

D. McDONALD.
TIMING DEVICE FOR PHOTOGRAPHIC PRINTING APPARATUS.
APPLICATION FILED JAN. 11, 1912.

1,054,435.

Patented Feb. 25, 1913.

3 SHEETS—SHEET 1.

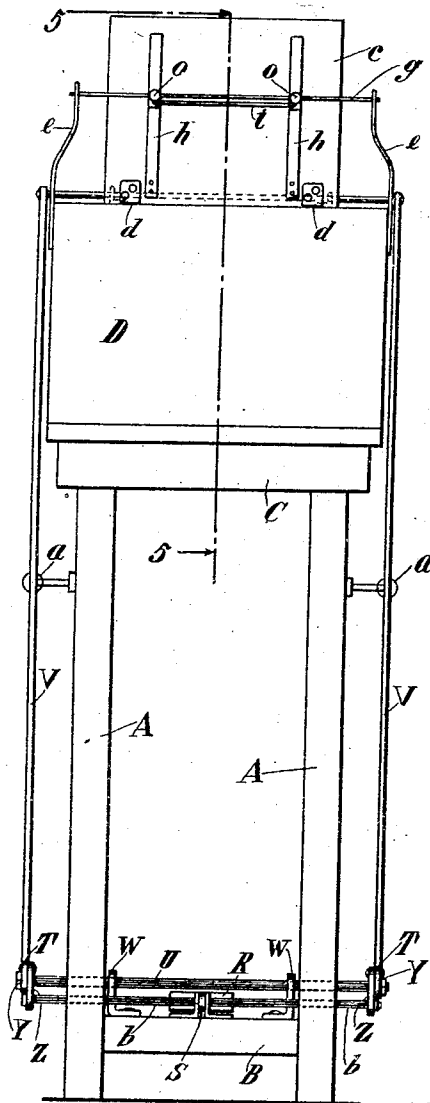


Fig 1

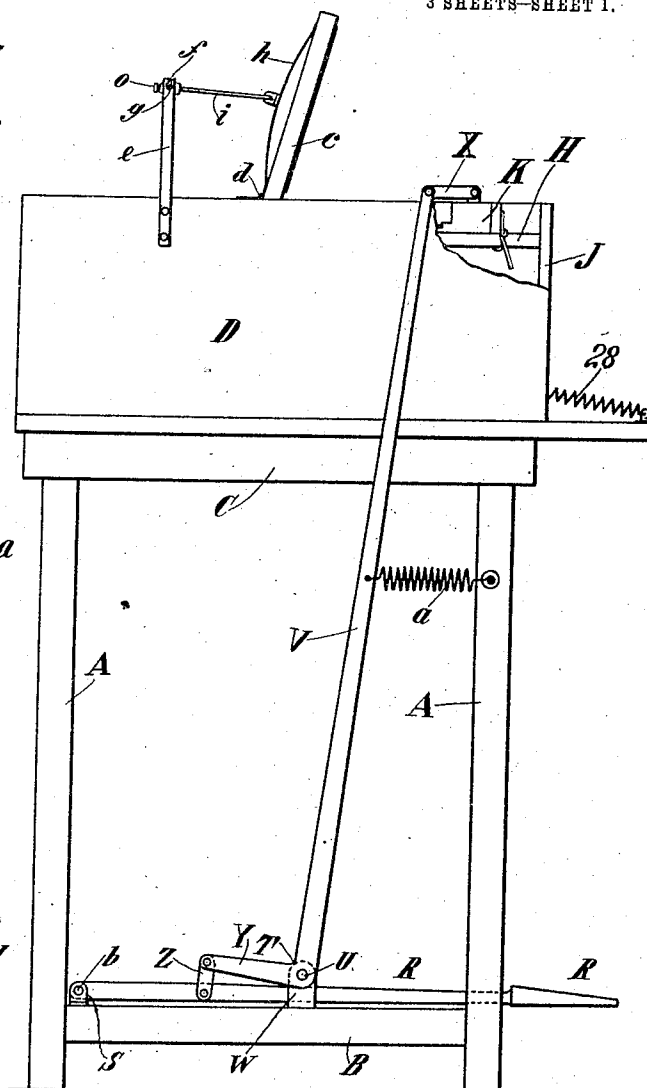


Fig 2

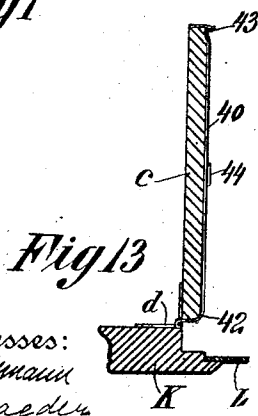


Fig 13

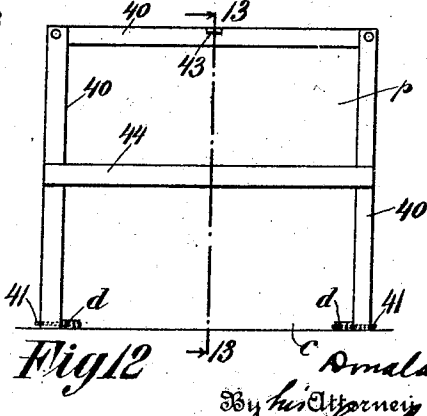


Fig 12

Witnesses:
W. M. Pilmann
S. M. Baeder

