July 13, 1937. S. S. SHELTON 2,086,950

TIME CONTROLLED SWITCH FOR CONTACT PRINTING

Filed March 18, 1936

Fig. 1.

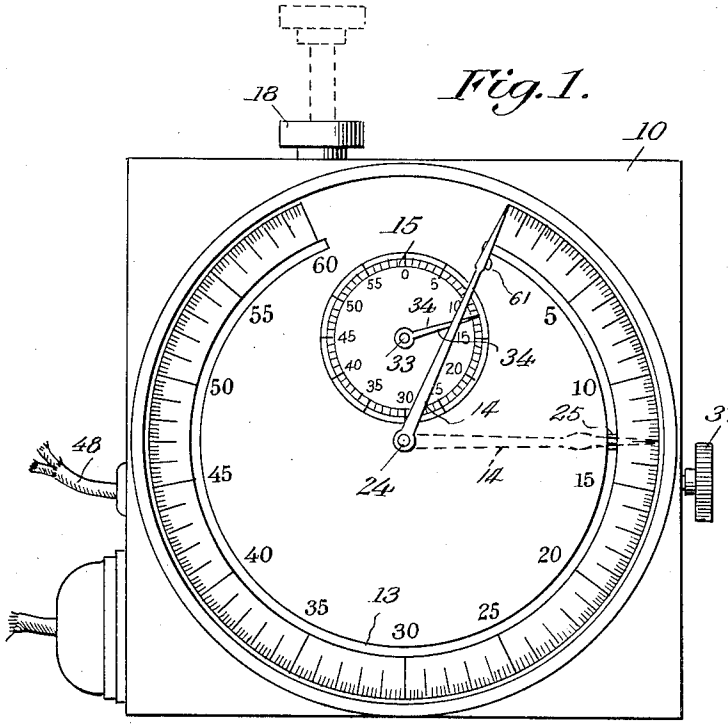


Fig. 3.

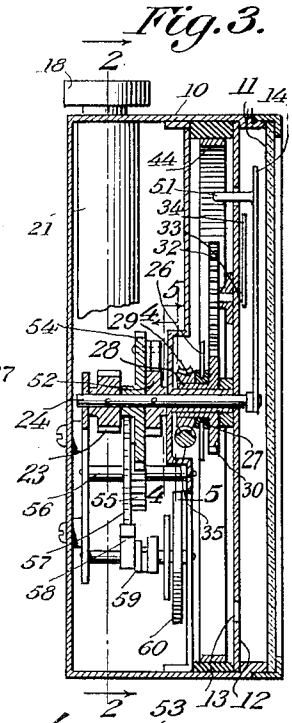


Fig. 2.

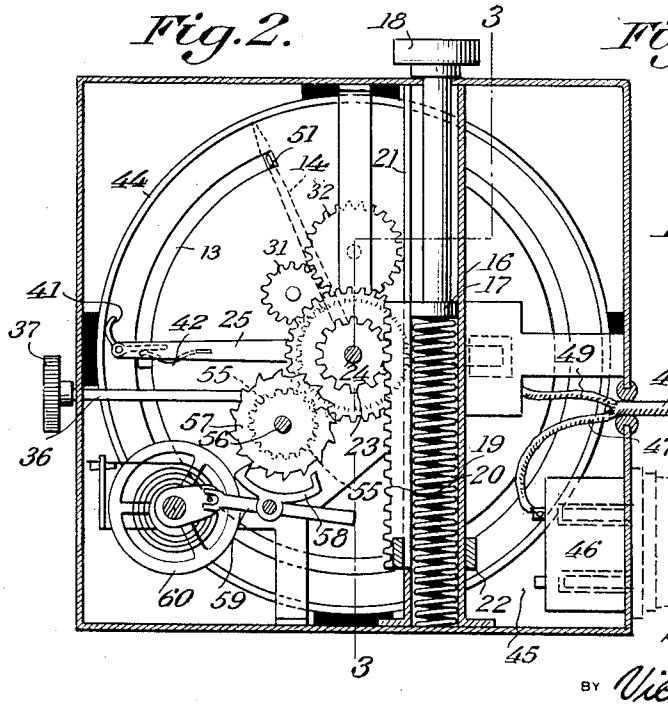


Fig. 4.

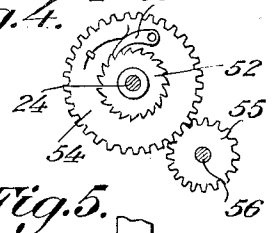


Fig. 5.

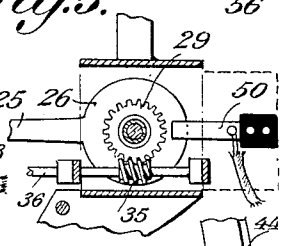
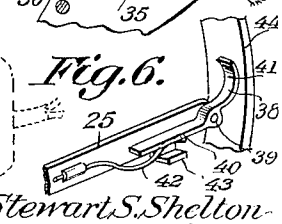


Fig. 6.



