P. A. FRIEDELL.

PHOTOGRAPHIC PRINTING MACHINE.

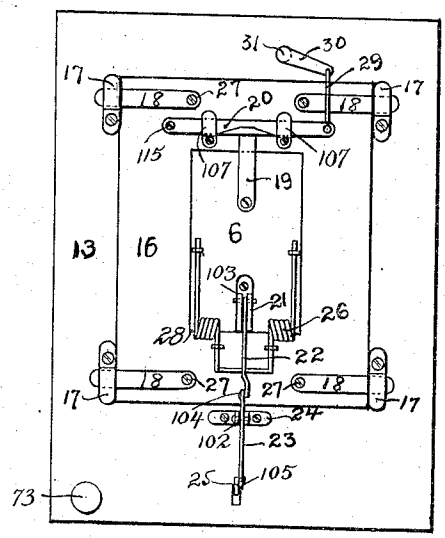
APPLICATION FILED MAR. 22, 1913.

1,168,622.

Patented Jan. 18, 1916.

3 SHEETS—SHEET 1.

Fig 1.



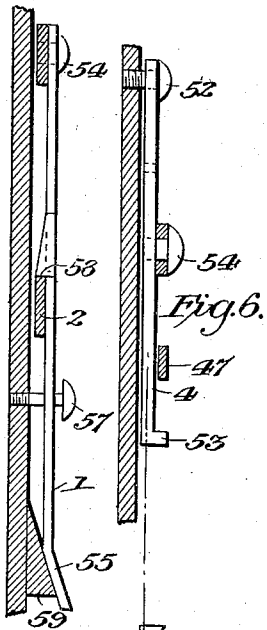
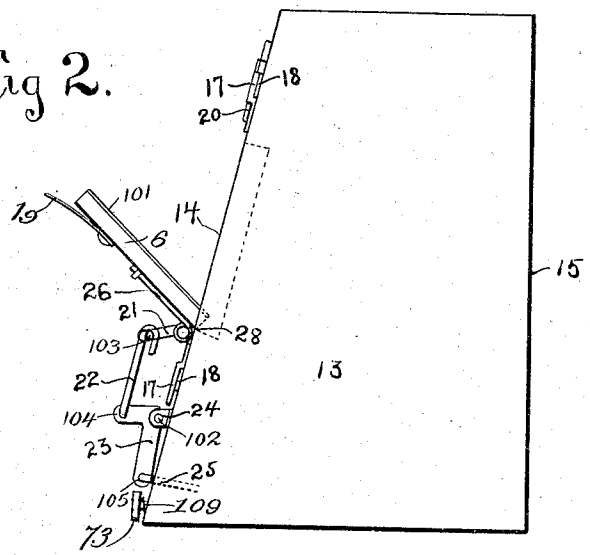


Fig. 5.

Fig. 6.

Fig 2.



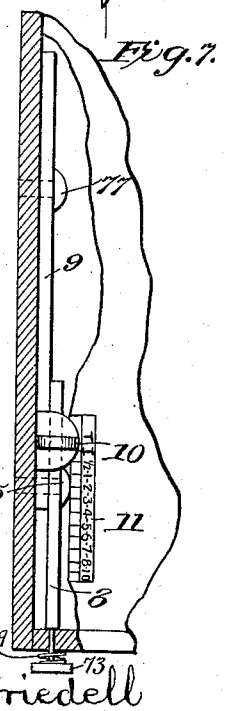


Fig. 7.

Witnesses

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3 SHEETS—SHEET 2.