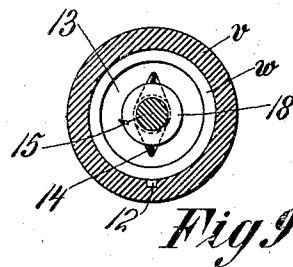
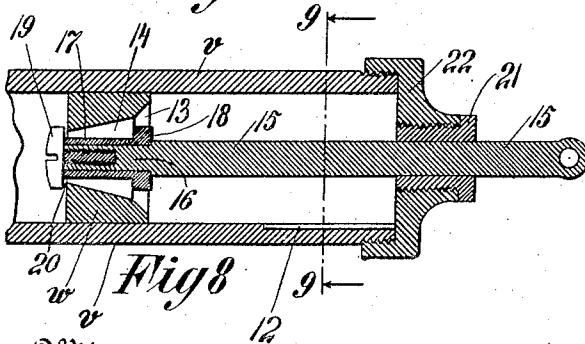
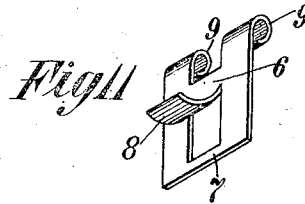
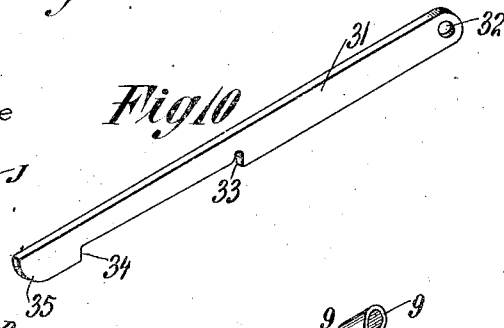
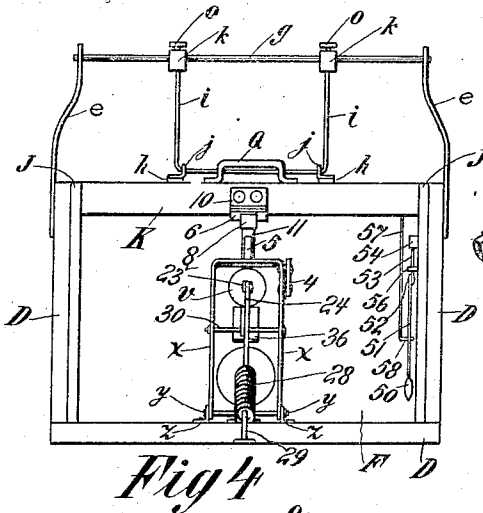
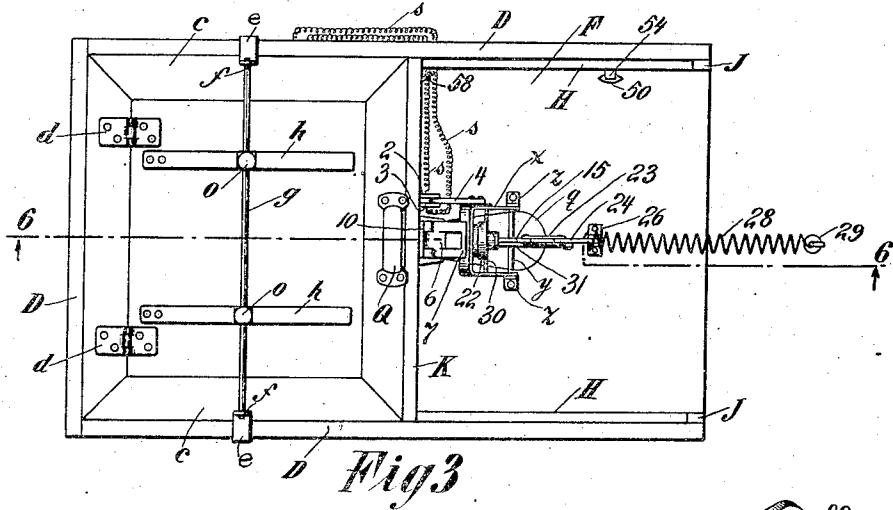
Inventor
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By his Attorney
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3 SHEETS—SHEET 2.



