Feb. 26, 1952 C. E. FARRIS 2,587,452

WATCH TIMING DEVICE

Filed Dec. 1, 1947 2 SHEETS--SHEET 1

FIG. 1.

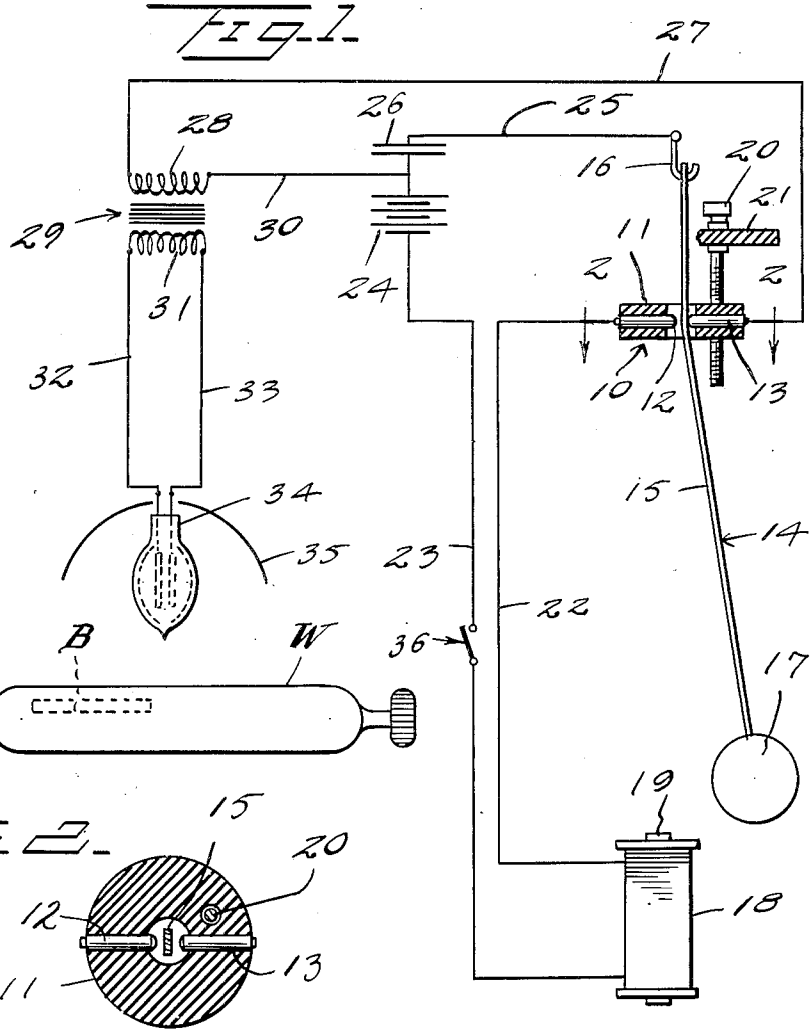
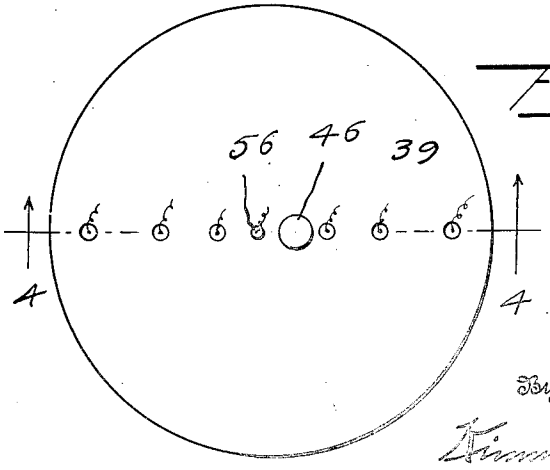


FIG. 2.

FIG. 3.



