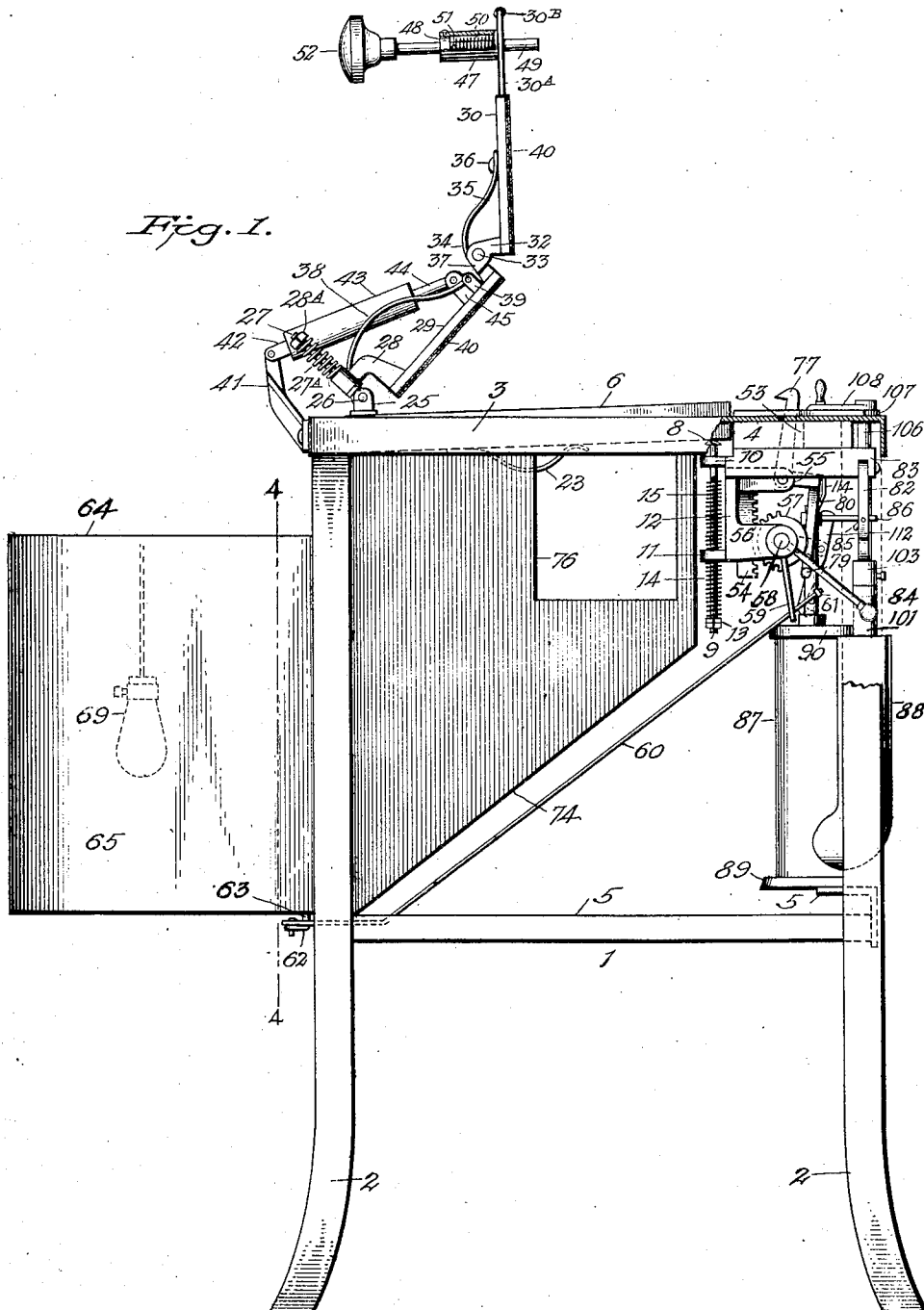


J. F. WARE.
PHOTOPRINTING CABINET.
APPLICATION FILED JAN. 22, 1910.

1,001,911.

Patented Aug. 29, 1911.

3 SHEETS-SHEET 1.



Witnesses:

G. Sargent Elliott.
Adella M. Fowler

Inventor:
By James F. Ware.
H. S. Bailey. Attorney.

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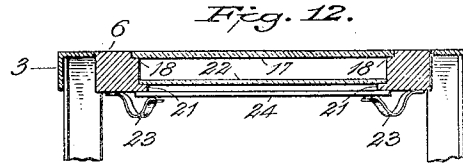
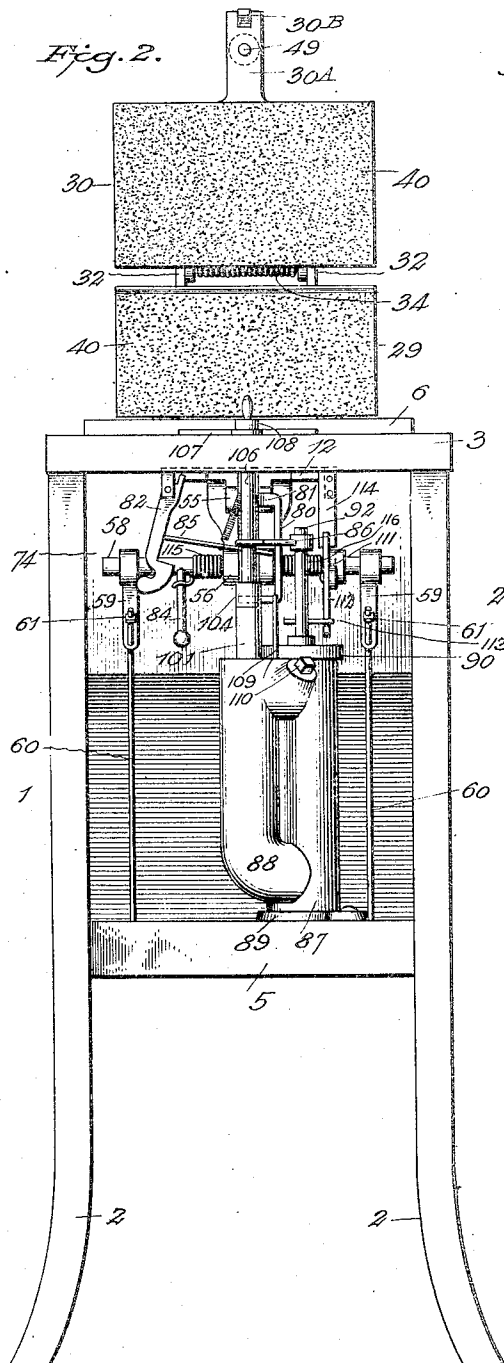
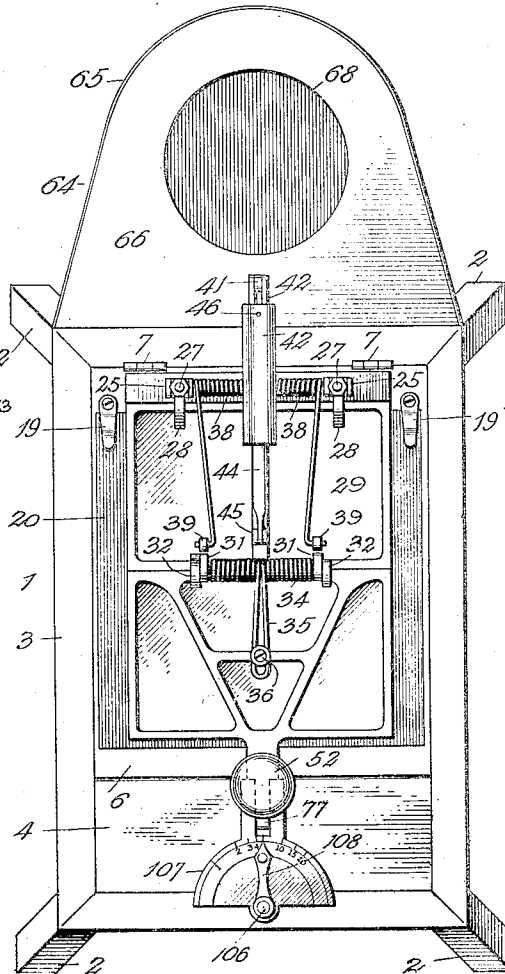


