Aug. 3, 1943. E. O. THOMPSON 2,325,812

CLOCK CONTROLLED MECHANISM

Filed Sept. 6, 1941

Fig. 1.

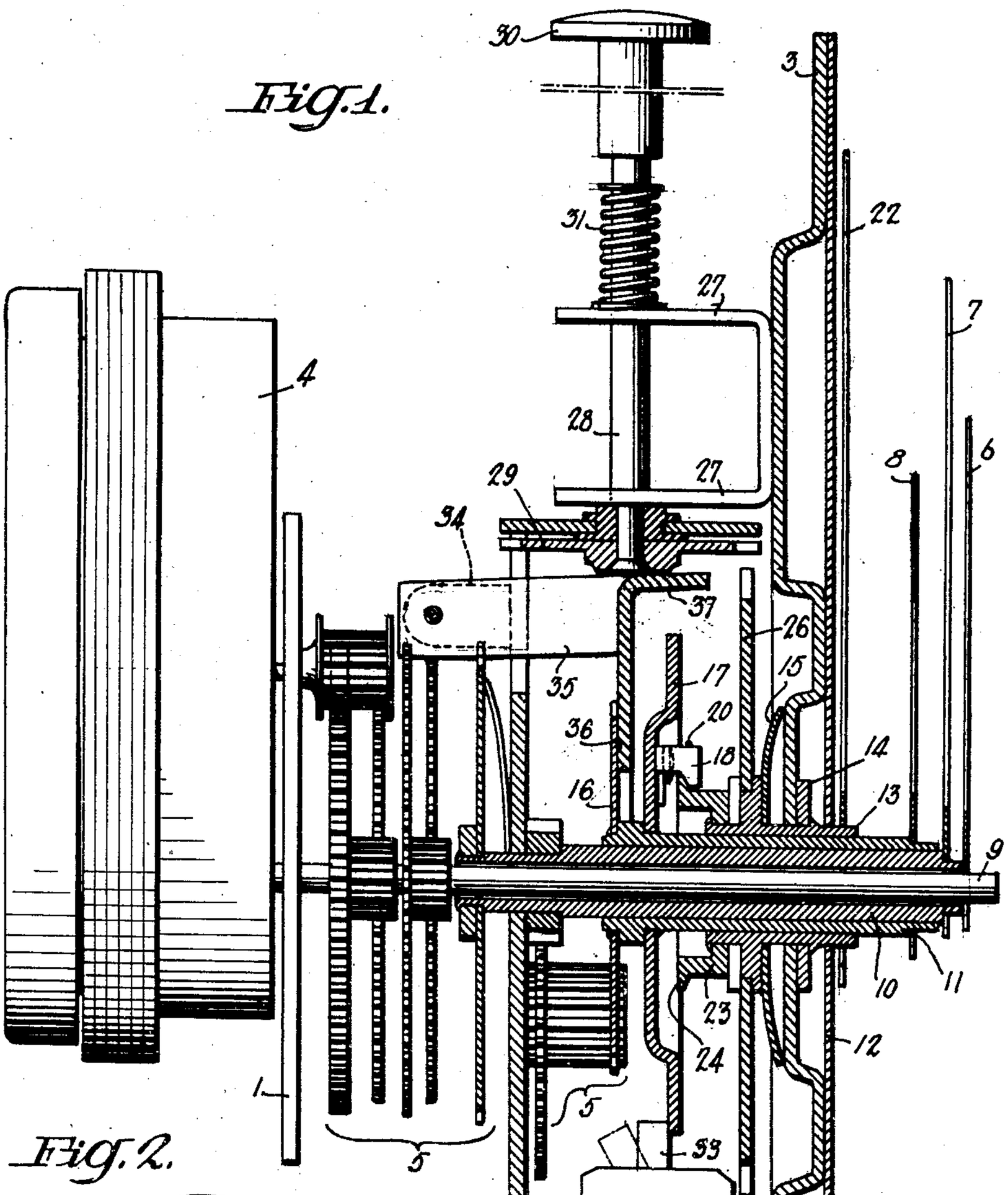


Fig. 2.

