Oct. 25, 1932. J. L. BARBER 1,885,055

AUTOMATIC PHOTOGRAPHIC PRINTING MACHINE

Filed Nov. 14, 1930 4 Sheets-Sheet 1

Fig. 1.

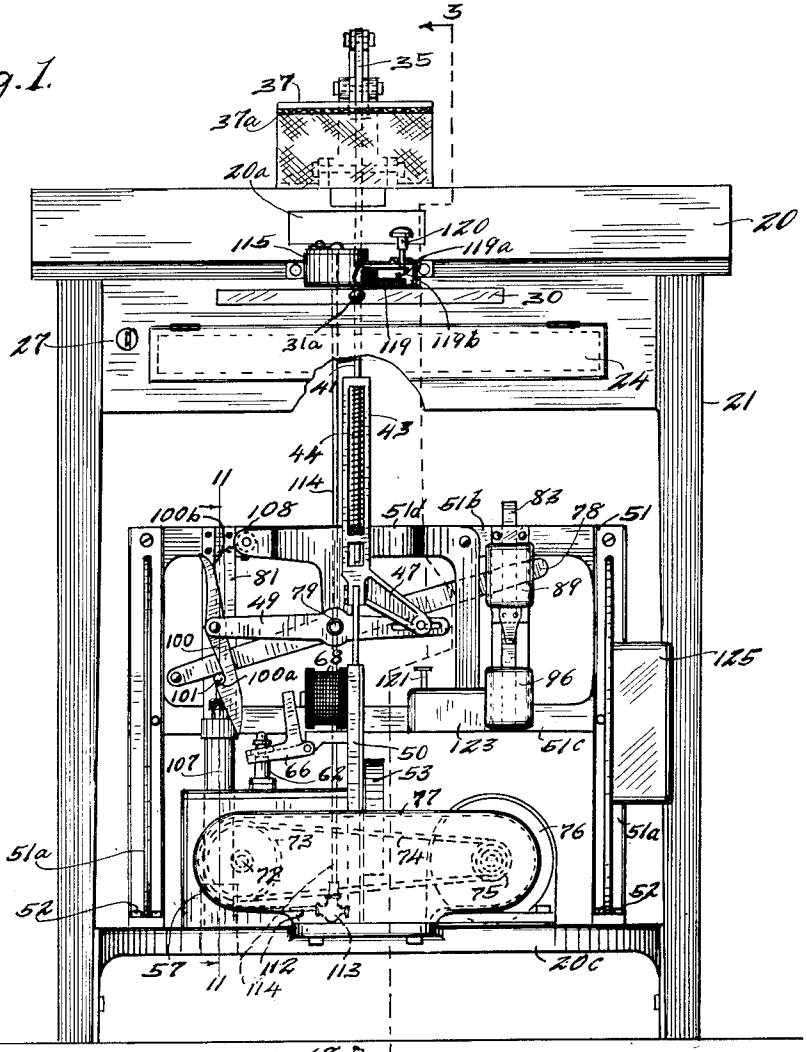
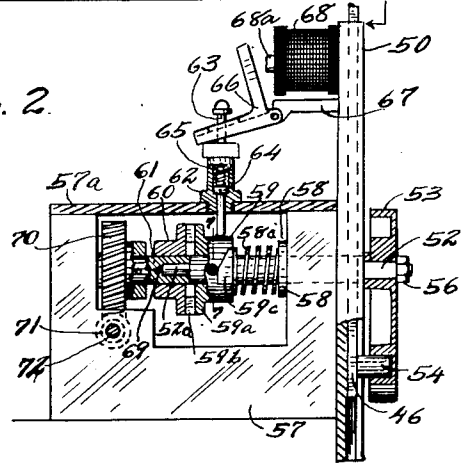


Fig. 2.



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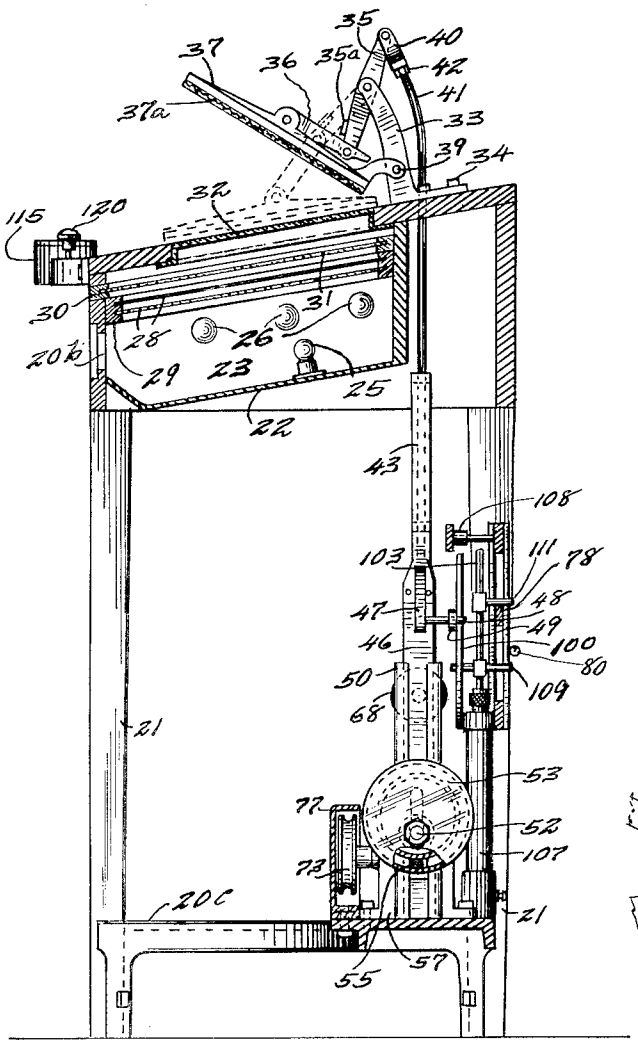


Fig. 3.

