

Nov. 20, 1923

1,474,342

W. C. ANDERSON

EXPOSURE TIMER

Filed April 1, 1922

2 Sheets-Sheet 1

Fig. 1.

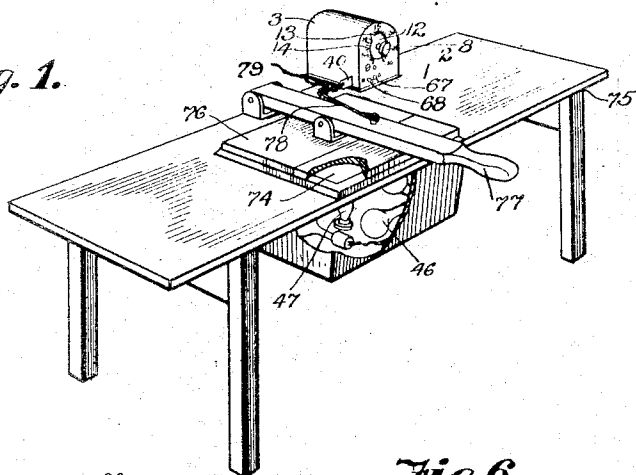


Fig. 5.

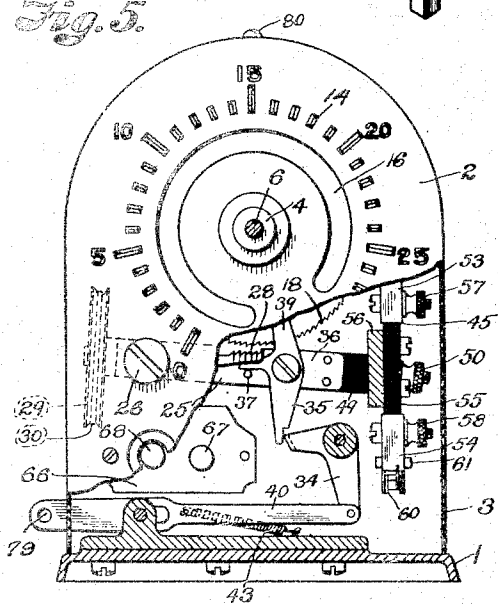


Fig. 6.

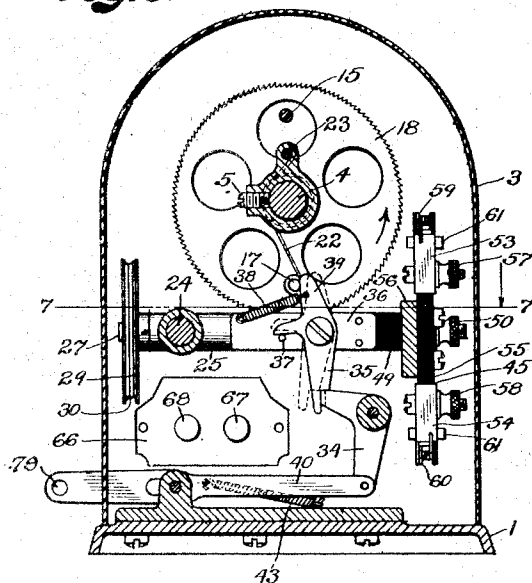


Fig. 7.

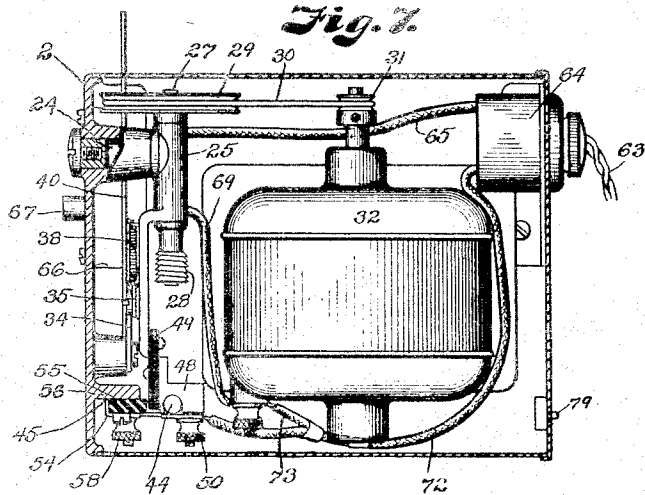
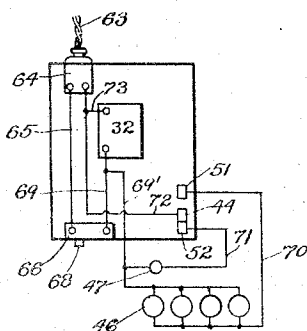


Fig. 8.



