Dec. 31, 1935. L. LYLE 2,025,755

PHOTOGRAPHIC PRINTING MACHINE

Filed Aug. 19, 1933 2 Sheets-Sheet 1

Fig. 1.

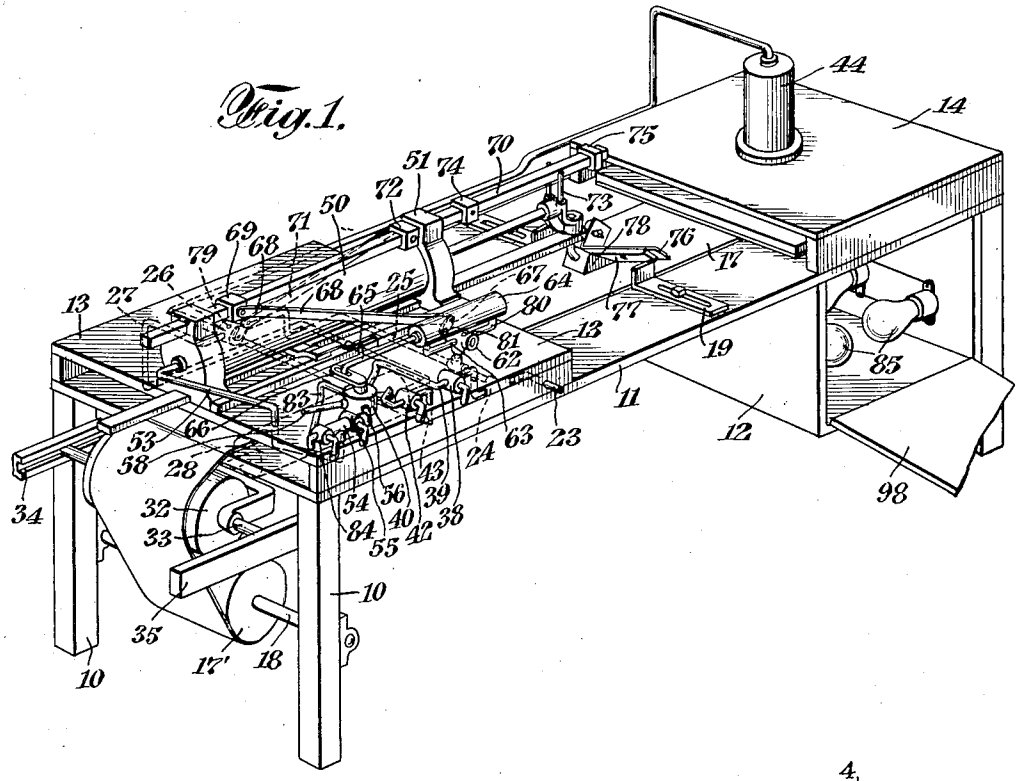
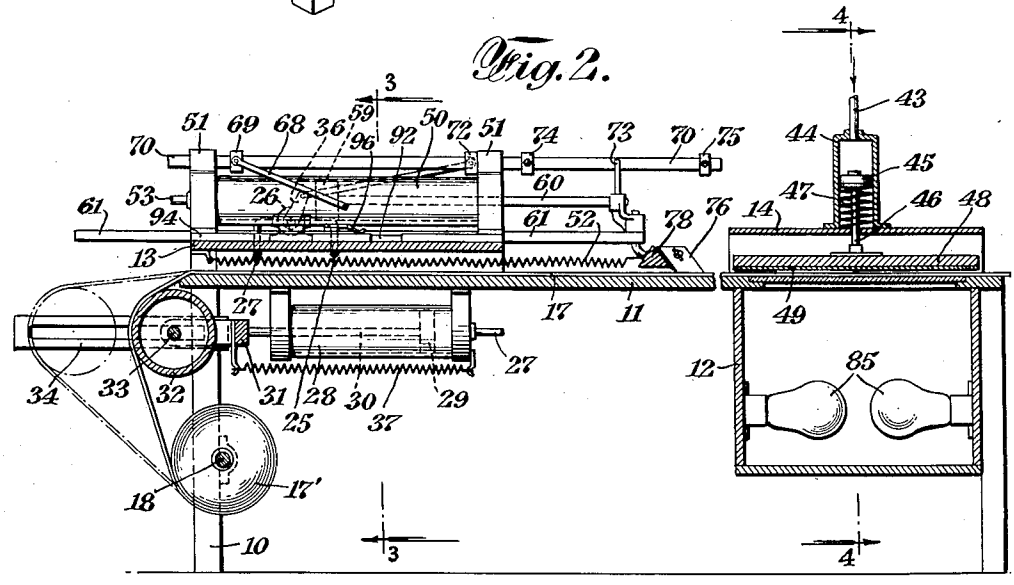


Fig. 2.



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Filed Aug. 19, 1933 2 Sheets-Sheet 2

Fig. 3.