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES F. WARE, OF DENVER, COLORADO.

PHOTOPRINTING-CABINET.

1,001,911.

Specification of Letters Patent.

Patented Aug. 29, 1911.

Application filed January 22, 1910. Serial No. 539,562.

To all whom it may concern:

Be it known that I, JAMES F. WARE, a citizen of the United States of America, residing in the city and county of Denver and State of Colorado, have invented a new and useful Photoprinting-Cabinet, of which the following is a specification.

My invention relates to an automatic operating variable time exposure photoprinting cabinet, and the objects of my invention are: First—to provide a suitable supporting cabinet having a table top containing an aperture in which a printing frame arranged to receive negatives for printing pictures therefrom is hinged and resiliently supported, and to which a padded pressure printing back is arranged to press the negative against the printing frame, the said pressure back being adapted to be latched to said cabinet for a predetermined period of time, and to be automatically and instantly released to spring upwardly and back from the printing frame far enough to permit the removal of the printed picture at the termination of said predetermined period of time; and second—to provide in combination with a photo-printing cabinet, having a printing frame and a divided and hinged padded printing back therefor, mechanism for holding said printing back against the frame for a predetermined time, said mechanism comprising a liquid-controlled, gravity valve, and mechanism operated by said valve and connected with a latch for locking the printing back, whereby when the printing back is closed against the printing frame, the said latch is operated to engage the printing back and hold the same until tripped by the mechanism, which is operated by the valve on its descent, the valve being raised to an elevated position by said mechanism.

A further object of the invention is to provide a cabinet of this character having a light-holding chamber at one end connected with said cabinet, said cabinet surrounding the under side of said printing frame, said light chamber being provided with spring operated doors, which are normally closed and which are adapted to be opened through connection with the valve controlled mechanism, so as to admit light to the cabinet when printing and shut it out when the printing back is released, said doors being provided with apertures, which are covered with fabric of any suitable color adapted

to throw a suitable degree of light on the under side of said printing frame to illuminate its under side sufficiently to see to lay negatives properly on it.

These objects are accomplished by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of this machine, partly broken away, and print holding shutter being raised or out of contact with the printing frame. Fig. 2 is a front elevation of the same. Fig. 3 is a plan view thereof, the print holding shutter being locked down against the printing frame. Fig. 4 is a transverse, sectional view through the light chamber on the line 4—4 of Fig. 1, showing the doors which form a communication between the light chamber and the cabinet. Fig. 5 is a detached plan view of the operating mechanism on an enlarged scale, together with the supporting bracket therefor. Fig. 6 is a front view of the same, showing the parts in the positions they assume when the print-holding shutter is locked to the frame. Fig. 7 is a side view of Fig. 6, with the parts in the same position, showing the latch which raises the valve tripped and the valve in the act of descending. Fig. 8 is a vertical, sectional view through the operating valve. Fig. 9 is a horizontal, sectional view thereof on the line 9—9 of Fig. 8. Fig. 10 is a front view of the cut-off valve. Fig. 11 is a front view of the valve tube in which the cut-off valve fits, showing the triangular port therein; and Fig. 12 is a transverse, sectional view through the printing frame, and a portion of the supporting frame, showing the spring for holding a vignetting card.

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

Referring to the drawings, the numeral 1 designates the frame of my photo-printing cabinet, which may be constructed of wood or any other suitable material, but I preferably construct it of angle iron bars of suitable dimensions. This cabinet frame comprises four legs 2, which are securely riveted or otherwise secured at their upper ends to an angle bar bent into a rectangular supporting frame 3, which is arranged with a flat side upward, and is made of a height that can be worked on conveniently by an operator standing at its front side. A support of wood, or other suitable material, is secured in the frame 3 along its front end,

