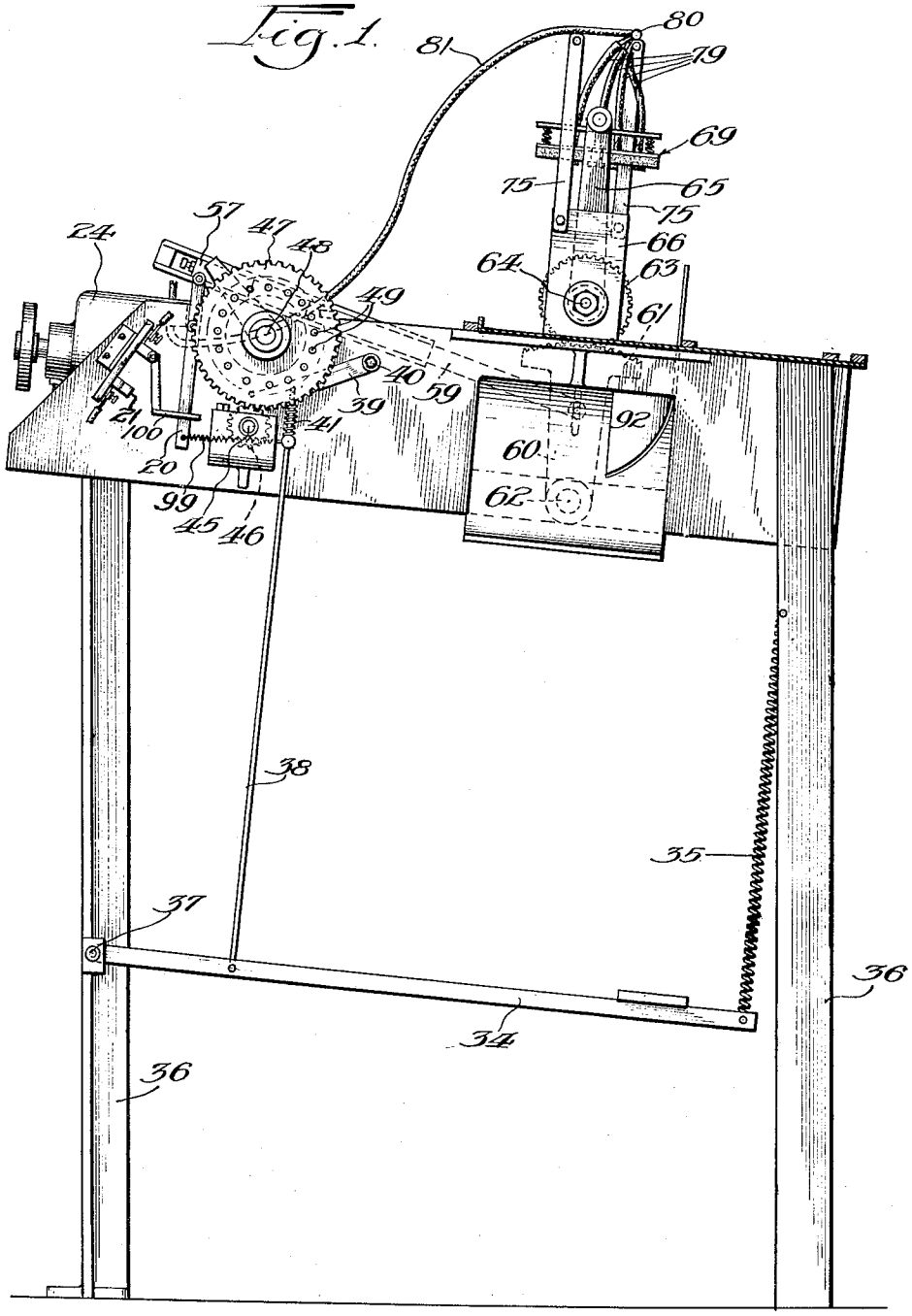
Dec. 9, 1930. S. L. BRIGGS 1,783,953

PICTURE PRINTING MACHINE

Filed Dec. 1, 1926 7 Sheets-Sheet 1

Fig. 1.



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Dec. 9, 1930. S. L. BRIGGS 1,783,953

