April 26, 1949. N. S. COLE 2,468,291

PHOTOGRAPHIC PRINTER

Filed Feb. 24, 1947 2 Sheets-Sheet 1

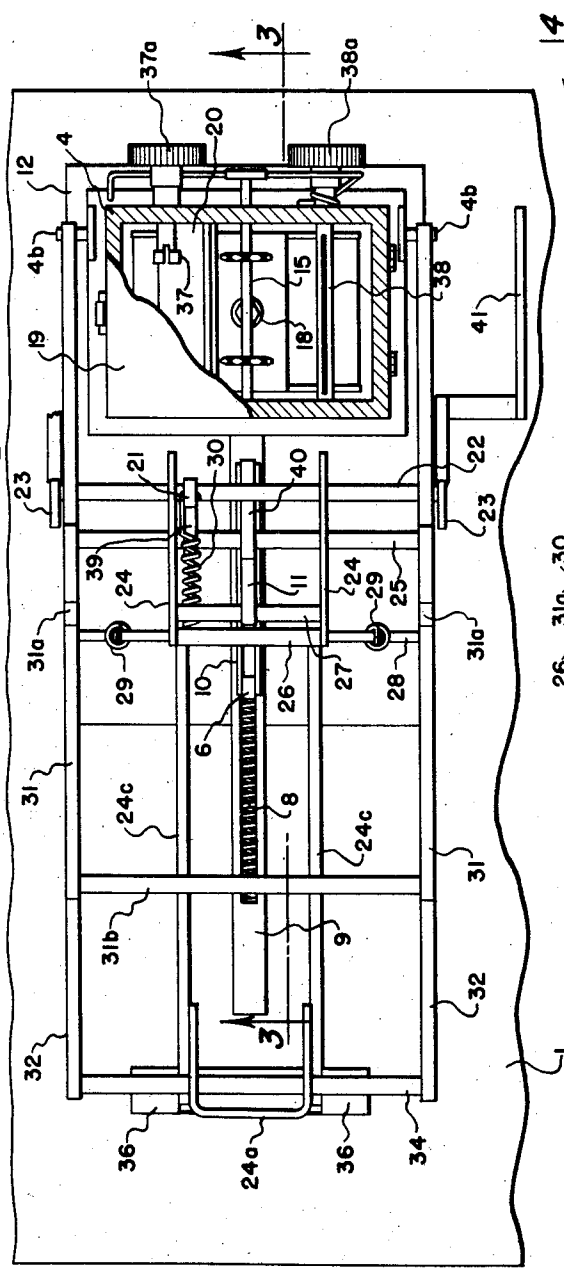


FIG. 1

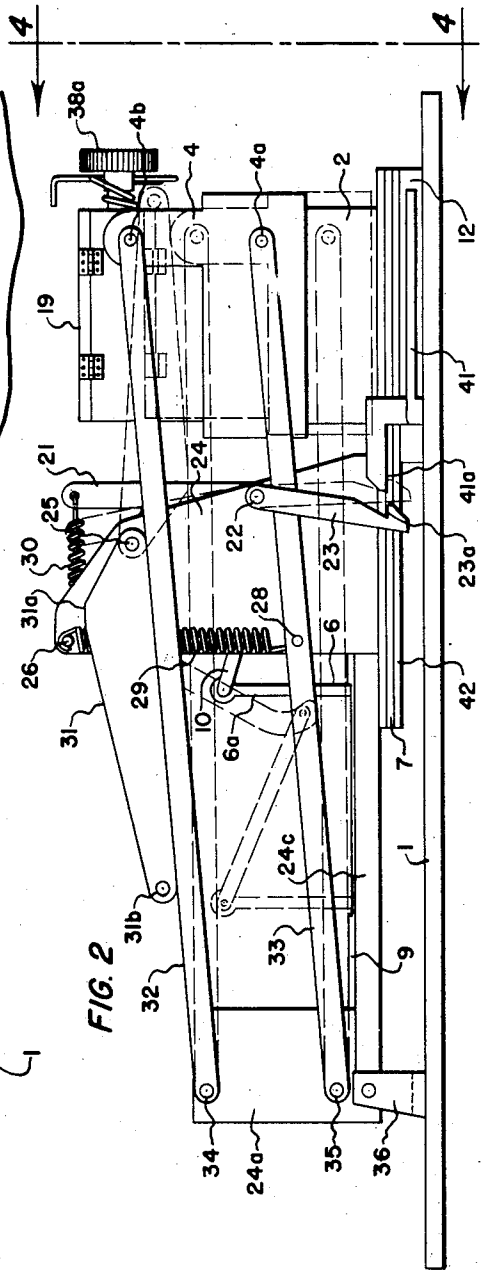


FIG. 2

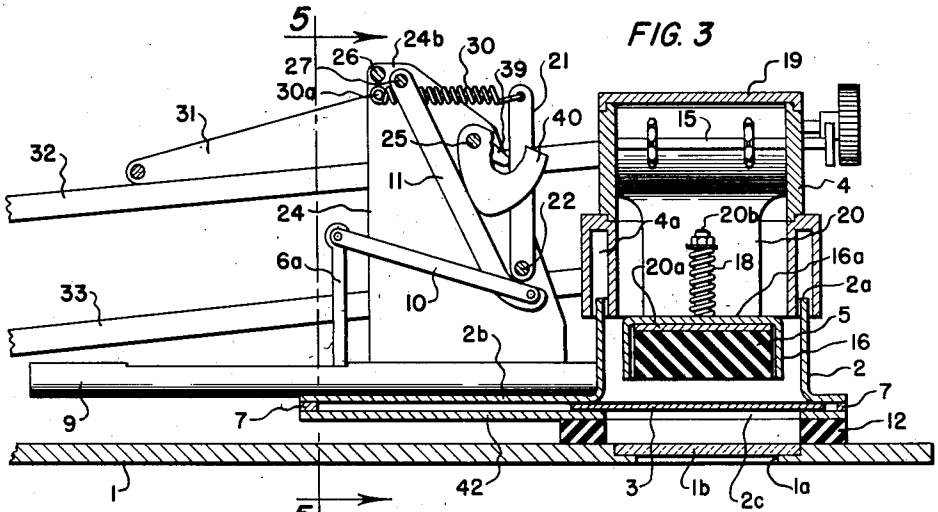
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PHOTOGRAPHIC PRINTER