Witnesses:
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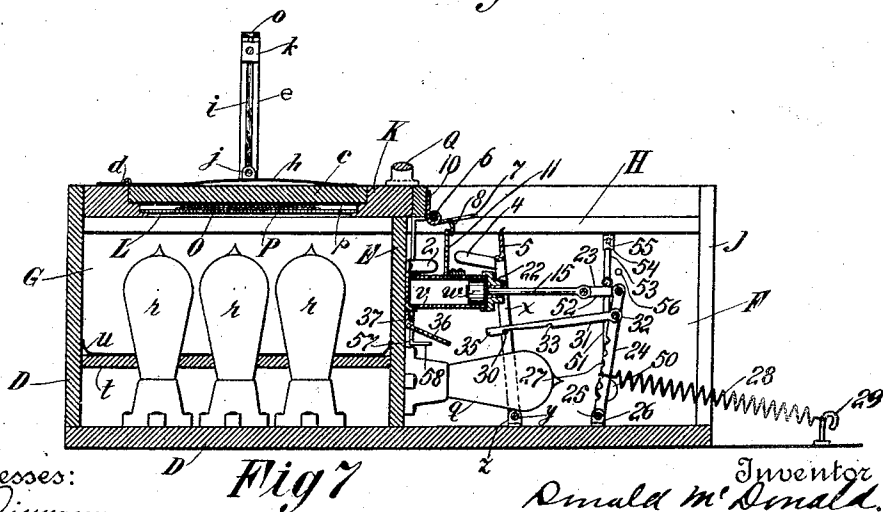
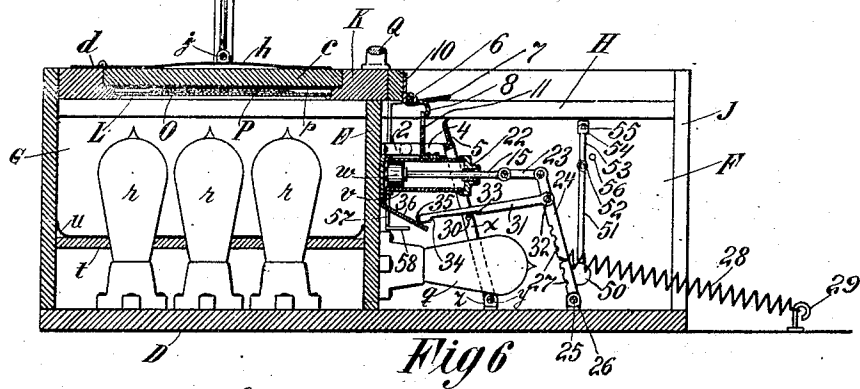
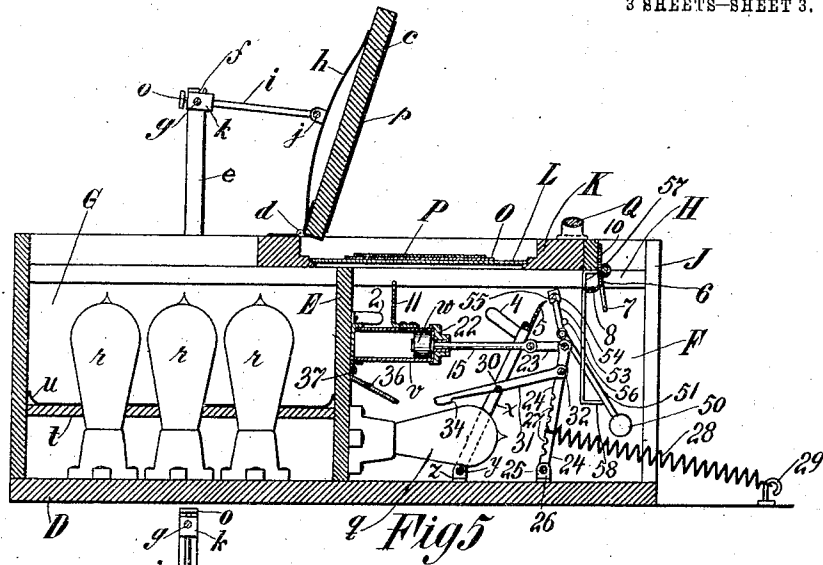
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