PICTURE PRINTING MACHINE

Filed Dec. 1, 1926 7 Sheets-Sheet 2

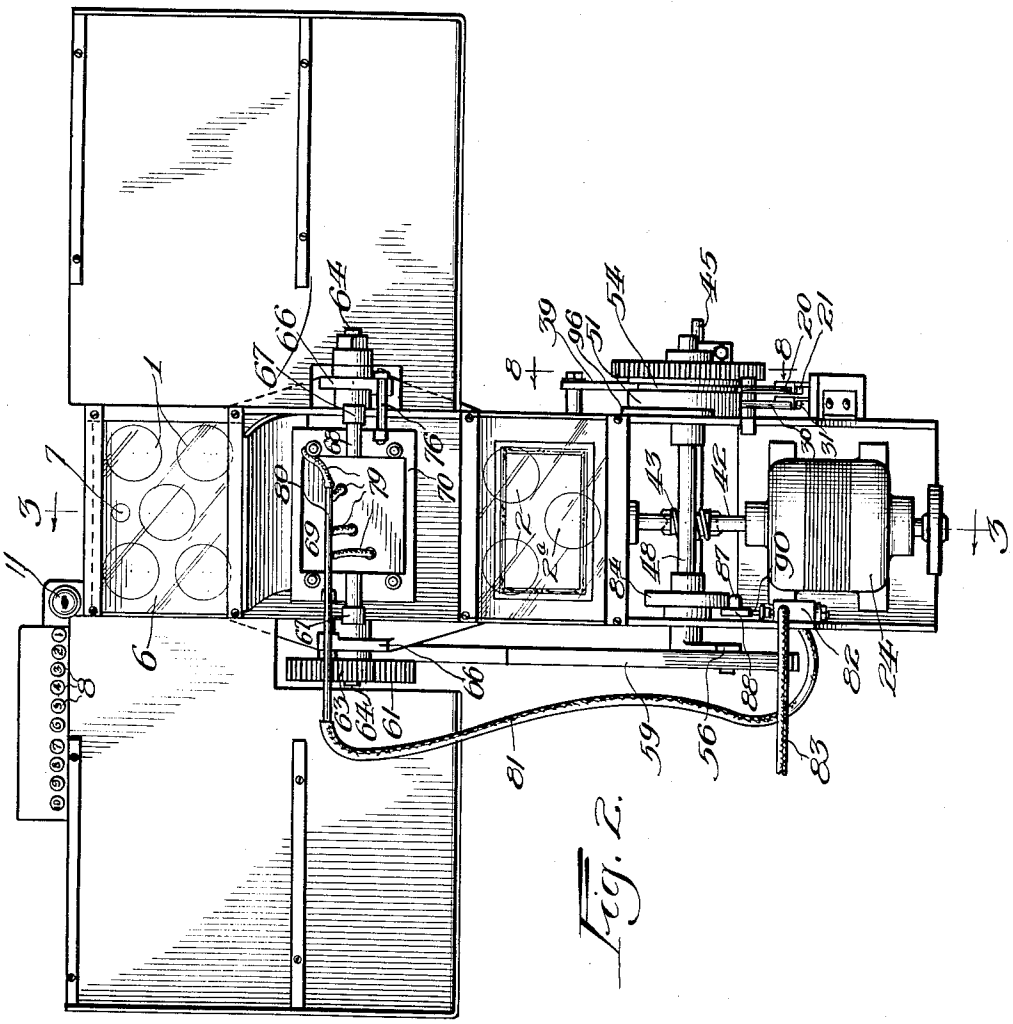


Fig. 2.

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PICTURE PRINTING MACHINE

Filed Dec. 1, 1926 7 Sheets-Sheet 3

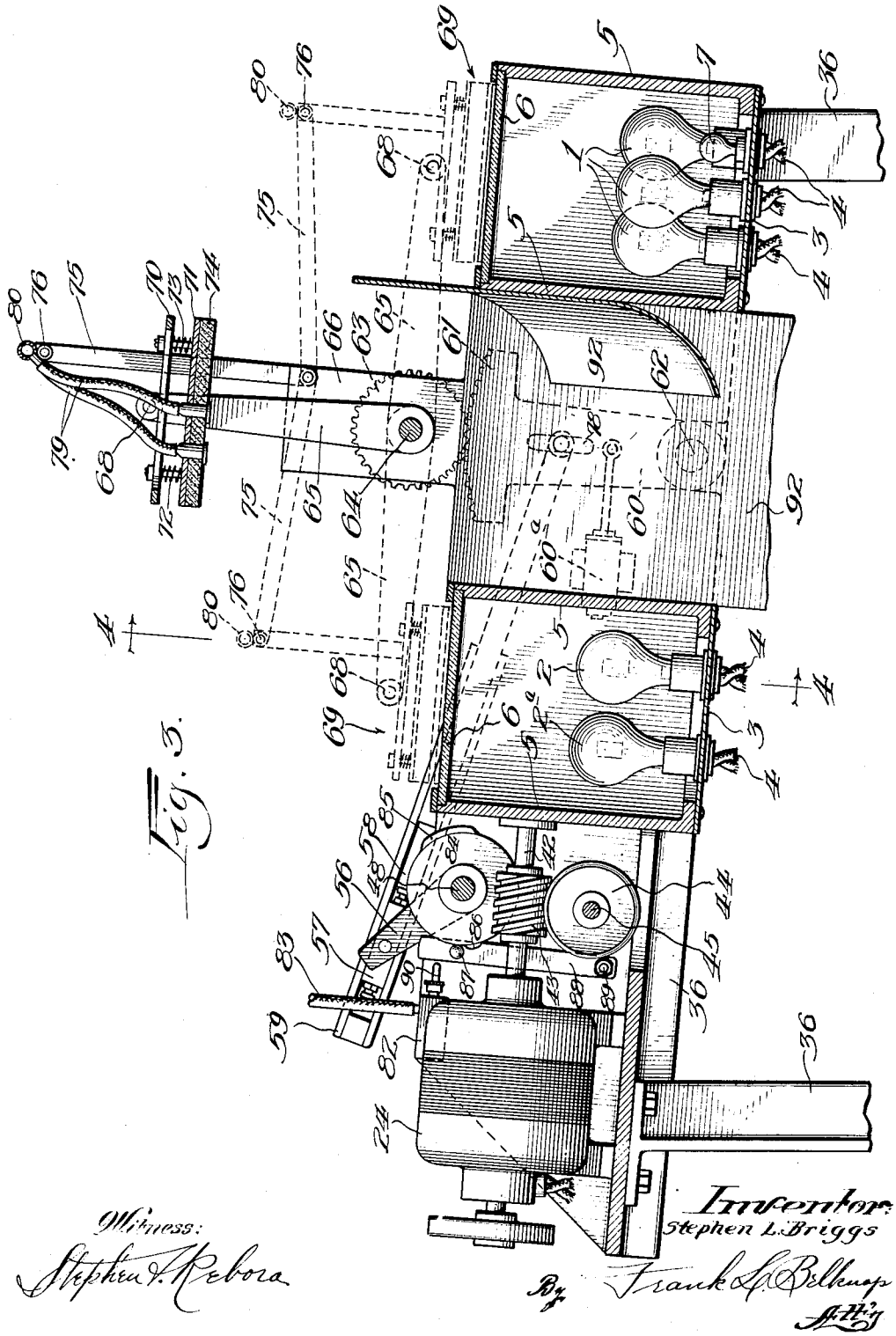


Fig. 5.