Filed Feb. 24, 1947 2 Sheets-Sheet 2

FIG. 3



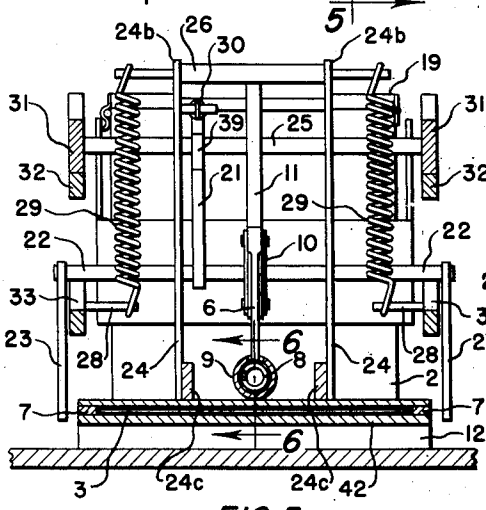


FIG. 5

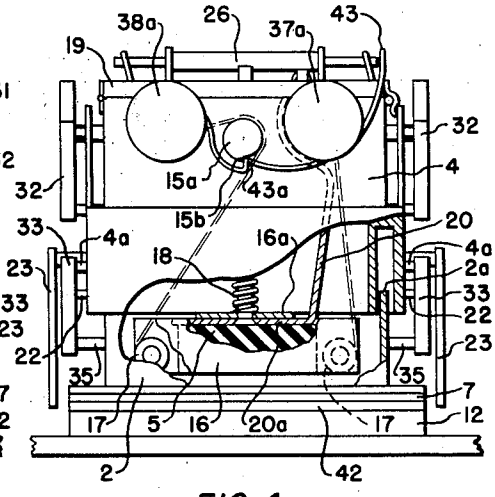


FIG. 4

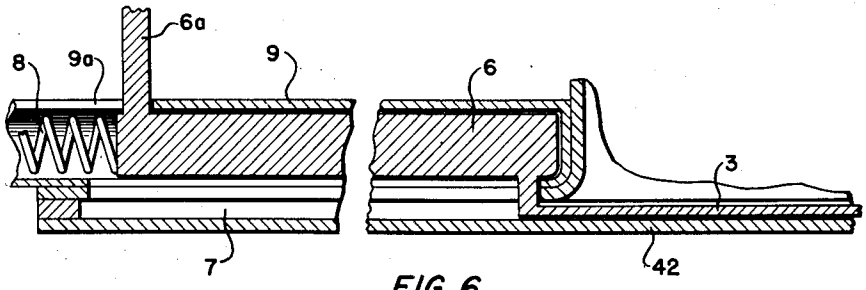


FIG. 6

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UNITED STATES PATENT OFFICE

2,468,291

PHOTOGRAPHIC PRINTER

Ned S. Cole, San Diego, Calif.