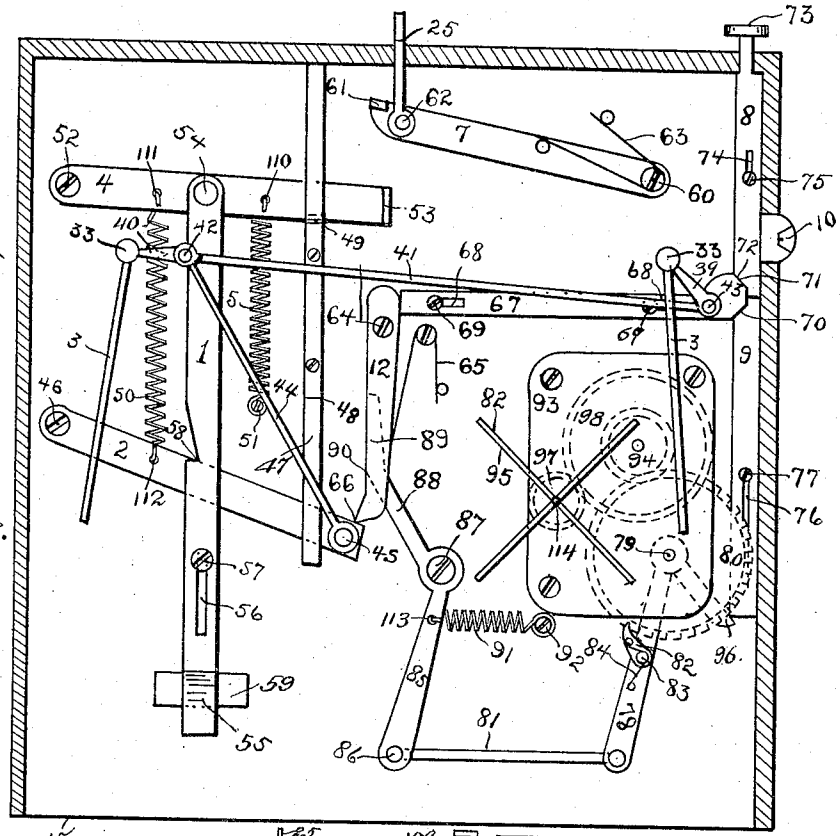


Fig. 8.

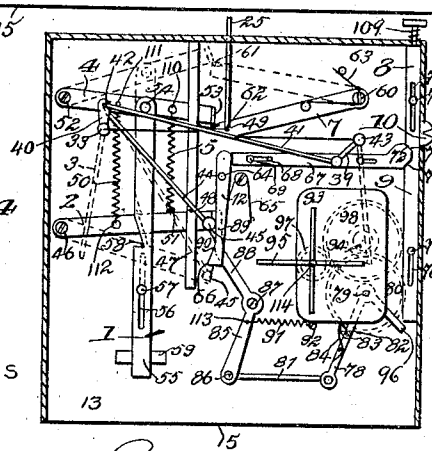


Fig. 4

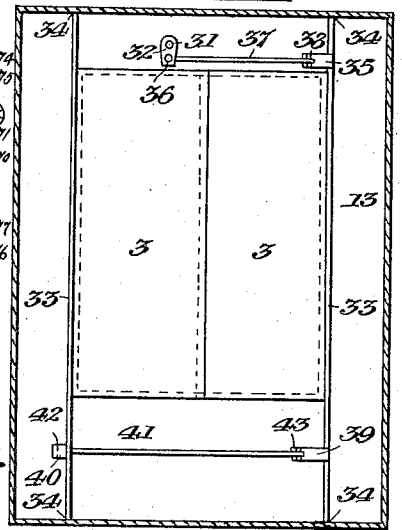


Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 9.