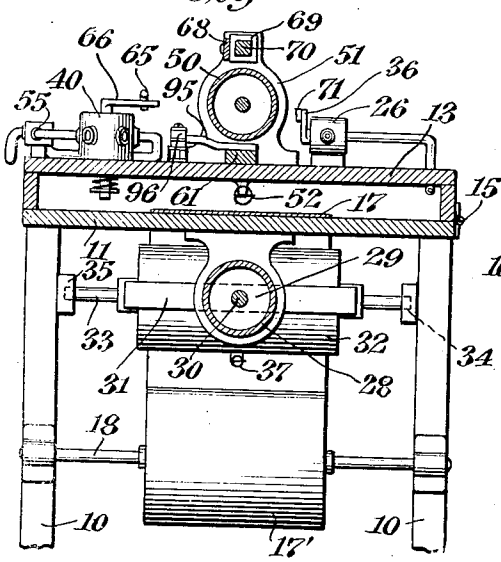


Fig. 4.

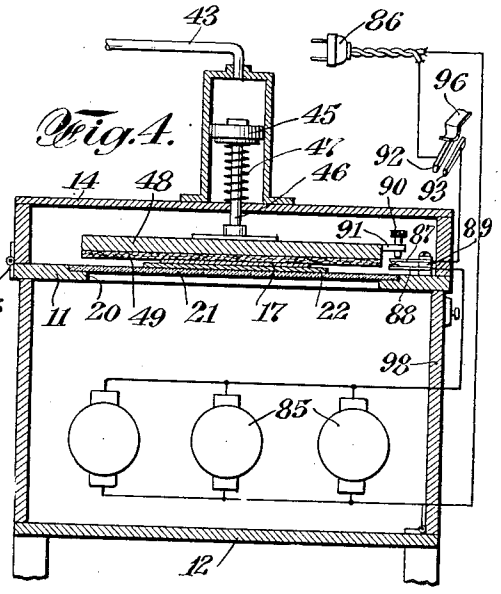


Fig. 5.

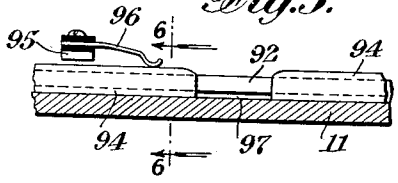


Fig. 6.

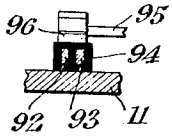


Fig. 7.

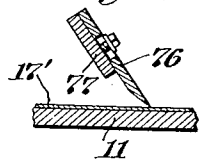
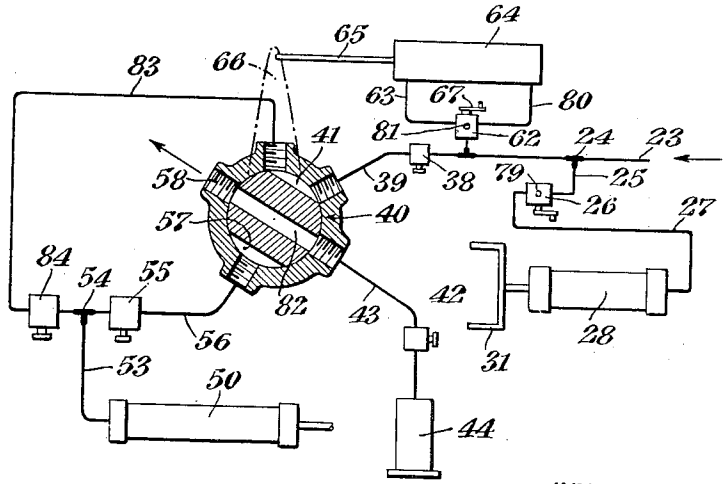


Fig. 8.



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UNITED STATES PATENT OFFICE

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PHOTOGRAPHIC PRINTING MACHINE

Leslie Lyle, Helena, Mont., assignor of three-tenths to Charles F. Farmer, Helena, Mont.

Application August 19, 1933, Serial No. 685,870

18 Claims. (Cl. 95—75)

This invention relates to the art of photographic printing and is more particularly concerned with means for automatically producing a plurality of such prints.

An object of this invention is to provide a new and improved automatic photographic printing machine which is operated by means of a fluid under pressure. It is another object of this invention to provide for the making of photographic prints of different sizes. Another object provides means for regulating the length of time of exposure and the speed of operations. A still further object of the invention provides for accurate and precise cooperation between the exposure and feeding mechanism during any printing cycle. As another object of the invention there is provided a machine which is entirely operated from a single energy source and in which there is a novel method of supplying sensitized material to the exposing operation.

In a preferred embodiment of one machine made in accordance with this invention, a roll of sensitized material is caused to pass over a slacking device and along the top of a printing table. At the front end of this table there is a reciprocating feeding and measuring mechanism operated entirely by means of compressed air flowing through a series of control and regulating valves. At the back of the table there is an exposure zone and means for holding the sensitized material immovable during exposure. The interrelation between the feeding and the exposing mechanisms is such that the lights, which operate intermittently, are only alight when the holding means for the sensitized material are in the holding position. During this time in the preferred embodiment, the feeding mechanism is on its return stroke.