Application February 24, 1947, Serial No. 730,519

12 Claims. (Cl. 95—73)

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My invention relates to a photographic contact printer, more particularly for use in making photographic impressions on sensitized material with light passing through a photographic transparency while the sensitized material is held in contact thereon and to improvements in my former application, Serial No. 692,631, filed August 23, 1946, now abandoned, and the objects of my invention are:

First, to provide a printer of this class wherein the sensitized material is carried in roll form in a light-tight magazine said magazine being an integral part of the printer;

Second, to provide a printer of this class, an integral part of which is a light-tight magazine which may be loaded or unloaded in the light with sensitized material contained in light-tight cartridges;

Third, to provide a printer of this class which operates in the light;

Fourth, to provide a printer of this class which is very fast in operation;

Fifth, to provide a printer of this class which is very simple to operate;

Sixth, to provide a printer of this class in which very accurate contact prints are made;

Seventh, to provide a printer of this class which makes contact prints in consecutive order on a roll of sensitized material thus facilitating the subsequent processing operations when accurate control of chemical baths, temperature, agitation, etc. make it impractical to handle the prints as single units;

Eighth, to provide a printer of this class which employs a vertically movable platen enclosed by an automatically actuated shutter which is closed when the platen is disengaged from the negative contact plane and automatically opens when said platen engages the film contact plane;

Ninth, to provide a printer of this class in which a platen is yieldably supported in a film containing box having a telescopic light trap means in connection with a shutter box therebelow whereby opening of the shutter in connection with said shutter box permits said platen in connection with said film containing box to be forced downwardly whereupon the telescopic relation of said boxes permits said platen to engage film on a contact printing surface; and

Tenth, to provide a photographic printer of this class which is very simple and economical of construction, efficient in operation and which will not readily deteriorate or get out of order.

With these and other objects in view, as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon forming a part of this application in which:

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Fig. 1 is a top or plan view of my photographic printer showing portions broken away and in section to amplify the illustration, Fig. 2 is a side elevational view thereof, Fig. 3 is a fragmentary longitudinal sectional view taken from the line 3—3 of Fig. 1, Fig. 4 is an end view of my photographic printer showing portions broken away and in section to amplify the illustration, Fig. 5 is a transverse sectional view thereof taken from the line 5—5 of Fig. 3 and Fig. 6 is an enlarged fragmentary sectional view taken from the line 6—6 of Fig. 5.

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

The base 1, shutter box 2, shutter 3, film box 4, platen 5, shutter retracting member 6, spacers 7, spring 8, spring tube 9, link 10, lever 11, shutter box gaskets 12, film roller 15, roller frame 16, rollers 17, spring 18, film box cover 19, platen bracket 20, lever 21, shaft 22, clamp levers 23, brackets 24, cam shaft 25, shafts 26, 27 and 28, springs 29 and 30, lever 31, links 32 and 33, shafts 34 and 35, base bracket 36, spools 37 and 38, cams 39 and 40, film rail 41 and the shutter track 42 constitute the principal parts and portions of my photographic printer.

In the construction of my photographic printer, I provide a flat frame member 1 having an aperture 1a therein provided with a glass contact plate 1b registering therewith beneath which a suitable light source may be provided. The base 1 is provided with a base bracket 36 substantially U-shaped through the opposite ends of which the shaft 34 extends, as shown best in Figs. 1 and 2 of the drawings. Pivotally mounted on the shaft 43 is the bracket 24. This bracket 24 is provided with a U-shaped portion 24a at its pivoted end and is provided with a pair of upwardly extending plate portions 24b at its opposite end connected to said U-shaped portion 24a by bars 24c. The shafts 34 and 35 extend through the U-shaped portion 24a of the bracket 24 and support the links 32 and 33 on opposite ends thereof at opposite sides of said U-shaped portion 24a of said bracket 24. These links 32 and 33 are pivotally connected at their opposite ends on trunnion portions 4a and 4b extending