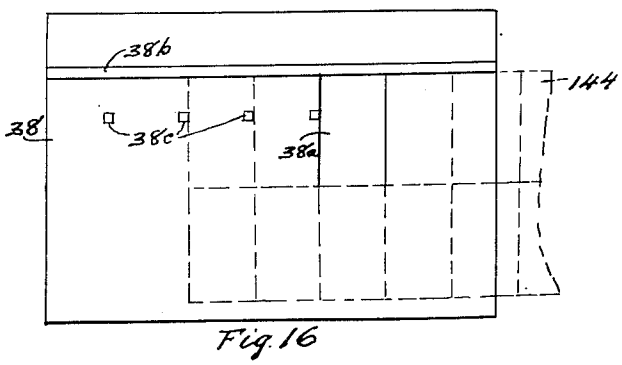


Fig. 16

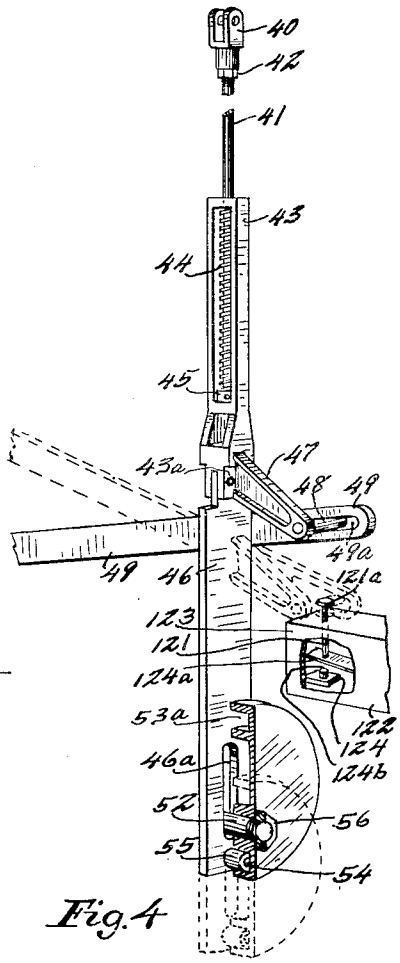


Fig. 4

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AUTOMATIC PHOTOGRAPHIC PRINTING MACHINE

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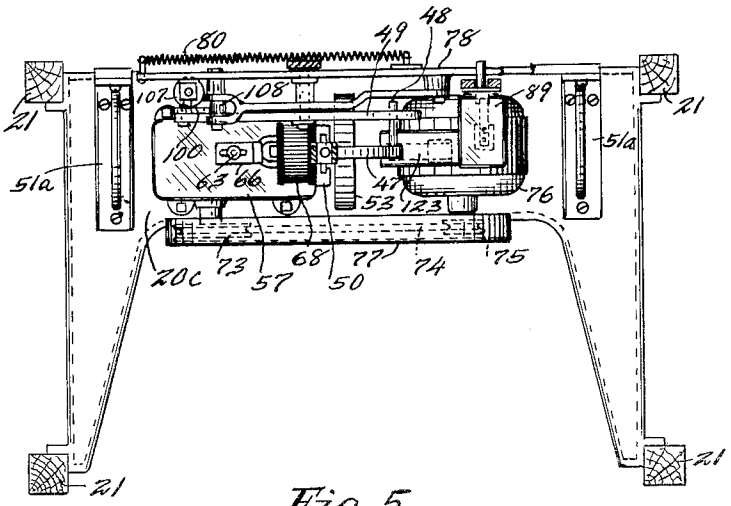


Fig. 5.

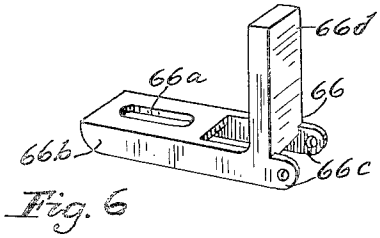


Fig. 6

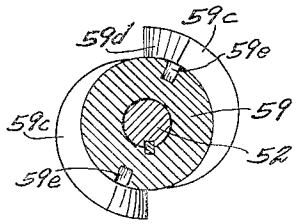


Fig. 7.

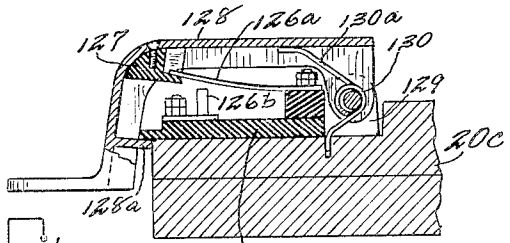


Fig. 8.

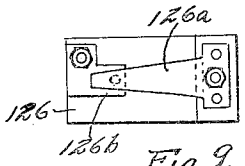


Fig. 9.

