Jan. 25, 1949. P. O. GIBSON 2,459,876

ADJUSTABLE TIME INTERVAL CONTROL DEVICE

Filed Oct. 18, 1945 2 Sheets-Sheet 1

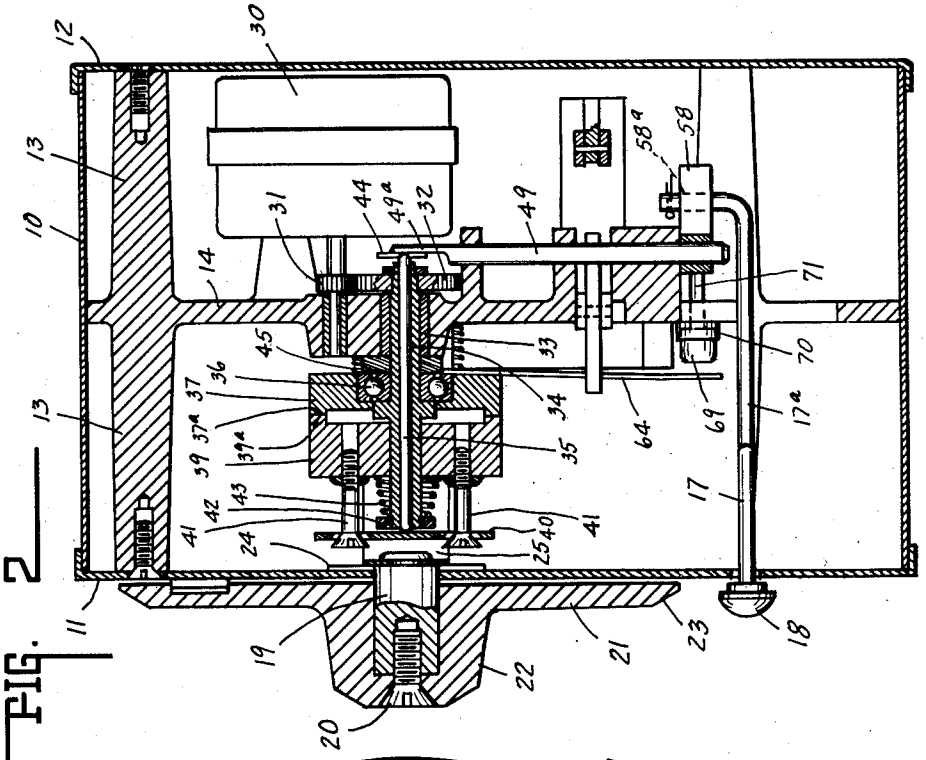

FIG. 2

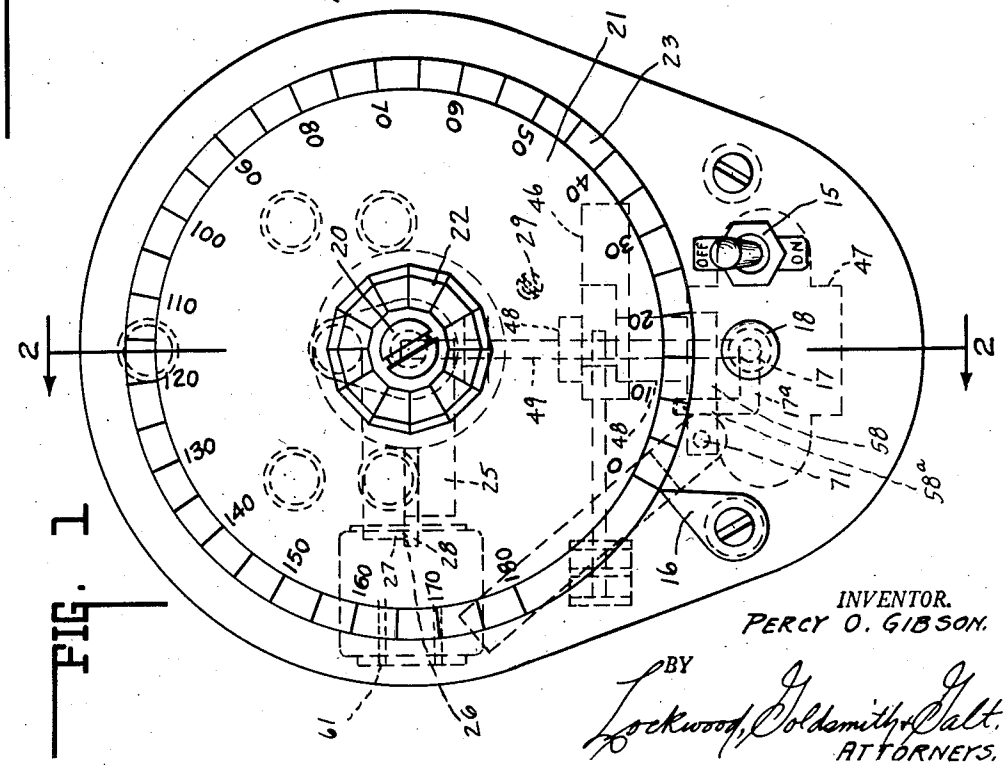

FIG. 1

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FIG. 3

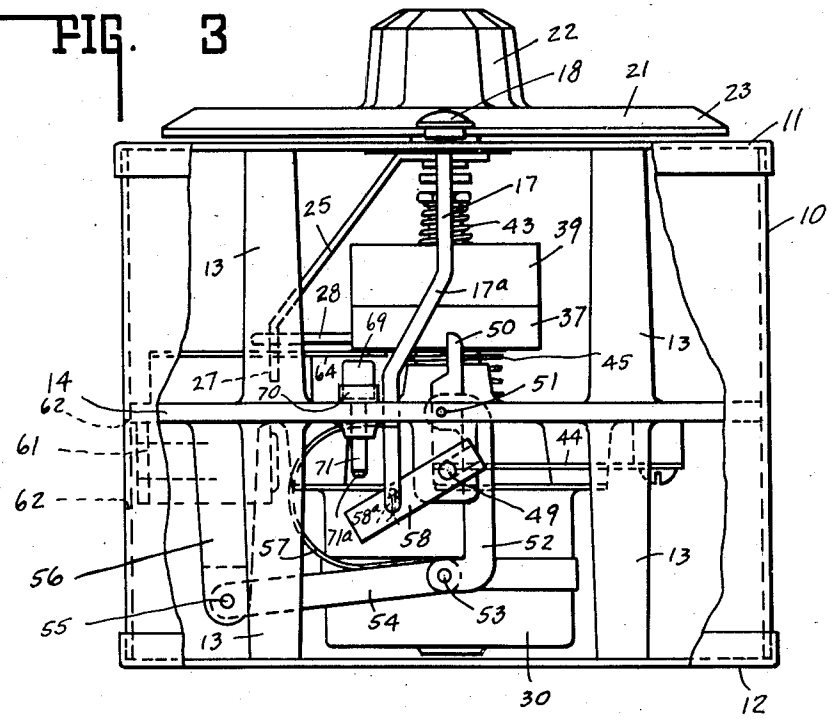
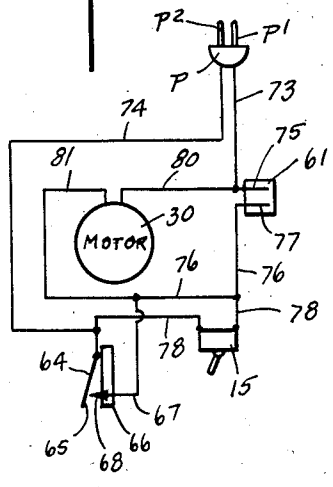


FIG. 4



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ADJUSTABLE TIME INTERVAL CONTROL DEVICE

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2 Claims. (Cl. 161—1)

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This invention relates to an adjustable timing device.

The chief object of this invention is to provide a timing device which can be set (within the range of same) and is repeatedly actuatable to control repetitiously an electric circuit for a predetermined selected interval within that range.

The chief feature of the present invention resides in providing a manually settable control for interval determination and associating same with a motive power source and an electric circuit to be controlled, whereby the latter is energized (or deenergized when desired by a reverse control) for the predetermined period only, the start of such period being determinable at will.

