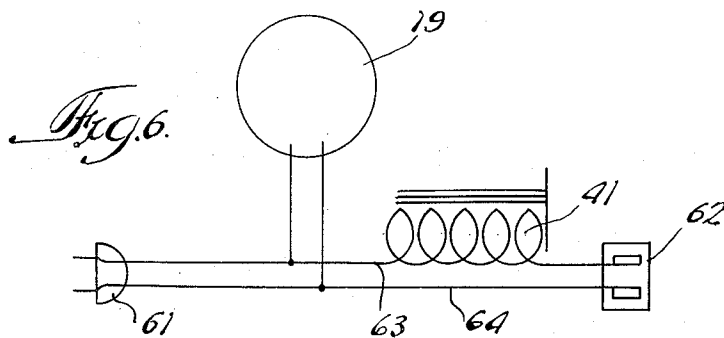
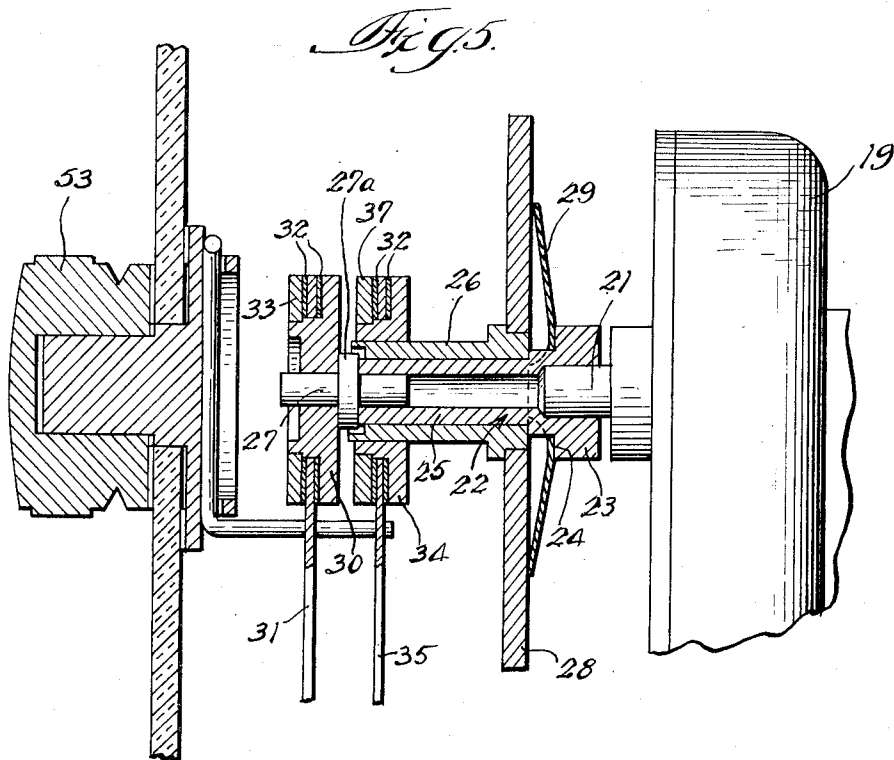
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2 Sheets-Sheet 2



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2,803,300

ELECTRIC TIMER

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Application October 1, 1953, Serial No. 383,654

3 Claims. (Cl. 161—15)

The present invention relates to an electric timer and has special reference to a timer for testing intermittently operating electric devices to show the actual running time thereof during any given period of elapsed time.

In connection with intermittently operating electrical equipment, such for example as refrigerators, it is frequently desirable to determine how long the device is in actual operation during a definite period of time. The present device is therefore equipped with two hands or indicators, one of which shows the total elapsed time that the timer is in operation and the other hand shows the actual running time of the device to which the timer is connected during the total running time of the timer.

It is desirable that both hands of such devices be readily reset to starting or zero setting. In the present device the hands are frictionally mounted on their respective shafts and, while normally rotatable therewith, may be reset without rotation of the shafts on which they are mounted.

An object of the present invention is to provide an electric timer which will show the actual running time of an intermittently operating electric device during any predetermined period of elapsed time.

Another object of the present invention is to provide a simple reliable timing device of the above type which is positive in operation.

Still another object of the present invention is to provide a timing device having an improved reset mechanism.

Further objects and advantages will be apparent from the following description and claims when considered with the accompanying drawings in which:

Fig. 1 is a front elevational view of an electric timer embodying the present invention;

Fig. 2 is a vertical cross-sectional view of the timer with parts thereof in elevation taken on the line 2—2 of Fig. 1 with certain parts shown in elevation;

Fig. 3 is a view similar to Fig. 1 with the front cover removed and most of the dial and supporting plate broken away;

Fig. 4 is a horizontal cross-sectional view of the reset mechanism taken on the line 4—4 of Fig. 2;

Fig. 5 is a cross-sectional view taken on the line 5—5 of Fig. 1, and

Fig. 6 is a diagrammatic showing of the wiring diagram employed in the timer.