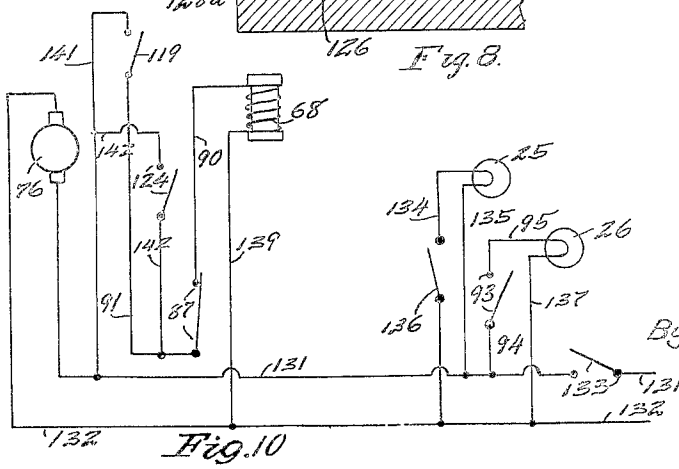


Fig. 10

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AUTOMATIC PHOTOGRAPHIC PRINTING MACHINE

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Fig. 11

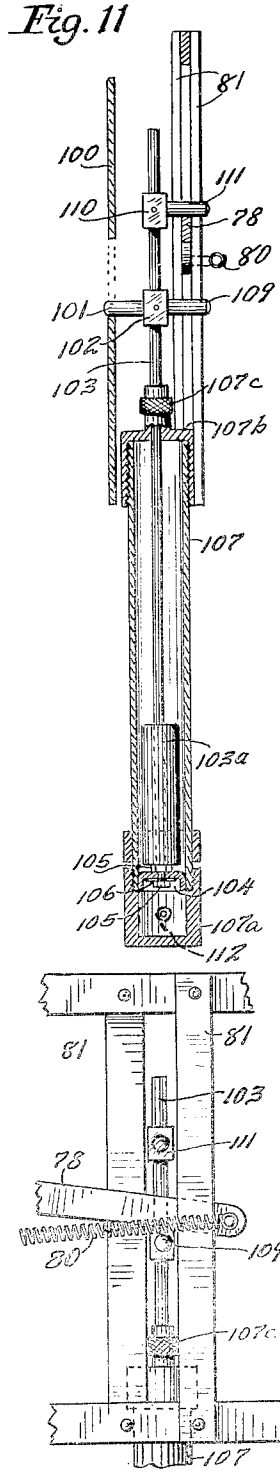


Fig. 13

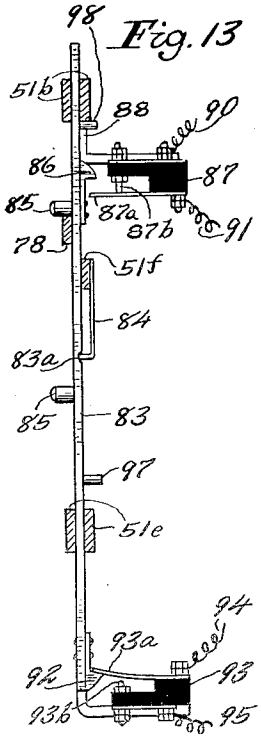
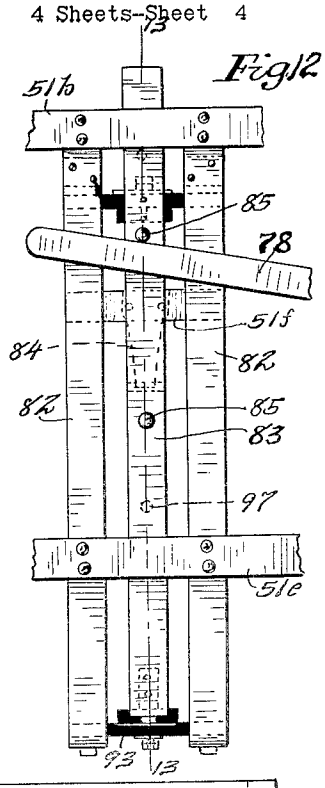


Fig. 12



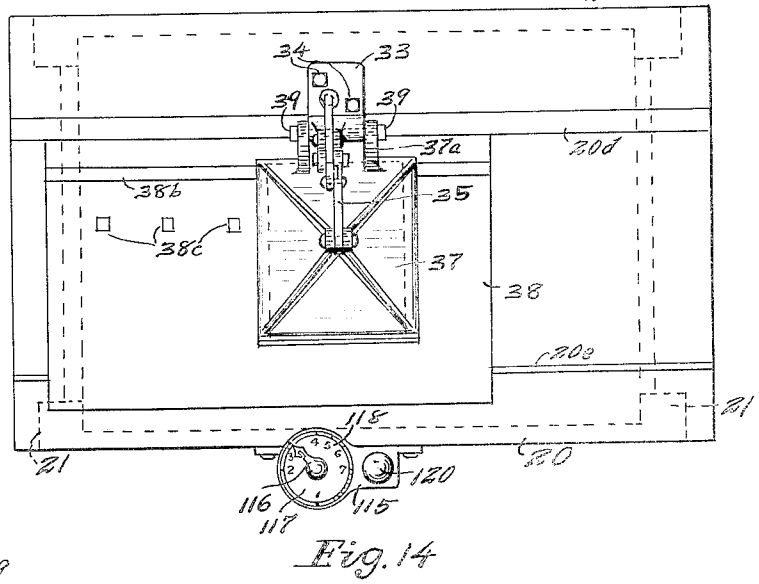


Fig. 14

Fig. 15.

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UNITED STATES PATENT OFFICE

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AUTOMATIC PHOTOGRAPHIC PRINTING MACHINE

Application filed November 14, 1930. Serial No. 495,656.

This invention relates to a photographic printing machine and particularly to a photographic printing machine having power driven and automatic means for operating the printing mechanism. The invention also refers to a device which can be used as an attachment to convert a hand operated printing machine into a power driven automatic machine. Hand operated printing machines are now used in large numbers, particularly by establishments which develop and print films taken by amateurs. Where a considerable volume of business is handled, it is desirable to have a machine which is automatic and power driven in operation, and it particularly is desirable to have a device which can be quickly attached to the hand operated machine to convert the same into a power driven automatic machine.

It is an object of this invention, therefore, to provide a simple and efficient power driven printing machine.

It is a further object of the invention to provide a simple and efficient power driven photographic printing machine which is largely automatic in operation.

It is another object of the invention to provide a simple and efficient power driven automatic photographic printing machine having easily operated means by which the length of exposure of a print can be readily adjusted or varied.

It is still another object of the invention to provide a power driven automatic printing machine having means movable to and from print holding position, said machine and means being operated by the operator merely momentarily closing a switch.

It is also an object of the invention to provide a simple and efficient photographic printing machine in which the machine is started and operated by a simple action by the operator, and in which the light for printing is automatically made and extinguished at the proper time.

It is still another object of the invention to provide a photographic printing machine comprising a power driven device, means for holding the print in printing position, mechanism for moving the said means to print holding and to inoperative positions, and means under the control of the operator for connecting said device, and mechanism to move said means to print holding position.

It is also an object of the invention to provide such a device as set forth in the preceding paragraph, together with automatically acting means to subsequently connect said device and mechanism to move said means to inoperative position.

It is a further object of the invention to provide such a machine as set forth in the two preceding paragraphs, the same having means under the control of the operator for determining the interval between the two connections between the said mechanism and device.

It is still another object of the invention to provide a photographic printing machine having a light chamber, a platen for holding a print in printing position over the light chamber, means for moving the platen to print holding position, a driving means, a clutch for connecting the driving means and said first mentioned means, and mechanism including an electrically operated element for operating said clutch to connect the driving means and the means for moving the platen to print holding position.

It is also an object of the invention to provide a photographic printing machine comprising a light chamber, a platen for holding the print in printing position over the light chamber and movable to print holding position and to inoperative position, a manually operated switch for actuating means to move said platen to print holding position, a switch operated when said platen moves to print holding position to furnish light for said light chamber, and a switch operated after a predetermined length of time for actuating means to move said platen to inoperative position.

It is further an object of the invention to provide a photographic printing machine comprising a light chamber, a platen for holding a print exposed to the light in said chamber, a manually operated switch, power means, a mechanism for depressing said platen, means including an electrically actuated element for connecting said power means

and mechanism to move said platen to print holding position, a second switch closed when said platen moves to print holding position, a third switch opened when said platen moves to print holding position to disconnect said power means and mechanism, time controlled mechanism for opening said third switch, the circuit through said electrically actuated element then being closed by said second switch and acting to again connect said power means and mechanism to move said platen to inoperative position.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings, in which like reference characers refer to similar parts throughout the several views, and in which:—

Fig. 1 is a view in front elevation of a printing machine embodying the invention herein disclosed;

Fig. 2 is a view partly in side elevation and partly in vertical section of the clutch and driving mechanism used;

Fig. 3 is a vertical section taken substantially on line 3—3 of Fig. 1, as indicated by the arrows;

Fig. 4 is a perspective view of a portion of the platen operating mechanism of the machine;

Fig. 5 is a detail horizontal section;

Fig. 6 is a perspective view of the magnet armature device used;

Fig. 7 is a vertical section taken on line 7—7 of Fig. 2;

Fig. 8 is a vertical section through a treadle switch which may be used;

Fig. 9 is a plan view of the switch elements of the switch shown in Fig. 8;

Fig. 10 is a wiring diagram of the device;

Fig. 11 is a vertical section taken substantialy on line 11—11 of Fig. 1;

Fig. 12 is a partial view in elevation of the device;

Fig. 13 is a vertical section taken on line 13—13 of Fig. 12;

Fig. 14 is a plan view of the device;

Fig. 15 is a partial rear view in elevation of the device; and

Fig. 16 is a plan view of the mask used in the printing operation.