and forms a table or platform 4 in connection with the narrow flat surface of the angle bars. Between this table and the lower ends of the legs bracing bars 5 are secured to the legs, thus making a rigid structure. The frame 3 is left open beyond the platform 4, and within this open space is hinged a resiliently cushioned printing and vignetting frame 6, which is arranged to receive light from a light chamber, to be fully explained hereinafter. This resiliently cushioned printing and vignetting frame fits loosely within the frame 3, and its rear end is hinged by a hinge 7 to the rear end of the frame 3, so as to swing upward from its front end. The front end of the frame rests on a head 8, formed on the upper end of a vertically positioned resiliently arranged rod 9, which is arranged to hold the front end of the frame normally a slight distance above the top surface of the table. This rod extends loosely through lugs 10 and 11, that form a part of a bracket 12, that is secured to the bottom of the platform 4. The lower end of this rod is provided with a thread, and nuts 13 are threaded to it. An expansive spring 14 is mounted on the rod between the upper nut and the under side of the lug 11, and an expansive spring 15 is mounted on the rod between the lug 11 and a pin 16, that is inserted through the rod below the lug 10. The expansive force of the two springs is equal and they normally hold the rod in a stationary position under opposing equalizing resilient pressures and so as to support the forward end of the printing frame a slight distance above the platform of the cabinet, for a purpose to be explained hereinafter. A sheet of glass 17, preferably plate glass, is loosely supported on steps 18, formed on the inside upper edge of the frame 6, the glass being flush with the said upper edge. This sheet of glass 17 is loosely seated in the frame in order that it may be quickly tilted up at its front end by the operator or be entirely removed, if desired; and its front corner may be cut away to form apertures in which a finger of the operator can be inserted underneath it to raise it. A pair of spring fingers 19 are secured to the frame 6 on each side of the plate glass, which are used to hold a card 20 that is used to center and adjust the negatives on the plate glass. Below the sheet of glass 17 around the inside surface of the frame are secured strips 21, on which a sheet of ground glass 22, or other light diffusing material, such as tissue paper, is placed, which is used to diffuse the rays of light from a light chamber and a communicating cabinet, which are arranged below the printing frame. This light chamber and cabinet will be explained fully hereinafter. Below the sheet of ground glass on the opposite sides of the

under side of the printing frame I pivotally secure a pair of bow-shaped springs 23, which are arranged to be swung around at an angle to the sides of the frame. These springs are adapted to receive and hold up against the under side of the printing frame a common type of vignetting card 24, as shown in Fig. 12 which I do not more fully illustrate, as they are extensively used by photographers. The opposite sides of the rear end portion of this printing and vignetting frame are each provided with a pair of lugs 25, through which a rod 26 extends, and on the opposite end portions of this rod, between each pair of lugs, I mount an eyebolt 27. Upon these bolts I mount a pair of angular shaped lugs 28, which are formed on the rear edge portion of a plate 29, which forms one member of a print holder shutter or printing back, the other member 30 being hinged thereto. The plate 29 is formed with apertured lugs 31 on its forward edge which register with similar apertured lugs 32 on the rear edge of the plate 30, and a rod 33 is passed through the registering lugs, thus hinging the plates 29 and 30 together. Coil springs 27^A encircle the eyebolts 27, and are held under tension between the lugs 28 and adjusting nuts 28^A on the outer ends of the eye-bolts. The rod 33 is encircled by the oppositely coiled portions of a spring 34, the ends of which are secured in apertures in the lugs 31, while the connecting portion of the two coils is formed into a loop 35, which is secured to the forward plate 30 by a screw 36. The tension exerted by the spring 34 is sufficient to normally hold the plate 30 at an angle to the plate 29, and this angle is defined by a stop lug 37 on one of the lugs 32, which engages the adjoining lug 31. Coil springs 38 encircle the rod 26, which hinges the plate 29 to the printing frame, and the forward end of each spring is secured in an apertured lug 39, near the front edge of the plate 29, while the opposite ends of the springs engage the rear end of the printing frame. The tension exerted by the springs 38 normally holds the print holder up and away from the printing frame, and when the print holder is pressed down upon the glass plate 17, upon which the photographic negatives and sensitized paper are placed, the plate 29 first contacts with the glass and the plate 30 contacts immediately afterward. The under sides of the plates 29 and 30 are provided with felt pads 40, which insure an even pressure upon the glass plate, and the springs 27^A permit the print holder to adjust itself to the thickness of the material beneath it, so that the pressure on the said material is uniform throughout.

A bracket 41 is secured to the rear end of the main frame 3, and to this bracket is pivotally secured a bifurcated lug 42 formed on

the rear end of an air cushion cylinder 43. A piston having a rod 44 is reciprocally mounted in this cylinder to form an air cushion on its rear stroke, and the outer
 5 end of the rod 44 extends to and is pivotally connected to a lug 45, which is formed on the top of the plate 29 of the printing back. The springs 38 are under sufficient tension to hold the plate 29 of the printing back
 10 normally at an upward angle that forces the piston into and against the bottom end of the cylinder, which acts as an abutment for the piston and prevents this part of the back from being raised any higher. A small
 15 vent hole 46 is preferably made in the rear end portion of the cylinder to allow the air to freely escape when the printing back is released from the printing and vignetting frame, and flies upward under the expanding
 20 tension of the springs 38, as will be fully described hereinafter.

Centrally upon the forward edge of the plate 30 is formed an extension 30^A, the end of which is bifurcated to receive a roller 30^B,
 25 which is pivotally mounted in said end, and upon this extension a hollow hub 47 is formed, in the end of which a centrally apertured cap 48 is secured, preferably by set screws. A hand operated push rod 49 extends reciprocally through the said cap and
 30 hub and plate, and an expansive spring 50 is placed in the hollow hub around the push rod, and is confined between the bottom of the hollow hub and a pin 51, which extends
 35 through the rod below the cap. The spring holds the pin up against the cap and thus defines the length and position of that portion of the push-rod that extends through and beyond the back. A knob 52 is secured
 40 to the upper end of the push-rod, on which an operator places his hand when pushing the printing back down against the printing and vignetting frame and locking it to the cabinet, which operation will now be
 45 described.