Witness:
Stephen V. Rebora

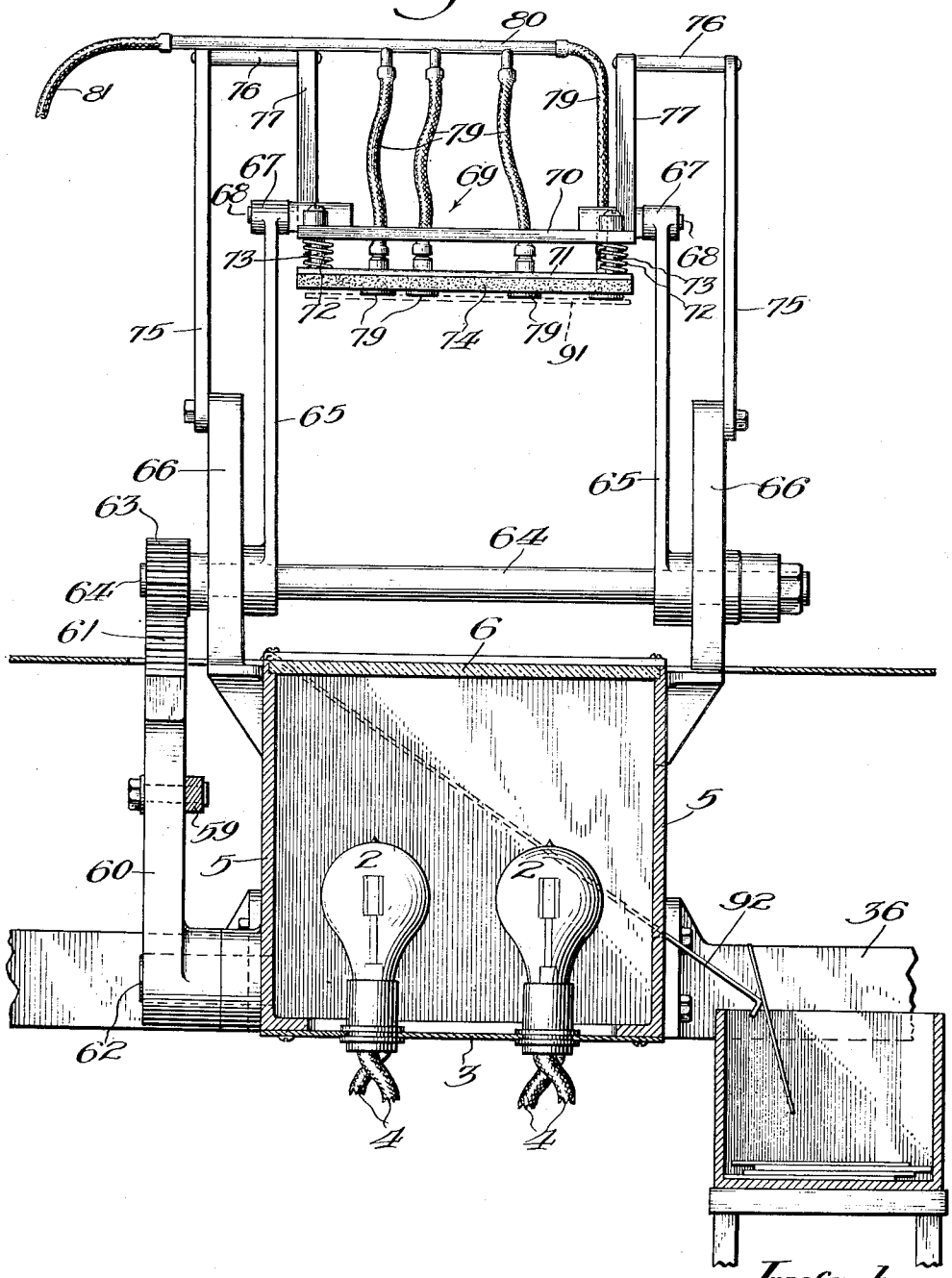
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PICTURE PRINTING MACHINE

Filed Dec. 1, 1926 7 Sheets-Sheet 4

Fig. 4.



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PICTURE PRINTING MACHINE

Filed Dec. 1, 1926 7 Sheets-Sheet 5

Fig. 5.

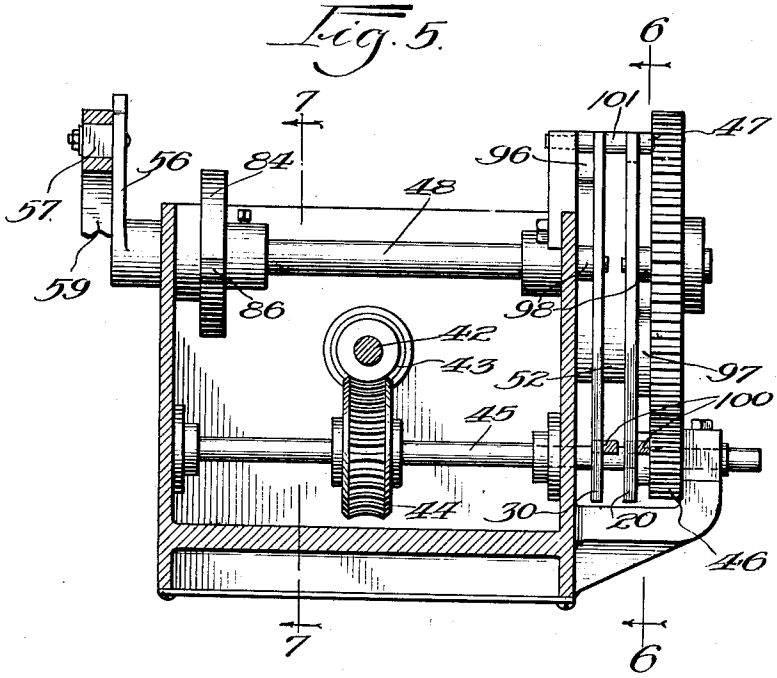
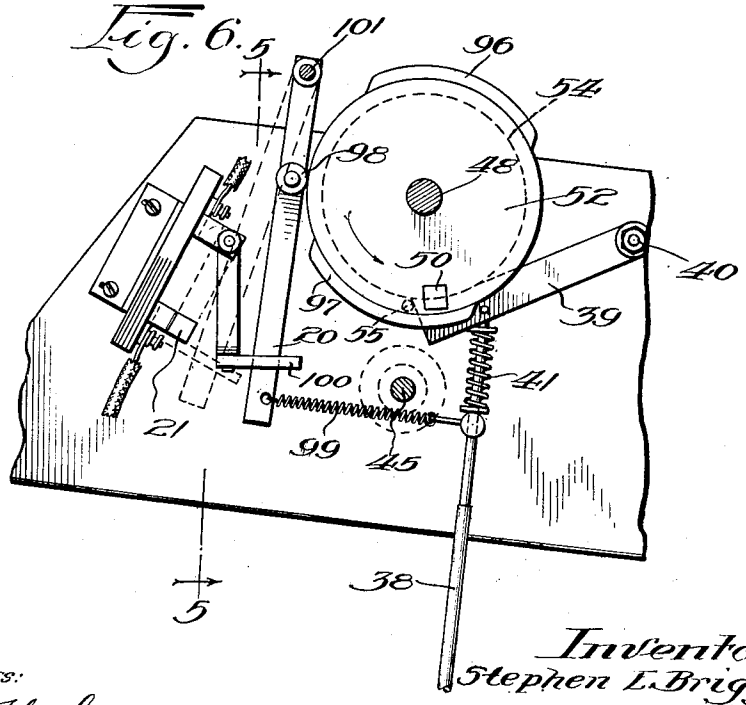


Fig. 6.5



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Dec. 9, 1930. S. L. BRIGGS 1,783,953

PICTURE PRINTING MACHINE

Filed Dec. 1, 1926 7 Sheets-Sheet 6

Fig. 7.