This invention is peculiarly applicable as a photographic timer, although not necessarily restricted thereto.

Other objects and features of the invention will be set forth more fully hereinafter.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings Fig. 1 is a plan view of the control and actuating face of the timer embodying the invention.

Fig. 2 is a central sectional view of the same and is taken on line 2—2 of Fig. 1 and in the direction of the arrows.

Fig. 3 is an elevational view with a portion of the casing removed to illustrate other parts more fully.

Fig. 4 is a wiring diagram of the electrical circuits employed.

In the drawings 10 indicates an enclosing sheet metal casing having its opposite edges confined within inwardly directed confronting peripheral flanges on front plate 11 and back plate 12. Same are suitably secured as shown to the oppositely directed posts 13 carried by base plate 14, said base plate, front plate and back plate having the same configuration or outline. Herein the posts are illustrated as integral with the base plate.

Herein face plate 11 mounts an "on and off" snap switch 15 and an indicator or pointer 16. Also reciprocable through said plate is rod 17 mounting on its exposed end the push button member 18.

A shaft 19, see Fig. 2, extends through said front plate and suitably secured thereto at 20 is a dial wheel 21 having finger engageable hub 22 and legended peripheral face 23, the legending being indicated in seconds. Obviously, when longer intervals are desired, the legending and

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power train (to be described) will be suitably modified to fulfill that object.

Suitably secured to the casing exposed end of shaft 19 is plate 24 with rearwardly directed angling arm 25 having the notch 26, see Fig. 1, in the transverse portion 27 thereof for forming an adjustable stop. Pin 28, power rotatable, normally bears against this stop, the position of which is angularly adjusted by setting dial 21. Extending from base plate 14 toward the front plate is stop 29 limiting power rotation of pin 28 to prevent overrunning, although such stop may be omitted if desired.

A synchronous motor 30 has pinion 31 driving gear 32 on shaft 33 carried by base plate 14 through which the shaft projects. This shaft is tubular as at 34 and slidably supports plunger rod 35 exposed at both ends.

Rotatably supported, as at 36, upon said shaft 33 is the collar or plate 37 that carries pin 28. Adjacent said collar is a similar one 39, the two collars having engageable clutch faces 37*a* and 39*a*. A plate 40 is secured by means of adjusting screws 41 to collar 39 and overlies the forward end of rod 35 exposed by tubular shaft 33.

Tubular shaft 33 mounts stop 42 and interposed between same and collar 39 is spring 43. The other end of rod 35 is exposed rearwardly of base plate 14 and terminates in an end portion bearing on flat spring member 44 to which reference will be had hereinafter. Whenever rod 35 is projected forwardly through spring 44, plate 40 is projected forwardly as well as collar 39 in opposition to spring 43 tending to effect clutching between faces 37*a* and 39*a*. Therefore, it is unnecessary to have the motor 30 start from any predetermined position.

Thus, if the motor is energized simultaneously with clutching incident to rod 35 moving rearwardly, the motor will instantly cause pin 28 to rotate from zero time and continue rotation for the desired interval.

There is provided a trip having a fixed position as it were the same is engaged by pin 28 for energy cutoff and motor stoppage, etc. Hence, rotation of dial 21 determines the position of stop 28 relative to the trip, and pin 28 is motor moved at motor energization from that selected adjusted starting position to the single trip position. If desired, a light coil spring 45 may return clutch collar 37 and pin 28 to stop 27 when the trip has been pin actuated.

Plate 14 is apertured at 46 and 47. Rod 17 having offset portion 17*a*, see Fig. 2, extends through slot 47. On opposite sides of slot 46 and

upon the rear face of plate 14 are the bosses 48 and rotatably supported thereby is rock shaft 49. Rock shaft 49 has pinned to it a trip arm 50 that projects into the path of pin 28 and is rocked clockwise, see Fig. 3, thereby.

This trip is pivotally connected at 51 to U-shaped link 52 pivoted at 53 to arm 54 pivoted at 55 in rearwardly directed elongated boss 56 on plate 14. A spring 57 normally constrains the arm 54 toward rearward position.