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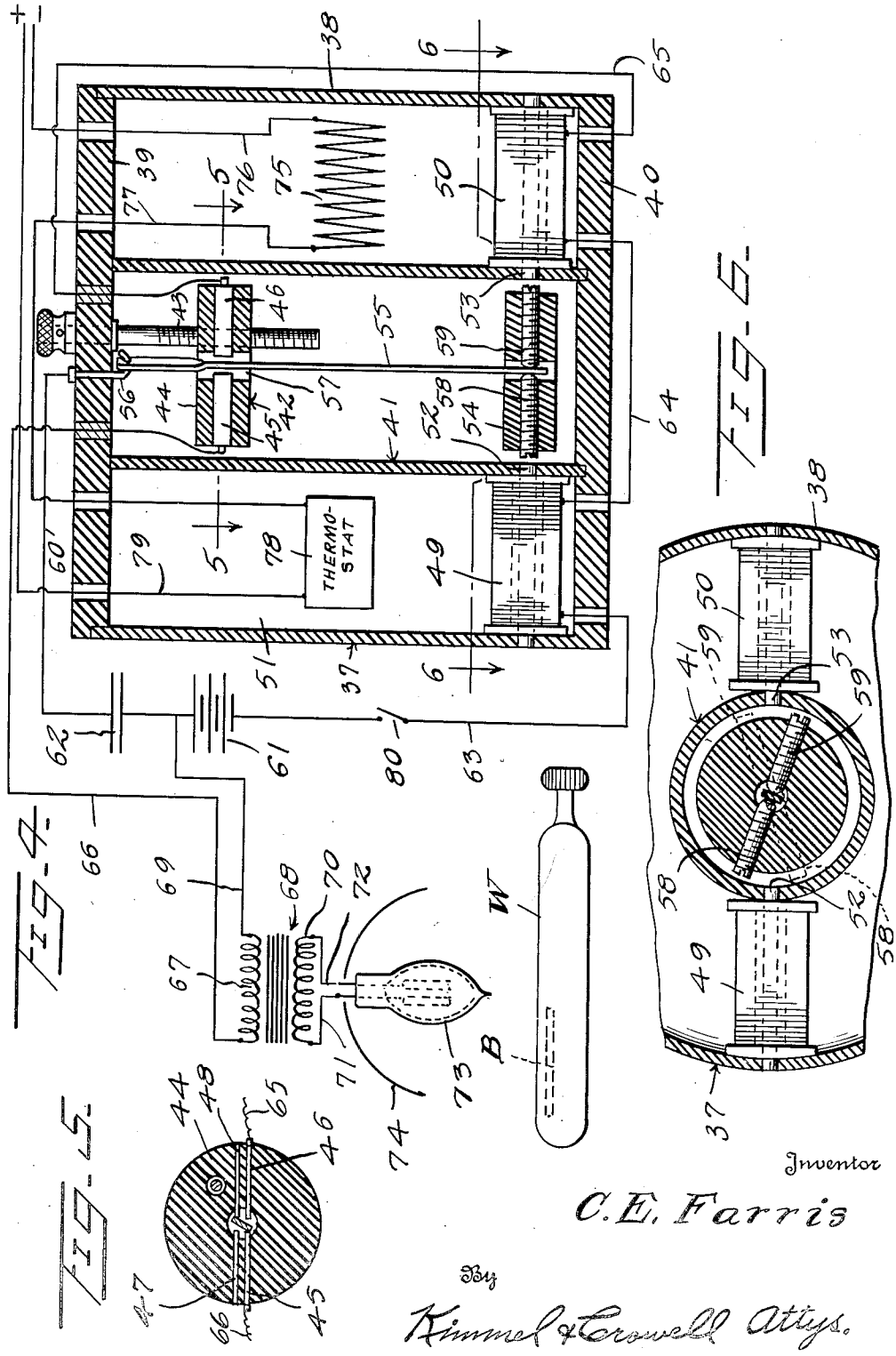


FIG. 4.