DONALD McDONALD, OF NEW YORK, N. Y.

TIMING DEVICE FOR PHOTOGRAPHIC-PRINTING APPARATUS.

1,054,435.

Specification of Letters Patent.

Patented Feb. 25, 1913.

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To all whom it may concern:

Be it known that I, DONALD McDONALD, a citizen of the United States, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Timing Devices for Photographic-Printing Apparatus, of which the following is a specification, accompanied by drawings.

This invention relates to a timing device for photographic printing apparatus, and the objects of the invention are to improve upon such devices, simplify their construction, enable photographs to be more rapidly printed than heretofore, and provide means for automatically timing the exposure.

To these ends the invention consists of the devices described and claimed in this specification and shown in one of its preferred embodiments in the accompanying drawings, in which—

Figure 1 is a rear end elevation of suitable printing apparatus embodying the timing device; Fig. 2 is a side elevation; Fig. 3 is a plan view of the box with the foot power treadle and connections omitted and the printing frame in printing position; Fig. 4 is a front end elevation of Fig. 3. Fig. 5 is a longitudinal sectional elevation on line 5—5 of Fig. 1, with the printing frame in retracted or preparatory position; Fig. 6 is a similar view on line 6—6 of Fig. 3 with the printing frame in printing position; Fig. 7 is a similar view showing the printing frame in printing position with the electrical contacts broken; Fig. 8 is an enlarged detail longitudinal sectional elevation taken through the dash pot of the timer; Fig. 9 is a transverse sectional view on line 9—9 of Fig. 8; Fig. 10 is an enlarged perspective view of the actuating bar of the timer. Fig. 11 is an enlarged perspective view of the setting hook on the printing frame; Fig. 12 is a detail front elevation of the movable platen or cover with an additional modification; and Fig. 13 is a vertical sectional view on line 13—13 of Fig. 12.

Referring to the drawings, A represents the legs or standards and B and C represent the cross pieces of one form of suitable printing apparatus to which my timing device may be connected.

D represents a suitable box or frame di-

vided in this instance by the partition E into two compartments, preferably open at the top. The opening of compartment F may be referred to as the sight opening and the opening of compartment G may be referred to as the exposure opening. The sides of the box or frame D are provided with the guideways H and stops J, upon which guideways a printing frame K is adapted to slide into registry with either one of the compartments F and G. The printing frame as shown is provided with the transparent plate L to receive the negative O on top of which is placed sensitized paper P. By grasping the handle Q the printing frame may be operated by hand. In Figs. 1 and 2, however, I have shown a suitable foot power device for moving the printing frame, preferably comprising the treadle R pivoted at S to the cross piece B. Bell crank levers T are pivoted to the rod U held in the brackets W, and the long arms V of said levers are pivotally connected by the links X to the printing frame K. The short arms Y of the bell crank levers are pivotally connected by the links Z to the treadle R. Suitable retracting springs *a* connect the long arms V to the legs A of the frame, so that by pressing down on the outer end of the treadle R the printing frame K is moved longitudinally on the guideways H and by releasing the pressure, the retracting springs *a* retract the printing frame.