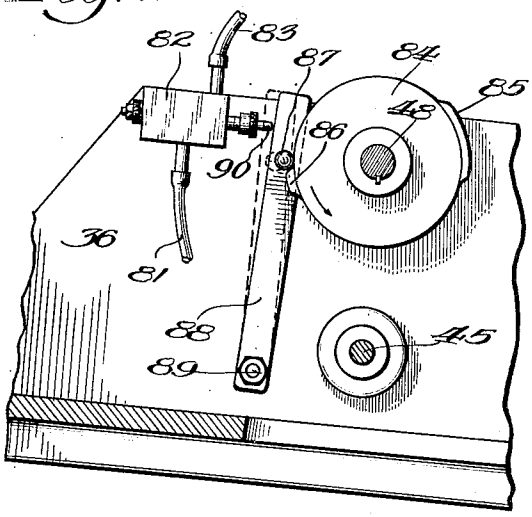


Fig. 9.

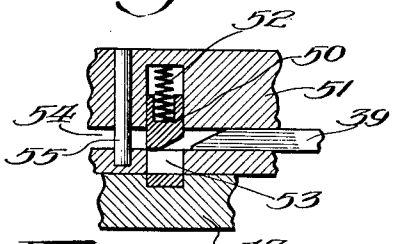


Fig. 10.

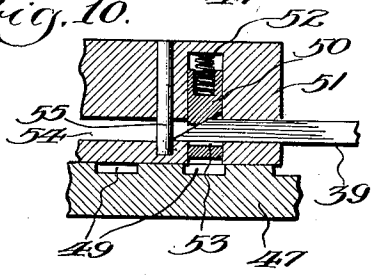


Fig. 8.

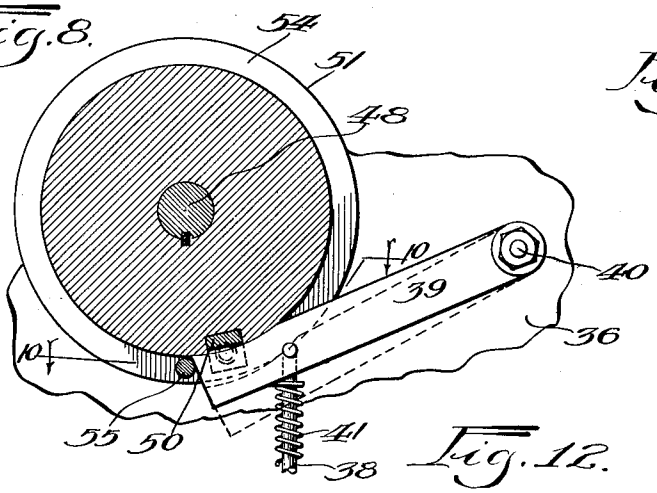


Fig. 11.

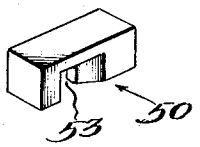
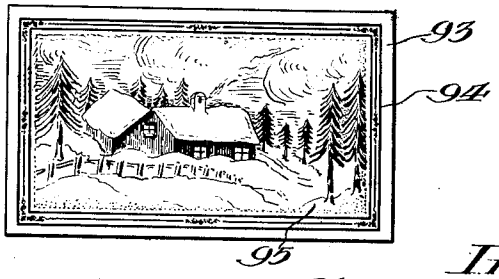


Fig. 12.



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Dec. 9, 1930. S. L. BRIGGS 1,783,953

