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TIMER FOR ELECTRICALLY OPERATED DEVICES

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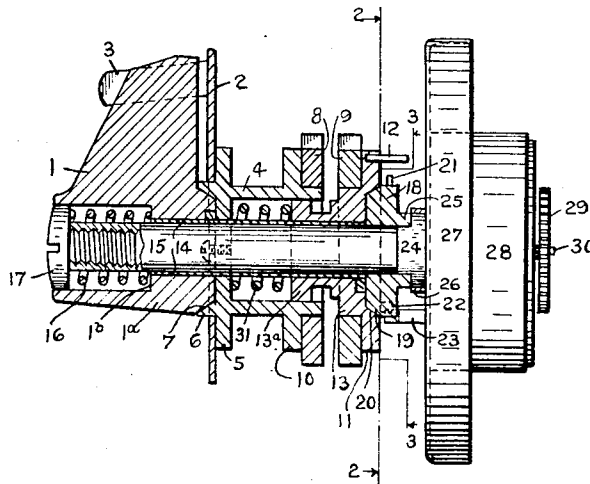


Fig-1

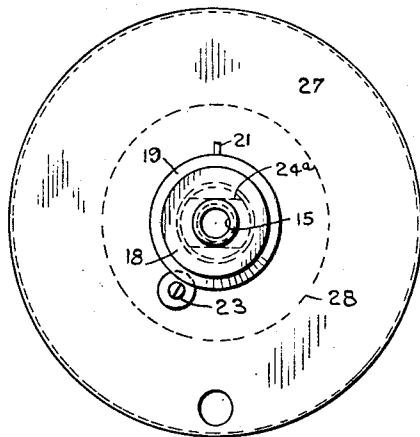


Fig. 2

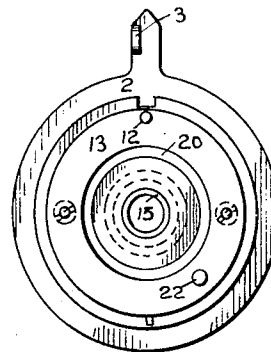


Fig 3

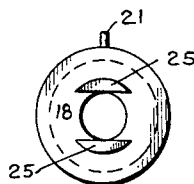


Fig. 4

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UNITED STATES PATENT OFFICE.

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TIMER FOR ELECTRICALLY-OPERATED DEVICES.

Application filed February 2, 1926. Serial No. 85,413.

The improvements relate to mechanism for timing the operation of electrical and electrically controlled devices and are in the nature of improvements in the mechanism of my application for Letters Patent of the United States Serial No. 708,740 filed April 24, 1924. In the said application means for winding the spring of the clock movement comprising a clutch which will permit the spring to be wound by the operation of a handle or the like until the spring is fully wound are shown. If the winding handle in that mechanism is turned around the dial in counter clockwise direction, after being turned in clockwise direction to wind the spring, the spring will remain wound to an extent corresponding with the clockwise movement of the handle, and will be further wound if the handle is turned back and then turned clockwise again, so that the spring will be wound on each clockwise turning of the handle until it is fully wound, when the clutch will slip and prevent winding. In the present improvements, the handle is so arranged and connected that it winds the spring only when the spring is unwound to a point where a lug or the like on the winding shaft will engage a lug connected with the handle, the indicator levers being otherwise frictionally operated as long as the clock is wound more than the requirements of the position of the indicator handle. In other words, the indicator handle positively engages and winds the spring mechanism only when it is not wound or rotated to a sufficient extent to return the indicator handle to "home" position, but does not wind it at all if it has been previously wound, as where the indicator handle has been turned wholly or partly around the dial in clockwise direction and turned back again by hand. This arrangement insures a sufficient winding to return the indicator to normal or "home" position at all times, and at the same time insures against over winding, restricting the maximum winding of the spring to one revolution of the handle.

The improvements are illustrated in the accompanying drawings, in which—

Fig. 1 is a vertical longitudinal section of timing mechanism embodying the improvements, the actuating spring being enclosed

in a casing shown in elevation, and the clock movement being omitted;

Fig. 2 is a vertical cross section on the line 2—2 of Fig. 1 looking in the direction indicated by the arrows, but showing the parts 15 and 18, in end elevation;

Fig. 3 is a similar section on the line 3—3 of Fig. 1, looking in the direction indicated by the arrows but omitting the part 18; and

Fig. 4 is a back elevation of the part 18 and parts integral therewith.

The parts not shown or described herein are substantially the same in construction and operation as the corresponding parts shown and described in the said application, to which reference is made for a full illustration and description thereof.