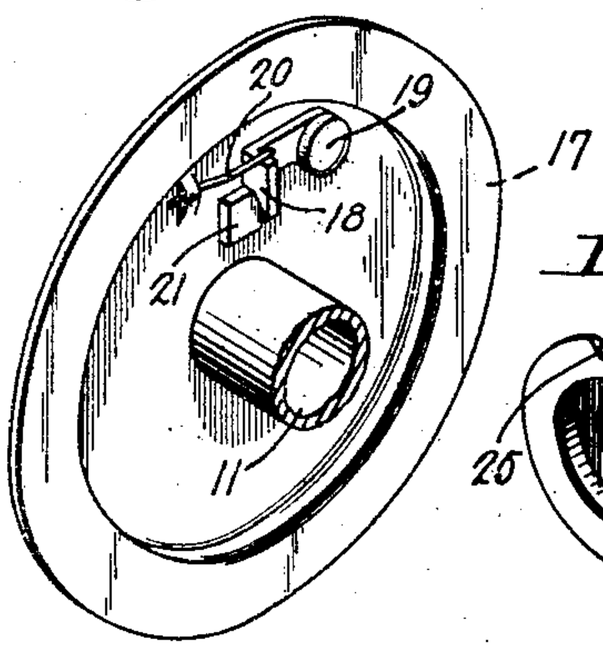
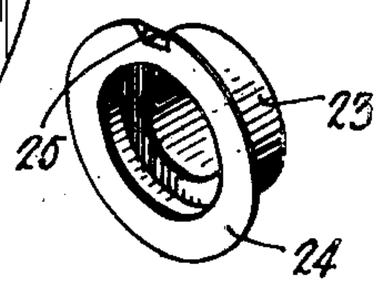


Fig. 3.



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Patented Aug. 3, 1943

2,325,812

UNITED STATES PATENT OFFICE

2,325,812

CLOCK CONTROLLED MECHANISM

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Application September 6, 1941, Serial No. 409,886

6 Claims. (Cl. 200—39)

This invention relates to clock controlled switch mechanisms and more particularly to the class of such devices in which an electrical switch is arranged to be opened or closed at a predetermined time by a clock mechanism. Devices of this type are particularly applicable to the control of electrical apparatus such as radio receivers, stoves and the like.

In prior devices of this type, considerable confusion among users of the devices has resulted from difficulties attending the setting of the device for operation at a particular time. Many prior devices have been so objectionable in this respect that they have been discarded soon after being purchased.

The primary object of the present invention is to provide a clock controlled switch mechanism in which the actuation of a single control manual serves to condition the switch for automatic operation at a desired time, as well as to select the desired time of operation.

A further object of the invention is to provide a clock controlled switch mechanism having a single control manual which is adapted to actuate a two-position switch from a first position to a second position and, if desired, also to adjust the mechanism so as to vary the time setting, which determines the time when the switch will be moved from the second position to the first position by a clock mechanism.

Another object of the invention is to provide a switch control mechanism of the above type having a single control manual adapted for both translational and rotary movement to effect, respectively, the presetting of the device for operation and adjustment of the time setting, thus conditioning the device for automatic actuation of the switch at a preset time.

These and other objects of the invention will be clearly understood from a consideration of the accompanying drawing, in which

Fig. 1 is a sectional view taken vertically through mechanism embodying one form of the invention;

Fig. 2 is a perspective view of one part of a latch unit employed in the device of Fig. 1; and

Fig. 3 is a perspective view of the associated part of the latch.

In the drawing, there is shown a clock mechanism assembled on a frame comprising parallel plates 1, 2, and 3 which are suitably secured together in fixed relation by studs (not shown). On plates 1 and 2 there are mounted a suitable electric motor 4 and gears 5 which are cooperatively arranged to rotate a second hand 6, a minute hand 7, and an hour hand 8 of a conventional clock by means of the concentric shafts 9, 10, and 11 respectively. 12 represents a section through the clock face. Since only the shaft 11 carrying the hour hand 8 is of particular importance in connection with this invention it is unnecessary to further describe the clock mechanism, for the same may be of any known type provided that the hour hand shaft is adapted to function as hereinafter described.

Shaft 11 is journaled in a rotatable sleeve 13 for rotational and longitudinal movement. Sleeve 13 is itself journaled in plate 3 and is clamped thereto by a washer 14 and a spring 15 positioned on opposite sides of plate 3. Thus shaft 11 and sleeve 13 are each independently rotatable. On the outer end of shaft 11 is the pointer 8 while on the inner end there is secured a gear 16. This gear 16 cooperates with gears 5 to rotate shaft 11 through one revolution in twelve hours as will be understood.