from the film box 4. It will be here noted that there are two of the links 32 and two of the links 33 which engage with said trunnion portions 4a and 4b at opposite sides of the film box 4, as shown best in Fig. 1 of the drawings. The links 32 and 33 pivoted at their opposite ends and connected to the film box 4 maintain vertical rectilinear operation of the film box 4 relatively to the shutter box 2. The shutter box 2 is a hollow rectangular box having its upper edge portion 2a telescopically mounted in a conforming chamber portion in the film box 4 providing a light trap intermediate the reciprocal telescopic portions of the film box 4 and the shutter box 2. The shutter box 2, at its lower portion, is provided with an extending plate 2b to the lower side of which is secured the spacer 7 supporting the shutter track 42 in spaced relation with said plate 2b whereby the shutter 3 is reciprocally mounted intermediate the track 42 and the plate 2b and arranged to enclose the opening 2c in the lower side of the shutter box 2 surrounded by the gasket 12 which is adapted to rest on the upper surface of the frame 1 around the aperture 1a therein above the contact plate 1b. Connected with the shutter 3, as shown in Fig. 6 of the drawings, is the shutter retracting member 6 provided with an upwardly extending arm portion 6a projecting through a slotted portion 9a in the tube 9 and pivotally connected at its upper end with the link 10, as shown best in Fig. 3 of the drawings. Positioned in the tube 9 and engaging the normally rear end of the shutter retracting member 6 is the compression spring 8 which tends to maintain the shutter 3 in closed position, as shown best in Figs. 3 and 6 of the drawings. The opposite end of the link 10 from its connection with the shutter actuating member 6 is pivotally connected with the lever 11 secured at its upper end to the shaft 27 and engaged by the cam 40 fixed on the shaft 25 also carrying the cam 39 fixed thereto which engages the lever 21 connected to the spring 30 fixed to the pin 30a at its opposite end projecting from the bracket 24. Fixed to the outer ends of the shaft 25 are the opposite ends of the lever 31. This lever 31 is provided with cam portions 31a adjacent the shaft 25 and is provided with an interconnecting shaft portion 31b at its middle portion which serves as an operating handle for actuation of said lever 31 about the axis of the shaft 25 in fixed connected relation therewith. The lever 21 at its normally lower end is fixed to the shaft 22 on the opposite ends of which the clamp levers 23 are rigidly secured. These clamp levers 23 are each provided with notched portions 23a therein adapted to engage the end hook portions 41a of the film rail 41 at opposite sides of the shutter box 2. The shaft 26 extends through the bracket 24 at its upwardly extending portions 24b and the springs 29 are connected to its opposite ends and extend downwardly intermediate the bracket and the links 33, as shown best in Fig. 1 of the drawings. The lower ends of these springs 29 are connected to shafts 28 in connection with the links 33 tending to hold the film box 4 together with the links 32 and 33 in the upper solid line position as shown in Fig. 2 of the drawings. The film box 4 is provided with a cover 19 arranged to be secured in light tight relationship with the upper open side thereof and revolubly mounted in this film box 4 are the spools 37 and 38 and the film roller 15 intermediate said spools 37 and 38. The film is arranged to pass from the spool 37 downwardly around the rollers 17 upwardly over the film

roller 15 and onto the spool 38. The spools 37 and 38 are actuated externally of the film box 4 by means of thumb wheels 37a and 38a, respectively. Fixed to the inner side of the film box 4 is the bracket 20 which is a substantially rigid member provided with an angularly extending lower end portion 20a to the lower side of which is fixed the sponge rubber platen 5. Extending over the portion 20a of the bracket 20 and the platen 5 is the substantially inverted U-shaped roller frame 16 in which the rollers 17 are revolubly mounted. This roller frame 16 is provided with a bridge portion 16a extending over the upper side of the angularly disposed portion 20a of the bracket 20 and is engaged by the spring 18 on the shaft 20b connected to the angularly disposed portion 20a of the bracket 20. Thus, the spring 18 tends to hold the roller frame 16 downwardly against the upper side of the angularly disposed portion 20a of the bracket 20 as shown best in Figs. 3 and 4 of the drawings.