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Fig. 2.

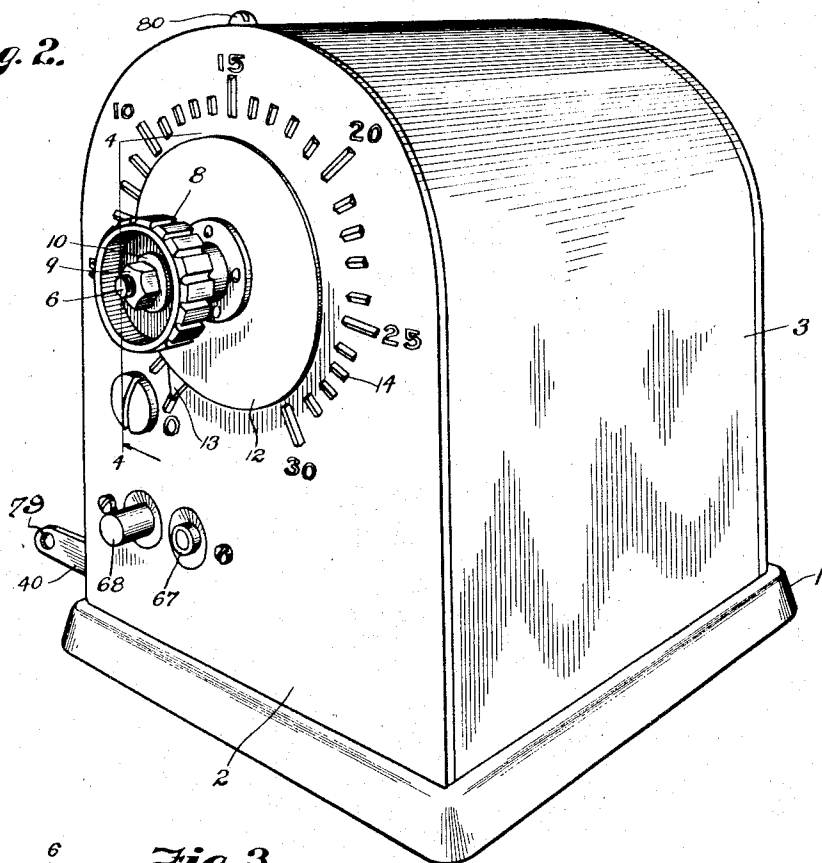


Fig. 3.

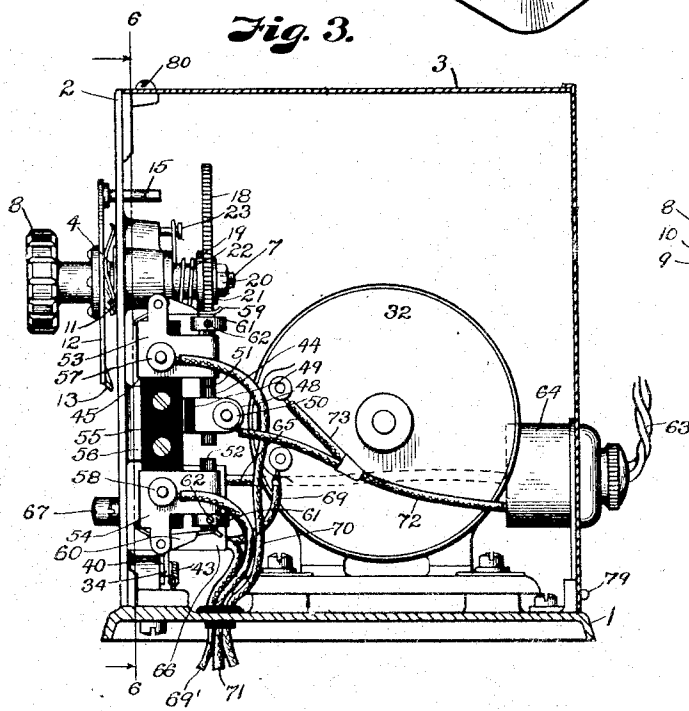
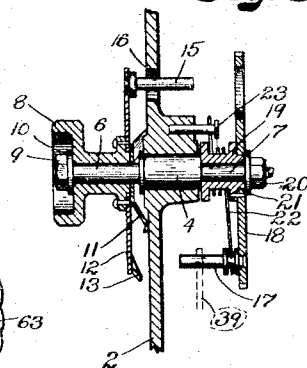


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM C. ANDERSON, OF KANSAS CITY, MISSOURI.

