Sept. 8, 1953

D. FERGUSON

2,651,244

PHOTOPRINT EJECTOR

Original Filed Aug. 1, 1949

3 Sheets-Sheet 1

Fig. 1.

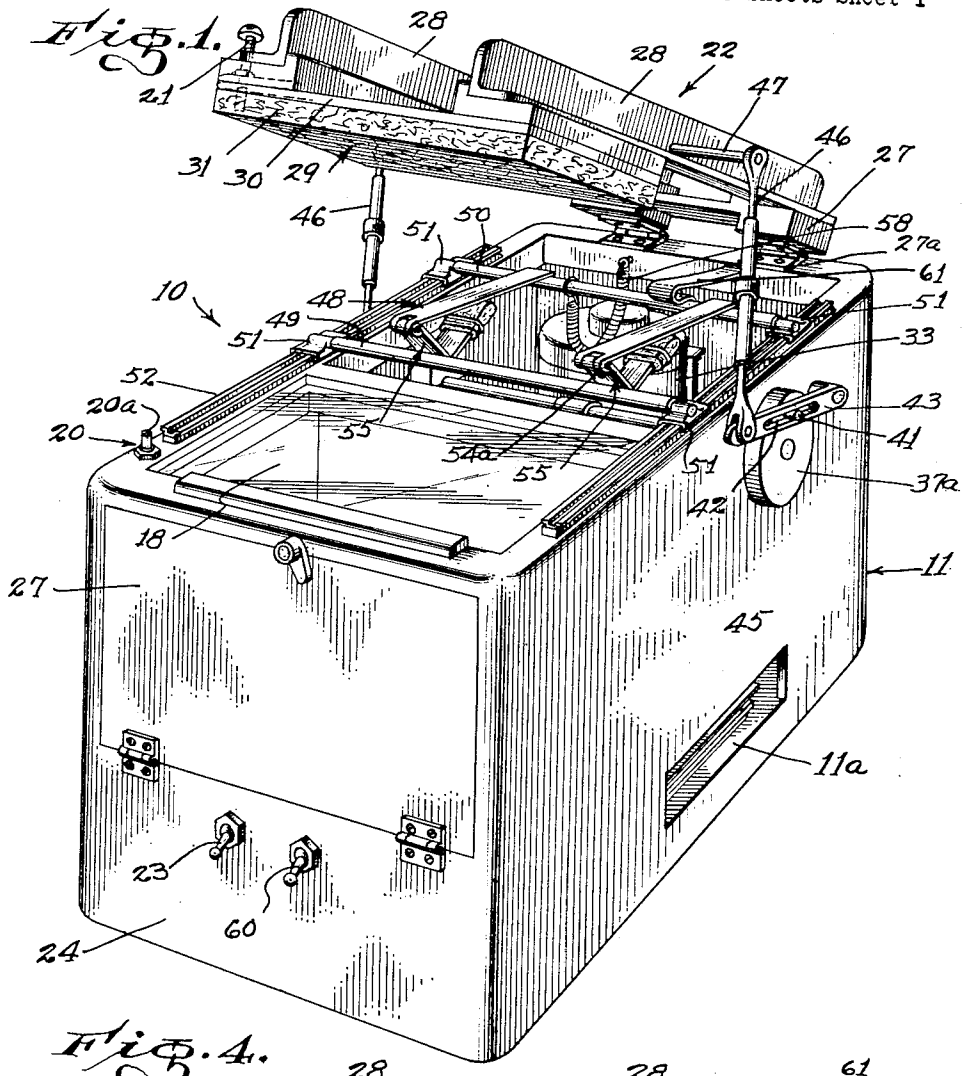
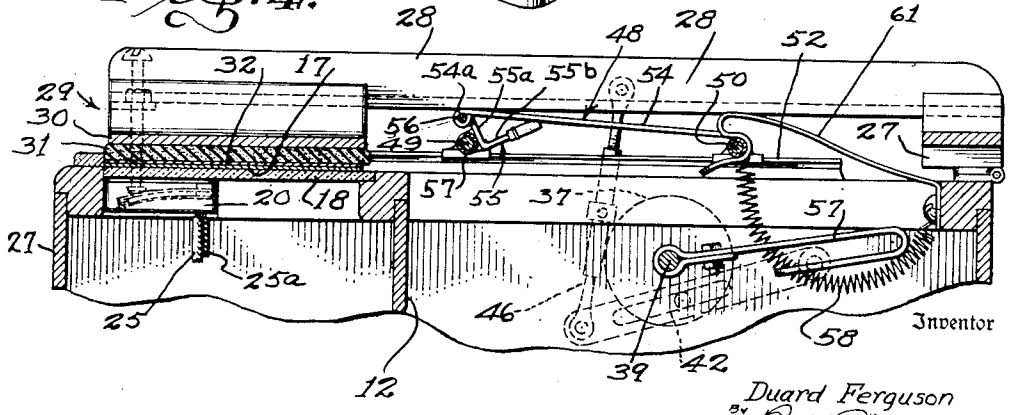