The operation of my photographic printer is substantially as follows:

A transparency is first placed on the contact printing plate 1b at the upper side of the frame 1 and the gasket 12 is engaged at the upper side of the frame 1 surrounding said transparency, as shown best in Fig. 3 of the drawings. The shaft 31b of the lever 31 is then rotated about the axis of the shaft 25 stationarily supported in connection with the bracket 24. As the shaft 25 is rotated, the lever 11, in connection with the link 10, secured to the arm 6a of the shutter retracting member 6 forces the shutter 3 backwardly into the dash line position as shown in Fig. 2 of the drawings, opening the aperture 2c in the shutter box 2 and pivoting the cam 39 out of engagement with the lever 21 permitting the spring 30 in connection therewith to rotate the shaft 22 carrying the clamp levers 23 into the dash line position, as shown in Fig. 2 of the drawings, engaging the extending portions 41a of the film rail 41 locking the gasket 12 in secure compressed relation between the shutter track 42 and the upper surface of the frame 1 surrounding the aperture 1a therein. Simultaneously to the engagement of the levers 23 with the film rail 41, the cam portions 31a of the lever 31 bear upon the upper edges of the links 32 forcing the film box 4 downwardly in telescopic relation with the shutter box 2 whereby the platen 5 engaging film at the lower side thereof is forced into engagement with the upper side of the contact plate 1b in the aperture 1a of the frame 1. When the platen 5 is forced downwardly toward the upper surface of the contact plate 1b the roller frame 16 is shifted upwardly on the shaft 20b against compression of the spring 18. This is caused by engagement of the rollers 17 at the upper surface of the contact plate 1b during compression of the platen 5 forcing the film engaged by the rollers 17 into contact relationship with the transparency placed over the contact plate 1b, as hereinbefore described. When the lever 31 passes forwardly into the dash line position, as shown in Fig. 2 of the drawings, it releases the latch 43 engaging the cam 15a of the film roller 15 permitting another length of film equal to the exposure lengths of the contact plate 1b to pass over the rollers 17 when actuated by rotation of the thumb wheel 38a on the spool 38. This film winding operation on the spool 38 takes place after the lever 31 has been released and the inherent tension in the film passing over the film roller 15 causes the notch 15b of the cam 15a to pass the dog 43a of

the latch 43 thereby permitting subsequent turning of said roller 15 until the notch 15b again engages the dog 43a of the latch 43. When the lever 31 is pivoted backwardly about the axis of the shaft 25 into the solid line position, as shown in Fig. 2 of the drawings, the cam 49 is released from the lever 11 permitting the spring 8 to force the shutter actuating member 6 forwardly into the solid line position, as shown in Fig. 6 of the drawings, closing the shutter 3 over the aperture 2c of the shutter box 2 rendering the shutter box 2 in its telescopic relation with the film box 4 light tight. The hereinbefore film shifting operation may then be carried on by rotating the thumb piece 38a of the spool 38 and the entire mechanism including the film box 4, shutter box 2, bracket 25 and connected parts may be raised upwardly and pivoted about the axis of the shaft 43 in connection with the bracket 36 secured to the frame 1. It will be here noted that movement of the lever 31 to the solid line position, as hereinbefore described, causes the cam 39 on the shaft 25 to actuate the lever 21 pivoting the clamp levers 23 out of engagement with the film rail 41. Thus, the mechanism, as hereinbefore described, is released for movement upwardly about the axis of the shaft 43. When the lever 31 is in the solid line position, as shown in Fig. 2 of the drawings, the springs 29 in connection with the bracket 24 tend to hold the links 32 and 33 together with the film box 4 in the upward solid line position, as shown in Fig. 2 of the drawings. Thus, the spring 29 connected to the bracket 24 causes positive engagement of the link 32 with the lower side of the lever 31 at the axis of the shaft 25 rigidly journaled in said bracket 24. It is to be noted that the gasket 12 in compressed relation makes a light tight arrangement before the shutter 3 is retracted and maintains a light tight condition until the shutter 3 is closed. Therefore, the shutter box 2 together with the film box 4 are maintained in light tight condition at all times. The channel portion 4a in the film box 4 provides a light trap in which the upper edge portion 2a of the shutter box 2 is positioned, regardless of the longitudinal disposition of said upper edge portion 2a relatively to the overall depth of the channel portion 4a of said film box 4.