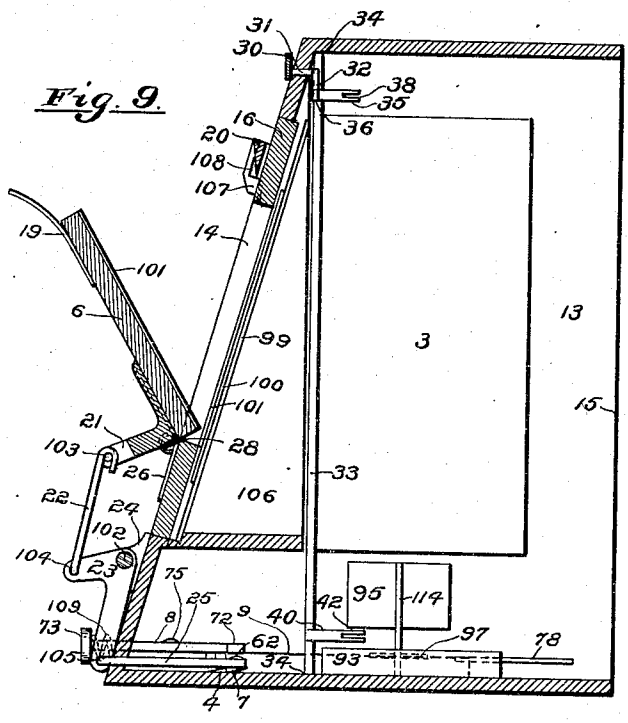
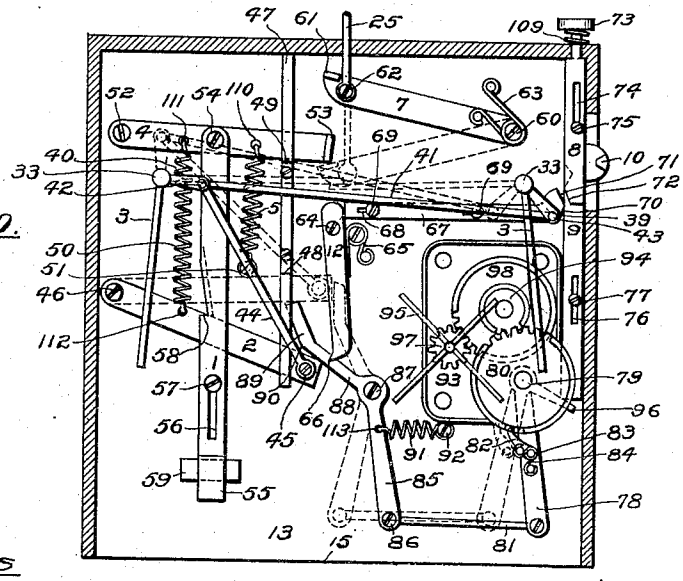


Fig. 10.



WITNESSES

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UNITED STATES PATENT OFFICE.

PHILIP A. FRIEDELL, OF NEW YORK MILLS, MINNESOTA.

PHOTOGRAPHIC-PRINTING MACHINE.

1,168,622. Specification of Letters Patent. Patented Jan. 18, 1916.

Application filed March 22, 1913. Serial No. 756,245.

To all whom it may concern:

Be it known that I, PHILIP A. FRIEDELL, residing in the village of New York Mills, State of Minnesota, have invented certain Improvements in Photographic-Printing Machines, of which the following is a specification.

In the accompanying drawings, Figure 1 is a front elevation of the printing machine, showing the platen closed as when an exposure is being made. Fig. 2 is a side elevation, with platen open. Fig. 3 is a sectional rear elevation, showing the leaves or shutters closed and the latch operating mechanism, all other mechanism removed. Fig. 4 is a sectional plan of the bottom of the printing machine showing the mechanism in position, set ready for a time exposure. Fig. 5 is a sectional elevation showing the transmission lever and the beveled block which raises and disengages this lever from the shutter actuating lever. Fig. 6 is a sectional elevation showing the power lever and a section of the guard and of the pivoted end of the transmission lever. Fig. 7 is a sectional elevation showing the timer regulating bar, exposure indicator, and time exposure release bar. Fig. 8 is a sectional plan of the bottom of the printing chamber, showing the mechanism in position as when a time exposure is being made. Fig. 9 is a sectional side elevation, showing the negative holding means. Fig. 10 is a sectional plan of the bottom of the printing machine showing the mechanism in position as when a slow instantaneous exposure is being made, the mechanism assuming the positions shown by the dotted lines when the exposure is completed.

Similar characters of reference refer to similar parts throughout the several views.