PICTURE PRINTING MACHINE

Filed Dec. 1, 1926 7 Sheets-Sheet 7

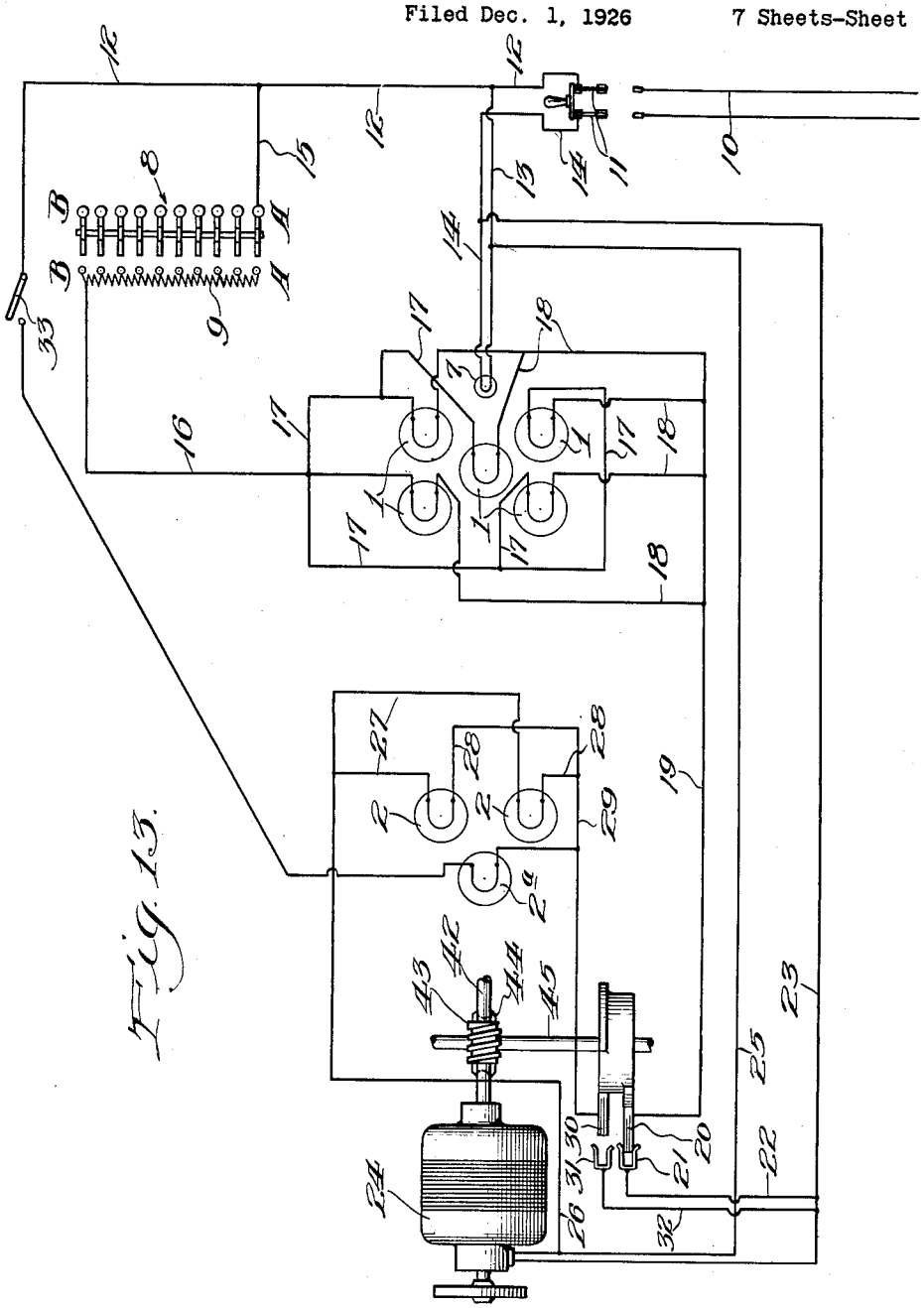


Fig. 13.

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Patented Dec. 9, 1930

1,783,953

UNITED STATES PATENT OFFICE

STEPHEN L. BRIGGS, OF CHICAGO, ILLINOIS

PICTURE-PRINTING MACHINE

Application filed December 1, 1926. Serial No. 151,885.

The present improvements relate more particularly to a machine so designed as to permit the printing of a picture from a film and the printing of a border around said picture, automatically and as part of the same operation.

In the specific embodiment of the present invention, the machine operates on the fundamental principle of a constant time exposure with varying light intensity.

One of the main objects of the invention is to provide an automatically operated machine for simultaneously printing pictures from films and printing artistic borders around said pictures.

Another object is to provide a machine embodying the principle referred to above by which the operator can apply a predetermined light intensity to a particular film.

Another object is to provide an automatically operated means, including a pressure pad and suction mechanism, under the control of the operator, for transferring the paper from the picture printing means to the border printing means, and for removing said paper from the border printing means to be dropped into a receptacle containing a setting solution.

The various parts of the machine are driven in timed relation and so correlated as to print a border evenly with reference to the picture and at a predetermined distance from the edges of the picture.

As a feature of the invention, after the operator, glancing at the film, has determined the light intensity most suitable for printing that particular film, the simple acts of pressing a predetermined button of a series of light buttons and then operating a pedal to place the motor in operation, automatically prints the picture and the border, and restores the machine to position for the next printing.

The machine is certain in operation and economical to manufacture, embodying simplicity in design and use.

Many other advantages and objects will be hereinafter more particularly brought out.

In the drawings:

Fig. 1 is a side elevational view of the complete machine.

Fig. 2 is a top plan view of same.

Fig. 3 is a cross sectional view on line 3—3 of Fig. 2.

Fig. 4 is a cross sectional view on line 4—4 of Fig. 3.

Fig. 5 is an enlarged fragmentary cross section on line 5—5 of Fig. 6.

Fig. 6 is a cross sectional view taken on line 6—6 of Fig. 5.

Fig. 7 is a cross sectional view taken on line 7—7 of Fig. 5.

Fig. 8 is a fragmentary enlarged sectional view taken on line 8—8 of Fig. 2.

Fig. 9 is a similar view to Fig. 10 showing the position of the plunger when the machine is operating.

Fig. 10 is a cross section taken on line 10—10 of Fig. 8 illustrating the normal position of the plunger.

Fig. 11 is a perspective view of the plunger.

Fig. 12 is a view of a picture showing the border.

Fig. 13 is a diagrammatic view illustrating the circuit.

Referring more in detail to the drawings, 1 and 2 designate sets of light exposure elements, taking the form of electric light bulbs mounted on plates 3 and having armored wire leads 4. Each set of light bulbs may be mounted in a cabinet having side and end walls 5, bottom plates 3 and top plate 6, which may be transparent colorless glass for the light bulbs 1 and an opaque glass with a transparent border outline for the light bulbs 2. For the purpose of the present description, the light bulbs 1 will be referred to as the picture printing zone, while bulbs 2 will be designated as the border printing zone. A small pilot bulb 7 may be also mounted on plate 3. The pilot bulb is always lighted to enable the operator of the machine, which is always used in a dark room for obvious reasons, to glance at the film from which it is desired to print pictures, and determine the proper light intensity to which to subject said film to secure the best results. Once having determined the proper light intensity for a certain film, the simple act of pressing a predetermined button and the manipulation of a pedal connected to the motor, will supply

that amount of light as will now be described.

Immediately adjacent the picture printing bulbs 1 (Fig. 13) are a row of button-type switches 8 having communication with a resistance coil 9. Assume that the wattage or light intensity runs from a minimum of 50 watts more or less to a maximum of say, 500 watts, more or less, these figures being purely illustrative, based on a specified constant time exposure. By pressing one of the button switches 8 adjacent the inlet end A of the resistance coil 9, the current will be caused to pass through the remaining length of said coil, thus reducing the wattage of said current. Vice versa, where one of the button switches 8 near the outlet end B, of the resistance coil 9 is manipulated, the current will not be so reduced in wattage. Therefore, it follows that when a light intensity in the lower range is desired, one of the button switches adjacent end A is manipulated, whereas when a light intensity in the upper range is necessary, one of the buttons nearest the end B is used.