Also secured to shaft 11 adjacent gear 16 is a disc member 17. As best shown in Fig. 2 the disc 17 carries a pivotally mounted pawl 18 which is loosely secured to disc 17 by a shouldered rivet 19 or the like.. Pawl 18 is thus pivoted about an axis formed by the rivet 19 and is movable toward and away from the shaft 11. A light wire spring 20 urges pawl 18 inwardly against a stop 21 carried by disc 17.

Referring again to sleeve 13, on its outer end there is mounted a pointer 22 which is preferably conspicuously colored to distinguish it from the clock hands. The inner end of sleeve 13 carries a cup member 23 (see Fig. 3) which has an annular tapered flange 24. At one place in flange 24 there is provided a notch 25, which is shaped to permit the passage of pawl 18 therethrough as described hereinafter. Also secured to sleeve 13 adjacent the cup member 23 is a large gear 26.

Sleeve 13 and the parts carried thereby are normally stationary but they may be rotated by means of a control manual so as to adjust the angular position of the notch 25 as will be described. As shown, the control manual comprises a mounting bracket 27 having holes to receive a longitudinally movable rod 28. At its inner end rod 28 carries a gear 29, and a knob 30 is secured to its outer end. A spring 31 normally maintains rod 28 in the position shown.

Secured to the plate 3 is an electric switch 32 having an extending control finger 33. Finger 33 is pivotally mounted and is movable between the positions shown to cause actuation of the

switch from an "on" to an "off" position. Finger 33 is spring biased to rotate clockwise as shown in the drawing, and such rotation is opposed by the engagement of finger 33 with the outer edge of disc 17 as shown. Since the switch 32 is a simple two-position switch which is biased to one position, it is unnecessary to illustrate in detail. The shaft 11 is longitudinally movable along its axis by means of a bell crank linkage. Plate 2 has a laterally extending mounting lug 34 for a bell crank 35, one end 36 of which is adjacent gear 16 as shown. Crank 35 has a tail portion 37 which underlies gear 29 and shaft 28 as shown.

To operate the device, the control manual knob 30 must be depressed thereby moving the shaft 28 longitudinally until the gears 26 and 29 become engaged. This movement will also rotate crank 35 so that the end 36 thereof, acting through gear 16, will cause the shaft 11 to slide toward the left as viewed in Fig. 1. Disc 17 will move with shaft 11 and accordingly the pawl 18 will be drawn over the flange 24 so as to seat on the flat side thereof thus retaining disc 17 in the position to which it is moved by the depression of the control manual. Finger 33 of the switch 32 will thus be moved into, and retained in, the position shown by the dotted lines, causing either the opening or closing of switch 32 as desired. When the disc 17 has been rotated by the continuously operating clock mechanism to a position in which pawl 18 is aligned with notch 25, disc 17 is released since the pawl may pass through the notch. The biasing spring of switch 32 then returns the switch to the full line position, moving the disc 17 and shaft 11 to the position shown. Thus the depression of knob 30 conditions the device for automatic operation which takes place at a time determined by the angular position of notch 25.

To adjust the position of notch 25, it is only necessary to rotate the knob 30 when it is depressed. As mentioned above, when knob 30 is depressed the gears 26, 29 become engaged. Hence when knob 30 is rotated while gear 29 is held in engagement with gear 26, the latter is rotated moving sleeve 13, pointer 22, cup 23 and notch 25 to any desired setting. The pointer 22 indicates the time corresponding to the setting of notch 25. For example, if it is desired to set the device for operation at twelve o'clock, the control knob is rotated until pointer 22 is aligned with the twelve o'clock hour mark on the clock face, and the notch 25 will then be so located that the pawl 18 will align itself with the notch when the hour hand 8 reaches the twelve o'clock mark.

The mechanism may be utilized to close or open any electrical circuit at a desired time, and it may be used to control a wide variety of devices. For example, suppose it is desired to turn on a radio receiver at a predetermined time. Switch 32 may be connected in series with the radio receiver's normal power supply. In this instance, the switch will be closed with finger 33 in the full line position and open with finger 33 in the dotted line position. Knob 30 may be depressed, thus moving the disc 17 to open switch 32, and the knob may be rotated to set the pointer 22 and notch 25 in a position corresponding to the time at which switch 32 is to be closed. By this simple manipulation of a single control manual the device will be preset to actuate switch 32 at the desired time, after which switch 32 will remain closed until knob 30 is again depressed.