Referring to the drawings, a photographic printing machine is shown comprising a table or counter 20 having the supporting legs 21. Counter or table 20 has an opening 20*a* in the top thereof illustrated as of rectangular form. Beneath opening 20*a* is a casing 22 forming a light compartment 23 and access may be had to this compartment through an opening 20*b* normally closed by a hinged door 24. A pilot light 25 is mounted in compartment 23 and this light may be controlled by a manually operated switch (not shown). The pilot light 25 is usually of comparatively low voltage. A plurality of lamps 26 of comparatively high voltage are also mounted in the compartment 23.

Within the compartment 23 and disposed in superposed relation with respect to each other above the lamps 10, is a plurality of light-diffusing glass panels 28 carried in a suitable frame 29. Above frame 29 is a removable frame 30 in which a ground glass panel 31 is carried. Panel 30 may be removed at the front of the table 20 and is shown in Fig. 1 as provided with a knob 31*a* for this purpose. A transparent member 32 made of material such as glass is disposed in the opening 20*a*, having its surface substantially flush with the top of the table 20.

A bracket 33 is secured to the top of table 20 in the rear of opening 20*a* by suitable screws 34. A lever 35 is pivoted intermediate its ends in the bifurcated end of bracket 33, said lever 35 at its lower and forward end being pivoted to a lever 36 which is in turn pivoted at its other end to the top of a platen 37 which is shown in Figs. 1, 2 and 14 as of rectangular shape and carries on its under surface a sheet of yielding material such as felt 37*a*. A mask 38 is provided, adapted to be positioned over the member 32 of the light chamber, said mask being provided with an opening 38*a* of predetermined area, depending upon the size of the negative from which the pictures are to be reproduced. A bead 38*b* is formed on the upper surface of the mask, which extends parallel to the rear edge of the mask and along the edge of the opening 38*a*. Stop lugs 38*c* are formed on the upper surface of the mask and arranged in a row in spaced relation with respect to each other and parallel with the bead 38*b*, as clearly shown in Fig. 8. Table 20 has a rib or bead 20*d* extending parallel to its front rear edge, and the rear edge of the mask 38 is adapted to abut this bead and the mask is also adapted to rest upon a bead 20*e* on the table 20, so as to space the forward edge of the mask slightly above the table to facilitate the gripping of the edge thereof, for removing or replacing the mask in position. The lever 36 has a projection extending rearwardly from its pivot, adapted to engage at times with a stop member 35*a* on lever 35. Platen 37 has a pair of lugs 37*a* projecting rearwardly therefrom, which are pivoted about a common axis to bracket 33 by the pivot studs 39. The lever 35 is pivoted at its upper end betwen the arms of a fork member 40 threaded on the upper end of an operating rod 41. A jamb nut 42 is disposed against the end of member 40. Rod 41 extends downwardly and rearwardly in curved form through the base of bracket 33 and extends vertically downward beneath table 20 through the top of a yoke member 43. A coil compression spring surrounds rod 41 within

yoke 43, the same bearing at its top against the top of yoke 43 and at its lower end against the collar 45 pinned to the lower end of rod 41. Yoke member 43 is bifurcated at its lower end to receive and be pivotally secured to the upper end of an operating bar 46 by pivot bolt 43*a*. A bracket 47 extends from one side of yoke 43 and a pin 48 is secured to the end of bracket 47 and projects laterally therefrom and at right angles thereto. Pin 48 extends through a slot 49*a* in a member 49 to be later described. Bar 46 is movable vertically in a guide member 50 secured to and forming part of a frame 51, which frame comprises side members 51*a* secured by screws 52 to a platform 20*c* forming part of the table 20. Frame 51 also includes a top cross member 51*b* and an intermediate cross member 51*c*. Bar 46 has a slot 46*a* in its lower portion, in which is disposed a stud 52 secured to a cam 53. Cam 53 has an annular groove or track 53*a* therein, in which moves a roller 54 carried on a pin 55 secured to bar 46. Stud 52 as shown in Fig. 2 has a reduced portion carrying a nut 56. Stud 52 is journaled in a bearing in a casing 57 mounted on platform 20*c*, the same having a collar 58 secured thereto, engaging one side of said bearing, and said stud having a clutch member 59 splined thereto and slidable thereon, said clutch member being engaged by one end of a coiled compression spring 58*a* surrounding stud 52 and bearing against collar 58 at its other end. Clutch member 59 has the clutch disk 59*a*, with spaced clutch teeth 59*b* on the face thereof adapted to engage with similar ratchet faced teeth projecting from another clutch member 60 secured to a shaft 61, said shaft 61 having a bore in its end in which is received a reduced portion 52*a* of the stud 52, the ends of shaft 61 and stud 52 abutting each other. Clutch member 59 is provided at opposite sides with cam projections 59*c* having inclined end surfaces 59*d*. Said clutch member also has at opposite sides cylindrical holes 59*e* therein. A casing 62 is threaded into the top 57*a* of the casing 57 and is centrally bored to have slidable therein a pin 63, the lower end of said pin substantially engaging the periphery of the cylindrical portion of member 59, said pin having a collar 64 secured thereto, against which bears one end of a coiled compression spring 65, the other end of which bears against the top of casing 62. Pin 63 is shown as having a head at its upper end, and said pin is of a diameter capable of passing into the holes 59*e*. Pin 63 at its upper portion beneath the head thereof, passes through a slot 66*a* in one arm 66*b* of an armature member 66. Member 66 has spaced ears 66*c* projecting at one end, which are pivoted to similar ears on a bracket 67 secured to and projecting from one side of guide member 50. Member 66 has a block like portion 66*d* extending at right angles to arm 66*b*, which portion forms an armature for a magnet 68 also mounted on guide 50, said magnet being shown as having a core 68*a* projecting at one end. As stated, clutch member 60 is secured to shaft 61 in any suitable manner, as by the pin 69 and said shaft also has secured thereto a worm wheel gear 70. A worm gear 71 meshes with worm wheel gear 70, said worm gear 71 being mounted on a shaft 72. Shaft 72 is journaled in bearings in the casing 57 and has secured at one end a pulley 73. A belt 74 runs over pulley 73, also running over a pulley 75 on the armature shaft of a motor 76 mounted on a platform 20*c*. A housing 77 encloses belt 74 and pulleys 73 and 75.