When it is desired to print a picture from a negative, the negative is placed on top of the sheet of glass 17 and a piece of sensitized photo-printing paper is placed over
 50 it. The operator then grasps the knob and presses the printing back down against the printing and vignetting frame, and as the printing back comes in contact with the printing and vignetting frame the depending
 55 end of the push-rod 49 enters a slot 53 formed in the table 4, and its lower end engages the upper end of a vertically positioned rack bar 54, which is slidably supported between two pairs of lugs 55 and 56,
 60 which form an integral part of the bracket 12. This rack bar meshes with a gear wheel 57, which is rigidly mounted on a shaft 58, which is rotatably mounted in the lugs 56 and projects beyond them on each side.
 65 This shaft is provided with two arms 59,

which are secured adjacent to its opposite ends and which extend downward at an angle to a vertical line. The ends of these arms are provided with apertures, through
 70 which the forward ends of a pair of rods 60 extend loosely. The ends of these rods are threaded and a nut 61 is threaded to each rod, which forms an adjustable abutment on the ends of these rods, against
 75 which the arms strike. These rods 60 extend to and are pivotally connected to the right angled end portions 62 of two vertical rods 63, which extend up through and are pivotally mounted in the bottom and top
 80 of a light receiving chamber 64, which is secured at the rear of the supporting structure. This light chamber comprises a casing 65, which is preferably constructed of sheet iron, and which is provided with flat
 85 top and bottom portions 66 and 67 respectively, the top portion being provided with an entrance opening 68, through which a suitable electric lamp 69 is inserted. The rods 63 are positioned at the sides of an
 90 opening 70, which is formed in the partition wall of the chamber, and which is normally held closed by two doors 71, which are secured to the rods 63, and are arranged to swing open and shut when the rods are
 95 partially rotated by the pulling movement of the rods 60 on their crank ends 62 by the arms 59 of the shaft 58.

In order to insure a light-tight joint between the edges of the shutters and the surrounding edges of the aperture I secure to
 100 the edges of the aperture a strip of felt 72, or other suitable cushioning material, and the rods are provided with coiled springs 73, that are secured at one end to the rods, and their opposite ends are secured to the adjacent
 105 end of the chamber. These springs are arranged to exert a closing tension on the doors sufficient to keep them closed tight enough to prevent the light of the electric lamp within the light chamber from escaping
 110 through them. Upon the end of the light chamber having the doors is secured a rectangular cabinet or chamber 74, the bottom of which inclines from the light chamber to the opposite end of said cabinet.
 115 This cabinet is preferably made of sheet metal, and comprises the inclined bottom, two sides and a short forward end, the opposite end being formed by the wall of the light chamber having the doors. This cabinet
 120 is secured to the under side of the frame 3, so that it is closed at its upper end by the printing frame 6. Thus when the doors 71 are opened the light will be reflected against the under side of this frame. In order to
 125 assist in reflecting the light from the light chamber against the under side of the printing frame, I cover the inside surface of the cabinet with a light reflecting medium,
 130 preferably white paint.

The doors 71 should be arranged to admit a little light at all times to the reflecting chamber, so that the under side of the printing frame can be illuminated sufficiently to permit the operator to plainly see to correctly set and adjust the negatives on the top surface of the glass plate of the printing frame. This feature of my invention can be carried out by covering the doors, which are provided with one or more apertures, with a material that will permit a soft light of suitable color to shine through them. The doors may consist of a supporting frame covered with a red fabric. I preferably, however, use doors made of tin plates, and form apertures 75 in each, which are covered with fabric, as before stated.

In order to facilitate the placing of vignetting frames under the springs 23 of the printing frame, I form openings 76 in the opposite sides of the light reflecting chamber, large enough to admit the hands of an operator. These openings may be covered by curtains or by slide doors, or by any other convenient means.

When the printing back is pressed down upon the printing frame, it is held in engagement therewith by a spring-operated latch 77, which is pivotally supported between the lugs 55 of the bracket 12. This latch is designed to be tripped at a predetermined time to release the printing back by mechanism which will now be described.

From the gear wheel 57, which may be simply a segment gear, if desired, extends a rod or finger 78, which normally rests upon a right-angled bend or foot 79, formed at the lower end of a depending arm 80, which extends from and forms part of the latch 77, the latch proper being in the form of an ordinary bell crank, from the horizontal member of which extends the arm 80. The arm 80 is formed with a lateral bend 81 at its union with the crank, which positions it on one side of the gear wheel 57, so as not to strike against the same.

A spring actuated depending latch 82 is pivotally attached to an arm 83, which projects from the bracket 12. This latch hangs in the path of a rod 84, which projects from the shaft 58, and is adapted to be engaged and held by the said latch 82 when the shaft is turned by the closing of the printing back. An arm 85 projects from the latch and extends into the path of a trip arm 86, which is connected to the piston rod of an oil controlled gravity valve, which is adapted to trip the latch 82 at a predetermined time and release the printing back. This valve comprises a main vertical cylinder 87 and a branch cylinder 88, which communicates with the main cylinder near the opposite ends of the same. A base plate 89 forms a closure for the lower end of the main cylinder, and this plate is screwed upon the end

of the cylinder and securely bolted to the forward brace bar 5.

A cap 90, having a central aperture, is screwed upon the upper end of the main cylinder. A piston 91, provided with suitable packing rings, is located in the main cylinder, and a rod 92 extends from this piston through the cap 90, the trip arm 86 being secured at its upper end. The piston is provided with a vertical aperture or port 93, which extends through it from top to bottom, and a disk valve 94 covers the lower end of the port. This disk valve has a stem 95, which extends down through a guide sleeve 96, projecting from the step portion of a bracket 97, which is secured to the bottom of the piston. A coil expansive spring 98 encircles the stem and sleeve and is interposed between the disk valve and the step. A pin 99 in the base plate limits the downward movement of the piston, and a pin 100, in the upper end of the piston, is designed to contact with the cylinder cap and define the upward movement of the piston.

A valve tube 101 is sweated or otherwise rigidly secured in the upper end of the branch cylinder 88, and this tube is provided with a narrow, triangular port 102, which faces the passage connecting the main and branch cylinders at their upper ends. A cut-off valve 103 is snugly but rotatably mounted in the valve tube, and an annular shoulder 104 is formed on this valve, which rests upon the end of the valve tube, and limits the downward movement of the cut-off valve within the tube. The lower portion of the cut-off is tubular and open to the branch cylinder, and a port 105 is formed in this tubular portion, which is designed to register with the port 102 of the valve tube. A stem 106 is connected to the cut-off, and extends up through the top of the front end of the frame 3 and through the axis of a graduated semi-circular plate 107, and a pointer 108 is secured upon the end of the stem and is provided with a knob or handle, by which the pointer may be turned to any one of the graduations on the plate, which are numbered from one to fifteen, or more if desired, and indicate a corresponding number of seconds. The valve is filled with oil, as shown in Fig. 8, and when the piston is raised, in a manner to be presently explained, the oil is forced through the port 93, and the instant the piston ceases to move upward the disk valve 94 is thrown by its spring to close the port 93, and when the piston is permitted to descend it forces the oil up through the branch cylinder and cut-off, whence it passes through the ports 105 and 102 of the cut-off and valve tube respectively, and into the upper end of the main valve cylinder. The time occupied by the descent of the piston is governed by the position of the cut-off relatively to the port

102. When the two ports exactly register the piston drops in the short period of time indicated on the graduated plate, and as the cut-off is turned so that the rear edge of its port approaches nearer and nearer to the narrow end of the triangular port 102 of the valve tube the area of the exit formed by the two ports is gradually contracted, the oil passes more slowly from the branch cylinder into the main cylinder and consequently the piston descends at a corresponding rate. A vent tube 109 is screwed in the upper end of the valve, where the main cylinder and branch cylinder communicate, and a threaded filling aperture is formed in the valve adjacent to the vent tube, which is normally closed by a screw 110.