Though I have shown and described a particular construction, combination and arrangement of parts and portion, I do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the scope of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

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

1. In a photographic printer of the class described, the combination of a frame, a light transmitting plate in connection with said frame, a shutter box having a gasket at its normally lower side arranged to surround said light transmitting plate, a movable shutter in said shutter box arranged to enclose the same upwardly of said gasket and a film box vertically telescopically mounted relatively to said shutter box having a platen therein arranged to contact said light transmitting plate.

2. In a photographic printer of the class described, the combination of a frame, a light transmitting plate in connection with said frame, a shutter box having a gasket at its normally lower side arranged to surround said light transmitting plate, a movable shutter in said shutter box arranged to enclose the same upwardly of said gasket and a film box vertically telescopically mounted relatively to said shutter box having a platen therein arranged to contact said light transmitting plate, pivoted linkage, said shutter box and said film box being pivotally movable with said linkage away from said light transmitting plate simultaneously.

3. In a photographic printer of the class described, the combination of a frame, a light transmitting plate in connection with said frame, a shutter box having a gasket at its normally lower side arranged to surround said light transmitting plate, a movable shutter in said shutter box arranged to enclose the same upwardly of said gasket, a film box vertically telescopically mounted relatively to said shutter box having a platen therein arranged to contact said light transmitting plate, pivoted linkage, said shutter box and said film box being pivotally movable with said linkage away from said light transmitting plate simultaneously, a bracket in connection with said frame and linkage means interconnecting said bracket and said film box whereby said film box is pivotally movable relatively to said frame.

4. In a photographic printer of the class described, the combination of a frame, a light transmitting plate in connection with said frame, a shutter box having a gasket at its normally lower side arranged to surround said light transmitting plate, a movable shutter in said shutter box arranged to enclose the same upwardly of said gasket, a film box vertically telescopically mounted relatively to said shutter box having a platen therein arranged to contact said light transmitting plate, pivoted linkage said shutter box and said film box being pivotally movable with said linkage away from said light transmitting plate simultaneously, a bracket in connection with said frame, linkage means interconnecting said bracket and said film box whereby said film box is pivotally movable relatively to said frame, and a second bracket pivotally connected with said first-mentioned bracket, said shutter box secured to said second-mentioned bracket.

5. In a photographic printer of the class described, the combination of a frame, a light transmitting plate in connection with said frame, a shutter box having a gasket at its normally lower side arranged to surround said light transmitting plate, a movable shutter in said shutter box arranged to enclose the same upwardly of said, gasket, a film box vertically telescopically mounted relatively to said shutter box having a platen therein arranged to contact said light transmitting plate, said shutter box and said film box being movable away from said light transmitting plate simultaneously, a bracket in connection with said frame, linkage means interconnecting said bracket and said film whereby said film box is pivotally movable relatively to said frame, a second bracket pivotally connected with said first-mentioned bracket, said shutter box secured to said second-mentioned bracket and lever means in connection with said second-mentioned bracket arranged to engage said links for telescopically moving said film box relatively to said shutter box.

6. In a photographic printer of the class described, the combination of a frame, a light transmitting plate in connection with said frame, a shutter box having a gasket at its normally lower side arranged to surround said light transmitting

plate, a movable shutter in said shutter box arranged to enclose the same upwardly of said gasket, a film box vertically telescopically mounted relatively to said shutter box having a platen therein arranged to contact said light transmitting plate, said shutter box and said film box being moveable away from said light transmitting plate simultaneously, a bracket in connection with said frame, linkage means interconnecting said bracket and said film whereby said film box is pivotally moveable relatively to said frame, a second bracket pivotally connected with said first-mentioned bracket, said shutter box secured to said second-mentioned bracket, lever means in connection with said second-mentioned bracket arranged to engage said links for telescopically moving said film box relatively to said shutter box, latch members pivotally connected with said second-mentioned bracket and means in connection with said frame engageable with said latch means for holding said shutter box securely against the upper side of said frame around said light transmitting plate.