The exposure chamber 13 is designed with an interchangeable negative holder 16 of suitable size for the largest negatives to be printed from, and an opening in the back to admit light from a window or other means of lighting, to the negative. The interchangeable negative holder is held in place and into absolute contact with the negative 100 by the springs 18, pivoted at 27, and sprung under the clips 17, against the transparent plate 99, and is covered on its inner surface with a resilient material 101. Fitting into the opening 14, in the center of the negative holder 16 is the platen 6, hinged at the bottom 28. At the top of the platen 6 is the spring 19 which clips under the lock 20 for keeping the platen in a closed position during an exposure. At the lower part of the platen 6 is located the lever 21, which through the closing of the platen 6, transmits power to the mechanism for operating the printing machine, by the rod 22, the bell crank lever 23 pivoted at 102 thence through the rod 25 to the lever 7. At the bottom of the platen 6 is also the spring 26 which throws the platen 6 to an open position when the lock 20 is released. The lock 20 is pivoted at 115 and has the rod 29 attached at its opposite end which hooks into the lever 30. The object of the interchangeable negative carrier is to provide means for printing any size negative or sensitive surface by the changing of negative carriers having a platen and opening the size of the prints to be made. A complete interchangeable negative carrier consists of the following parts; 16, 18, 19, 20, 21, 22, 26, 27, 28, 29, 115, 6, 101, 107, 108 and 103. The lever 30 is pivoted through the printing chamber 13 at 31 to the lever 32 (Fig. 3). Inside of the printing chamber back of the negative carrier are the leaves 3 swinging with the pivots 33 pivoted at 34. At the top of the pivot 33 is the projection 35 to which the rod 37 is pivoted at 38, the opposite end of said rod 37 being pivoted to the lever 32 at 36. At the lower end of the pivots 33 are the projections 39 and 40 one leading forward, the other leading back. Pivotally connecting the two projections 39 and 40 is the rod 41 pivoted at 42 and 43, which causes the leaves to work in unison. Also pivoted to the projection 40 at 42 is the rod 44, Fig. 8, the opposite end of said rod 44 being pivoted to the lever 2 at 45. The lever 2 is pivoted to the printing chamber at 46, and slides under the guard 47 as far as the shoulder 48. The lever 2 derives its power from the spring 50, connected between the levers 2 and 4 at 111 and 112. The lever 4 derives its power from the spring 5 which is attached to the bottom of the printing chamber at 51 and to the lever 4 at 110. The lever 4 is pivoted to the bottom of the printing chamber at 52, and at its opposite end has the shoulder 53 for the engagement of the lever 7. The lever 4 also has pivoted to it at 54 the lever 1 for transmitting power to the lever 2. The lever 1 is bent upward at 55 and has the slot 56 through which the

pin 57 projects, for keeping the lever 1 in position. Lever 1 also has the shoulder 58 for engaging the lever 2 as shown in Fig. 5. Fastened to the bottom of the printing chamber is the block 59, which raises the lever 1 when sliding over block 59 at the time the leaves are wide open, disengaging the lever 2 from the lug 58 and allowing lever 2 to return to its normal position, closing the leaves.

Lever 7 is pivoted at 60 and has the shoulder 61 for engaging the shoulder 53 on lever 4, and has the rod 25 (Fig. 1) pivoted at 62. The spring 63 returns the lever 7 to its normal position when the platen 6 is opened. The time lever 12 is pivoted at 64. The spring 65 normally keeps the lever 12 in a position so the end 66 engages the lever 2 upon closing. The bar 67 has the slots 68 through which the pins 69 project for keeping bar 67 in proper place. At the end of bar 67 are the shoulders 70 and 71. The bar 8 has the shoulder 72 and the button 73 and the slot 74 through which the pin 75 passes the spring 109 normally keeping the button and bar in a forward position. Under the bar 8 is the bar 9 having thereon the indicator 10 and the slot 76 through which passes the pin 77. The bar 9 engages the end of lever 96. Lever 96 is pivoted at 79 on the axis of the gear wheel 80, and has the arm 78, to which is pivoted, at its outer end the rod 81. The pawl 82 is also pivoted to the arm 78 at 83, the spring 84 keeping the pawl in engagement with the teeth of the gear wheel 80. The rod 81 is pivoted into the lever 85 at 86. The lever 85 is pivoted at 87 and has the arm 88, which engages the lever 2 in automatic short time exposures. The arm 88 has the part 89 parallel with the path of lever 2 so as to offer no resistance to the closing of the leaves after the lever 2 from the lug 58, has passed the point 90. The spring 91, attached at 92 draws the lever 85 backward for short automatic time exposures, thereby offering resistance to the closing of the leaves. The timer consisting of the gear wheels 80, 94, 98 and 97 and the fan 95 and the case 93.