The valve is raised in the following manner: An arm 111 is rigidly secured upon the shaft 58, and a latch or hook 112 is pivotally attached, midway of its length, to the outer end of said arm. This hook is so hung that it stands in position to engage an arm 113, which projects from the piston rod 92, when the arm 111 is raised by the turning of the shaft 58, and when the valve reaches the limit of its upward movement, which occurs simultaneously with the latching of the printing back, the upper end of the hook 112 engages the inclined face of a plate 114, which is secured to the bracket 12, whereby the hook is moved or tripped to disengage the arm 113, thus permitting the piston to descend by gravity. As it approaches the limit of its downward movement, the trip arm 86 engages the latch arm 85 of the latch 82, which is thereby pushed to one side, thus releasing the rod 84 and permitting the shaft to assume its normal position, which is accomplished by coil springs 115 and 116. The spring 115 bears at one end on a pin 117, projecting from the adjacent lug 56, while its other end bears upon the arm 84. The spring 116 is held by a pin in the adjacent lug at one end, while its opposite end bears upon the arm 111. The pressure thus exerted upon the arms 84 and 111 causes the shaft to be instantly reversed when the arm 84 is released by the latch 82. When the shaft 58 is thus thrown, the finger 78 strikes the foot 79, which rocks the latch 77 and releases the printing back.

In the practical operation of the machine, the light chamber is provided with a suitable lighting medium, such as an electric or an acetylene lamp, and before actual printing is commenced experimental tests are made to ascertain the light power and the probable length of exposure required for the character of work in hand, and this is accomplished by placing the negatives on the plate glass of the printing frame and lifting the arm 84, which turns the shaft 58 and gear wheel 57, which moves the rack bar downward, the said arm 84 being en-

gaged and held by the latch 82. The piston is also raised at the same time and released at the limit of its upward movement by the inclined plate 114, as previously mentioned, while the arms 59 draw upon the rods 60, whereby the doors 71 are opened to admit light to the cabinet 74 and upon the negatives, the tone of which determines the probable length of exposure necessary for the best results. Meanwhile, the piston descends until the arm 86 engages the arm 85, by which the latch 82 is tripped and the parts of the mechanism are restored to their normal position. At the same instant the doors 71 are closed to shut out the light from the cabinet, this being accomplished by the springs 73. In this test work the printing back is left up so that the operator may observe the negatives and arrange the vignetting card, but when the probable length of time has been ascertained and the pointer 108 set accordingly the negative or negatives, with the sensitized paper, are placed upon the glass plate 17, and the printing back is pressed down upon them, and in doing this the operation above mentioned is repeated, only it is now effected by the engagement of the end of the push rod 49 with the rack bar 54, which partially rotates the gear wheel 57 and shaft 58, locking the arm 84 to the latch 82 and lifting the finger 78 from the foot 79, thus permitting the latch 77 to be thrown by its spring 77^A to engage the roller 30^B of the printing back. The doors 71 are opened in the manner before mentioned, admitting light from the light chamber, which is reflected upon the under side of the ground glass and through the same to the negatives upon the plate glass by the inclined bottom of the cabinet, and at the expiration of the time indicated by the pointer 108 the piston reaches the limit of its downward movement, the latch 82 is tripped, as above described, and the finger 78 engages the foot 79, whereby the latch 77 is moved to release the printing back. The end of the trip arm 86 is bent to pass loosely around the rod 106, and is thus held in position to engage the rod 85, which lies in its path. When the printing back is pressed down, it also depresses the forward end of the printing frame upon the cushioning rod 9, and as the said frame is under tension it insures perfect contact of the same with the printing back and consequently of the negatives with the sensitized paper, and as the said printing back is released and flies up under the action of the springs 34 and 38, the printing frame under the action of the spring 15 follows it, thus keeping the negatives and sensitized paper firmly pressed together until after the light has been cut off from the cabinet by the closing of the doors 71.

It will be noted that as the forward ends

of the rods 60 extend beyond the ends of the operating arms 59 the said arms will be moved a considerable distance before engaging the nuts on the ends of the said rods. During this period the printing back is pressed upon the negatives and they are firmly clamped against the printing frame, so that when the said arms 59 do operate the rods 60 to open the doors 71 and admit light to the cabinet all danger of spoiling the print through imperfect contact has been entirely eliminated.

The machine herein described provides for accurate, variable, time exposure printing frame photo negatives and the like, and insures a uniform exposure for any desired number of prints for any desired period of time for which the operating valve is set.

Some of the features of my present invention are illustrated in my pending applications, Serial Numbers 504,773, filed June 28, 1909; 486,603, filed March 29, 1909, and my allowed application Number 486,602, filed March 29, 1909.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a photo-printing machine, as specified, the combination of a cabinet; a printing frame in the top of the cabinet and hinged thereto at its rear end; a two part print holding shutter hinged to the rear end of said frame; a latch for the shutter; means for operating the same to engage and hold the shutter when closed; means for releasing the same at a predetermined time, whereby the latch is withdrawn and the shutter released; springs for throwing the shutter up; a light receiving casing at one end of the cabinet; spring-controlled doors for said casing, and means connecting said doors with the latch operating means, whereby the doors are opened when the shutter is closed and closed when the shutter is released.