Connected to the feeding and measuring mechanism and controlling valves is a slacking device which slackens a predetermined amount of paper from the roll and permits it to be fed forwardly at the proper time. By means of certain valves, the length of time of operation and the length of stroke of the feeding mechanism may be regulated. Regulation of the time necessary to make a stroke is an independent matter for each stroke. The amount of clearance for the holding means is adjustable and again the times for moving into engagement with the sensitized material and out of such engagement are independently controllable through certain valves. These valves directly control the speed of operation and thereby the length of strokes and time of exposure. It is because of certain connections between the exposure circuit and the feeding mechanism that the length of time of exposure is controlled by the regulating valves.

To feed the sensitized material, the feeding mechanism pushes an accurate length into position to be engaged by the holding means during exposure. At this time, the slacking device is withdrawn and certain connections in the exposure circuit made to the holding means prevent exposure until the holding means come into engagement.

The features of the preferred machine are specific objects of this invention.

As a result of the use of a photographic printing machine made in accordance with this invention, the operator may make any number and size of prints; may use various widths of sensitized material; will find that it is easy to insert fresh sensitized material and that the mechanism is comparatively simple and easy to get at.

Other objects and advantages of this invention will be apparent from the description and drawings in which:

Fig. 1 is a view in perspective of a machine made in accordance with the invention, at one phase of its operation in a printing cycle;

Fig. 2 is a cross-sectional view in elevation of the machine in Fig. 1 taken along the length thereof and to one side of the main portions of the feeding and exposure mechanisms;

Fig. 3 is a cross-sectional view in elevation of the front part of the machine taken on lines 3—3 of Fig. 2;

Fig. 4 is a cross-sectional view in elevation taken on line 4—4 of Fig. 2;

Fig. 5 shows in detail the controlling member in the exposure circuit connected to the feeding mechanism;

Fig. 6 is a cross-sectional view on lines 6—6 of Fig. 5;

Fig. 7 is a detailed sectional view of a feeding blade in feeding relation to the sensitized material, and

Fig. 8 is a diagrammatic representation of the pneumatic circuit and valves which operate and control the machine.

Referring to the drawings, 10 indicates a table having a top 11 which carries at one end thereof beneath said top 11 a light box 12. Positioned on the table top 11, one at each end thereof are two platforms 13 and 14, the latter of which is located directly above light box 12. As shown in Figs. 3 and 4, platforms 13 and 14 are hingedly secured at 15 and 16 respectively, thereby permitting them to be swung aside when the sensitized paper 17 and the photographic negatives 22 are placed in position before the machine begins to operate. The sensitized paper 17 is supplied in rolls 17' carried by spindle 18 supported in brackets on the front legs of the table 10. The free end of the paper 17 passes upwardly around a slacking roller 32 and along the middle of the table top 11. Between platforms 13 and 14 are two lateral paper guides 19 adjustable for different widths of paper 17. That portion of the table top 11 immediately

above light box 12 is apertured at 20 and has fitted therein a transparent pane of glass 21. Ordinarily the photographic negatives 22 are affixed directly to the glass 21. The sensitized paper 17 passes over these negatives and at the proper interval the lights in light box 12 go on, exposing the paper 17 and making the desired prints. That portion of the glass 21 which is not covered with negatives may be masked to save as much of the printing paper 17 as possible.

The motive power for the machine is supplied from a source of compressed air which is connected to the fitting 23 at one side of the platform 13. Tracing the path of the air (as best shrown in Fig. 8) through the various parts of the machine when it is in the position shown in Fig. 1 discloses that the air passes through T-fitting 24 into line 25, through valve 26 and thence by means of line 27 into cylinder 28 which is secured underneath table top 11 and beneath platform 13. Within cylinder 28 is piston 29 and piston rod 30 connected at its outer end by means of yoke 31 to a slacking roller 32. The journal 33 of slacking roller 32 extends outside the ends of the yoke 31 and fits into slots 34 in the extended guiding and supporting pieces 35 fastened to the legs of the table 10 above the roll 17' as shown. Movement of the slacking roller 32 outwardly is effected by means of the air entering fitting 23 and passing through valve 26 into the rear of cylinder 28 when the lever 36 of valve 26 is thrown to the right as seen in Fig. 2. Retraction of the slacking roller 32 is effected by means of the spring 37 connected between the bracket supporting cylinder 28 and the bottom of the yoke 31. As will be described later, varying the length of time of admission of air into cylinder 28 will vary the length of the stroke of slacking cylinder 32 and thereby the length of sensitized paper 17 to be fed forwardly during each printing cycle.

Air passes through the other branch of T-fitting 24 (see Fig. 8) through valve 38 and by means of line 39 into the main control valve 40. In one position of the valve 40, line 39 is connected by means of port 41 with valve 42 and line 43, whence it passes into platen cylinder 44. Within this cylinder (see Fig. 4) is furnished piston 45 and piston rod 46 and secured in vertical manner to the top of platform 14 is a confined spring 47 which raises platen 48 away from the glass plate 21 in the exposure zone on table top 11 whenever the air in the cylinder 44 is exhausted. Ordinarily, platen 48 will be faced with some softer material as at 49, such as felt, which will bear directly upon the sensitized paper 17, the negative or negatives 22 and the glass 21 in such respective order.