A lever 78 is pivoted on pivot 79 secured in a bracket 51*d*, and said lever 78 has secured to its end, namely the left hand end as seen in Fig. 1, a tensile coiled spring 80, the other end of which is secured to frame member 51*d* substantially in horizontal alinement with pivot 79. Lever 78 moves in a guideway formed by slightly spaced vertical members 81, members 81 also having their edges spaced as shown in Fig. 15. The other end of lever 78 moves in a guideway formed by two bars 82, said bars having their edges laterally spaced and having at either side at their tops and bottoms the frame members 51*b* and the lower bars 51*e*. A bar 83 is movable between the bars 82 and the guideway formed by the upper and lower bars secured thereto, which bar has a notch 83*a* therein adapted to receive the end of a spring pawl 84 secured to a short transverse bar 51*f* extending between bars 82. Bar 83 has a pair of vertically spaced pins 85 projecting from one side thereof, and lever 78 moves closely adjacent this side of bars 83 and is disposed between the pins 85. The bar 83 carries a pawl 86 adapted to engage with the movable contact member 87*a* of the switch 87 having a fixed contact member 87*b*, the switch 87 being mounted on a bracket 88 secured to frame member 51*b*, the switch being shown as enclosed in a switch box 89 as seen in Fig. 1. The movable contact 87*a* is resilient, so that when free, it will spring into engagement with the fixed contact 87*b*. Conductors 90 and 91 are shown as connected respectively to the contacts of switch 87. Bar 83 adjacent its lower end carries another pawl 92 adapted to engage the movable contact 93*a* of a switch 93, the same being shown as having a fixed contact 93*b*. Movable contact 93*a* is also resilient, and when free, will move into engagement with fixed contact 93*b*. Conductors 94 and 95 lead from the contacts 93*a* and 93*b*. Switch 93 is enclosed in a casing 96 as shown in Fig. 1. Bar 83 also carries stop pins 97 and 98 projecting at one side thereof and adapted to engage the cross bar 51*e* and 51*b* respectively.

Pivot 97 also has fulcrumed thereon the

lever 49 already referred to, having a slot 49*a* adjacent one end, said slot receiving pin 48 projecting from the arm 47. Lever 49 at its other end is pivotally connected to a lifting member 100 having a notch therein forming a shoulder 100*a* adapted to engage a pin 101 projecting from a block 102 secured to the plunger rod 103 of the plunger or piston member 104 shown as of inverted cup shape and secured to the lower end of rod 103 by the nuts 105 and washer 106. A weight 103*a* is secured to the lower end of rod 103. Plunger or piston 104 moves in a cylinder 107 having a cylindrical cap 107*a* threaded on its lower end and another cylindrical cap 107*b* threaded on its upper end. Rod 103 passes through a bore in cap 107*b*, said cap having a projecting hub with a knurled annular portion 107*c* thereon adapted to be engaged for unscrewing cap 107*b*. Lifting member 100 has its upper end 100*b* formed on a curve adapted to act as a cam and engage a cam roller 108 carried on one end of a bracket 51*d*. Block 102 has a pin 109 projecting at the side opposite pin 101, said pin projecting between the bars 81 and adapted to be engaged by lever 78. Rod 103 also carries above the block 102 another block 110, from which projects a pin 111 disposed above pin 109 and also projecting between bars 81 and adapted to be engaged by levers 78. Cap 107*a* at the bottom of cylinder 107 has a pipe 112 to which is connected a valve 113, said valve having a needle valve seat (not shown) in which cooperates the needle valve stem 114 extending vertically to a casing 115 mounted on table 20, said stem 114 having secured at its upper end a pointer or hand 116 adapted to move over a dial 117 in the top of casing 115, which dial is circumferentially graduated and provided with numerals 118. Casing 115 also contains a switch 119 having a resilient movable contact member 119*a* disposed over a fixed contact member 119*b*, said contact member 119*a* being adapted to be momentarily pressed against the fixed contact member by a plunger 120 having a knob at its upper end disposed outside of casing 115.

The pin 48 is disposed in line with the head 121*a* of the plunger 121 projecting through the top of the switch casing or box 123, said plunger being adapted to engage the resilient movable contact member 124*a* of a switch 124 disposed in said box and having a fixed contact member 124*b*. A distributing box or casing 125 for the various conductors used in the electrical circuits is shown as mounted on one of the frame members 51.

In Figs. 8 and 9 a treadle switch 126 is shown, which may be mounted upon the platform 20*c*. Switch 126 has a resilient movable contact 126*a* normally spaced from the fixed contact 126*b*, but which is held out of engagement with said fixed contact by being engaged on the lip of the block 127 secured to the treadle 128 which treadle is hinged to a bracket 129 which may be mounted on platform 20*c*, said treadle 128 normally being held elevated by the torsion spring 130 having an arm 130*a* engaging the treadle and having its other end or arm secured in platform 20*c*. Treadle 128 is provided with an inwardly projecting lug 128*a* engaging a projecting portion of switch 126 to limit the upward movement of said treadle.

In Fig. 10 the wiring diagram for the circuit used is shown comprising the line conductors 131 and 132. A main control switch 133 is shown for closing the circuit. The pilot light 25 is shown having conductors 134 and 135 connected respectively to the line conductors 131 and 132 and controlled by the manually operated switch 136. The printing lamps 26 are shown, to which are connected the conductors 137 and 95. Conductor 95 connects to a switch 93 and another conductor 94 extends from switch 93 to line conductor 131. The magnet 68 is shown having one end of its winding connected to a conductor 139 which is connected to line conductor 132. The other end of the winding on magnet 68 is connected to a conductor 90. Conductor 90 is connected to switch 87 and a conductor 91 leads from switch 87 to switch 119.

It will be seen that the motor 76 is permanently connected across the line, so that the motor will run whenever switch 133 is closed. The conductor 142 extends from conductors 141 to conductor 91 and this has interposed therein the switch 124.