Referring more particularly to the drawing, there is shown an electric timer embodying the present invention comprising a casing 11 of metal or other suitable material, and a transparent cover 12, preferably made of a plastic such as Pyralin, secured to the casing by any suitable means such as the ring 14 and screws 15. The bottom of the casing is preferably provided with a pair of suction cups 13 for maintaining the timer in desired upright position.

A mounting plate 16 is also attached to the front of the casing 11 by the screws 15. This mounting plate

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preferably supports the operating mechanism of the timer and is provided on the front or outer side thereof with a face 17 which, in the form illustrated, is designed to indicate time up to one hour.

Supported on the rear side of the plate 16 by a mounting stud 18 is a substantially constant speed motor 19, preferably of the synchronous clock type.

Secured on the motor shaft 21 of the motor and rotatable therewith is a main drive shaft 22 having a flange 23 on the inner end forming a shoulder 24, and a preferably hollow outer end 25 of reduced size. A barrel 26 is positioned over the reduced outer end 25 of the main drive shaft 22 for rotation thereabout and is prevented from outward movement beyond the end of the shaft by the central flange 27a of the plug 27 fixedly secured in the outer end of the hollow shaft portion 25. A clutch wheel 28 fixedly mounted on the inner end of the barrel 26 is normally caused to rotate with the main drive shaft 22 by a clutch spring 29 positioned between the shoulder 24 on the drive shaft and the clutch wheel 28.

Secured on the outer end of the plug 27 is a bushing 30 having the inner end of an elapsed time pointer or hand 31 on the reduced central portion thereof. The hand 31 with a thin paper or metal friction washer 32 on each side thereof is held in place on the bushing 30 by a retaining washer 33. The hand 31 normally rotates with the bushing 30, but may be rotated about the bushing when desired. A pointer or hand 35 for indicating running time is similarly mounted about the bushing 34 on the outer end of barrel 26 with friction washers 32 on each side thereof, and a retaining washer 37. Thus, the hand 35 normally rotates with the bushing 34, but may be rotated thereabout, such as when it is desired to reset the hands.

With the construction above described, the hand 31 for indicating total elapsed time will rotate continuously whenever the motor 19 is energized and rotates the shaft 21. Also, the hand 35 for indicating the running time of the device to be tested will rotate with the motor shaft 21 due to the frictional connection of the clutch spring 29 between the main drive shaft 22 and the clutch wheel 28, unless the clutch wheel 28 and barrel 26 are held against rotation.

In order to indicate the total running time of the device during any predetermined period of elapsed time, rotation of the clutch wheel 28 and barrel 26 is prevented, except when the device being tested is in operation. This may be accomplished by braking means which normally prevents rotation of the clutch wheel, but is released whenever the device is running. This brake means, shown particularly in Fig. 3, may be controlled by a solenoid which operates upon current flow rather than voltage drop and is preferably connected in series with the instrument being tested so that during the operation of the device the solenoid is actuated to release the brake.

The solenoid illustrated comprises a pair of field poles 38 and 39, a winding or coil 41, and a core 42, the latter preferably being provided with a shading ring 43.

An armature 44, having a brake shoe 45 swivelly mounted on the outer end thereof, is preferably supported intermediate its ends on the field pole 41 with the inner end overlying the upper end of the core 42. The brake shoe 45 is shaped and arranged to engage tightly the periphery of the clutch wheel 28 when in braking position and prevents rotation thereof. A coil spring 46, connected between the armature 44 and a pin 47 on the field pole 41, normally maintains the brake shoe 45 tightly against the clutch wheel 28. However, energization of the solenoid pivots the armature 44 to

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raise the outer end and release the brake, as shown in Fig. 3.

The winding of the solenoid is placed in series with the device being tested so that the solenoid is energized to release the brake shoe 45 when the device is in operation. As soon as the device ceases operation, the circuit supplying energy to the coil 41 is broken and the spring 46 returns the brake shoe 45 into engagement with the clutch wheel 28 to prevent further rotation of the latter.

The solenoid assembly is mounted on the solenoid mounting stud 48 for pivotal movement thereabout. This permits the armature to be so adjusted that when the brake shoe 45 is lowered into contact with the periphery of the clutch wheel 28 it will neither advance nor back up the wheel.

Referring to Figs. 2 and 4, there is shown a pointer reset assembly that may be employed in the present timer. This preferably comprises a reset shaft 51 extending through an opening in the central portion of the transparent cover 12. The shaft 51 is provided with an inner flange or shoulder 52 positioned adjacent the inner face of the cover 12. This shoulder 52 may be circular, as shown, and is of greater diameter than the outer diameter of the pointer bushings 30 and 34. Fixed on the outer end of the shaft 51 is a knob 53, by means of which the shaft may be rotated.