The circuit illustrated in Fig. 13 may be described as follows: Current flows through line 10, switch 11, line 12, branch 13 and pilot light 7, the circuit being completed by line 14. A branch 15 transmits current to the button switches 8 and resistance coil 9, passing from the end B of said resistance coil through branch 16 into the light bulbs 1 through branches 17 and out through lines 18 to line 19 connected to bar 20 adapted to have intermittent contact with switch 21, which through lines 22 and 23, motor 24, and lines 25, completes the circuit. A branch 26 transmits current to light bulbs 2 through branches 27, 28 and 29 connecting to switch bar 30 intermittently contacting knife switch 31 which, through line 32, communicating with line 23, completes the circuit. It is to be noted that bulb 2*a* is an auxiliary bulb, lighted infrequently by closing switch 33 in line 12 and completing the circuit.

Describing now the operation of the machine, the operator, having placed a film on the transparent plate 6 above the picture printing zone 1 and having manipulated the proper button switch 8 to apply the desired light intensity, now applies pressure to the pedal 34 held under spring tension by means of spring 35 anchored to legs of the supporting frame 36. This pedal 34 rocks downwardly on pivot 37 carrying with it the upright rod 38 having pivotal connection with an arm 39 pivoted at 40 to a portion of the main supporting structure 36. A coil spring 41 may be interposed adjacent the connection between upright 38 and arm 39. The action which takes place when arm 39 is rocked will be hereinafter more particularly described.

The motor 24 drives the shaft 42 carrying worm 43 thereon, which worm meshes with worm gear 44 mounted on shaft 45 bearing in the supporting structure and carrying on one end keyed thereto a spur gear 46. This spur gear 46 in turn meshes with gear 47 loosely mounted in shaft 48.

The inside face of gear 47 is provided with circumferentially spaced slots 49 adapted for selective registration with a plunger designated as a whole by 50. This plunger projects from the face of a combined clutch cam member 51, being held under spring tension by means of spring 52. The plunger 50 comprises a small block recessed intermediate its width at 53. As shown in Fig. 10, when the machine is not operating, the plunger 50 is kept out of the recesses 49 in gear 47 by the end of arm 39 passing through the recess 53 in the plunger. Thus the gear 47 is continuously rotating, but being loose on shaft 48, will not rotate said shaft until the arm 39 has been rocked out of engagement with recess 53 in plunger 50, permitting the plunger to enter one of the slots 49 in the inner face of the gear, and imparting rotation to said shaft 48. The combination clutch and cam member 51 is circumferentially grooved at 54 to permit the arm 39 to ride therein when it has been rocked and the member 51 has been rotated.

As a feature of the present invention, the member 51 and shaft 48 make only one complete rotation, being stopped when the projecting pin 55 strikes the end of the arm 39, which, after rocking to permit said rotation, has, through the coil spring 41, been returned to its normal position, that is, lying in the groove 54. Simultaneously, the end of the arm 39 will enter the recess 53 of plunger 50, removing said plunger from registration with an aperture 49 of the gear 47, thus permitting free rotation of the gear but stopping the shaft 49 and member 51. The end of the arm 39 and the side walls defining the recess 53 are preferably provided with opposed tapered wedge-like surfaces to facilitate instant disengagement.

The rotation of the shaft 48 places in operation mechanism which moves a pressure pad between the light exposure zones 1 and 2, and simultaneously applies suction, as will now be explained.

The shaft 48 carries an outwardly projecting arm 56 having a pivotal connection with a member 57 sliding in the slot 58 of an elongated arm 59 having a pivotal connection with the body portion 60 of a segmental gear 61. The body portion 60 is mounted for rocking movement on the shaft 62 bearing in the supporting structure. The segmental gear 61 is adapted to mesh with gear 63 mounted on shaft 64, to which shaft is also keyed upstanding arms 65. The shaft 64 is journalled in supports 66 projecting upwardly from the main supporting structure. The arms 65 at their upper ends may be pro-

vided with bearings 67 for receiving the stub shafts 68 projecting from the upper face of a pressure pad designated as a whole by 69. More specifically, this pressure pad may comprise upper and lower plates 70 and 71 separated by coil springs 72 and spacers 73. The under surface 74 of lower plate 71 may have attached thereto a layer of flexible cushioning material. The upwardly projecting supports 66 have pivotally connected thereto other arms 75, which, through connections 76 and arms 77 connected with the supports for stub shafts 68, function to balance the movement of the pressure pad 69 and incidentally, act as supporting braces.

When the machine is idle, the pressure pad, in normal position, is suspended above the main supporting structure 36, intermediate the two light exposure zones 1 and 2, as shown in Figs. 3 and 4. When the mechanism heretofore described, is placed in operation by pressure applied on pedal 34, the pressure pad will be moved first to the light exposure zone 1, then to the light exposure zone 2, then returning to its normal suspended position intermediate the two zones. Dotted lines in Fig. 3 illustrate the positions of the arms and braces and the positions of the pressure pad when it is moved. A slot 78 in the body portion 60 of segmental gear 61 is provided to permit adjustment of the arm 59.

Projecting through the plates of the pressure pad and opening on the face thereof are suction lines 79 communicating with suction header 80, which latter communicates with a suitable source, the functioning of which will be now described.