During admission of air to cylinder 44, the main cylinder 50, which is mounted in brackets 51 on top of platform 13 is being exhausted in the following way. Air flows out of the cylinder 50 under the compulsion of spring 52 through line 53 and thence into T-fitting 54, whence it passes through valve 55 and line 56 into main control valve 40. Within this valve 40 is the port 57 communicating with the exhaust line 58. Interiorly arranged in cylinder 50 is the piston 59 and piston rod 60 rigidly connected at its outer end to a flat sliding guide 61 which carries the feeding devices and is connected to the end of spring 52. The other end of retracting spring 52 is hooked to the under side of platform 13.

A third branch of the air line leading from fitting 24 (see Fig. 8) connects with valve 62 and admits air to line 63 into the front end of cylinder 64 while the rear end exhausts through the vent 81 in valve 62. Inasmuch as the piston and the piston rod 65 of cylinder 64 are connected to the valve lever 66 of main control valve 40, the air will maintain valve lever 66 in its extreme right position (i. e., moved clockwise from the position shown in Fig. 8) and preserve the air passages necessary for the exhaustion of cylinders 44, 50 and the filling of the cylinders 28 and 64. In order that valve 62 will pass the air into cylinder 64 in this manner, valve lever 67 is thrown to the right and held there by means of the rigid link 68 which is connected to collar 69. Collar 69 is secured to control rod 70 which is slidably secured in the top of the brackets 51 with respect to cylinder 50. It is a similar link 71 and collar 72 that maintains valve lever 36 of valve 26 in its rearward or right position as shown in Fig. 2.

Movement of the control rod 70 is limited to a distance equal to the distance between the brackets 51 less the distance between collars 69 and 72. As cylinder 50 is exhausting and piston rod 60 is returning, two upstanding fingers 73 at the outer end of rod 60 will in time engage collar 74 on rod 70 and will move the rod 70 rearwardly (to the left as seen in Fig. 2) until the square collar 69 abuts against the rear bracket 51, thereby moving collar 72 away from forward bracket 51 which is the position in which it is pictured in Fig. 1 of the drawings. The links 71 and 68 which are connected respectively to collars 72 and 69 fixed upon rod 70 move with it and thus throw the valves 26 and 62 respectively. As soon as cylinder 64 fills through pipe 80, piston 65 moves to the left and thereby valve lever 66 is moved to its extreme counter-clockwise position.

The moving parts of valve 40 are thus brought into their extreme counter-clockwise position as shown in Fig. 8 in such manner that (*a*) no further air may flow in line 56, (*b*) line 43 is vented to atmosphere through ports 82 and 58, and (*c*) air is allowed to pass from line 39 through port 41 to line 83. The effect of (*a*) is to prevent further venting of air from main cylinder 50; the effect of (*b*) is to commence venting air from cylinder 44 and thus permit the platen 48 to rise and release the paper at the printing position; and the effect of (*c*) is to admit air to main cylinder 50 to commence the next succeeding forward feeding step of the paper 17. This stage of the cycle of operation is herein referred to as the beginning of the forward or feeding phase.

The admission of air into main cylinder 50 causes the piston 59 therein to move forward (to the right as seen in Fig. 2) and thus to cause piston rod 60 and the sliding guide 61 to move forward to feed an unexposed section of paper 17 to printing position under the platen 48.

The means for feeding the paper 17 are two blades 76, adustably secured to the backing plates 77 which are fastened to a block 78 carried at the extreme forward end of the sliding guide 61. The two blades 76 form an oblique angle, and upon forward movement of the sliding guide 61 take hold of the sensitized paper 17 and feed it forwardly toward the printing position a distance equal to the length of the stroke of piston rod 60, the paper 17 having previously been slackened by the withdrawal of the slacking roller 32. When the rod 60 reaches the predetermined end of its forward stroke, the fingers 73 engage collar 75 and thus move the control rod 70 forwardly, and reversal of the various operating parts of the machine is effected in the following manner.

The forward movement of control rod 70,

through corresponding movement of the links 71 and 68 connected to it, throws the valves 26 and 62 respectively to their opposite positions. Valve 26, which controls the slacking roller, moves to a position such that air is permitted to escape from cylinder 28 through line 27 and vent 79, thereby permitting frame 31 and the slacking roller 32 thereon to move to the right (as seen in Fig. 8) under the influence of spring 37. Valve 62, which controls the operation of the piston in cylinder 64, moves to a position such that air from supply line 23 is permitted to flow through line 63 to one end of cylinder 64 and air is permitted to escape from the other end of cylinder 64 through line 80 and vent 81, thereby causing the piston and its piston rod associated with cylinder 64 to move to the right (as seen in Fig. 8) and thus move valve lever 66 to its extreme clockwise position.