EXPOSURE TIMER.

Application filed April 1, 1922. Serial No. 548,605.

To all whom it may concern:

Be it known that I, WILLIAM C. ANDERSON, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Exposure Timers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to exposure timers and more particularly to a device for controlling the lamps in a photograph printing machine whereby the time of exposure may be made of long or short duration. Modern studios are usually equipped with printing machines for printing photographs from negatives but it is common practice for the operator to time the exposure by watch or his judgment, thus causing lack of uniformity in prints from the same negative and loss of time from mistakes.

It is therefore the principal object of the present invention to provide a simple yet durable mechanism which may be quickly and easily attached to any photograph printing machine whereby the pilot and printing lamps may be illuminated at the proper moment and during the proper interval of time.

Another object of the invention is to provide a setting mechanism which may be set for long or short exposures and which controls a master switch in circuit with the pilot and printing lamps so that the lamps may be flashed on or off according to the position at which the setting mechanism has been set.

In accomplishing these and other objects of the invention I have provided the improved details of structure hereinafter described and illustrated in the accompanying drawings, in which:

Fig. 1, is a perspective view of a photograph printing machine equipped with an exposure timer constructed in accordance with my invention.

Fig. 2, is a perspective view of the exposure timer.

Fig. 3, is a side elevation of the timer, the case and base being in vertical section to clearly illustrate the interior mechanism.

Fig. 4, is a vertical section through the dial taken on the line 4—4 of Fig. 2.

Fig. 5, is a front view of the device, parts being broken away for better illustration.

Fig. 6, is a similar view taken on the line 6—6 of Fig. 3.

Fig. 7, is a plan sectional view on the line 7—7 of Fig. 6.

Fig. 8, is a wiring diagram.

Referring more in detail to the parts:—

1 designates a base preferably of cast material, which supports a front plate 2 and housing 3, all of which are fitted together to support and enclose the operating parts.

Pressed into a boss in the front plate 2 is a shoulder stud 4 which is held in position by a set screw 5 and which has forwardly and rearwardly extending portions 6 and 7.

A knob 8 is mounted so as to turn freely on the portion 6 and is held thereon by a nut 9 and washer 10 in such a manner as to be engaged by a spring washer 11 to prevent the knob from becoming accidentally moved after it is once set. The knob has a disk or cursor 12 secured to its rear face and provided with a finger 13 adapted to cooperate with the scale 14 preferably cast on the front plate 2 and composed of marks corresponding to seconds of time and numerals such as 5—10—15, etc., showing the number of seconds for which the device is set.

The disk 12 carries a pin 15 which projects through an arcuate slot 16 in the front plate 2 and in the path of a similar pin 17 projecting from the worm wheel 18, the latter being fixed to a hub 19 revoluble on the portion 7 of the stud 4 and held in place by a nut 20 and washer 21.

Surrounding the hub is a light coil spring 22, one end of which engages a pin 23 in the front plate and the other end of which engages the pin 17 in the worm wheel so that the worm wheel will be normally returned to initial position with the pin 17 against

the pin 15, it being understood that the pin 15 may be in any one of the several positions depending on the position of the finger 13 with respect to the dial 14.

5 Pivottally mounted on a boss in the front plate 2 is the trunnion 24 of the arm 25 which carries the driving worm, trip and switch mechanisms presently described. The trunnion is held in place by a screw 26, the
10 head of which seats against the outer face of the plate 2 so as to permit the arm to swing freely up or down.

Revolubly mounted in the arm 25 and at right angles to trunnion 24 is a shaft 27
15 which carries a worm 28 at one end and a belt wheel 29 at the other, the latter being connected by means of a belt 30 to the grooved pulley 31 on the motor 32 so that the motor will drive the worm 29. The motor
20 is of the constant speed type and the ratios of the belt wheels are such that the worm 29 will turn at a constant predetermined speed.