In operation, when a print is to be printed, the machine will be in the position shown in Figs. 1 and 3. The operator now places the negative on the mask 38 over the opening 38*a*, and the papers 144 are now placed over the mask with the desired portion over the opening 38*a*. If single prints are to be made, paper is cut to a size which will more than slightly cover the opening 38*a*. If a number of prints are to be made, a long sheet of paper such as shown in Fig. 16 may be used, and the paper moved successively into engagement with the lugs 38*c* after each printing operation. The operator now presses down on the knob of the plunger 120 momentarily closing a switch 119 and instantly releases the knob or handle. When the machine is in operation, the main switch 123 is closed and motor 76 is running continuously. Pulley 73 is constantly driven and worm 71 and worm wheel 70 are constantly driven, as is also shaft 61, and clutch member 60. At this time clutch member 59 is withdrawn from clutch member 60 and pin 63 is seated in one of the holes 59*e* of clutch member 59. When switch 124 is closed, a circuit is closed through the magnet 68. This circuit can be traced through one line conductor 132 through conductor 139 and the winding of

the magnet 68 through conductor 90 through switch 87 which is now closed through conductor 91 and switch 119, thence through conductor 141 to line conductor 131. When magnet 68 is actuated, it attracts armature 66*d* of member 66, swinging said member clockwise about its pivot and lifts pin 63 against the tension of spring 65. This withdraws pin 63 from clutch member 59 and said clutch member is immediately urged by spring 58ª into engagement with clutch member 60. Shaft 52 is now driven and cam member 53 is revolved. Cam member 53 draws down on roller 55, moving downward bar 46 and member 43 attached thereto. Motion is transmitted through spring 44 to rod 41 which pulls down on lever 35, swinging the forward end of said lever upward, and swinging lever 36 upward, thus depressing platen 37 so that it moves to the position shown in dotted lines in Fig. 3, members 35 and 36 also moving to the position shown in dotted lines. The projection on lever 36 engages the stop member 35*a*, and the toggle formed by members 35 and 36 is thus straightened and platen 37 held down against the printing paper. When the machine operation is started, switch 93 is closed, closing the circuit through pilot light 25. Switch 119 being only momentarily closed, the circuit through the magnet 68 was only momentarily closed, and is immediately broken so that armature 66 is released and pin 63 is moved down by spring 65 against the surface of clutch member 59. As clutch member 59 revolves, the cam portion 59*c* engages pin 63 and clutch member 59 is forced backward against the tension of spring 58*a* and withdrawn from engagement with clutch member 60. Pin 63 drops into one of the holes 59*e* and clutch member 59 as well as shaft 52 is thus stopped after a 180° revolution. Cam 53 having moved 180° and moved platen 37 down into engagement with the print, the same is thus held in this print holding position. When member 43 moves downwardly, member 47 is also moved downwardly and pin 48 moves into engagement with the head 121*a* of plunger 121 and closes switch 124. This switch is thus now closed, while the platen remains in print holding position. It will be seen that motion is transmtted to rod 41 and to the platen through the spring 44. Should any obstruction be under the platen, this spring will be compressed so that nothing will be broken, and should the operator get her fingers under the platen, serious injury to the finger will be prevented.

When member 47 and pin 48 are moved downwardly, pin 48 moving in slot 49*a* depresses the lever 49, thus lifting the left hand end of said lever as seen in Fig. 1, and moving upward the lifting member 100. This member 100 moving upwardly, lifts up on pin 101, thus lifting plunger 103 and moving the piston 104 upwardly in cylinder 107. When lifted, member 100 moves upwardly, its upper cam portion 100*b* engages the roller 108 and said member is swung about its pivotal connection with lever 49, swinging its lower portion to the right as shown in Fig. 1 and tripping pin 101, so that said pin is now free to descend. Piston 104, when pin 101 is tripped, immediately begins to descend, owing to weight 103*a*. The descent of said piston is regulated by regulating the exit of fluid from cylinder 107, it being understood that this cylinder will contain suitable fluid. In practice, the device has worked very successfully, using air in cylinder 107. The escape of said fluid is regulated by regulating the fluid 113 and this is done by the operator moving the hand 116 to the desired spot. When the operator starts to print the negatives, she inspects the negative by quickly holding it up and looking at it to see how dense it is. She is sufficiently experienced so that from this inspection of the print she knows where to turn the hand 116 to secure the proper period of exposure. The hand 116 is thus turned to the proper one of the numerals 118 before plunger 120 is operated. Weight 103 now descends, and its descent, as stated, will determine the period of exposure of the print.

When member 100 is raised by lever 49, pin 109 is also raised with pin 101 and the same engages the lower side of lever 78 at the left hand end thereof as seen in Fig. 1, swinging this end of the lever 78 upwardly. When said lever passes a horizontal position, spring 80 which is under tension, contracts and snaps the end of lever 78 upward. When the left hand end of lever 78 as seen in Fig. 1 is thus moved upwardly, its right hand end is moved downwardly, and the same engages pin 85 of bar 83 and quickly moves said bar downward until its stop pin 97 engages one of the members 51*e*. Bar 83 is held in its upper position by spring pawl 84 engaging in the notch 83*a*. When the bar is moved downwardly, the pawl cams out of said notch. When bar 83 thus moves downward, pawl 86 engages the movable contact member 87*a* of switch 87 opening switch 87, and pawl 92 moves out of engagement with the movable contact member 93*a* of switch 93, thus permitting switch 93 to close. When switch 93 thus closes, the circuit is closed through the printing lamps 26 as shown in the wiring diagram in Fig. 10. The exposure of the print is thus begun almost instantly after the operator presses on the plunger 120. When weight 103*a* descends, it draws down on plunger 103 and thus moves pin 111 downward, thus gradually moving down the left hand end of lever 78 as seen in Fig. 1. When said lever moves past substantially horizontal position, spring 80 again snaps the lever downward as the length of said spring crosses the fulcrum of said lever,

so that the right hand end of said lever is quickly moved upwardly. When said latter end of lever 78 moves upwardly, it engages pin 85 and raises bar 83 until stop pin 98 engages member 51*b*. When bar 83 thus moves upwardly pawl 92 again engages the movable contact 93*a* of switch 93, opening said switch and pawl 86 moves out of engagement with movable contact 87*a* of switch 87, thus permitting said switch to close. When switch 87 was opened by the downward movement of bar 83, the circuit through magnet 68 was opened, as will be clearly seen from Fig. 10. The circuit is also open at switch 119, but it will be seen that with switch 124 closed, that as soon as switch 87 again closes, the magnet will be again actuated. As soon as lever 78 therefore is moved downwardly by pin 111 and snaps into its lower position, switch 87 is allowed to close and the circuit is again closed through magnet 68. This again attracts armature 66 and plunger or pin 63 is withdrawn from the hole 59*e* of clutch member 59 and said clutch member is again engaged with clutch member 60 by being moved by spring 58*a*. Shaft 52 and cam 53 are again rotated and member 46 is moved upwardly as are also members 43 and rod 41. The upward movement of rod 41 lifts the platen 37 and the printing operation is completed. When bar 83 was moved upwardly by the lever 78, switch 93 was opened and the circuit through the printing lamps 26 was broken and said lamps extinguished. The lamps 26 thus are automatically extinguished as soon as the platen moves to its inoperative position.