The printing frame is preferably provided with a movable platen or cover *c* hinged at *d* to the printing frame and adapted to open when the printing frame is in register with the sight opening of compartment F, and close when the printing frame is in register with the exposure opening of compartment G. Brackets *e* are mounted at each side of the box D and provided with recesses *f* at their upper ends, having enlarged portions forming bearings for a rod *g*. The platen or cover *c* is preferably provided with springs *h* on its back to which is connected the metal frame *i* as by means of the ears *j*. The ends of the frame *i*, which is preferably U-shaped, are connected to the rod or bar *g* as by means of the clamps *k* having the set screws *o*. Obviously as the printing frame slides on the guideways H the cover or platen *c* will open and close as indicated in the drawings. The platen *c* may be provided with a soft or

padded surface *p* to contact with the sensitized paper *P* and hold the paper and negative in position.

The sight opening of compartment *F* is provided with an electric light *q* emitting non-actinic rays, as a red light, while exposure opening of compartment *G* is preferably provided with a source of light comprising a plurality of electric lights *r* adapted to affect sensitized paper. The lights *q* and *r* are incandescent lamps and the lamps *r* are connected in the lighting circuit *s*, a portion of the wires of which only are shown in Fig. 3, it being understood that these wires *s* extend into the box or frame and connect the lamps *r* with a suitable source of energy. The wires *s* as shown terminate at the switch contacts 2 and 3 preferably arranged on the partition *E*. Means are provided controlled by the printing frame *K* for energizing the lamps *r*, when said frame is in registry with the exposure opening, and means are also provided for automatically timing the exposure of the printing frame at the exposure opening, so that the lights *r* are automatically extinguished or deenergized after the proper interval of time. The interval of time for the exposure may be predetermined and varied at will, according to whether or not a long or a short exposure is required. A horizontal partition *t* is preferably provided in the exposure compartment *G* having a reflecting surface *u* for increasing the intensity of the light.

The timing device is indicated more especially in Figs. 3 to 10 inclusive, and referring to these figures, *v* represents a dash pot having a movable member preferably in the form of a plunger *w* of any suitable material, preferably graphite, so constructed that the plunger has a quick forward stroke and a slow return motion. The slow return stroke of the plunger *w* controls the breaking of the lamp circuit *s*, thereby terminating the exposure. The dash pot *v* may be conveniently secured to the partition *E* and the timing apparatus is preferably located in the sight chamber *F*.

x represents a switch arm preferably in the form of an inverted *U* pivoted on the rod *y* held in the brackets *z* and provided with the insulated switch contact 4 adapted to contact with the contacts 2 and 3. A projection 5 extends from the upper portion of the switch arm *x* and is adapted to be engaged by the setting hook or trip 6 having the loop 7 and the hook 8. This setting trip is pivoted by means of the bends or loops 9 to the bracket 10 on the printing frame *K*. A stop 11 is mounted on the dash pot *v*.

The dash pot embodies the cylinder having the longitudinal recess 12 at its outer end extending for a distance slightly greater than the width of the plunger *w*, for a purpose hereinafter to appear. The plunger *w*

is recessed at 13 and provided with the elongated tapering opening 14 extending through the plunger. The plunger rod 15 has a reduced end 16 over which is fitted a sleeve 17 having the head 18 of slightly less diameter than the greatest diameter of the opening 14. The sleeve 17 is held on the plunger rod as by means of the screw 19, the head of which is slightly larger in diameter than the orifice 20 in the plunger *w*. The distance between the inner surface of the head 18 and screw head 19 is slightly greater than the depth of aperture 14, so that the plunger *w* has slight play on the sleeve 17. The plunger rod 15 passes through the gland 21 secured in the cylinder head 22. With the construction described, it is obvious that as the plunger moves forward from the position of Fig. 5 to the position of Fig. 6, air may pass freely from in front of the plunger to the rear through the opening 14. As the plunger rod 15 is retracted from the position of Fig. 6 to the position of Fig. 7, the screw head 19 closes the orifice 20 and air cannot pass freely through the opening 14, except the amount due to leakage around the screw head 19 and for this reason the plunger *w* travels slowly backward, in the cylinder *v*, until the plunger arrives opposite the slot 12 in the wall of the cylinder, which permits air to pass freely from one side to the other of the plunger and the remaining short portion of the backward stroke is accomplished quickly, at a time necessary to quickly snap open the contact 4 and break the circuit of the lamps *r*.