The worm 28 lies immediately beneath the
25 worm wheel 18 and normally out of mesh with it as shown in Fig. 5, but may be raised into driving relation therewith by mechanism consisting of a bell-crank lever 34 pivottally mounted on a boss on the front
30 plate 2 and having one end adapted to engage the notched end of a latch lever 35 pivottally mounted on an extension 36 of the arm 25. The lever 35 is held in upright position against a stop 37 by a spring 38 attached to an upwardly inclined arm 39 of the latch 35 which lies in the path of the
35 trip pin 17 of the worm wheel 18. (See Figs. 4 and 6.) The opposite end of the bell-crank lever 34 connects with a link 40 slidably mounted on the front plate 2 and projecting from the housing 3 so that a cable may be attached thereto and to an operative part of the printing machine to
40 operate the timer as will be presently described. A spring 43 extends from the link to the front plate 2 so that the bell-crank is returned to normal position after each operation of the printer.

The extension 36 of the arm 25 also carries the central carbon 44 of an automatic
50 switch 45 which controls the white printing lamps 46 and the red pilot lamp 47 of the printing machine.

The carbon 44 is held in a clamp 48 supported on an insulator 49 on the extreme
55 end of the extension 36 and provided with a binding post 50. The switch also contains upper and lower carbon contacts 51 and 52 respectively which are slidably mounted
60 in metal brackets 53 and 54 rigidly secured to an insulator 55 which is carried by the lug 56 on the front plate 2. The brackets 53 and 54 are provided with binding posts 57 and 58 for attaching the circuit wires
65 and with spring pressed shoes 59 and 60

which bear against the ends of the carbons to hold them in functional position.

Each of the carbons 51 and 52 has a collar 61 provided with a set screw 62 to clamp
70 the collar to the carbon, and limit the movement of the carbon contacts in the brackets 53 and 54; it being understood that there is a slight vertical movement of the upper and lower carbons when the central carbon engages them so as to permit of proper en-
75 gagement or disengagement of the worm and worm wheel and insure a good contact in the switch.

The line wires 63 lead into a service connection 64 from which a wire 65 leads to a
80 hand switch 66 having push buttons 67 and 68 for controlling the circuit. Another wire 69 leads from the hand switch 66 to the motor 32 and thence by a branch wire 69' to one side of the pilot lamp 47 and the
85 bank of white printing lamps 46. A wire 70 connects the opposite side of the white printing lamps to the upper carbon 51 and a wire 71 leads from the opposite terminal
90 of the pilot lamp 47 to the lower carbon 52.

The central carbon 44 connects by a wire 72 direct to the service connection 64 but has a branch wire 73 which leads to the op-
posite terminal of the motor.

With the above described connection it
95 is apparent that when the hand switch 66 is operated the motor will start and the red pilot lamp will be illuminated because the motor is connected directly in the circuit and the central carbon 44 is resting on the
100 lower carbon 52.

With the parts in this position, the operator can place a negative on the glass
panel 74 of the printing machine 75 and arrange sensitized paper in the proper posi-
105 tion by the aid of the pilot lamp 47. As soon as this is done, he lowers the platen 76, against the paper and negative by means of the printing arm 77 and in doing so, pulls the cable 78 which passes through an eye 79
110 on the machine and is attached to the link 40 of the timer so that the link is pulled outwardly from the housing when the printing arm is lowered.

This action rocks the bell-crank lever 34
115 which engages the lever 35 and raises the arm 25, thus meshing the worm 28 with the worm wheel 18 and closing contact between carbons 44 and 51 and breaking contact between carbons 44 and 52. The red
120 light therefore, goes out and the bank of white lights is illuminated so as to print the picture.

As the motor is constantly running the worm wheel 18 will move in the direction
125 of the arrow (Fig. 6) during the printing operation and advance the pin 17 from its position against the stop pin 15 to engagement with the arm 39 of the latch 35, rocking the latter as shown in dotted lines (Fig. 6)
130

and disengaging it from the bell-crank 34 therefore permitting the arm 25 to fall by gravity, disengage the worm from the worm wheel and break the upper contacts 44 and
 5 51. The white lamps are thus extinguished at the proper time and the pilot lamp again is illuminated.

It will be apparent that the time interval will be constant for each operation, but that
 10 the interval can be lengthened or shortened by moving the knob 8 so that the worm wheel 18 will have to move a greater or less distance before tripping the latch 35.