2. In a photo-printing machine, as specified, the combination of a cabinet; a printing frame in the top thereof, and hinged at its rear end to the cabinet; a resilient support for the forward end of said frame; a two part padded print-holder hinged to the rear end of said frame; a spring-operated latch for said print holder; a shaft; means for partially rotating the shaft when the shutter is closed; arms on said shaft, one of which releases the latch from engagement with the shutter; a latch for engaging the other arm; a gravity device for tripping said latch at a predetermined time; a third arm on said shaft; a hook pivoted to said arm and adapted to lift said gravity device as the print holder is closed; means for tripping the hook to release the gravity device simultaneously with the latching of the

print holder; means for restoring the shaft to its normal position whereby the shutter latch is operated to release the shutter; and springs for throwing up the shutter.

3. In a photo-printing machine as specified, the combination with a cabinet; a printing frame in the top of the cabinet, and hinged at its rear end to said cabinet; a resilient support for the front end of said frame, and a two part print holding shutter hinged to the rear end of said frame; of a spring operated latch for said shutter; a shaft; an arm carried by said shaft which normally holds said latch in an inoperative position; means for turning the shaft when the shutter is closed, whereby the said arm releases the latch, which immediately engages and holds the shutter; a second arm on said shaft; a latch in the path of said arm, which engages the same when the shaft is turned; an automatically operating gravity device for tripping said second latch at a predetermined time; means connected with the shaft for lifting the gravity device as the shutter is closed; means for releasing the gravity device simultaneously with the latching of the shutter; a spring for reversing the shaft, whereby the shutter latch is moved to release the shutter; springs for throwing the shutter up; and means for cushioning its movement.

4. In a photo-printing machine as specified, the combination with a cabinet having a hinged printing frame in its top, and a print holder hinged to said frame; of a spring-operated latch adapted to engage the forward end of said print holder; a shaft; a gear wheel on the shaft; a rack bar in mesh with the gear wheel; an arm carried by said shaft which normally holds the latch in an inoperative position; a second arm on the shaft; means for depressing the rack bar, when the print holder is closed, whereby the shaft is turned and the said print holder is engaged by its latch; a latch in the path of the second arm which engages the same when the shaft is turned; a gravity device for automatically tripping said latch at a predetermined time; means connected with the shaft for lifting the gravity device; means for releasing the gravity device simultaneously with the latching of the shutter; a spring for reversing the shaft and rack bar whereby the print holder is released; and springs for throwing up the said holder.

5. In a photo-printing machine as specified, the combination with a cabinet, having hand openings in opposite sides; a hinged printing frame in its top, and a print holder hinged to said frame; of a spring operated latch adapted to engage said print holder; means for normally holding said latch in an inoperative position; means operated by the print holder when closed, for releasing

said holding means whereby the latch engages the print holder, and for operating said holding means for moving said latch at a predetermined time to release the print holder; means for throwing the print holder up, when released from the latch; a light chamber at one end of the cabinet; spring controlled doors for normally closing communication between the cabinet and light chamber, and means for opening said doors simultaneously with the latching of the print holder.

6. In a photo-printing machine as specified, the combination with a cabinet having at its top a hinged printing frame, resiliently supported at its free end; a print holding shutter hinged to said frame, and springs for normally holding said shutter up; of a spring-operated latch for said shutter; a shaft; a gear wheel on the shaft; a rack bar in engagement with the gear wheel; a hand-operated pusher rod on said shutter which depresses said rack bar, when the shutter is closed, and partially rotates the shaft; an arm carried by the shaft, which normally holds the latch in an inoperative position but releases the same to engage the shutter when the shaft is turned; a second arm carried by the shaft; a spring controlled latch in the path of said second arm; a gravity valve having a piston rod; a third arm carried by the shaft; a hook pivotally connected to said third arm and adapted to lift said piston rod; an arm carried by said piston rod for tripping said last mentioned latch, when said rod descends; springs for restoring the shaft to its normal position, whereby the shutter is released and flies back; means for retarding the movement of the piston rod, and means for engaging the hook to cause the same to release the piston rod simultaneously with the latching of the shutter.

7. In a photo-printing machine as specified, a cabinet having hand openings on opposite sides; a light receiving chamber on the rear end of the cabinet; spring-controlled doors for normally closing communication between the cabinet and chamber, having apertures which are covered by fabric of suitable color; a printing frame hinged in the top of the cabinet; a print holding shutter hinged to said frame; opposite spring clips on the under side of said frame in line with the hand openings and adapted for holding a vignetting card; a latch for holding said shutter in contact with said frame; means for tripping said latch to release the shutter at a predetermined time; springs for throwing said shutter up when released; and means for opening the doors of the light chamber simultaneously with the latching of the shutter.

8. In a photo-printing machine as specified, the combination with a cabinet pro-

vided with an opening in its top; a light chamber on one end of the cabinet, and spring controlled doors for normally closing communication between said chamber and cabinet; of a printing frame in said opening in the top of said cabinet, and hinged at its rear end to said cabinet; a resilient support for the front end of said printing frame, which normally holds said frame at an inclination to a horizontal plane; a two part padded shutter hinged upon the rear end of said frame; springs for normally holding the shutter open; a spring operated latch for engaging said shutter when closed; means for automatically tripping said latch to release the shutter at a predetermined time; and means for opening said spring controlled doors simultaneously with the latching of the shutter.

9. In a photo-printing machine as specified, the combination with a cabinet provided with an opening in its top and having hand openings on opposite sides; of a printing frame hinged at its rear end in said opening in the top of said cabinet; a spring supported rod beneath the forward end of said printing frame, which normally elevates said forward end; spring clips on the under side of said frame in line with said hand openings, adapted to hold a vignetting card; a print holding shutter hinged to the rear end of said frame; springs for normally holding said shutter open; a spring operated latch for engaging said shutter when closed; and means for automatically tripping said latch to release the shutter at a predetermined time.

10. In a photo-printing machine as specified, a cabinet having hand openings on either side and an opening in its top; a light receiving chamber on the rear end of said cabinet; spring operated doors which normally close communication between the cabinet and light chamber; a printing frame hinged at its rear end in said opening in the top of the cabinet; a resilient support beneath the front end of the frame, which normally holds the same at an elevation; oppositely arranged spring clips on the under side of said frame, adapted for supporting a vignetting card; a print-holding shutter hinged to the rear end of the frame; springs for normally holding said shutter up and away from the frame; a spring operated latch for holding the shutter when closed against the frame; means for automatically tripping the latch to release the shutter at a predetermined time; and means for opening the door of the light chamber simultaneously with the latching of the shutter.