The moving parts of valve 40 are thus brought into their extreme clockwise position (contrast with Fig. 8) in such manner that (*a*) line 56 is vented to atmosphere through ports 57 and 58, (*b*) air is allowed to pass from supply line 39 through port 41 to line 43, and (*c*) no further air may flow in line 83. The effect of (*a*) is to commence venting air from main cylinder 50 through line 53, valve 55 and line 56, thus permitting the sliding guide 61 and piston rod 60 to retreat (to the left as seen in Fig. 2) under the influence of spring 52; the effect of (*b*) is to admit air to cylinder 44 and thus to depress the platen 48 and to secure a portion of the paper at the printing position for the desired exposure; and the effect of (*c*) is to shut off the further feed of air to main cylinder 50 through line 83, valve 84 and line 53. This stage of the cycle of operation is herein referred to as the beginning of the feed mechanism return phase.

The retreat of the sliding guide 61 and the piston rod 60, which with associated parts are herein sometimes referred to as the reciprocable feed mechanism, causes the blades 76 to slide backwardly along the upper surface of the paper 17, which is held stationary during this phase of the cycle of operation by the locking effect of the platen below described.

The depression of the platen 48 causes the same to engage the paper tightly at the printing position, and thus to bring it accurately into focus and at the same time to lock the paper against backward movement as the reciprocable feed mechanism returns toward its starting point.

The smaller control valves 84, 55, 42 and 38 are generally chosen from needle point valves for purposes of accurate and independent adjustment of the times of filling and exhausting the various pneumatic cylinders on the machine. For example, as platen cylinder 44 is exhausted, the air passes through valve 42 and to the exhaust line 58. By regulation of this valve, the time in which it takes spring 47 to lift the platen 48 may be regulated. Similarly, the exhausting of cylinder 50 is controlled by valve 55 and the time of filling thereof by valve 84. Valves 55 and 84 between them control the length of time necessary for two strokes of the cylinder 50. The length of stroke of piston rod 60 is varied by shifting collar 74 on the control rod 70. As soon therefore, as the piston rod 60 has reached the limit of its forward or feeding movement, fingers 73 by means of collar 75 shift the control rod 70 and restore the parts to the position that is shown in Fig. 1, whereupon a reversal in the direction of flow of the air in the various cylinders is effected, so that cylinder 44 begins to fill with air and cylinder 50 begins its exhaust stroke. At the same time, cylinder 64 has reversed its direction of flow and has moved main control valve lever 66 to the right.

The lighting or exposure circuit is so timed that the battery of lights 85 within the light box 12 do not go on until the platen 48 is firmly down and until the feeding mechanism is engaged in its retreating movement toward the rear of the machine. Energy for the lighting circuit is obtained from a socket outlet in which the member 86 is plugged. Contained in the circuit with the plug 86 and the lights 85 are two switches, one of which comprises two spring members 87 and 88 which are fastened to insulated post 89 on table top 11 underneath platform 14. Normally, the blade members are apart and this switch is closed whenever platen 48 descends and brings a projecting member 90, which is fastened by means of bracket 91 to the platen 48, down into engagement with the top blade 87 to press it against the lower blade 88. By these means, the lights 85 can never come on and expose the sensitized paper until the platen 48 is down in a position in which it holds the paper firmly over the negatives 22 and the glass 21.

In series with the switch 87—88 are two separated conducting bars 92 and 93 running parallel to cylinder 50 and secured to the top platform 13 but insulated therefrom and from each other by insulation 94. Secured to the sliding guide 61 is a laterally extending arm 95 which carries a spring-pressed conducting blade 96, also insulated from all parts of the machine, which is broad enough to bridge the distance between the two conducting bars 92 and 93. Inasmuch as the insulation is removed at a point 97 from the two bars 92 and 93, as indicated in Fig. 5, passage of the blade 96 over the bars at point 97 will close the electrical circuit and turn on the lights 85, thereby exposing the sensitized paper in accordance with the objects of this machine. Although blade 96 passes over the exposed bars at 97 on both the forward and backward strokes of piston rod 60, the circuit is only completed when the blade 96 is being retracted along with the feeding mechanism and moving toward the back of the machine, because it is only at this time that the switch 87—88 is closed. During the forward or feeding stroke of the feeding mechanism, platen 48 is raised, lifting member 90 out of the way and opening the circuit at 87—88. Upon the length of the exhaustion period of cylinder 50 will depend the length of time it takes contact 96 to move over the exposed portion 97 of the bars 92 and 93. Insulation 94 covering bars 92 and 93 may be made slidable with respect to the bars so that uncovered portion 97 may be varied in length, thereby varying the length of time of exposure in another manner. In this way, it is possible to regulate the exposure time of the sensitized paper 17 beneath the platen 48. A hinged door 98 on the light box 12 provides ready access to the lighting bulbs 85.