FIG. 5.

FIG. 6.

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WATCH TIMING DEVICE

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2 Claims. (Cl. 73—6)

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This invention relates to timing devices for watches.

An object of this invention is to provide a timing device for watches embodying a light bulb of the neon or gaseous discharge tube type, and a means for flashing the light bulb which is synchronized with the known beat of the balance wheel, so that upon flashing of the light bulb in a correctly timed watch an observed point on the balance wheel will be disposed at the same point when the light flashes so that the balance wheel will appear to stand still, whereas in an inaccurately timed watch an observed point of the balance wheel will not be disposed at the same point when the light flashes occur so that the balance wheel will appear to have movement.

Another object of this invention is to provide a device of this kind which can be easily and quickly adjusted to produce the required beats which are well known in known watches.

In a modified form of this invention the operating mechanism for flashing the light bulb is mounted in a sealed housing having a temperature controlled chamber so that the operating mechanism will be unaffected by atmospheric temperatures or pressures.

With the above and other objects in view, my invention consists in the arrangement, combination and details of construction disclosed in the drawings and specification, and then more particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a diagrammatic view of an electric watch timing device constructed according to an embodiment of this invention,

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1,

Figure 3 is a plan view of a modified form of this invention,

Figure 4 is a sectional view taken in the line 4—4 of Figure 3, showing also the electric circuits associated with the device,

Figure 5 is a sectional view taken on the line 5—5 of Figure 4, showing the circuit closer in circuit closing position,

Figure 6 is a fragmentary sectional view taken substantially on the line 6—6 of Figure 4, showing the weight for the circuit closer in normal position.

Referring to the drawings and first to Figures 1 and 2, the numeral 10 designates generally a switch which is associated with this invention and includes an insulated body 11 having a pair of opposed contacts 12 and 13 mounted therein in spaced relation. A combined pendulum and

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movable circuit closer generally designated as 14 engages between and extends downwardly from the switch 10. The pendulum 14 includes an elongated flexible conductor 15 which is formed of relatively resilient material which is suspendingly supported from a fixed member 16 disposed above the switch 10.

The elongated member 15 has secured to the lower end thereof a weight 17 which comprises a movable armature and is disposed in operative position to an electro-magnetic member 18 having a core 19. The switch 10 is adjustably supported for adjustment lengthwise of elongated member 15 by means of a screw or bolt 20 which is rotatably carried by a fixed support 21.

The screw or bolt 20 is threaded into the body 19 so that rotation of the screw or bolt 20 will effect vertical adjustment of the switch 10 and thereby effect regulation of the oscillation of the weight 17. The contact member 12 is connected to one side of the electro-magnetic member 18 by means of a conductor 22, and the other side of the electro-magnetic member 18 is connected by a conductor 23 to a source of constant electric potential 24 which may be in the form of a battery or the like.

The pendulum supporting member 16 is connected to the other side of the supply source 24 by means of a conductor 25, and an electrical discharge condenser 26 is interposed in the conductor 25. Contact 13 is connected by a conductor 27 to one side of the primary 28 of a transformer 29. The other side of the primary 28 is connected by a conductor 30 to the conductor 25 between the condenser 26 and the battery or supply source 24.

The transformer includes a secondary 31 which is connected at the opposite ends thereof by conductors 32 and 33 to a light bulb 34 which may be in the form of a gaseous discharge tube and a reflector 35 is correlated with the tube 34 so as to reflect and confine the light rays to a predetermined point.

In the timing of a watch, the watch W is placed beneath the light bulb 34 in a position where the light rays will strike the balance wheel B. The light rays from the bulb 34 will constitute the only means whereby light is admitted to the balance wheel in order that when this wheel is oscillating a predetermined spot or point on the wheel may be indicated and this spot correlated with the making and breaking of the electric circuit by means of a pendulum 14.