The action is as follows: A negative is placed in the negative carrier 16 and centered according to the part to be printed under the platen 6. The negative carrier 16 is placed in position and the springs 18 clipped under the clips 17 and the rods 22 and 29 connected. A sheet of photo sensitive material is placed into the opening in the negative carrier 16 between the platen and the negative, the platen 6 is pushed shut by the spring 19 which locks under the lock 20. Simultaneously, the lever 21 through the rod 22, the lever 23 and the rod 25 draws the lever 7 forward. The lever 7 engages the shoulder 53 of the lever 4, drawing the lever 4 forward with the lever 1, and draws the springs 5 and 50 storing power in the springs 5 and 50. The shoulder 58 on the lever 1 engages the lever 2, the shoulder 61 on the lever 7 passes the shoulder 53 on the lever 4, thereby releasing the lever 4. The spring 5 draws the lever 4 back at the same time through the lever 1 pushing the lever 2 out and drawing the leaves open. The upward turned part 55 of lever 1 slides over and is raised up by the block 59, thereby disengaging the lever 2. The lever 2 drawn by the spring 50 is drawn back to its normal position, closing the leaves. The leaves in closing through the lever 35 and the rod 37 swings the lever 32, thereby raising the lever 30 and the lock 20 thereby releasing the lock 20 on the spring 19. The platen 6 being released swings back allowing the lever 7 to return to its normal position as shown in Fig. 4. In making time exposures the indicator 10 is set to the T on the scale 11 which moves the bar 9 to the point shown in Fig. 8 thereby holding the arm 88 out of engagement with the lever 2 through the levers 96 and 78. The lever 12 engages the lever 2 on its return holding the lever 2 in the position shown in Fig. 8 until the button 73 is pushed inward, which through the bar 67 moves the lever 12 out of engagement with the lever 2, allowing the lever 2 to return to its normal position, closing the leaves. In instantaneous exposures, the indicator 10 is set to the I on the scale 11, which moves and holds the lever 12 out of engagement with the lever 2 through the bar 67 at the same time not allowing the arm 88 to come into engagement with the lever 2. In slow instantaneous or short automatic time exposures the indicator is set to the time shown on the scale 11. The lever 2 swings to the position shown in Fig. 8 the spring 91 throws the arm 88 into engagement with the lever 2, the arm 96 is swung back as far as the bar 9 will permit it to go, the pawl 82 on lever 78 engages the teeth of the gear wheel 80, the lever 2 moves the lever arm 88 thereby pulling the gear wheel 80 forward and propelling the fan 95 through the gear train 80, 94, 98, 97. As soon as the lever 2 has reached the point 90, the lever arm 88 offers no more resistance allowing the lever 2 to close the leaves instantly.

I claim;

1. In an automatic photographic printing machine, a printing chamber, a negative carrier, means for admitting either artificial or daylight to said negative carrier, means for closing out said light from said negative carrier, said means consisting of leaves or segments which are normally closed in a position back of said negative carrier, means for opening and closing said leaves or segments, means for holding said leaves or segments in an open position for a predeter-

mined time, a platen, means for transmitting power to mechanism for operating said printing machine through the closing of said platen, means for automatically locking said platen during an exposure, means for automatically unlocking said locking means at the completion of an exposure, a timer for regulating the duration of exposure, and means for automatically resetting said printing machine for the next exposure.