11. In a device as specified, the combination with a cabinet; a light chamber at one end of the cabinet; spring controlled doors for normally closing an opening between

said cabinet and chamber; a hinged printing frame in the top of the cabinet; a resilient support for the forward end of the frame; a print-holding shutter hinged at its rear end
 5 to said frame, and springs for normally holding said shutter up and away from the frame; of a spring controlled latch for holding the shutter in contact with the frame; means for tripping the latch; a gravity device
 10 for operating the tripping means; means for retarding the movement of the gravity device; and means for opening said doors simultaneously with the closing of the shutter.

15 12. In a device as specified, the combination with a cabinet, having hand openings in two opposite sides; a hinged printing frame in the top of the cabinet; a resilient support for the forward end of the frame;
 20 a print-holding shutter hinged to the rear end of the frame; a latch for holding the shutter against the frame and springs for exerting an upward pull upon the shutter; of means for tripping the latch comprising
 25 a revoluble member; an arm carried by said member; means for partially revolving said member, simultaneously with the latching of the shutter; a latch for engaging said member when thus revolved; means for tripping the latter latch at a predetermined
 30 time; and a spring for restoring the revoluble member to its normal position, whereby the arm carried thereby trips the shutter holding latch.

35 13. In a device as specified, the combination with a cabinet; a printing frame in the top of the cabinet hinged at its rear end; a resilient support for the front end of said frame; a print holding shutter hinged at its
 40 rear end to said frame; springs for normally holding said shutter up and away from the frame; a spring controlled latch for holding said shutter against the frame; a light receiving casing communicating
 45 with the cabinet; and spring controlled doors for normally closing said casing; of means for tripping the shutter latch, comprising a shaft; an arm carried by the shaft, which normally holds the shutter latch in-
 50 operative; means for turning the said shaft to lift the arm and free the latch simultaneously with the closing of the shutter; a second arm on the shaft; a latch for engaging said second arm when the shaft is
 55 turned; connecting rods attached to the doors of the light chamber at one of their ends; and arms on said shaft connected to the opposite ends of said connecting rods, whereby the doors are opened simulta-
 60 neously with the latching of the shutter; a gravity valve for automatically tripping the latter latch at a predetermined time; means connected with the shaft for actuating said valve; springs for reversing the shaft when
 65 said latter latch is tripped, whereby the

shutter latch is thrown to release the shutter; and means for retarding the movement of the gravity valve.

14. The combination with a cabinet as specified; a printing frame in the top of the
 70 cabinet; a print holding shutter hinged to the said frame; springs for normally exerting an upward lifting tension on the shutter; and a spring controlled latch for engaging the shutter when closed; of mech-
 75 anism for freeing the latch at a predetermined time, comprising a shaft; a gear wheel on the shaft; a rack bar in mesh with the gear wheel; a radially disposed arm carried by the shaft in normal contact with the
 80 shutter latch to hold it out of operative position; a manually operated push rod on the shutter for depressing the rack bar to turn the shaft and free the shutter latch; a second arm carried by the shaft; a latch to en-
 85 gage said second arm when the shaft is turned; a gravity device for tripping the latter latch, comprising a pair of communicating cylinders containing a suitable liquid; a piston in one of said cylinders,
 90 having a vertical port; a valve for closing the lower end of said port; a piston rod extending up from said piston; a pivotal arm carried by the shaft for lifting the piston and rod; means for tripping said arm to re-
 95 lease the piston simultaneously with the latching of the shutter; an arm at the upper end of the piston rod for tripping the said latter latch when the piston descends; a cut-off in the opposite cylinder for regulat-
 100 ing the flow of the circulating liquid as the valve descends; a rod connected with the cut-off and extending above the top of the cabinet; a graduated plate on said cabinet; a pointer on the rod, above the graduated
 105 plate; and a spring for restoring the shaft to its normal position when the latter latch is tripped.

15. In a photo-printing cabinet as specified, the combination with a hinged print
 110 holding shutter; springs for normally holding said shutter open and a spring operated latch for holding the shutter when closed; of a releasing mechanism for the latch, comprising a shaft; a gear wheel on the shaft;
 115 a rack bar in engagement with the gear wheel; an arm on the shaft for engaging the latch; a second arm on said shaft; a latch for engaging the second arm; means for tripping the latter latch, comprising a
 120 liquid-controlled gravity valve having a piston and piston rod, a trip arm on said piston rod, said trip-arm being in position to engage said second named arm and cause it to trip the said latch on the descent of
 125 said piston rod; means connected with the shaft for lifting said piston and piston rod, and means for releasing the piston and rod simultaneously with the latching of the
 130 shutter; means for retarding the movement

of the valve; means for depressing the rack bar simultaneously with the closing of the shutter, whereby the shaft is partially rotated and held by the engagement of the last mentioned latch with the said second arm of the shaft; and a spring for restoring the shaft to its normal position, whereby the shutter latch is operated to release the shutter.

16. The combination with a photo-printing cabinet, having a hinged printing frame; of a print-holding shutter comprising a pair of plates united by a hinge connection; a spring for lifting the forward plate relatively to the rear plate; apertured lugs on the rear plate; eye bolts pivotally attached to the rear end of the frame, which pass through said apertured lugs; adjusting nuts on the ends of the bolts; springs on said bolts interposed between said apertured lugs, and the nuts, and a spring for raising said shutter; a latch for holding the shutter in contact with the frame; a resilient support for the front end of the frame; spring supports on the under side thereof for holding a vignetting card; and means for releasing said latch at a predetermined time.

17. The combination with a cabinet as specified, a hinged printing frame thereon; a print-holding shutter hinged to said frame; and a light receiving chamber on the end of said cabinet; of doors for normally closing said light chamber, comprising apertured plates covered with fabric of suitable color; springs for holding said doors in a closed position; means for opening said doors simultaneously with the closing of the shutter; and a variable time gravity valve for releasing the shutter latch at a predetermined time.

18. In a photo-printing machine as specified, the combination of a cabinet; a printing frame in the top thereof, hinged at one end; a two part print holder hinged to said frame; a roller in the front end of the forward member of said print holder; a latch for engaging said roller; means for operating the latch to engage the roller when the shutter is closed; a gravity device for operating said means at a predetermined time, whereby the latch is withdrawn and the shutter released; and springs for throwing the shutter up.