The winding indicator handle 1 is keyed on a hollow spindle 14 on the opposite end of which is keyed a collar 13 carrying a horizontally extending pin 12 for moving certain contact arms, and another horizontally extending pin 22 both pins extending rearwardly from the rear face of said collar. The pin 22 is adapted when the arm 1 is rotated clockwise to come in contact with the pin 21 projecting from the periphery of the disk 18 locked on the butt 24 of the winding post 15, and thereby to wind the spring (not shown) of the clock movement in the casing 28. If the arm 1, however, is turned a full clockwise revolution both pins 21 and 22 will be stopped by contact with the stop 23 fixed on and extending from the stationary flanged disk 27, and the winding movement of the arm thus checked. If now the arm is released the clock movement will return it to home position, causing it to travel through a complete circle, which in the present mechanism will require twelve hours. Completing the circle, and reaching home position, the electric circuit will be broken by the arm through suitable mechanism, shown in said application, and the electrically controlled cooking or other operation stopped.

The disk 2 with its operating indicator arm 3 is loosely mounted on the spindle 14 between the collar 13 and the hub 1* of the handle 1, and is adapted to be rotated by the said hub through the beveled surfaces 6 and 7 on sleeve 4 carrying disks 2 and 7 on the hub, forming a friction clutch which

is held by the compression spring 31 strung on the spindle 14 and compressed between the extension 13^a of the collar 13 and the disk 5 on the end of the sleeve 4. Rings 8 and 9 fixed on the sleeve 4 and collar 13 respectively operate the electrical contact arms to make and brake the circuit, as shown and described in the said application, these rings being secured to the flanges 10 and 11 respectively. With this arrangement, the indicator handle 3 may be set to start the operation after a lapse of any desired time, and on reaching home position, and the indicator handle 1 to stop the operation after the lapse of an additional period and on reaching home position—all as set forth in said application—the arm 3 and its connected mechanism being rotated toward home position by the hub of the arm 1 through the said friction clutch.

As a full revolution of the arm 1 will very rarely be required, and as the period represented thereby is the maximum period during which operation will be automatically maintained, the winding of the spring to the extent produced by one revolution is the maximum that can be attained by the present mechanism. In most cases the period will be less than half the maximum. Therefore, when the indicating arm or handle 1 is moved less than a full revolution the spring will be wound to a corresponding extent, and only sufficient to move the said arm to its home or stopping position. If, however, the arm has been previously turned beyond that point and turned back manually it will not wind the spring at all, as the pin 22 will not rotate far enough to come in contact with the pin 21. If the spring is partly wound, but not to the extent desired, the pin 22 will engage the pin 21 when it has reached the point corresponding with the winding of the spring and wind the spring to the desired additional extent.

The frictional connection between the shaft 15 and the indicator handle 1 is through the spring 16 sprung on the shaft and held under compression between the head of the screw 17 and the bottom shoulder 1^b of the recess of the hub handle. The shaft 15 is hollow, and is interiorly threaded at its outer end, to receive the threaded shank of the head 17. As this connection is stronger than the frictional clutch, the handle 1 may be moved toward home position, under the influence of the main spring after the starter arm 3 has reached a home position and been checked. If the pin 21 on the disk 18 is in engagement with the pin 22 on the collar 13, in fixed relation to the indicator handle 1, it will move the said handle in counter clockwise direction until the handle is stopped at its home position, but if the spring has been wound to a point which carries the pin 21 beyond the pin 22

the frictional engagement between the shaft 15 and the said handle, through the spring 16, will cause it to move in that direction.

The disk 18 is keyed on the butt of the shaft 15 by means of the lugs 25 on opposite sides of the central opening of the disk through which the shaft 15 passes, the flat sides of these lugs engaging the flat sides 24^a of 24. In order that the indicator handle 1 may be moved in both directions without winding or unwinding the spring when the pins 21 and 22 are not in contact, the beveled surfaces 19 and 20 of the disk 18 and collar 13, respectively, are so arranged that they slide freely one on the other. The large fixed disk 27 has an annular flange 26 through which the butt 24 of the shaft 15 passes, and the shaft may be secured to the spring within the casing 28 in the usual manner, and on the opposite projecting end of this shaft is a ratchet wheel 29 to hold the wind of the spring. A main shaft 30 extending therefrom is provided to connect the same with suitable chronometer mechanism for accurately timing the unwinding movement of the spring and the resulting counter clockwise movement of the indicator handles 1 and 3 and their connected mechanism propelled thereby.