As shown in Figure 1, the electro-magnetic member 18 is slightly offset from the vertical

plane of the pendulum 14 when the latter is at rest. Preferably a switch 36 is interposed in the conductor 23 for regulating the current going to the electro-magnetic member 18.

Referring now to Figures 3 to 6 inclusive, there is disclosed a modified form of this invention. An insulated and sealed housing generally designated as 37 is formed of a cylindrical side wall 38 and top and bottom walls 39 and 40 respectively. The housing 37 also includes a cylindrical inner member 41 comprising an inner housing for the switch or circuit maker and breaker, as will be hereinafter described. The inner housing 41 has disposed therein a switch member generally designated as 42 which is adjustably supported by means of an adjusting screw 43, rotatably carried by the top wall 39. The switch member 42 includes an insulated body 44 having secured therein a pair of opposed contact members 45 and 46.

The body 44 also has mounted therein a pair of opposed stop members 47 and 48. A pair of electro-magnetic members 49 and 50 are disposed in the chamber 51 which is formed between the inner housing 41 and the outer housing 38, and the electro-magnetic members 49 and 50 include cores 52 and 53 respectively which project through the wall of the housing 41.

A weight 54 which may be of non-magnetic characteristic is suspendingly supported within the inner housing 41 from an elongated resilient strap 55 which is secured at its upper end to a supporting member 56 carried by the top wall 39. The strap 55 extends through a central opening 57 in the body 44, and the lower end of the strap 55 is fixed relative to the weight 54 by means of an opposed pair of screws 58 and 59 which form armatures for the electro-magnetic members 49 and 50.

A supporting member 56 is connected by means of a conductor 60 which extends through the top wall 39 to one side of an electrical supply source 61 in the form of a battery or the like. An electrical discharge condenser 62 is interposed in the conductor 60, the purpose for which will be hereinafter described. The other side of the battery 61 is connected by a conductor 63 to one end of the electro-magnetic member 49, and the other end of the electro-magnetic member 49 is connected by a conductor 64 to one end of the electro-magnetic member 50. The other end of the electro-magnetic member 50 is connected by a conductor 65 to contact 46.

Contact 45 is connected by a conductor 66 to one side of the primary 67 of a transformer 68. The other side of the primary 67 is connected by a conductor 69 to conductor 60 between condenser 62 and battery 61. The transformer 68 includes a secondary 70 which has the opposite ends thereof connected by conductors 71 and 72 to a light bulb 73 of the gaseous discharge type.

A reflector 74 is correlated with the bulb 73 for confining and directing the light rays toward the balance wheel B of a watch W, disposed beneath the bulb 73. The outer housing 37 is adapted to be heated for maintaining an even temperature within the inner and outer housing by means of a heating element 75 disposed in the chamber 51 and connected at one end thereof by conductor 76 to an electric supply source which may be independent of the battery 61. The other end of the heating element 75 is connected by a conductor 77 to a thermostat 78 also disposed in the chamber 51, and a conductor 79 connects the other side of the supply source for the heating element 75 to the thermostat 78.

In the use and operation of this timing device, the device shown in Figures 1 and 2 which is a simple form of this invention, is operated as follows. A watch which is known to be correctly timed is placed beneath the light bulb 34 so that the balance wheel B will receive its light from the bulb 34. The pendulum 14 is set in operation by closing of switch 36 and manually displacing the pendulum until the strip 15 contacts the contact 12, a circuit will then be closed to electro-magnetic member 18 thereby swinging the armature or weight 17 to the left as viewed in Figure 1. At this time the electric circuit is completed from contact 12 through resilient strip 15, supporting member 16, and conductor 25, to charge condenser 26. When the pendulum 14 swings in the opposite direction or to the right, and resilient member 15 engages contact 13, the primary circuit to transformer 29 will be closed through conductor 27 on one side and conductor 25, condenser 26, and conductor 30 on the other side and the condenser 26 will discharge.