The header 80, through the medium of flexible conduit 81 communicates with an automatically operated device 82 for applying and shutting off suction maintained by line 83. The operation of this suction control device is as follows: A disk 84 is keyed to shaft 48 having cams 85 and 86 on its edge. As said disk 84 rotates due to the rotation of shaft 48 heretofore described, the large cam 85 will contact the pin 87 carried by an arm 88, causing said arm to be rocked on its pivot 89 and forcing a finger 90 into the suction control 82, to cause a suction to be applied to the pressure pad face and maintained during the time cam 85 is in contact with the pin 87. Simultaneously, as before described, the rotation of shaft 48 has moved the pressure pad 69 to contact above light exposure zone 1, the suction being applied only when said pressure pad 69 is ready to be moved from zone 1 to zone 2. The cam 85 is so placed and is of such a size that the suction will be applied only at the instant the pressure pad is ready to be moved from zone 1 to zone 2. This applied suction causes the sheet of picture paper or blank 91 to be carried on the face of the pressure pad from zone 1 to zone 2. At the instant that the pressure pad contacts the surface of zone 2, the pin 87 rides off of contact with cam 85, the arm 88 returning under spring tension (not shown) to its normal position away from contact with finger 90 which moves out to shut off the application of suction. When the pressure pad is again ready to be moved from zone 2 to its stationary suspended normal position, cam 86 has been moving around to contact pin 87 to apply suction. It is to be noted that cam 86 is shorter than cam 85, since it is only necessary to move the paper from zone 2 to a point intermediate the two zones, where, when the application of suction is stopped, the paper will drop off, due to its own weight and gravitationally fall into the chute 92; which latter directs it to a setting solution. When removed from the setting solution, the picture will be provided with an artistic border such as shown in Fig. 12, in which 93 represents the paper, 94 the border printed in zone 2 and 95 the picture printed in zone 1. The picture 95 will, of course, vary while the border will always be the same. This is accomplished by applying a border of any predetermined design to the transparent plate 6 of zone 2, which border is printed on all the paper blanks brought into contact with it.

As a feature of the invention, while the pressure pad is automatically moving from zone 1 to zone 2, and while it is in contact with zone 2, the operator is removing the film just printed in zone 1, and is glancing at another film to determine the proper light intensity.

Describing now the mechanism for completing the circuit and permitting the bulbs in zones 1 and 2 to light only at the proper time, the combination clutch cam member 51 is provided on its periphery with cams 96 and 97 on opposite sides of the circumferential groove 54. These cams 96 and 97, when the member 52 is rotated, successively contact rollers 98 carried by arms 20 and 30, held under spring tension by means of coil springs 99. Each of the arms 20 and 30 is connected, through the medium of bars 100, to the switches 21 and 31.

The arms 20 and 30 pivot on the shaft 101. The arrangement is such that, as the cams 96 and 97 successively move the arms 20 and 30 into engagement with the knife switches 21 and 31, the circuit will be completed and the bulbs in zones 1 and 2 successively illuminated, the cams 96 and 97 being so positioned and of such size as to cause these bulbs to be illuminated only at the time they are priting. The means for varying the light intensity during such lighting has been heretofore described.

It may be well to here repeat that the machine is designed to operate on the fundamental principle of a constant time exposure and a varying light intensity. This constant time exposure may be a second and a half, the

wattage at that time exposure, varying from say 50 to 500 more or less. If the time is changed, of course, the wattage must be correspondingly changed.

The operation of the machine should be apparent from the foregoing description. Summarizing the description, after the operator glancing at a film placed on the glass plate 6 of light exposure zone 1 having determined the light intensity to which to subject that particular film, presses one of the buttons 8 corresponding to a predetermined wattage. Depression of the pedal 34 will have disengaged the arm 39 from contact with the recess 53 of the plunger 50 permitting said plunger to fall into one of the recesses 49 of the gear 47, which is continuously rotating, as shown clearly in Fig. 9. This will rotate the shaft 48 to move the pressure pad 69 from its normal stationary position to a point in contact with the light exposure zone 1, as shown in dotted lines in Fig. 3. Simultaneously, the rotation of the shaft 48 will rotate the cam 96 into contact with the roller 98 of bar 20, moving said bar a sufficient distance to make contact with the switch 21. This closes the circuit and lights the bulbs in light zone 1. The contact made by one of the buttons 8 through the resistance coil 9 decreases the current to that amount of intensity desired to print that particular film. After an exposure of a second and a half, the pressure pad, due to the rotation of the arm 56, and movement of the element 57 in slot 58 of the arm 59, rocks the segmental gear 61 to move the pressure pad from zone 1 to zone 2.

Just before the pressure pad 61 is moved away from contact with light exposure zone 1, the rotation of disk 84 brings cam 85 in contact with the stud 87 carried by pivotal arm 88, rocking said arm into contact with the finger 90, which applies the suction. Simultaneously, the roller 98 on switch bar 20 is riding off the high part of cam 96, which permits the switch bar 20 to be pulled away from contact with switch 21, due to spring 99 which shuts off the current and the light bulbs 1 go out.

This suction going through the face of the pressure pad through the ducts 79, causes the paper to be carried on the face of said pressure pad while it is moving from zone 1 to zone 2. The width of the cam 85 is proportioned so that at the instant that the pressure pad makes contact with the light exposure zone 2, the stud 87 is riding off the high part of the cam 85, thus cutting off the suction. Simultaneously, with the contact of the pressure pad 69 to the light exposure zone 2, the cam 97 is moved around to contact the roller 98 on switch bar 30 moving said bar a sufficient distance to close the switch 31, permitting lighting of the bulbs in the light exposure zone 2.

When the pressure pad has been in contact with light exposure zone 2 for a second and a half, the roller 98 on switch bar 30 riding off the high part of the cam 97 permits breaking of contact between it and the switch 31, thus shutting off any further flow of current to the light bulbs 2. Simultaneously, the cam 86 has been riding around and at the instant that the pressure pad begins to leave light zone 2, this cam contacting the pin 87 on pivotal bar 88, causes the suction to be again applied. When the pressure pad has reached a position substantially midway between the two light zones, the pin 55 in recess 54 contacts the bar 39 which has been restored to its normal position by spring 41, thus preventing any further rotation of the member 52 and shaft 48. At the same time the arm 39 passes through the recess 53, and the plunger 50 forcing said plunger out of contact with the slot 49 in the face of the gear. At the same time, the stud 87 riding off the high part of cam 86 will again shut off the suction, permitting the paper blank to drop into the chute 92.

It is to be noted as a feature of the present invention that the mechanism has been so timed that only one complete rotation of the shaft 48 is permitted, after which the mechanism is automatically stopped. During the time that the pressure pad has been moving from light zone 1 to light zone 2, and back to its normal position, the operator has removed the film from which that picture has been printed, and is determining what wattage to apply to another film which has been placed on the transparent plate 6 of light zone 1. When this has been determined, the proper button 8 is pressed, and the manipulation of pedal 34 again causes the mechanism to make one complete rotation.

It is to be understood that when the machine is idle, the gear 47 is continually rotating due to the motor 24 having been previously connected with the usual switch.