19. In a photo-printing machine as specified; a cabinet; a printing frame hinged at one end in the top of said cabinet and resiliently supported at its opposite end; a print holder hinged to said frame; a roller in the front end of said holder; a spring controlled latch for engaging said roller when the print holder is down; and means for operating said latch, comprising a shaft; a gear wheel on said shaft; a rack bar in mesh with said gear wheel; a hand operated push rod on the print holder which depresses

the rack bar when the shutter is closed and partially rotates the shaft; a rod carried by the gear wheel; which normally holds the latch in an inoperative position but releases the same to engage the roller when the shaft is turned; a rod extending from the shaft; a spring controlled latch in the path of said rod; a gravity valve having a rod; an arm on the shaft; a hook pivoted to said arm and adapted to engage the valve rod to lift the valve as the shutter is closed; an arm carried by the valve rod for tripping the last mentioned latch when the valve descends; springs for reversing the shaft, whereby the print holder is released and flies back to its normal position; and a projection having an inclined face adapted to engage the hook and cause the same to release the valve simultaneously with the latching of the print holder.

20. In a photo-printing machine as specified; a cabinet; a resiliently mounted printing frame in the top thereof; a two part spring controlled print holder hinged to said frame; a roller in the front edge of the print holder; a latch for engaging said roller when the print holder is down, and means for operating the latch comprising a shaft; a gear wheel on the shaft; a rack bar in engagement with the gear wheel; a rod extending from the gear wheel which normally holds the latch in an inoperative position; a second rod extending from the shaft; a spring actuated latch in the path of the second rod; a push rod on the print holder adapted to depress the rack bar when the holder is closed to partially rotate the gear wheel, whereby the first latch is released to engage the print holder and the second latch engages the second rod to hold the shaft against backward rotation; a gravity valve; a hook pivotally secured to the shaft and adapted to lift the gravity valve when the print holder is closed; means for engaging the hook simultaneously with the latching of the print holder, whereby the valve is released; an arm connected with the gravity valve for tripping the said second latch when the valve descends; and springs for reversing the shaft whereby the first latch is operated to release the print holder.

21. In a photo-printing machine as specified, the combination of a cabinet having hand openings on opposite sides; a printing frame hinged at one end in the top of the said cabinet and resiliently supported at its opposite end; a spring controlled print holder hinged at one end to the printing frame; a light chamber at one end of the cabinet; spring controlled doors for normally closing said light chamber; rods forming pivotal supports for said doors, which terminate below the chamber in crank arms; pull rods secured to said crank arms;

a bracket secured to the cabinet frame; a shaft pivotally mounted in the bracket; arms on the ends of said shaft through which the forward ends of the pull rods extend loosely; and nuts on the ends of said arms; a spring actuated latch for engaging the print holder when the same is closed; a gravity device; and means connected with the print holder for partially rotating said shaft when the holder is closed to lift said gravity device and release said latch; and means connected with the gravity device for effecting the movement of the latch to release the print holder, the arms on the ends of the shaft being set to engage the nuts on the ends of the pull rods and open the said doors after the print holder has made contact with the printing frame; and a spring for restoring the shaft to its normal condition.

22. In a photo-printing machine as specified; a cabinet; a communicating light chamber; spring-controlled doors for normally closing said light chamber and crank arms connected to said doors; a spring-controlled shaft mounted on the cabinet frame; arms on the ends of the shaft; pull rods connected at one end to the crank arms on said doors while their opposite ends extend loosely through the ends of said arms and are provided with nuts; a printing frame resiliently mounted in the top of the cabinet; a spring-controlled print holder hinged to said printing frame; a gear wheel on the shaft; a rack bar in mesh with the gear wheel; a spring supported push rod on the end of the print holder adapted to depress the rack bar and partially rotate the shaft when the holder is closed, whereby the arms draw on the pull rod to open the doors of the light chamber, but after the print holder has made contact with the printing frame; a spring operated latch for engaging the print holder; a latch for preventing backward rotation of the shaft; a gravity device connected with the shaft; means connected with the gravity device for releasing the shaft holding latch; and means connected with the shaft for tripping the print holding latch.

23. In a photo-printing machine as specified, the combination with a cabinet; a printing frame resiliently mounted in the cabinet; a spring-controlled print holder hinged to the printing frame; a latch for engaging said print holder; an operating mechanism for releasing said latch at a predetermined time; of a communicating light chamber at the end of the cabinet; spring controlled doors for normally closing said light chamber, and rods connecting said doors with the operating mechanism, whereby when the said print holder is

closed the said pull rods are drawn upon to open the doors immediately after the print holder is latched; and a gravity valve for operating said mechanism.

24. In a photo-printing machine as specified; the combination with a two part spring controlled print holder having a roller in one edge, and a spring-operated latch for engaging said roller; of mechanism for operating said latch comprising a spring-controlled shaft; a gear wheel on the shaft; a rack bar in mesh with the gear wheel; a rod extending from the gear wheel adapted to normally hold the latch in an inoperative position; a second rod extending from the shaft; a second spring-controlled latch in the path of said second rod; a spring supported push rod on the print holder for depressing the rack bar when the holder is closed to partially rotate the shaft, whereby the first rod releases the print holder latch and permits the same to engage the roller on said holder while the second rod is engaged by the second latch to prevent backward rotation of the shaft; an arm on the shaft; a hook pivoted midway of its length to said arm; a gravity valve adapted to be lifted by said hook when the shaft is turned by the push rod; an inclined abutment in the path of the upper end of the hook, which disconnects the same from the valve simultaneously with the latching of the shutter; an arm connected with the valve for tripping the said second latch, when the valve descends, whereby the shaft is released and assumes its normal position and the rod on the gear wheel operates the print holder latch to release the said holder; and means for retarding the movement of said valve.

25. In a photo-printing machine as specified, a cabinet having hand openings on opposite sides; a printing frame resiliently mounted in the cabinet and hinged thereto at one end; spring clips on the under side of said printing frame in line with the hand openings, adapted to hold a vignetting card; spring clips on the upper side of said frame, adapted to hold a negative positioning card; a two-part, spring-controlled print holder hinged to said printing frame; a latch for engaging said holder when closed; mechanism for operating said latch to release the holder and a gravity valve connected with said mechanism for operating the same at a predetermined time.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES F. WARE.

Witnesses:

G. SARGENT ELLIOTT,
ADELLA M. FOWLE.