Other examples of uses to which the device may be put are: visual or audible signaling, in which case the switch 32 may control a signal circuit; timing the operation of heating and cooking devices; controlling the operation of machinery; etc.

Although a single embodiment of the invention has been illustrated, it will be apparent that various modifications and further embodiments are possible.

I claim:

1. In a control device, a switch to be controlled comprising a member movable between two positions and biased to one of said positions, a timing mechanism, a controlling member rotated by said timing mechanism and slidably movable to control said switch member, manual means for sliding said controlling member in a direction to move said switch member to its other position, latching means for retaining said controlling member in its effective position until it has reached a certain point in its rotary cycle, and adjustable means for varying the point at which said latch means releases said controlling member, to thereby effect operation of said switch member at a selected time.

2. In a control device, a switch to be controlled comprising a member movable between two positions and biased to one of said positions, a timing mechanism, a controlling member rotated by said timing mechanism and slidably movable to control said switch member, manual means for sliding said controlling member in a direction to move said switch member to its other position, latching means for retaining said controlling member in its effective position until it has reached a certain point in its rotary cycle, and means operable by said manual means to vary the point at which said latch means releases said controlling member, to thereby effect operation of said switch member at a selected time.

3. In a control device, a switch to be controlled comprising a member movable between two positions and biased to one of said positions, a timing mechanism, a shaft rotated by said timing mechanism and slidably movable relative to said switch member, a controlling member carried by said shaft, manual means translationally movable for sliding said shaft and the controlling member carried thereby in a direction to cause said controlling member to move said switch member to its other position, latching means operable to retain the controlling member in the position to which actuated by said manual means until said member has reached a predetermined point in its rotary cycle, and means operable by said manual means to vary the point at which said latching means releases said controlling member thereby effecting operation of said switch member at a selected time.

4. In a control device, a switch to be controlled comprising a member movable between two positions and biased to one of said positions, a timing mechanism, a shaft rotated by said timing mechanism and slidably movable relative to said switch member, a controlling member carried by said shaft, manual means translationally movable for sliding said shaft and the controlling member carried thereby in a direction to cause said controlling member to move said switch member to its other position, a sleeve journalled on said shaft for relative rotation and sliding movement with respect to the shaft, latching means cooperating between the sleeve and controlling member for retaining the latter in the position to which actuated by said manual means until said member has reached a predetermined point in its rotary cycle, and means providing a mechanical connec-

tion between said sleeve and manual means upon translatory movement only of the latter, said manual means being operable through said mechanical connection to rotate said sleeve and vary the point at which said latching means releases the controlling member thereby effecting operation of said switch member at a selected time.

5. In a control device, a switch to be controlled comprising a member movable between two positions and biased to one of said positions, a timing mechanism, a shaft rotated by said timing mechanism and slidably movable relative to said switch member, a controlling member carried by said shaft, manual means translationally movable for sliding said shaft and the controlling member carried thereby in a direction to cause said controlling member to move said switch member to its other position, a sleeve journalled on said shaft for relative rotation and sliding movement with respect to the shaft, latching means cooperating between the sleeve and controlling member for retaining the latter in the position to which actuated by said manual means until said member has reached a predetermined point in its rotary cycle, a gear carried by said sleeve, a second gear carried by said manual means and arranged to mesh with the first gear upon translatory movement of said manual means to slide said controlling member, said manual means being rotatable to rotate said gears and the sleeve to vary the point at which said latching means releases the controlling member thereby effecting operation of said switch member at a selected time.

6. In a control device, a switch to be controlled comprising a member movable between two positions and biased to one of said positions, a timing mechanism, a shaft rotated by said timing mechanism and slidably movable relative to said switch member, a controlling member carried by said shaft, manual means translationally movable for sliding said shaft and the controlling member carried thereby in a direction to cause said controlling member to move said switch member to its other position, a sleeve journalled on said shaft for relative rotation and sliding movement with respect to the shaft and having a flange portion adjacent said controlling member, latching means carried by the controlling member and cooperable with said sleeve flange to retain said controlling member in the position to which actuated by said manual means until said member has reached a predetermined point in its rotary cycle, a gear carried by said sleeve, a second gear carried by said manual means and arranged to mesh with the first gear upon translatory movement of said manual means to slide said controlling member, said manual means being rotatable to rotate said gears and the sleeve to vary the point at which said latching means releases the controlling member thereby effecting operation of said switch member at a selected time.

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