A diametrically extending opening is formed in the flange 52 through which extends a reset wire 54 formed with a central section and two transverse end sections. The central section 55 is rotatably mounted in the opening in the shoulder 52, and the opposite end portions 56 and 57 are at right angles to each other as well as to the central portion 55. The end portion 57 is sufficiently long to engage both pointers 31 and 35 when it is arranged to extend inwardly from the cover 12, as shown in Fig. 4. Rotation of the knob 53 in a clockwise direction will cause the end portion 57 of the reset wire to engage the pointers 31 and 35 and move them about their respective bushings 30 and 34 to zero or starting position ready for a test. If the wire portion 57 lies in the path of the pointers as they rotate with their bushings 30 and 34, they will push it out of the way upon contact therewith by causing the wire to pivot about the axis of the central portion 55. Such a construction permits the hands 31 and 35 to be reset without rotating the bushings on which they are mounted.

The wiring diagram preferably employed in the present timer is shown in Fig. 6. A plug 61 for connection to a source of electrical energy is connected to a receptacle 62 by a pair of conductors 63 and 64. The winding 41 of the solenoid is connected in the conductor 63, and the motor 19 is connected across the conductors 63 and 64 so as to be in parallel therewith.

For conducting the test with the present timer, the leads of the device to be tested are connected to the receptacle 62. Thereafter, when it is desired to start the test, the plug 61 is connected to a source of electrical current. As soon as contact is made, the motor 19, being connected across the conductors 63 and 64, starts to operate and continues operating so long as the plug 63 is connected to a source of electrical energy. While the switch, such as a thermostatic switch, which controls the operation of the device being tested, is in closed position, current will flow through the winding 41 of the solenoid and to the device, depressing the inner end of the armature 44 and raising the outer end thereof with the brake 45 to release the clutch wheel 28.

In the use of the timer for testing the operating time of a device, the leads of the device are connected to the receptacle 62 and the plug 61 is connected to a source of electrical energy. If the switch controlling the operation of the device is closed at this time the motor 19 will be energized, driving the main drive shaft 22, and

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the coil 41 of the solenoid will be energized to release the brake 45 so that the barrel 26 will rotate with the shaft 22 and the hands 31 and 35 will rotate together. This continues until the switch controlling the device opens, thereby preventing further energization of the coil 41, although the motor 19 still continues to operate.

Upon de-energization of the coil 41, the spring 46 will move the outer end of the armature 44 downwardly and bring the brake shoe 45 into braking position against the periphery of the clutch wheel 28, thereby preventing rotation of the barrel 26 and the hand 35, although the main shaft 22 and hand 31 continue operating. This cycle is repeated every time the device is operated with the result that the hand 35 will indicate the actual running time of the device during the total elapsed time, as indicated by the hand 31. Upon the completion of a test, the knob 53 is rotated in a clockwise position to reset the hands 31 and 35 in their starting position ready for another test.

While a particular embodiment of this invention has been illustrated and described, it will be understood, of course, that the invention is not to be limited thereto, since many modifications may be made, and it is contemplated, therefore, by the appended claims, to cover any such modifications as fall within the true spirit and scope of this invention.

I claim:

1. In a timer having a drive shaft and a pointer frictionally mounted thereon for rotation therewith, a transparent cover on the front of said timer over said pointer, a reset shaft extending through said cover and rotatable therein, said shaft having a reset wire transversely arranged adjacent the inner end thereof and rotatable about its axis, said wire having a substantially transverse end portion of sufficient length to engage said pointer, and means for limiting the rotation of said wire between a position in which said end portion is substantially normal to said cover and a position in which said end portion is substantially parallel to said cover.

2. In a timer having a drive shaft and a pointer frictionally mounted thereon for rotation therewith, a transparent cover on the front of said timer over said pointer, a reset shaft extending through said face and rotatable therein, said shaft having a reset wire transversely arranged adjacent the inner end thereof and rotatable about its axis, said wire having an end portion of sufficient length to engage said pointer, and means associated with the opposite end of said reset wire for limiting rotation thereof between a position in which said end portion is substantially normal to said cover and a position in which said end portion is substantially parallel to said cover.

3. In a timer having a drive shaft and a pointer frictionally mounted thereon for rotation therewith, a transparent face on the front of said timer over said pointer, a reset shaft extending through said face and rotatable therein having a hole extending transversely through the inner end thereof, a reset wire having a central portion positioned in said hole and rotatable therein, said wire having one end extending substantially normal to said central portion and of a length to engage said indicator when said wire extends inwardly from said shaft, the opposite end of said reset wire extending substantially normal to both said central portion and the opposite end thereof.

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