The plunger rod 15 is pivotally connected by a link 23 to the outer end of a lever 24 pivoted at 25 to the bracket 26 and provided with notches 27 engaging the retracting spring 28, one end of said spring being held stationary by the hook 29. The switch arm *x* is provided with the pin 30 and an actuating bar 31 is pivoted at 32 to the lever 24. This actuating bar is provided with the notch 33, and the hooked end 34 has the rounded surface 35 adapted to ride up on the inclined surface 36 formed by the bracket 37 attached to the partition *E*.

The operation of the parts is as follows: Assuming that the printing frame *K* is in retracted position substantially as indicated in Fig. 5, in which said frame is shown in the act of being retracted by hand or foot power, and has not quite reached the end of its travel. In normal position the frame will register with the sight opening of compartment *F*. The normal or inoperative position of the timing apparatus is as shown in Fig. 5, with the switch arm *x* retracted and the actuating bar 31 in the position shown with the notch 33 engaging the pin 30. As the printing frame *K* is moved into registry with the exposure opening of compartment *G*, the loop 7 on the setting trip 6

first engages the extension 5 on the switch arm x and moves said arm forward, carrying the contact 4 into contact with the switch blades or contacts 2 and 3. The hook or toe 8 of the setting trip 6 abuts against the stop 11 and raises the loop 7 out of engagement with the extension 5, as indicated in Fig. 6, leaving the timing apparatus in readiness for the retracting movement. The engagement of the actuating bar 31 with the pin 30 carries the lever 24 and the plunger w forward into the position indicated in Fig. 6, until the rounded end 35 of the actuating bar rides up on the inclined surface 36, thus releasing the actuating bar from engagement with the switch arm x . With the parts in the position indicated in Fig. 6, the spring 28 exerts a pull upon the lever 24, which pull is resisted by the tendency to create a vacuum in front of the plunger w . The vacuum is slowly broken by leakage around the screw head 19 and the piston slowly travels backward in the cylinder v , since air may also escape from the cylinder between the gland 21 and the plunger rod 15. The notch 33 is maintained out of engagement with the pin 30, because of the inclined surface 36 upon which the end of the actuating bar 31 bears, as indicated in Fig. 6, and in the course of the backward movement of the actuating bar the hooked end 34 will engage the pin 30 and as the plunger w completes its stroke, the switch arm x will be pulled backward and the contact 4 will be snapped out of engagement with the contacts 2 and 3, so that the parts will assume the position indicated in Fig. 7, thus terminating the exposure. As the printing frame K is retracted, the loop 7 of the setting trip 6 engages the extension 5 on the switch arm x and restores the setting mechanism to the position indicated in Fig. 5, at which point in the movement the loop 7 slides from engagement with the extension 5 and the parts are in readiness for another exposure after the printing frame has been filled.

There is a lost motion connection between the switch arm x and the actuating bar 31, due to the fact that the notch 33 on said bar is disengaged from the pin 30 at a certain point in the movement of the switch arm, and the backward movement of the timing mechanism under the influence of the spring 28 is controlled by the slow return motion of the movable plunger in the dash pot v . The time of exposure may be varied as desired, by engaging the spring 28 with notches higher or lower on the lever 24, thus varying the tension of the spring and the leverage on the lever 24.

If desired, an addition may be made to the platen or cover c indicated in Figs. 12 and 13, for the purpose of holding the sensitized paper in position upon the negative as

the printing frame is moved longitudinally. As shown, the cover or platen c may be provided with the supplemental frame 40 preferably of thin sheet metal hinged to the pintles 41 of the hinges d of the platen. In order to enable the frame 40 to be hinged to the pintles 41 of said frame, it is bent at 42, as indicated in Fig. 13. The spring catch 43 holds the supplemental or auxiliary frame in position against the platen and a flexible strip, as of rubber 44 extends transversely across the platen and is connected to the sides of the frame 40. In the operation of this modification, the spring catch 43 is disengaged and the auxiliary frame 40 is first lowered upon the sensitized paper P, so that as the printing platen is moved forward, there is no danger of disarranging the paper and it remains firmly in position squarely upon the negative O. When the platen or cover c closes upon the printing frame, the spring catch 43 automatically engages the frame 40 and as the platen rises, the auxiliary frame is carried upward with the platen.