Also carried by the rock shaft 49 is an arm 58 and to the same is pivotally connected the rearward end of rod 17 at 58a. When the button 18 is depressed, see Fig. 3, arm 58 is rotated counterclockwise and so is shaft 49 and trip 50. Thus trip 50 is projected upwardly and forwardly of plate 14 through aperture 46 for pin 28 engagement. The linkage is such that an over-center toggle-like action results whereby the trip is retained in projected position and rod 17 is retained in the depressed position. When the trip is tilted, this over-center action is reversed and spring 57 becomes effective to further and quickly retract trip 50 and project rod 17.

Reference will now be had to plunger 35 and member 44. The two are constantly engaged and the latter comprises a leaf spring suitably carried by the rear face of base 14. Shaft 49 aforesaid, see Fig. 2, terminates adjacent this engagement and has a flatted face 49a. When the shaft 49 is rocked by rod 17, the flat face 49a is exposed to spring 44 so that plunger 35 may move rearwardly. When the arcuate portion is presented by trip release, plunger rod 35 moves toward the front.

Carried by the front plate 11 is snap switch 15. Carried by the base plate 14 is female plug socket 61 and casing 10 is apertured at 62 to expose same for connection to an electrically operable device, such as a photo-printing lamp or other device not shown, the duration of operation of which is to be controlled.

Also carried by plate 14 and on the forward face thereof and in insulated relation thereto as at 63 is a current conducting spring finger 64 with special contact 65. Adjacent thereto in insulated relation as at 66 is current conductor 67 with special contact 68 juxtapositioned to contact 65.

Finger 64 herein is extended and its free end bears on insulation cap 69 carried by cup 70 on stem 71 slidable through plate 14 and having its free rearward end 71a juxtapositioned to the free end of arm 58.

When rod 17 is out or up, cap 69 is held in forward or up position, and there is an open circuit between contacts 65 and 68. When, however, the rod 17 is pushed rearwardly, arm 58 tilts counterclockwise and the spring force in finger 64 forces the cap rearward, since arm 58 is no longer in the way.

This action is such in extent that the cap 69 appreciably clears the end of the finger 64 when the contacts 65 and 68 are engaged.

Reference will now be had to Fig. 4 wherein the control and power circuit is illustrated, and similar numerals indicate similar parts. A conventional terminal plug P has prongs P1 and P2 and line 73 from prong P1 leads to one terminal 75 in female socket 61. Another line 74 leads from prong P2 to spring finger 64. A line 67—76 leads

from contact 68 to the other terminal 77 in the female socket 61.

Obviously, when switch 65—68 is closed, current is supplied to socket 61. A line 78 shunts this switch but has included therein snap switch 15. By this switch the operativeness of the load associated with socket 61 and to be controlled by the device can be ascertained without imposing the time control feature thereon.

If the load be a photo-printing device, the light can be kept lit by switch 15 for negative positioning, etc. and other adjustments of parts, etc.

In shunt with load outlet 61 by lines 80 and 81, but protected by switch 65—68, is motor 30. Whenever the load socket is live by reason of switch 65—68, the motor 30 will be energized. When switch 65—68 is open, motor 30 will not be energized.

While the invention has been illustrated and described in great detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character.

The several modifications described herein as well as others which will readily suggest themselves to persons skilled in this art, all are considered to be within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. A variable interval control device including in combination a motor, a clutch, an actuator clutch connected to the motor and rotatable thereby, switch means for motor control, means simultaneously effecting clutch operation and switch means operation and operable by the actuator at the expiration of a predetermined interval for motor stoppage and clutch disconnection, a manual initiator for actuating the said simultaneous means, the latter including an over-center holding arrangement, and spring means normally constraining the said simultaneous means to non-clutching and open switch position.

2. A variable interval control device including in combination a motor, a clutch, an actuator clutch connected to the motor and rotatable thereby, switch means for motor control, means simultaneously effecting clutch operation and switch means operation and operable by the actuator at the expiration of a predetermined interval for motor stoppage and clutch disconnection, a manual initiator for actuating the said simultaneous means, the latter including an over-center holding arrangement, and spring means normally constraining the said simultaneous means to non-clutching and open switch position, and return of the manual initiator to non-initiating position.

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