The treadle switch shown in Figs. 7 and 8 may be substituted if desired, for the hand operated switch 119. The circuits will be the same, the conductors 91 and 141 being connected respectively to the movable and fixed contacts 126*a* and 126*b* respectively. The treadle would, of course, as stated be mounted on the platform 20*c* so as to be in convenient position to be operated by the operator's foot.

From the above description it is seen that applicant has provided a simple, easily operated and very efficient automatic photographic printing machine. All that the operator has to do is to adjust the hand 116 for determining the exposure period and then momentarily presses on the plunger 120. The operation after this is entirely automatic, the printing lamps being lighted automatically and automatically extinguished and the platen being moved to print holding position and automatically returned to inoperative position after the desired printing period. The pressing on plunger 120 as described connects the mechanism for moving the platen to the motor or power driven mechanism, the clutch making a half-revolution and then being disconnected. It will be seen that the parts carried on platform 20*c* and the frame member 51 can readily be applied to a manually operated machine, all that is necessary being to connect the member 40 to the platen operating mechanism. This member 40 and rod 41 will replace the usual treadle actuated rod on the manually operated machine.

The casing 115 is readily mounted on the counter or table on which the light box and platen are mounted. A manually operated machine can thus be easily and quickly converted into a power driven and automatic machine.

The machine is quick and accurate in operation. Repeated prints can be made from the same negatives and these prints will be entirely uniform. Repeated prints can also be made very rapidly. The device has been amply demonstrated in actual practice and found to be very successful and efficient.

This application is a substitute for and a continuation in part of applicant's pending application S. N. 423,124, filed January 24, 1930, for all common subject matter.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which, generally stated, consists in a device capable of carrying out the objects above set forth, in the novel parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:—

1. An attachment for a printing machine having a platen movable to and from print holding position, having in combination, a member connectable to said platen, means for reciprocating said member to move said platen to and from print holding position, starting a switch constructed and arranged to be closed by the operator and then allowed to open, and power actuated mechanism operated by the closing of said starting switch to operate said first mentioned means and move said platen to print holding position, said power actuated mechanism accomplishing its operation while said starting switch is in open position.

2. The structure set forth in claim 1, a second switch opened when said platen moves to print holding position to render inoperative said first mentioned means, and a time-controlled means to again close said last mentioned switch to again actuate said first mentioned means to move said platen from print holding position.

3. A photographic printing machine having in combination, a table, a light chamber carried by said table, a platen for holding a print over said light chamber, a switch on said table in convenient position for manipulation by the operator, means actuated by the closing of said switch for moving said platen to print holding position, and an adjustable

member on said table controlling means for determining how long said platen will be held in print holding position.

4. A photographic printing machine having in combination, a table with a light chamber carried thereby, a platen for holding a print over said light chamber, a casing mounted on said table, a normally open switch in said casing, means projecting above said casing adapted to be engaged by the operator for closing said switch, means operated by said switch for moving said platen to print holding position, a dial on said casing, and means movable over said dial by the operator controlling means for determining how long said platen will be held in print holding position.

5. A photographic printing machine having in combination, means for holding a print in position to be printed, an electrically controlled power means for moving said means to and from print holding position, means for variably predetermining the period said print holding means shall remain in print holding position and a switch in position for convenient manipulation by the operator for closing a circuit to actuate said last mentioned means.

6. A photographic printing machine having in combination, means for holding a print in position to be printed, means for moving said means to and from print holding position, means for variably predetermining the interval said print holding means can remain in print holding position a power means, and means including an electrically actuated member for connecting said power means and second mentioned means.

7. A photographic printing machine having in combination, means for holding a print in position to be printed, means for moving said means to and from print holding position, a power means, means for connecting said power means and second mentioned means to operate the latter, a manually operated device actuated by the operator for operating said last mentioned means to move said first mentioned means to print holding position, and automatically operated means for actuating said last mentioned means to connect said power means and second mentioned means to move said first mentioned means from print holding position.

8. The structure set forth in claim 7, and means under the control of the operator for determining the interval between the operation of said manually operated device and said automatically operated means.

9. A photographic printing machine having in combination, a light chamber, a platen for holding a print exposed to light over said chamber, a manually operated switch, a power means, a mechanism for depressing said platen, and means including an electrically actuated element for connecting said power means and mechanism to move said platen to print holding position, a second switch closed when said platen moves to said print holding position, a third switch opened when said platen moves to print holding position to disconnect said power means, and mechanism, timing mechanism for closing said third switch, the circuit through said electrically actuated element then being closed by said second switch and acting to again connect said power means and mechanism to move said platen to inoperative position.

10. A photographic printing machine having in combination, a light chamber, a platen for holding a print in printing position over said light chamber, a power means, mechanism for moving said platen to print holding and inoperative positions, means for connecting said power means and mechanism including an electrically operated element, a circuit adapted to be closed for actuating said last mentioned means, a manually actuated switch for closing said circuit to operate said mechanism and move said platen to print holding position, means for immediately opening said switch, a second switch moved to open said circuit when said platen moves to print holding position, a conductor extending about said manually opened switch and a third switch in said conductor closed when said platen moves to print holding position, and time controlled mechanism for closing said last mentioned switch to again close said circuit and actuate said element to operate said mechanism and move said platen to inoperative position.

11. A photographic printing machine having in combination, means for holding a print in position for printing, means for moving said means to and from print holding position, a switch controlled by the operator for closing a circuit to actuate said last mentioned means to move said first mentioned means to print holding position, and a second switch for closing a circuit to actuate said last mentioned means to move said first mentioned means from print holding position.

12. The structure set forth in claim 11, and automatic means for operating said second switch.

13. A photographic printing machine having in combination, means for holding a print in position for printing, means for moving said means to and from print holding position, a switch controlled by the operator for closing a circuit to actuate said last mentioned means to move said first mentioned means to print holding position, a second switch automatically operated to hold said circuit closed when said first mentioned means moves to print holding position, a third switch automatically opened to break said circuit when said first mentioned means moves to print holding position, and timing

means for subsequently closing said last mentioned switch to actuate said second mentioned means to move said first mentioned means from print holding position.

14. A photographic printing machine having in combination a light chamber, a platen for holding a print in printing position over said light chamber, mechanism for moving said platen, a driver, and means including an electro-magnet for connecting said driver and mechanism to move said platen to print holding position.