The case 3 is held in position by a pin 79 at the rear of the base and a screw 80 at the
 15 top of the front plate 2, so that the case may be easily removed to expose the parts for lubrication or repair.

It is to be understood that I have described and illustrated the preferred embodiment of my invention and that variations may be made in both operation and
 20 structure without departing from the spirit and scope of the invention.

Having thus described my invention, what I claim as new therein and desire to secure by Letters-Patent is:

1. In an exposure timer, a circuit closer, an arm forming a part of said circuit closer
 30 and mounted for pivotal movement, a latch on said arm, a bell-crank for engaging said latch, a link for actuating said bell-crank, a worm in said arm, a prime mover for driving said worm, a worm wheel adapted for
 35 engagement with said worm at times, and a trip pin on said worm wheel for tripping said latch from said bell-crank for the purpose set forth.

2. An exposure timer comprising a frame, an arm pivotally mounted in the frame, an insulated contact on said arm, insulated contacts on said frame adapted for engagement
 40 by said arm contact, a latch on said arm, a bell-crank on said frame adapted to engage the latch to raise the arm, a link for actuating the bell-crank, a worm revolvably mounted in the arm, a motor for driving
 45 said worm at a constant speed, a worm wheel revolvably mounted on said frame and adapted for engagement with said worm, when said arm is in raised position, a trip pin
 50 on said worm wheel for engaging said latch to release said arm, a dial, a cursor for said dial, a stop pin on said cursor in the path of said trip pin and a spring for moving said trip pin against said stop pin after
 55 said arm is released.

3. An exposure timer comprising a frame, a circuit closer on said frame, an arm pivotally mounted on said frame and adapted to
 60 actuate said circuit closer, a worm revolvably mounted in said arm, a motor for driving said worm, a worm wheel revolvably mounted in said frame, a latch on said arm, manually operated mechanism for engaging said latch

to raise said arm and mesh said worm and worm wheel, a trip pin in said worm wheel for releasing said latch, a dial, a cursor for said dial, a stop pin in said cursor in the path of said trip pin, a knob for
 70 manually moving said cursor and stop pin relative to said trip pin, a spring washer for frictionally holding said cursor in set position and a spring for moving said trip pin against said stop pin after the trip
 75 pin has released said latch and broken said worm and worm wheel connection.

4. In an exposure timer a circuit closer, upper and lower contacts for said circuit closer, a central contact adapted for engaging either upper or lower contacts, means
 80 for manually raising said central contact into engagement with said upper contact, motor driven mechanism for releasing said central contact to engage said lower contact and manually set timing mechanism for
 85 controlling the duration of contact between said central and upper contacts.

5. The combination with a photograph printing machine comprising a printing
 90 arm, of an exposure timer comprising a circuit closer, a link operable from said printing arm for functioning said circuit closer, motor driven mechanism for defunctio-
 95 ntioning said circuit closer and manually set timing mechanism for determining the functional period of said circuit closer.

6. The combination with a photograph printing machine comprising a printing
 100 arm, a bank of printing lamps and a pilot lamp, of a circuit closer comprising upper, lower and central contacts, a service connection having a wire connected with the central contact of the circuit closer and with the
 105 motor, a hand switch, a second wire leading from the service connection to the hand switch, a wire leading from the hand switch to the motor and pilot and printing lamps, a wire leading from the pilot lamp to the lower contact of the circuit closer, a wire
 110 leading from the printing lamps to the upper contact of the circuit closer, means connecting the printing arm with the central contact of the circuit closer to switch said printing lamps into circuit when said print-
 115 ing arm is lowered and means for automatically releasing the central contact of the circuit closer to disconnect said printing lamps and connect said pilot lamp into the circuit.

7. An exposure timer comprising a front plate having an arcuate slot, a graduated dial concentric with said slot, a cursor revolvable over said dial, means for frictionally
 120 holding said cursor, a stop pin on said cursor projecting through said slot, a worm wheel concentric with said cursor, a trip pin on said worm wheel normally lying against said stop pin, a circuit
 125 closer, means for actuating said circuit

closer in one direction, a latch for holding
said actuating means in one position, a
motor for driving said worm wheel to move
said trip pin against said latch and trip
said actuating means and a spring on said
worm wheel for returning said trip pin
against said stop pin.

In testimony whereof I hereby affix my
signature in presence of two witnesses.

W. C. ANDERSON.

Witnesses:

A. L. COMSTOCK,
JOHN N. SPRINK, Jr.