2. In an automatic photographic printing machine, in combination, a light chamber, a negative carrier, clamping means on said negative carrier for immovably holding a negative in said negative carrier, so any desired part of said negative may be printed from, and for holding said negative carrier in position, a platen, automatic locking means for said platen, a spring for normally holding said platen in an open position, means in combination with said platen for transmitting power to mechanism for operating said printing machine, leaves or segments for normally closing communication of light to said negative carrier, means for automatically opening and closing said leaves or segments, means for holding said leaves or segments in an open position for a predetermined period, and means for automatically unlocking said platen at the completion of an exposure, means for automatically resetting said mechanism for the next exposure, and a timer consisting of a multiplicity of gear wheels for regulating the duration of exposure.

3. In an automatic photographic printing machine, a light chamber, a negative carrier, spring members for holding said negative carrier in position and immovably holding a negative in said negative carrier, a platen, means for normally holding said platen in an open position, means for automatically holding said platen in a closed position during an exposure, means for automatically releasing said holding means at the completion of an exposure, means for closing out light from said negative carrier, said means consisting of leaves or segments back of said negative carrier, means for automatically operating said printing machine by the transmission of power through the closing of the platen, by springs or other means, whereby all other operations of the printing machine are carried out automatically, said mechanism being automatically released at the instant the platen is entirely closed, simultaneously automatically locking said platen in a closed position and opening the leaves or segments, means for holding said leaves or segments in an open position for time exposures, means for releasing said mechanism, means for holding said leaves or segments open for a predetermined time, means for regulating the duration of exposure, and means for closing said leaves or segments, and means for automatically resetting the mechanism for the next exposure.

4. In an automatic photographic printing machine, in combination, a printing chamber, a negative carrier, a platen, means for normally holding said platen in an open position, means for automatically locking said platen in a closed position, means for transmitting power to mechanism for operating the printing machine whereby all operations of said printing machine are carried out automatically, leaves or segments normally closing out light from said negative carrier, means for automatically opening said leaves or segments, means for automatically holding said leaves or segments in an open position for a predetermined time, means for holding said leaves or segments open for long time exposures, means for releasing said holding means, means for automatically closing said leaves or segments, means for moving said holding means out of engagement with said mechanism for instantaneous exposures, means for regulating the duration of exposure, means for automatically unlocking the platen, allowing said platen to return to an open position at the completion of an exposure, simultaneously automatically resetting said mechanism for the next exposure.

5. In an automatic photographic printing machine, a printing chamber, an exposure opening, leaves or segments for opening and closing said exposure opening a negative carrier, a platen, locking and unlocking means for said platen, a spring carried by said platen for normally keeping said platen in an open position a lever carried by said platen, whereby the act of closing said platen transmits power to a mechanism for opening and closing said leaves and operating a timing device, a timing device consisting of a multiplicity of gear wheels connected to a fan arrangement, a lever carried by said timer, a pawl on said lever for engaging the teeth of the main gear wheel, means for controlling the movement of said lever in one direction, movement of the lever in the opposite direction being performed by the mechanism for opening and closing the leaves or segments, whereby the act of closing said leaves or segments is retarded for a determined period, means for putting out of engagement with said mechanism said timer, for instantaneous exposures and time exposures, automatic means for locking said leaves or segments in an open position for time exposures, means for releasing said mechanism whereby the mechanism closes said leaves or segments, means for regulating the duration of exposure, means for unlocking said platen whereby said platen returns to an open position, in turn resetting said mechanism for the next exposure.

6. In a photographic printing machine, a printing chamber, an exposure opening, leaves or segments for opening and closing said exposure opening, mechanism for opening and closing said leaves or segments, a timing device for governing the operation of said mechanism whereby said leaves or segments can be regulated for instantaneous slow instantaneous and time exposures of different duration, a negative carrier, a platen, means for locking said platen in a closed position, means for unlocking said locking means upon the completion of an exposure, a spring for throwing said platen open when said lock is released, a lever carried by said platen for transmitting power to the mechanism for operating said printing machine.

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Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."