15. A photographic printing machine having in combination, means for holding a print in print holding position, electrically operated means for moving said means to and from print holding position, a switch adapted to be momentarily closed by the operator to actuate said second mentioned means to move said first mentioned means to print holding position, and a switch operated after a determined period of time to again actuate said second mentioned means to move said first mentioned means from print holding position.

16. A photographic printing machine having in combination, means for holding a photographic print in printing position and movable to and from printing position, a power means, mechanism for moving said first mentioned means to print holding position, manually controlled means for connecting said second mentioned means and mechanism to move said first mentioned means to print holding position, and means for variably predetermining the interval said print holding means can remain in print holding position.

17. A photographic printing machine having in combination, a light chamber, a platen for holding a print in printing position over said light chamber, a driver, mechanism for moving said platen, means adapted to be actuated by the operator for connecting said driver and mechanism to move said platen to print holding position, and automatically acting means for again connecting said driver and mechanism to raise said platen to inoperative position.

18. A photographic printing machine having in combination, a light chamber, a platen for holding a print in printing position over said light chamber, a continuously running motor, a half-revolution clutch, mechanism for moving said platen to print holding or inoperative position respectively upon operation of said half-revolution clutch, and means including an electro-magnet for operating said half-revolution clutch to connect said motor and mechanism to move said platen to print holding position.

19. A photographic printing machine having in combination, a light chamber, a platen for holding a print in printing position over said light chamber, mechanism for moving said platen to print holding position, a power means for actuating said mechanism, a switch closed by the operator, means actuated by the closing of said switch for causing said power means to operate said mechanism, and means for variably predetermining the interval said platen can remain in print holding position.

20. The structure set forth in claim 19, a lamp to which said print is exposed, a switch for controlling the circuit of said lamp, and means operated when said platen is depressed for closing said switch.

21. A photographic printing machine having in combination, a light chamber, a platen for holding a print in printing position over said light chamber, a manually operated switch, a power means, mechanism for depressing said platen, means actuated by the closing of said switch for connecting said power means and mechanism for depressing said platen, and means for variably predetermining the interval said platen can remain in print holding position.

22. The structure set forth in claim 21, and means operated when said platen is depressed, for disconnecting said power means and platen.

23. A photographic printing machine having in combination, a light chamber, a platen for holding a print exposed to light, a manually operated switch, a power means, a mechanism for depressing said platen, and means including an electro-magnet for connecting said power means and mechanism, a second switch for controlling said electro-magnet, means for opening said second switch when said platen is depressed, means for again closing said second switch, and timing mechanism controlling said last mentioned means whereby said mechanism is again operated and said platen raised.

24. A photographic printing machine having in combination, a light chamber, a platen for holding a print in printing position over said light chamber, mechanism for moving said platen, means for including an electro-magnet controlling said mechanism, a switch adapted to be closed by the operator for actuating said means and depress said platen, a lamp for affecting said print, a second switch controlling said electro-magnet, a light switch for controlling the circuit of said lamp, a member operated upon movement of said first mentioned means to open said second switch and render inoperative said electro-magnet and to close said light switch, a time controlled means operating said last mentioned member to open said light switch and close said second switch for operating said mechanism to raise said platen.

25. A photographic printing machine having in combination, a light chamber, a platen for holding a print in printing position over said light chamber, power means, means in-

cluding an elector-magnet for actuating said power means to depress said platen, a switch opened when said platen is depressed to de-energize said electro-magnet and render inoperative said power means, a time-controlled means for closing said switch to again actuate said power means for raising said platen.

26. The structure set forth in claim 25, and means adjacent the operator's position for adjusting the period of operation of said time controlled means.

27. A photographic printing machine having in combination, means for holding a print exposed to light, a motor, means for actuating said means from said motor, means for terminating the operation of said first mentioned means, and time controlled means for determining the time of operation of said last mentioned means and thus the length of exposure of said print.

28. A photographic printing machine having in combination, means for holding a print exposed to light, a motor, means for making a certain definite rotative movement actuated from said motor, means for moving said first mentioned means to and from print holding position, and means for connecting said first mentioned means and motor for actuating said third mentioned means.

29. The structure set forth in claim 28, a timing mechanism set by the operation of said third mentioned means, and means controlled by said timing mechanism for again actuating said second mentioned means to move said first mentioned means from print holding position.

30. A printing device having in combination, means for holding a print exposed to light, a motor, a mechanism adapted to be driven by said motor for actuating said means, means actuated by the operator for connecting said mechanism and motor, and means operated upon actuation of said first mentioned means for disconnecting said motor and mechanism.

31. The structure set forth in claim 30, and a timing mechanism operating automatically to again connect said motor and mechanism to render inoperative said first mentioned means.

32. A printing device having in combination, means for holding a print exposed to light, a motor, a mechanism adapted to be driven by said motor for actuating said means, means actuated by the operator for connecting said mechanism and motor, means for disconnecting said mechanism and motor after said first mentioned means has been placed in operation, a timing mechanism set by said mechanism when said first mentioned means is operated, and means for rendering said first mentioned means inoperative controlled by said timing mechanism to determine the period of exposure.

33. A printing machine having in combination, means for holding a print exposed to light, a driver, mechanism adapted to be connected to said driver for placing said first mentioned means in operation, electro-magnetic means for connecting said driver and mechanism, a switch adapted to be closed by the operator to actuate said electro-magnetic means, a second switch opened when said first mentioned switch is operated for de-energizing said electro-magnetic means, and disconnecting said mechanism and driver.

34. A photographic printing machine having in combination, means for holding a print in printing position, means for moving said means to and from print holding position, a manually operated member, a power driven mechanism, electrically controlled means controlled by said manually operated member for causing said mechanism to actuate said second mentioned means to move said first mentioned means to print holding position, and means for variably predetermining the interval said print can be held in printing position.

35. A photographic printing machine having in combination, a light chamber, printing lamps in said chamber, means for holding a print in printing position over said chamber, a power driven mechanism for moving said first mentioned means to print holding position and lighting said lamps, and timing mechanism actuated by said mechanism when moving said print holding means to print holding position, for subsequently operating said mechanism to move said first mentioned means from print holding position and extinguishing said lamps.

36. The structure set forth in claim 18, and a timing mechanism for again actuating said half-revolution clutch to move said platen to inoperative position.

37. An attachment for a printing machine having a platen movable to and from print holding position, having in combination, a member connectable to said platen, means for reciprocating said member to move said platen to and from print holding position, power actuated mechanism for operating said means to move said platen to print holding position, and a starting switch adapted to be closed by the operator to cause said power actuated mechanism to become operative, said starting switch being capable of movement to open position while said power actuated mechanism is operative.

38. The combination as specified in claim 37, and means for retaining said platen in print holding position for a predetermined period of time.

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