The operation of my photographic printing machine, which is entirely automatic, is as follows: The negative 22 from which prints are to be made is placed on the glass 21 at the printing position (see Fig. 4) and a strip of sensitized paper 17 is drawn from roll 17' and laid as shown in Fig. 2 with the propelling blades 76 of the reciprocable feed mechanism in contact therewith. Assuming the machine is at the beginning of the forward or feeding phase of its cycle, the

reciprocal feed mechanism 60, 61 moves to the right, as seen in Fig. 2, and the blades 76 propel the paper 17 forward in synchronism therewith. Power for such forward movement of the feed mechanism is obtained by admitting compressed air (see Fig. 8) from supply line 23, 39 through port 41, line 83, regulating valve 84 and line 53 to main cylinder 50 where it actuates a piston 60 connected to the feed mechanism. The speed of such forward movement is controlled by adjustment of the rate of flow of such air through valve 84. During the course of such forward movement platen 48 (see Fig. 2) is in raised position to permit the paper beneath it to move. The paper required for such forward feed movement has been previously slacked from the feed roll 17'.

Upon arrival of the feed mechanism near the forward limit of its path of travel, fingers 73 integral therewith engage collar 75 adjustably fixed upon rod 70, and thereby shift rod 70 longitudinally forward. This brings about, through the linkages and means above described, a reversal of operation. Main control valve 40 (see Fig. 8) is moved in a clockwise direction by movement of the piston in cylinder 64 so that further supply of air to the main cylinder 50 is interrupted and air already within cylinder 50 is vented to atmosphere through regulating valve 55, line 56, and ports 57 and 58. This causes the reciprocable feed mechanism to begin to retreat along its path of travel under the influence of spring 52, the blades 76 sliding freely along the paper, at a speed determined by the strength of this spring and by adjustment of the rate at which air is vented from cylinder 50 through valve 55. The clockwise movement of control valve 40 also permits air to pass from supply line 23, 39 through port 41 and line 43 to cylinder 44 which causes the platen 48 to depress and engage the paper at the printing position. The platen remains depressed during the time the reciprocable feed mechanism is retreating. In addition to the foregoing, the shifting forward of rod 70 brings about, through the linkage above described, the movement of valve 26 (see Fig. 8) to such position as to admit air from supply line 23, through valve 26 and line 27 into cylinder 28. This in turn causes yoke 31 and slacking roller 32 carried thereby to move itno the path of travel of the paper adjacent feed roll 17' to draw from this feed roll a sufficient length of paper for the succeeding forward or feeding step.

Upon arrival of the reciprocable feed mechanism near the rearward limit of its path of travel, fingers 73 engage collar 74 adjustbly fixed upon rod 70, and thereby shift rod 70 longitudinally to the rear. This brings about, through the same system of linkages and means above describe, a second reversal of operation to cause a repetition of the forward feeding phase. Main control valve (see Fig. 8) is thereby moved in a counter-clockwise direction so that further venting of air from main cylinder 50 is interrupted and air is admitted to such cylinder through line 83 as set forth above. The counter-clockwise movement of valve 40 also interrupts the supply of air to cylinder 44 and permits air already within that cylinder to vent to atmosphere through line 43 and ports 82 and 58, thus permitting platen 48 (see Fig. 4) to rise under the influence of spring 47 and to release the paper at the printing position. In addition to the foregoing, the rearward shifting of rod 70 brings about, through the linkage already described, the movement of valve 26 (see Fig. 8) to such position as to cut off the supply of air to cylinder 28, and to permit therein to vent to atmosphere through line 27 and vent hole 79, thereby permitting yoke 31 and slacking roller 32 carried thereby to retreat from within the path of travel of the paper adjacent feed roll 17' under the influence of spring 37 (see Fig. 2) and so to slack off enough paper previously drawn from the roll to supply the next succeeding feeding step without tension or resistance.

The operation of the source of illumination in connection with the foregoing is as follows: The lights 83 (see Fig. 4) at the printing position are, as a group, in series with two switches 92, 93, 96 and 87, 88, 90 which are also in series with each other and with a source of current. The first of these switches comprises two bars 92 and 93 insulated from each other and a bridging member 96 secured to and slidable with the reciprocable feed mechanism, and is so arranged that contact is established between the bars through the bridging member during a portion of the forward and during a portion of the retreating movement of the feed mechanism. The other of these switches comprises two spaced leaves 87 and 88 insulated from each other and an adjustable plunger 90 secured to and movable with the platen 48, and is so arranged that when the platen is seated in contact with the paper one leaf 87 is depressed to make contact with the other leaf 88. Since the switches are in series, both must be closed to energize the lights. This occurs only during a portion of the time that the feed mechanism is retreating (when the platen is depressed). The length of time during which the lights are energized is thus dependent on the length of time bridging member 96 is in contact with bars 92 and 93, and this in turn may be adjustably controlled by adjusting the length of the exposed or uninsulated portion of these bars, and by adjusting the rate of speed of the return movement of the feed mechanism in the manner and by the means herein set forth.

Thus, when the machine has been started in its cycle of operation as herein described, it requires only a supply of compressed air through supply line 23 and a source of electric current for the lighting circuit, to assure continuous automatic operation for the making of prints from negatives placed on the glass 21 until the supply of paper on the roll 17' is exhausted.

By modification of the light chamber in a manner which will be obvious from the foregoing, and substituting a projecting device in place of the contact printer herein described, my machine will print projected pictures.