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TIME CONTROLLED SWITCH FOR CONTACT PRINTING

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Application March 18, 1936, Serial No. 69,566

3 Claims. (Cl. 200—35)

This invention relates to time switches for controlling photographic printing lamps and has for an object to provide a novel timing mechanism for automatically extinguishing the lamps at the end of the time period that the print must be exposed to the light.

A further object is to provide a device of this character in which the downward thrust of a spring controlled plunger sets the clock hand at the zero or initial starting position, return upward movement of the plunger actuating the clock-work mechanism through the predetermined time period, a projection on the clock hand at the end of such period actuating a circuit breaker on the switch hand to open the light circuit and extinguish the light automatically.

A further object is to provide a device of this character which will be formed of a few strong simple and durable parts, which will be easy to manufacture, and which will not easily get out of order.

With the above and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing forming part of this specification,

Figure 1 is a front elevation of a time controlled switch for contact printing constructed in accordance with the invention.

Figure 2 is a longitudinal sectional view of the device taken on the line 2—2 of Figure 3 and showing the mechanism in rear elevation.

Figure 3 is a cross sectional view of the device taken on the line 3—3 of Figure 2.

Figure 4 is a fragmentary sectional view taken on the line 4—4 of Figure 3.

Figure 5 is a fragmentary sectional view taken on the line 5—5 of Figure 3.

Figure 6 is a detail perspective view of the switch hand and circuit breaker carried thereby.

Referring now to the drawing in which like characters of reference designate similar parts in the various views, 10 designates a casing having a glass closure 11 for the front thereof. A dial plate 12 is disposed in the casing and the front of the plate is graduated by radial division lines to indicate five second time periods throughout one minute, each five second period being subdivided to indicate one second and one-fifth second time intervals. The dial plate is provided with a slot 13 which is concentric with the center of the dial plate, the slot being interrupted at the top by a gap of metal, one end of the gap being the starting point or the zero point of the clock hand 14 and the other end of the gap being the terminal point of the arc of travel of the clock hand.

There is also inscribed on the dial plate a circular series of graduations 15 designating second intervals of time in each five second period throughout a minute, this dial corresponding to the setting dial of the usual and well known alarm clock.

An upright cylindrical housing 16 is mounted in the casing and within the housing a plunger 17 is slidably fitted, the plunger stem extending upwardly to the top of the casing and being equipped with a button 18 by means of which the plunger may be manually moved downwardly against the tension of a helical spring 19 mounted in the bottom of the housing. A rack 20 extends downwardly from one side of the plunger and is movable vertically in a slot 21 formed in the side of the housing, sliding movement of the rack being directed by a circular guide 22 secured to the lower end of the rack and encircling the housing 16.

The rack engages a pinion 23 which is fixed on the arbor 24 of the clock hand 14. Thus when the plunger is pressed downwardly the rack and pinion device moves the clock hand in a counter-clockwise direction to return the hand to initial starting position. Upward movement of the plunger under urge of the spring 19 moves the rack and pinion device to rotate the clock hand in a clockwise direction.

A switch hand 25 is provided with a hub 26, as best shown in Figures 3 and 5, having an insulating ring 27 which is fixed to a loose sleeve 28 to which latter is also fixed a worm gear 29. The sleeve is integral with a gear 30 which constitutes the setting gear of the clock mechanism as will now be explained. The gear 30 meshes with an idle gear 31 which in turn meshes with a gear 32 that is fixed to an arbor 33 which carries a setting hand 34 that is associated with the setting dial 15. A worm 35 actuates the worm gear 29 and is mounted on a shaft 36 which extends outside of the casing and is equipped with a button 37. By manually rotating the shaft 36 the setting hand is turned to indicate any desired time period on the dial 15. The switch hand 25 being fixed to the sleeve 28 turns as a unit with the setting hand 34.

It is now clear that by manipulating the button 37 the predetermined time period for energizing the printing electric lamp will be indicated by the hand 34 of the dial 15 and at the same time the switch hand 25 will be advanced to an angular position on the slot 13 corresponding to the angular position of the setting hand 34.

The switch hand 25 is equipped at the outer end with a switch contact 38 which is pivoted intermediate its ends on the hand, as shown at

39 in Figure 6, the inner end 40 of the contact being substantially straight and the outer end 41 being curved. A spring 42 fixed to the hand bears against the straight end of the contact and holds the curved end of the contact against a circular switch contact 44 which is fixed to the casing and insulated therefrom, as best shown in Figure 3. A stop 43 limits movement of the contact.