Closing of the primary circuit to transformer 29 will cause a flashing of the light bulb 34, and the timed flashing of bulb 34 with observing of a specified or particular point on the balance wheel B will bring the specified point on the balance wheel B at the same spot in the flashing of bulb 34 every time the pendulum 14 swings back and forth. The effect of this is to create the illusion that the balance wheel B is standing still. When this occurs the pendulum 14 is correctly timed with respect to the accuracy of the timed watch so that another watch of the same beat of the balance wheel can be placed beneath the light bulb 34. If the second watch is inaccurately timed, observance of a particular spot on the balance wheel will indicate that such spot will be at a different point at substantially every oscillation of the balance wheel, giving the impression of movement of the balance wheel rather than the effect of the balance wheel being stationary.

The hair spring of the watch is then adjusted so that the balance wheel will oscillate correctly, and when the observed point appears to stand still at every flashing of the bulb 34, the second watch will be accurately timed.

The structure shown in Figures 3 to 6 inclusive will operate in substantially the same manner as that in Figures 1 and 2, with the exception that the pendulum will oscillate about a vertical axis. In addition, the structure shown in Figures 3 to 6 inclusive is not subject to variations in temperature and atmospheric pressures as the outer housing 37 may be sealed to eliminate variations in pressure and the thermostat 78 will maintain a predetermined constant temperature within the device. When the circuit is closed from battery 61 by closing of switch 80 which is interposed in conductor 63, and weight 54 is manually placed in oscillation, band or strap 55 will be twisted and at one point will engage contact 45 and will also engage stop 48. When the circuit is closed to contact 45 by engagement of strap 55 therewith, a circuit is completed to discharge condenser 62 and primary 67 will be energized thereby effecting a flashing of light bulb 73. On the opposite oscillation of weight 54, strap 55 will engage contact 46 and stop 47 and will close a circuit to the electro-magnetic members 50 and 49 and to the condenser 62 to charge the latter.

I do not mean to confine myself to the exact details of construction herein disclosed, but claim all variations falling within the purview of the appended claims.

What I claim is:

1. A flash producing means for a watch timing device comprising electro-magnetic means, a movable armature, means suspending said armature adjacent the electro-magnet means whereby the armature will be moved in at least one direction when said electro-magnetic means is energized, an electric circuit having a source of electrical potential connected with said electro-magnetic means, a switch interposed in said circuit, said suspending means constituting a circuit closer connected with said switch, a light circuit connected with said switch and said suspending means, a light in said light circuit, movement of said suspending means in one direction closing said first named circuit and movement of said suspending means in the opposite direction closing said light circuit, and a condenser having one side connected between both of said circuits with the opposite side thereof connected with said suspension means for alternate connection in each of said circuits, said condenser being charged at the time said first named circuit is closed and the charge of said condenser constituting the electric source for said light circuit when the latter is discharged by closing thereof by said armature to thereby effect a flashing of said light bulb.

2. A flash producing means for a watch timing means comprising an electric circuit, an electro-magnetic member interposed in said circuit, an oscillating armature disposed for movement adjacent said member, a resilient suspension member for said armature connected to said circuit, a contact carrier engaging loosely about said

suspension member, support means adjustably supporting said carrier whereby to regulate the oscillation of said armature, a contact carried by said carrier connected to said circuit and engageable by said suspension member upon movement of the latter in one direction whereby to close said circuit, a light circuit connected to said suspension member, a second contact carried by said carrier connected to said light circuit and disposed in opposed relation to said first contact whereby movement of said suspension member in the opposite direction will effect closing of said light circuit, a condenser connected between said circuits and constituting the energy source for said lighting circuit, closing of said first named circuit effecting a charging of said condenser, and closing of said light circuit effecting a discharge of the energy in said condenser, and a light bulb in said light circuit, discharge of said condenser by said first named circuit lighting said bulb.

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