The various modifications and combinations of the new features of this invention will be apparent to those skilled in the art and such changes or modifications are expressly contemplated as coming within the scope of this invention, which is not to be limited except as may be done by the appended claims.

I claim:

1. In a device of the class described, a strip of sensitized paper, a reciprocable carriage adapted to move forward to advance said strip to printing position and then to return to starting position, a reciprocable platen adapted to secure said strip in printing position when said strip has been advanced to printing position and then to release said strip, an electric light at the printing position, a source of current therefor, a line connecting said current source with said light, a first switch in series in said line adapted to be closed

when said platen is in securing position and to be open when the same is in releasing position, and a second switch in series in said line adapted to be closed during a portion of the forward and during a portion of the backward movements of said carriage, whereby the light is in electrical communication with said source of current through both switches on the backward movement of said carriage.

2. In a device of the class described, a strip of sensitized paper, a reciprocable carriage adapted to move forward to advance said strip to printing position and then to return to starting position, a spring to oppose the forward movement of said carriage, a cylinder, a piston therein connected to said carriage, means to admit a compressed fluid into said cylinder to move the piston and said carriage in a forward direction against the opposition of said spring, selective means for venting said fluid to permit return of the carriage under the influence of said spring at a predetermined speed, an electric light at the printing position and a source of current therefor, and a switch in circuit with said light and said source operatively interconnected with said carriage and adapted to be closed upon a partial traverse thereof in either direction and to be opened upon a further traverse thereof.

3. In a photographic printing machine, a reciprocable feed mechanism adapted to feed a strip of sensitized paper intermittently forward to printing position, a source of illumination adjacent the printing position, means on the printing mechanism and effective during a predetermined portion of the return movement thereof to control energization of said illuminating source, and adjustable means to control the speed of the return movement of said feed mechanism and thereby to control the duration of the period within which said source of illumination is energized.

4. In a photographic printing machine, a reciprocable feed mechanism adapted to feed a strip of sensitized paper intermittently forward to printing position, pneumatic means to propel said feed mechanism in one direction, a spring to oppose said movement and, when the pneumatic means is inoperative, to propel said feed mechanism in the opposite direction, a source of illumination adjacent the printing position, means actuated during a predetermined portion of the backward movement of said feed mechanism to energize said source of illumination, and an adjustable valve associated with said pneumatic means for selectively controlling the rate of flow of air therethrough whereby the speed of backward movement of said feed mechanism and the length of time during which energy is supplied to said source of illumination may be selectively controlled.

5. In a photographic printing machine, a reciprocable feed mechanism adapted to feed a strip of sensitized paper intermittently forward to printing position, pneumatic means to propel said mechanism during its forward movement, a source of illumination adjacent the printing position, a switch adapted to be closed during a portion of the backward movement of the feed mechanism to energize said source of illumination, a passageway for venting air from said pneumatic means at the conclusion of a forward movement of said feed mechanism, and an adjustable pressure relief valve for selectively controlling the venting of air from said pneumatic means through said passageway whereby the speed of backward movement of said feed mechanism and in consequence the length of time energy is supplied to said source of illumination may be selectively controlled.

6. The combination with a reciprocable feed mechanism for feeding a strip of material intermittently forward to predetermined position, of a cylinder, a piston therein connected to said feed mechanism, a supply of compressed air for said cylinder adapted when admitted to said cylinder to actuate said piston and move said feed mechanism in one direction, an adjustable control valve for selectively controlling the rate of admission of air to said cylinder whereby the speed of movement in one direction of said feed mechanism may be controlled, and a second adjustable control valve for selectively controlling the rate of venting air from said cylinder whereby the speed of movement in the opposite direction of said feed mechanism may be independently controlled.

7. The combination according to claim 6 wherein a strip of sensitized paper is fed into printing position and there are lights adjacent the printing position, a source of electric power for energizing said lights, and switching mechanism between said source and said lights adapted to connect said source and said lights during a portion of the rearward movement of the feed mechanism, the arrangement being such that adjustment of one of said valves controlling the speed of such rearward movement permits selective adjustment of the length of time during which said lights are energized.

8. The combination with a reciprocable feed mechanism adapted to feed a strip of material step by step forward to predetermined position, of a cylinder, a piston therein adapted to propel said mechanism in one direction when compressed air is admitted to said cylinder, a spring to oppose said movement and, when the pressure in said cylinder is released, to move said feed mechanism in the opposite direction, a first means actuated by the arrival of said feed mechanism near one end of its path of travel to shut off the supply of compressed air to said cylinder and to vent said cylinder whereby said feed mechanism may be moved in the opposite direction under control of the spring, a second means actuated by the arrival of said feed mechanism near the other end of its path of travel to admit compressed air to said cylinder whereby said feed mechanism may be moved in the opposite direction against the resistance of said spring, said first and said second means being selectively adjustable toward and away from each other for selectively determining the length of the path of travel of said feed mechanism.