As a modification of the apparatus, it is frequently desirable to visually or audibly indicate to the operator the actual time or interval of exposure as by the beats of a pendulum or other similar device and I propose to suspend a pendulum weight 50 within the sight compartment and set the weight 50 in vibration by the movement of the printing frame K. The weight 50 may be hung on a rod 51 pivoted at 52 to a link 53 suspended by the loop 54 on the knife edge 55. Stop 56 or two stops, if desired, may be arranged adjacent the link 53, so that as the pendulum weight or bob 50 swings, a tapping or knocking sound is indicated and the time of exposure may be adjusted to a suitable number of beats of the pendulum. In order to set the pendulum swinging, a bracket 57 may be connected to the printing frame and provided with the bent end 58 which engages the pendulum rod 51 and holds said rod in retracted position when the printing frame is retracted, as indicated in Fig. 5. As the printing frame is moved forward the pendulum is released and swings in the sight compartment.

Obviously, by raising the setting trip 6 and maintaining it in raised position, the printing frame may be moved into registry with either compartment, without operating the timing mechanism and in such operation of the device it is necessary to close the electric switch by hand, which may be done by disconnecting the actuating bar 31 from the pin 30 and manipulating the switch arm x by hand. In such operation of the device, the time of exposure may be calculated as desired, or by means of such a device as the pendulum described.

This apparatus has been found to operate efficiently and well and greatly reduce the

time in which a succession of photograph prints may be made.

The device is certain in operation and a less number of prints are destroyed than with devices of similar character.

The apparatus is simple and is not apt to get out of order and may be adjusted for various times of exposure, as desired.

I claim and desire to obtain by Letters Patent the following:

1. A timing device for photographic printing apparatus having a movable printing frame and a source of light, comprising an electric switch and a switch arm, a dash pot, lost motion connections between the said switch arm and dash pot, means connected to the printing frame for setting the said switch arm, and means connected to said lost motion connections for automatically retracting the said switch arm to open the switch without moving the printing frame.

2. A timing device for photographic printing apparatus having a movable printing frame and a source of light, comprising an electric switch and a switch arm, a dash pot, lost motion connections between the said switch arm and dash pot, means connected to the printing frame for setting the said switch arm, retracting means connected to the said lost motion connections for opening the switch and operative independently of the motion of the printing frame, and means for setting the retracting means to act after varying intervals of time.

3. A timing device for photographic printing apparatus, having a movable printing frame, and a source of light connected in a lighting circuit, comprising an electric switch and a switch arm controlling the lighting circuit, a dash pot provided with a movable member having a slow return motion, operative connections between the said switch arm and the said movable member, means for setting the said switch arm as the printing frame is moved into exposure position, and retracting means for the said switch arm for opening the switch controlled by the return motion of the movable member of the dash pot.

4. A timing device for photographic printing apparatus having a movable printing frame, and a source of light connected in a lighting circuit, comprising an electric switch and a switch arm controlling the lighting circuit, a dash pot provided with a movable member having a slow return mo-

tion, operative connections between the said switch arm and the said movable member, means for setting the said switch arm as the printing frame is moved into exposure position, and retracting means for the said switch arm for opening the switch controlled by the return motion of the movable member of the dash pot, said setting means co-operating with the said switch arm after the switch is opened to restore the said arm to normal position as the printing frame is moved into inoperative position.

5. A timing device for photographic printing apparatus having a movable printing frame, and a source of light connected in a lighting circuit, comprising an electric switch and a switch arm controlling the lighting circuit, means connected to the printing frame for setting the said switch arm as the frame is moved into exposure position and for restoring the said switch arm to normal position after the switch is opened when the printing frame is moved into inoperative position, and means independent of the movement of the printing frame for automatically moving the said switch arm to break the lighting circuit after a predetermined interval of time after the said arm is set.

6. A timing device for photographic printing apparatus, having a printing frame, and a source of light connected in a lighting circuit, comprising an electric switch and a pivoted switch arm controlling the lighting circuit, a dash pot provided with a movable member having a quick forward stroke and slow return motion, lost motion connections between the said switch arm and the said movable member of the dash pot, means connected to the printing frame for setting the said switch arm, and retracting means for the said switch arm for opening the switch connected to said lost motion connections, whereby the exposure is timed by the return motion of the movable member of the dash pot and independently of the movement of the printing frame.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

DONALD McDONALD.

Witnesses:

HERBERT G. OGDEN,
HENRY SHELDON.