The circular contact 44 is connected by a wire 45 to one terminal of a socket 46, which may accomodate any standard plugs from lights or from a printing cabinet, as best shown in Figure 2. The other terminal of the socket is connected to one wire 47 of an electric current supply cable 48. The other wire 49 of the cable is terminally connected to a brush 50 which has wiping contact with the hub 26 of the switch hand 25.

To open the lamp circuit just described, it will be seen by referring to Figure 3, that a lug 51 is secured to the rear side of the clock hand 14 and projects through the slot 13. The lug 51 is adapted to engage the straight end 40 of the contact 38 and tilt the contact to disengage the curved end 41 thereof from the circular contact 44, thereby breaking the circuit to the electric light bulbs at the end of the predetermined time limit, as will presently be described.

The timing mechanism comprises a ratchet gear 52 which is fixed to the arbor 24. The ratchet gear is held against retrograde movement by a spring pressed pawl 53 carried by a gear 54 which is loose on the arbor 24. The gear 54 meshes with a gear 55 which is secured to an arbor 56 of an escapement wheel 57 which is engaged by a pawl 58 carried by an oscillating lever 59 which is governed by a spring controlled balance wheel 60.

In operation the setting hand 34 is adjusted by rotation of the button 37 as above described. The switch hand, being movable as a unit with the setting hand, is simultaneously set to occupy a predetermined angular position on the slot 13 of the dial plate and is held locked in set position by the worm 35. Before the plunger is pressed to start the operation the lug 51 is in engagement with the contact 40. At rest the position of the plunger is dependent upon the position of the switch arm 25. The plunger may now be pressed downwardly and then quickly released. During downward movement of the plunger the pinion 23 moves the clock hand 14 counter-clockwise to zero or initial position against a stop pin 61 at the initial end of the slot 13, as best shown in Figure 1. During this downward movement of the plunger the ratchet gear 52 will rotate freely on the gear 54 and will not impart movement to the arbor 24.

When the plunger is released the helical spring 19 expands and moves the plunger upward to rotate the pinion 23 and the arbor 24 to turn the clock hand 14 through the predetermined time period. At the end of the time period the lug 51 will trip the contact 38 and disengage it from the circular contact 44 to break the circuit to the illuminating electric bulb. The pawl 53 locks the ratchet gear 52 to the escapement actuating gear 54 to control rotation of the arbor 24 during upward movement of the plunger and its rack under urge of the spring 19.

Thus it will be seen that rotation of the button 37 sets the switch hand 25 in a predetermined position which position is indicated by the setting hand 34. Thereafter the plunger is depressed to first return the clock hand 14 to its initial starting position at the zero end of the dial scale. When the plunger is released the spring 19 expands and moves the clock hand through the predetermined time period at the end of which the energizing circuit of the electric lamp is automatically broken by the clock hand lug 51 dislodging the switch hand contact 38 from the circular contact 44.

From the above description it is thought that the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

1. A time switch comprising in combination a setting hand, a clock hand, a switch hand, means for manually moving the setting hand and the switch hand simultaneously through a predetermined angular movement, a circular switch contact co-axial with the clock hand and the switch hand, a pivoted spring pressed switch contact on the switch hand having wiping engagement with the circular contact, a pin on the clock hand engageable with the pivoted switch contact to dislodge the same from the circular switch contact and hold the pivoted switch contact in circuit breaking position at the end of a predetermined time interval, clock mechanism for moving the clock hand, a manually operable spring controlled plunger, and a rack and pinion mechanism connected to the plunger for actuating the clock mechanism.

2. A time switch comprising in combination a setting hand, a clock hand, a switch hand, means for manually moving the setting hand and the switch hand simultaneously through a predetermined angular movement, a manually operable plunger, a spring tending constantly to hold the plunger at one limit of movement, a rack and pinion device connected to the plunger and to the clock hand and adapted to move the clock hand counter-clockwise to reset the clock hand at initial starting position when the plunger is moved to compress the spring, clock mechanism for moving the clock hand clockwise during movement of the plunger under urge of the spring, and a circuit breaker having a movable member adapted to be engaged and held by the clock hand in circuit breaking position at the end of a predetermined time interval.

3. A time switch comprising in combination a setting hand, a clock hand, a switch hand, means for manually moving the setting hand and the switch hand simultaneously through a predetermined angular movement, a circular switch contact co-axial with the clock hand and the switch hand, a pivoted switch contact on the switch hand having wiping engagement with the circular contact, a projection on the clock hand engageable with the pivoted switch contact to dislodge the same from the circular switch contact and hold the pivoted switch contact in circuit breaking position at the end of a predetermined time interval, a manually operable plunger, a spring tending constantly to hold the plunger at one limit of movement, means connected to the plunger and to the clock hand for moving the clock hand counter-clockwise to initial starting position when the plunger is moved to compress the spring, and clock mechanism for moving the clock hand clockwise during movement of the plunger under urge of the spring.

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