9. The combination with a reciprocable feed mechanism adapted to feed a strip of material step by step forward to predetermined position, a cylinder, a piston therein adapted to propel said feed mechanism in one direction when compressed air is admitted to said cylinder, a valve adapted in one position to admit compressed air to said cylinder and in another position to vent residual air from said cylinder, a trip actuated by arrival of said feed mechanism near one end of its predetermined path of travel to move the said valve from one of its said positions to the other thereof whereby the direction of movement of said feed mechanism is reversed.

10. The combination according to claim 9 wherein the trip is longitudinally adjustable along

the path of travel of the feed mechanism to permit selective adjustment of the extent of said path of travel.

11. The combination with a reciprocable feed mechanism adapted to feed a strip of material step by step forward to predetermined position, of a cylinder and cooperating piston for moving said feed mechanism in a forward or feeding direction, a spring to oppose said forward movement of the feed mechanism and to cause the same to move in a backward direction at the conclusion of a feeding step, a reciprocable platen adapted to engage the strip at the predetermined position after the conclusion of a feeding step and to release it before the commencement of a succeeding feeding step, a cylinder and cooperating piston for moving said platen in one direction, a source of compressed air, valve mechanism for supplying air from said source to either of said cylinders, a trip actuated upon arrival of said feed mechanism near the forward end of its path of travel adapted to change the position of said valve mechanism whereby air is vented from the first-mentioned cylinder and simultaneously the platen is caused to move to engage the strip, and a second trip actuated upon arrival of said feed mechanism near the rearward end of its path of travel adapted to change the position of said valve whereby air is admitted to said first-mentioned cylinder and simultaneously the platen is caused to release the strip.

12. The combination according to claim 11 wherein one of said trips is longitudinally adjustable along the path of travel of the feed mechanism to permit selective adjustment of the length of said path of travel.

13. The combination with a reciprocable feed mechanism adapted to feed a strip of material step by step forward to predetermined position, of a cylinder and cooperating piston for moving said feed mechanism in a forward or feeding direction, a spring to oppose said forward movement of the feed mechanism and to cause the same to move in a backward direction at the conclusion of a feeding step, a reciprocable platen adapted to engage the paper at the predetermined position after the conclusion of a feeding step and to release it before the commencement of the succeeding feeding step, a cylinder and cooperating piston for moving said platen to strip engaging position, a spring to oppose such motion of the platen and to withdraw from engaging position when released, a source of compressed air, valve mechanism for supplying air from said source alternately to said cylinders and venting air alternately from them. a trip actuated upon arrival of said feed mechanism near the forward end of its path of travel adapted to change the position of said valve mechanism whereby air is vented from said first-mentioned cylinder and air is admitted to said second-mentioned cylinder, and a second trip actuated upon arrival of said feed mechanism near the rearward end of its path of travel adapted to change the position of said valve mechanism whereby air is admitted to said first-mentioned cylinder and air is vented from said second-mentioned cylinder.

14. The combination according to claim 8 wherein a strip of sensitized paper is fed into printing position and there are lights adjacent the printing position, a source of electric power for energizing said lights and switching mechanism between said source and said lights adapted to connect said source and said lights during a portion of the rearward movement of the feeding mechanism, the arrangement being such that adjustment of one of said valves controlling the speed of such rearward movement permits selective adjustment of the length of time during which said lights are energized.

15. The combination according to claim 9, wherein a strip of sensitized paper is fed into printing position, the trip is longitudinally adjustable along the path of travel of the feed mechanism to permit selective adjustment of the extent of said path of travel and there are lights adjacent the printing position, a source of electric power for energizing said lights and switching mechanism between said source and said lights adapted to connect said source and said lights during a portion of the rearward movement of the feeding mechanism, the arrangement being such that adjustment of one of said valves controlling the speed of such rearward movement permits selective adjustment of the length of time during which said lights are energized.

16. The combination according to claim 11 wherein a strip of sensitized paper is fed into printing position, said platen engages the strip in printing position and is withdrawn at the conclusion of the printing step and there are lights adjacent the printing position, a source of electric power for energizing said lights and switching mechanism between said source and said lights adapted to connect said source and said lights during a portion of the rearward movement of the feeding mechanism, the arrangement being such that adjustment of one of said valves controlling the speed of such rearward movement permits selective adjustment of the length of time during which said lights are energized.

17. A machine according to claim 11, wherein a strip of sensitized paper is fed into printing position, one of said trips is longitudinally adjustable along the path of travel of the feed mechanism to permit selective adjustment of the length of said path of travel and there are lights adjacent the printing position, a source of electric power for energizing said lights and switching mechanism between said source and said lights adapted to connect said source and said lights during a portion of the rearward movement of the feeding mechanism, the arrangement being such that adjustment of one of said valves controlling the speed of such rearward movement permits selective adjustment of the length of time during which said lights are energized.

18. The combination according to claim 9, wherein a strip of sensitized paper is fed into printing position and there are lights adjacent the printing position, a source of electric power for energizing said lights and switching mechanism between said source and said lights adapted to connect said source and said lights during a portion of the rearward movement of the feeding mechanism, the arrangement being such that adjustment of one of said valves controlling the speed of such rearward movement permits selective adjustment of the length of time during which said lights are energized.

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