By an obvious mechanical arrangement, provision may be made so that when one button 8 is pressed down, it remains in that position until raised by pushing another button, the light of course, having been shut off when the switches 21 and 31 disengage.

The pilot bulb 7 is always lighted, functioning to permit the operator to look through the film and decide not only what wattage to apply to that film, but also the particular kind of paper to use.

I have shown diagrammatically in Fig. 3 a cushioning or shock absorbing mechanism 60*a* for the purpose of permitting gradual contact of the pressure pad instead of a sharp jerky movement.

I claim as my invention:

1. A machine for printing pictures from films comprising in combination separate independently controlled light exposure elements consisting of a picture printing zone

and a border printing zone, a pressure pad, means cooperatively associated with the pressure pad for transferring picture paper from one printing zone to the other printing zone, and positive automatic means for actuating said pressure pad to successively cooperate without interruption with both of said zones when said positive automatic means is actuated.

2. A machine for printing pictures from films comprising in combination separate independently controlled light exposure elements consisting of a picture printing zone and a border printing zone, a pressure pad, means cooperatively associated with the pressure pad for transferring picture paper from one printing zone to the other printing zone, means for actuating said pressure pad to successively cooperate with said picture printing zone and said border printing zone, and means for varying the intensity of the light for each film, whereby light intensity is decreased or increased gradually and uniformly.

3. A machine for printing pictures from films comprising in combination light exposure elements, including a picture printing zone and a border printing zone, a pressure pad, communications between the contact face of said pressure pad and a source of suction, means for actuating said pressure pad to cause same to successively cooperate with said picture printing zone and said border printing zone, said means including elements operating to simultaneously apply suction to transfer a sheet of picture paper.

4. A machine for printing pictures from films comprising in combination light exposure elements, including a picture printing zone and a border printing zone, a pressure pad, communications between the contact face of said pressure pad and a source of suction, means for actuating said pressure pad to cause same to successively cooperate with said picture printing zone and said border printing zone, said means including elements operating to simultaneously apply suction to transfer a sheet of picture paper, and means for varying the intensity of the light for each film.

5. A machine for printing pictures from films, comprising in combination, light exposure elements including a picture printing zone and a border printing zone, manually operable switch members for varying the light intensity for each film, a pressure pad, means for moving said pressure pad to successively contact with each of said zones, communications between the contact face of the pressure pad and a source of vacuum supply, said means for moving the pressure pad also comprising means for applying and shutting off a vacuum condition.

6. A machine for printing pictures from films, comprising in combination, light exposure elements including a picture printing zone and a border printing zone, manually operable switch members for varying the light intensity for each film, a pressure pad, means for moving said pressure pad from a stationary normal position intermediate said picture printing zone and said border printing zone to successively contact with each of said zones and return to stationary normal position, and means cooperatively associated with the pressure pad for transferring picture paper from one zone to the other.

7. A machine for printing pictures from films, comprising in combination, light exposure elements including a picture printing zone and a border printing zone, manually operable switch members for varying the light intensity for each film, a pressure pad, means for moving said pressure pad from a stationary normal position intermediate said picture printing zone and said border printing zone to successively contact with each of said zones and return to stationary normal position, means cooperatively associated with the pressure pad for transferring picture paper from one zone to the other, comprising communications between the contact face of the pressure pad and a source of vacuum supply, said means for moving the pressure pad also comprising means for automatically applying and shutting off the vacuum condition.

8. A picture printing machine, comprising in combination a picture printing exposure zone and a border printing exposure zone, means including a pressure pad and suction connections therewith, for transferring a sheet of picture paper from the picture printing zone to the border printing zone, means under the operator's control for imparting movement to the pressure pad to successively cooperate with each of said zones, and simultaneously controlling the suction, and means for varying the light intensity for each film.

9. A picture printing machine, comprising in combination a picture printing exposure zone and a border printing exposure zone, means including a pressure pad and suction connections therewith, for transferring a sheet of picture paper from the picture printing zone to the border printing zone, means, under the operator's control, for imparting movement to the pressure pad and simultaneously controlling the suction, comprising an electric switch and pressure pad actuating means, a shaft actuated to make one complete rotation cooperatively engaging respectively with said electric switch, and pressure pad actuating means.

10. A picture printing machine, comprising in combination a picture printing exposure zone and a border printing exposure zone, means, including a pressure pad and suction connections therewith, for transfer-

ring a sheet of picture paper from the picture printing zone to the border printing zone, means, under the operator's control for imparting movement to the pressure pad and simultaneously controlling the suction, comprising an electric switch, a suction valve and pressure pad actuating means, a shaft actuated to make one complete rotation cooperatively engaging respectively with said electric switch, suction valve and pressure pad actuating means, and means for varying the light intensity for each film.

11. A machine for printing pictures from films, comprising in combination, light exposure elements including a picture printing zone and a border printing zone, manually operable switch members for varying the light intensity for each film, a pressure pad, means for moving said pressure pad to successively contact with each of said zones, communicating ducts between the contact face of the pressure pad and a source of vacuum supply, said means for moving the pressure pad also comprising means for applying and shutting off a vacuum condition, the mechanism for actuating the pressure pad simultaneously cooperating with an electric switch mechanism for controlling the lighting of said light exposure zones and also simultaneously cooperating with the suction control.

12. A machine for printing pictures from films, comprising in combination, light exposure elements including a picture printing zone and a border printing zone, manually operable switch members for varying the light intensity for each film, a pressure pad, means for moving said pressure pad from a stationary normal position intermediate said picture printing zone and said border printing zone to successively contact with each of said zones and return to stationary normal position, and means cooperatively associated with the pressure pad for transferring picture paper from one zone to the other, said means being so synchronized as to permit the pressure pad to rest in stationary position a relatively short length of time while in contact with each of said light exposure zones.

13. A machine for printing pictures from films comprising in combination light exposure elements including a picture printing zone and a border printing zone, a pressure pad, means cooperatively associated with said pressure pad for transferring picture paper from one light exposure zone to the other light exposure zone, means for actuating said pressure pad to successively cooperate with said picture printing zone and said border printing zone, synchronized means for maintaining conditions of a constant time exposure, and means for varying the intensity of the light for each film.

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