7. In a photographic printer of the class described, the combination of a frame, a light transmitting plate in connection with said frame, a shutter box having a gasket at its normally lower side arranged to surround said light transmitting plate, a moveable shutter in said shutter box arranged to enclose the same upwardly of said gasket, a film box vertically telescopically mounted relatively to said shutter box having a platen therein arranged to contact said light transmitting plate, said shutter box and said film box being moveable away from said light transmitting plate simultaneously, a bracket in connection with said frame, linkage means interconnecting said bracket and said film whereby said film box is pivotally moveable relatively to said frame, a second bracket pivotally connected with said first-mentioned bracket, said shutter box secured to said second-mentioned bracket, lever means in connection with said second-mentioned bracket arranged to engage said links for telescopically moving said film box relatively to said shutter box, latch members pivotally connected with said second-mentioned bracket, means in connection with said frame engageable with said latch means for holding said shutter box securely against the upper side of said frame around said light transmitting plate and lever and linkage means in connection with said first-mentioned lever arranged to retract said shutter simultaneously to the movement of said film box in telescopic relationship with said shutter box.

8. In a photographic printer of the class described the combination of a contact printing plate arranged to transmit light therethrough, a shutter box arranged to be positioned in light tight relationship surrounding a portion of said contact printing plate, a shutter arranged to enclose said shutter box adjacent said contact printing plate, a film box, film supporting spools therein, a platen in said film box over which said film extends in substantially parallel relationship to the plane of said contact printing plate, said film box telescopically mounted relatively to the upper portion of said shutter box in light tight relationship therewith whereby vertical movement of said film box relatively to said shutter box permits said platen to engage said contact printing plate when said shutter is in open position.

9. In a photographic printer of the class described the combination of a contact printing plate arranged to transmit light therethrough, a shutter box arranged to be positioned in light tight relationship surrounding a portion of said contact printing plate, a shutter arranged to enclose said shutter box adjacent said contact printing plate, a film box, film supporting spools therein, a platen in said film box over which said film extends in substantially parallel relationship to the plane of said contact printing plate, said film box telescopically mounted relatively to the upper portion of said shutter box in light tight relationship therewith whereby vertical movement of said film box relatively to said shutter box permits said platen to engage said contact printing plate when said shutter is in open position and means for automatically opening said shutter when said film box is moved downwardly in telescopic relationship with said shutter box.

10. In a photographic printer of the class described the combination of a contact printing plate arranged to transmit light therethrough, a shutter box arranged to be positioned in light tight relationship surrounding a portion of said contact printing plate, a shutter arranged to enclose said shutter box adjacent said contact printing plate, a film box, film supporting spools therein, a platen in said film box over which said film extends in substantially parallel relationship to the plane of said contact printing plate, said film box telescopically mounted relatively to the upper portion of said shutter box in light tight relationship therewith whereby vertical movement of said film box relatively to said shutter box permits said platen to engage said contact printing plate when said shutter is in open position, means for automatically opening said shutter when said film box is moved downwardly in telescopic relationship with said shutter box and a gasket at the under side of said shutter box arranged to provide a light trap around a portion of said contact printing plate.

11. In a photographic printer of the class described the combination of a contact printing plate arranged to transmit light therethrough, a shutter box arranged to be positioned in light tight relationship surrounding a portion of said contact printing plate, a shutter arranged to enclose said shutter box adjacent said contact printing plate, a film box, film supporting spools therein, a platen in said film box over which said film extends in substantially parallel relationship to the plane of said contact printing plate, said film box telescopically mounted relatively to the upper portion of said shutter box in light tight relationship therewith whereby vertical movement of said film box relatively to said shutter box permits said platen to engage said contact printing plate when said shutter is in open position, means for automatically opening said shutter when said film box is moved downwardly in telescopic relationship with said shutter box, said platen of yieldable material and a roller frame adapted to support film at the under side of said platen having rollers in connection therewith and vertically moveable relatively to said platen.

12. In a photographic printer of the class described the combination of a contact printing plate arranged to transmit light therethrough, a shutter box arranged to be positioned in light tight relationship surrounding a portion of said contact printing plate, a shutter arranged to enclose said shutter box adjacent said contact printing plate, a film box, film supporting spools therein, a platen in said film box over which said film extends in substantially parallel relation-

ship to the plane of said contact printing plate, said film box telescopically mounted relatively to the upper portion of said shutter box in light tight relationship therewith whereby vertical movement of said film box relatively to said shutter box permits said platen to engage said contact printing plate when said shutter is in open position, means for automatically opening said shutter when said film box is moved downwardly in telescopic relationship with said shutter box, said platen of yieldable material, a roller frame adapted to support film at the under side of said platen having rollers in connection therewith vertically moveable relatively to said platen and a spring in connection with said film box arranged to force said roller frame downwardly toward the lower surface of said platen.

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