What I claim is:

1. In a device of the character described, a shaft adapted to rotate to wind and to be oppositely rotated on the unwinding of a spring device, means connected with said shaft for measuring and indicating the winding and unwinding movement thereof, connecting devices between said shaft and said means permitting independent movement of said means with respect to said shaft, a part in rigid relation to said means and another part in the path of rotation of said first part in rigid relation to said shaft.

2. In a device of the character described, a shaft adapted to rotate to wind and to be oppositely rotated on the unwinding of a spring device, means connected with said shaft, for measuring and indicating the winding and unwinding movement thereof, connecting devices between said shaft and said means permitting independent movement of said means with respect to said shaft, a part in rigid relation to said means, another part in the path of rotation of said first part in rigid relation to said shaft and a fixed stop in the path of one of said members.

3. In a device of the character described, a shaft adapted to rotate to wind and to be oppositely rotated on the unwinding of a spring device, means connected with said shaft for measuring and indicating the winding and unwinding movement thereof, connecting devices between said shaft and said means permitting independent movement of said means with respect to said

shaft, a part in rigid relation to said means, another part in the path of rotation of said first part in rigid relation to said shaft, and a fixed stop in the path of both of said members.

4. In a device of the character described, a shaft adapted to be rotated to wind and to be oppositely rotated on the unwinding of a spring device, means connected with said shaft for measuring and indicating the winding and unwinding movement thereof, connecting devices between said shaft and said means permitting independent movement of said means with respect to said shaft, a part in rigid relation to said means, another part in the path of rotation of said first part in rigid relation to said shaft, a second means for measuring and indicating the rotary movement of said shaft movable thereon.

5. In a device of the character described, a shaft adapted to be rotated to wind and to be oppositely rotated on the unwinding of a spring device, means connected with said shaft for measuring and indicating the winding and unwinding movement thereof, connecting devices between said shaft and said means permitting independent movement of said means with respect to said shaft, a part in rigid relation to said means, another part in the path of rotation of said first part in rigid relation to said shaft, a second means for measuring and indicating the rotary movement of said shaft movable thereon and movable with respect to the first-named indicating and measuring means.

6. In a device of the character described, a shaft adapted to be rotated to wind and to be oppositely rotated on the unwinding of a spring device, means connected with said shaft for measuring and indicating the winding and unwinding movement thereof, connecting devices between said shaft and said means permitting independent movement of said means with respect to said shaft, a part in rigid relation to said means, another part in the path of rotation of said first part in rigid relation to said shaft, a second means for measuring and indicating the rotary movement of said shaft movable thereon and movable with respect to the first-named indicating and measuring means, said second indicating means being connected with the shaft through said first indicating means.

7. The combination of a spring actuated and spring winding shaft, a member rigidly connected to rotate therewith, a second member connected to rotate therewith, a connection between said shaft and said second member permitting relative movement of

the latter thereon, a member rigidly connected with said second member, said first member on the shaft being in the path of rotation thereof, a third member mounted on said shaft and movable therewith, a connection therefor permitting movement of said third member relative to all of the other members and contact devices carried by each of the said second and third members, whereby the said second member may be moved to rotate the shaft in winding direction and both second and third members may be moved by said shaft separately and simultaneously in unwinding direction.

8. The combination of a spring winding and spring actuated shaft, a device for indicating the winding and unwinding movement of said shaft, a sleeve on said shaft upon which said indicating member is fixed, a second member for indicating the movement of the shaft, a sleeve surrounding said shaft and said first-named sleeve upon which it is mounted, and positive means connecting said shaft with one of said indicating members for rotating said shaft in winding direction.

9. The combination of a spring winding and spring actuated shaft, a device for indicating the winding and unwinding movement of said shaft, a sleeve on said shaft upon which said indicating member is fixed, a second member for indicating the movement of the shaft, a sleeve surrounding said shaft and said first-named sleeve upon which it is mounted, positive means connecting said shaft with one of said indicating members for rotating said shaft in winding direction and a flexible connection between one of said members and said shaft permitting said shaft to move said member in unwinding direction and permitting said member to move on the said shaft in both directions.

10. In a device of the character described, a rotary winding shaft, means for indicating circumferentially the extent of movement of said shaft within 360 degrees, means associated with said indicating means for moving said shaft in winding direction comprising a fixed member on said last means and a fixed member on said shaft in the path of rotation thereof, a clutch connection between said last member and the shaft permitting movement of the former by the latter in unwinding direction, and a stop limiting the rotary movement of all said parts within 360 degrees.

Witness my hand this 29th day of January, 1926, at the city of Milwaukee, in the county of Milwaukee, State of Wisconsin.

EDWIN A. RUTENBER.