Fig. 4.



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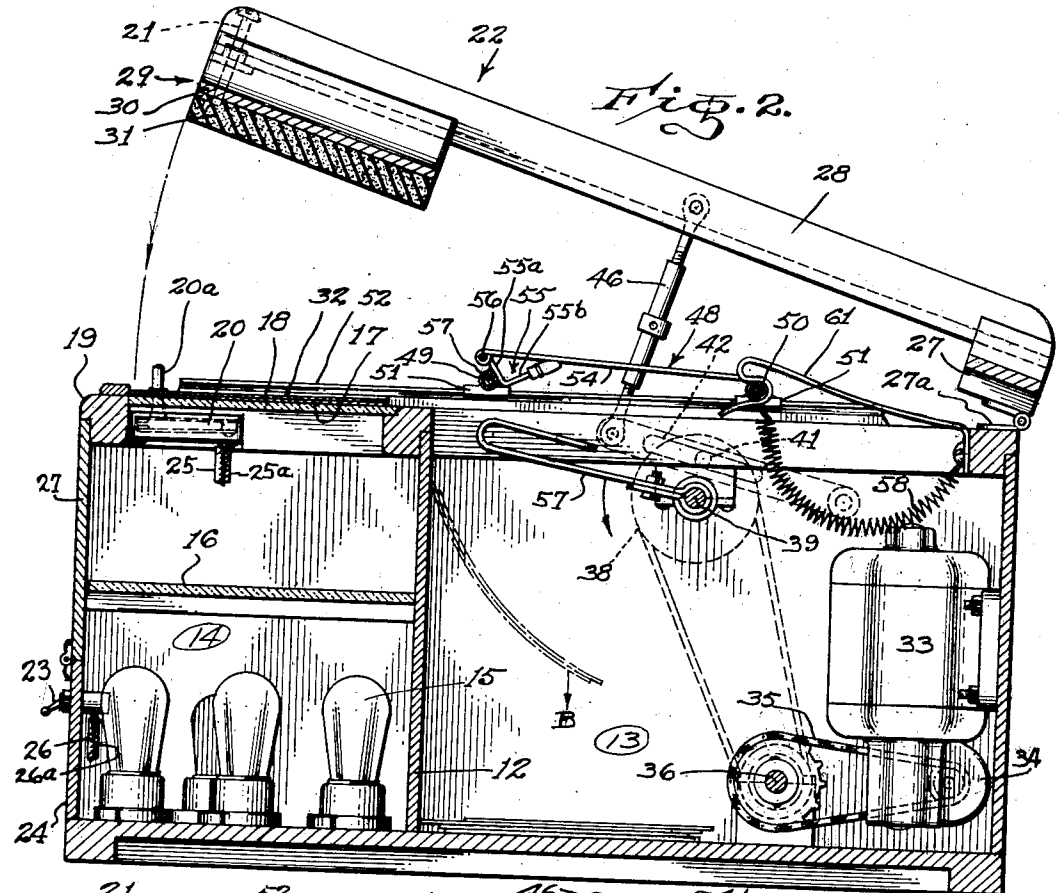


Fig. 2.

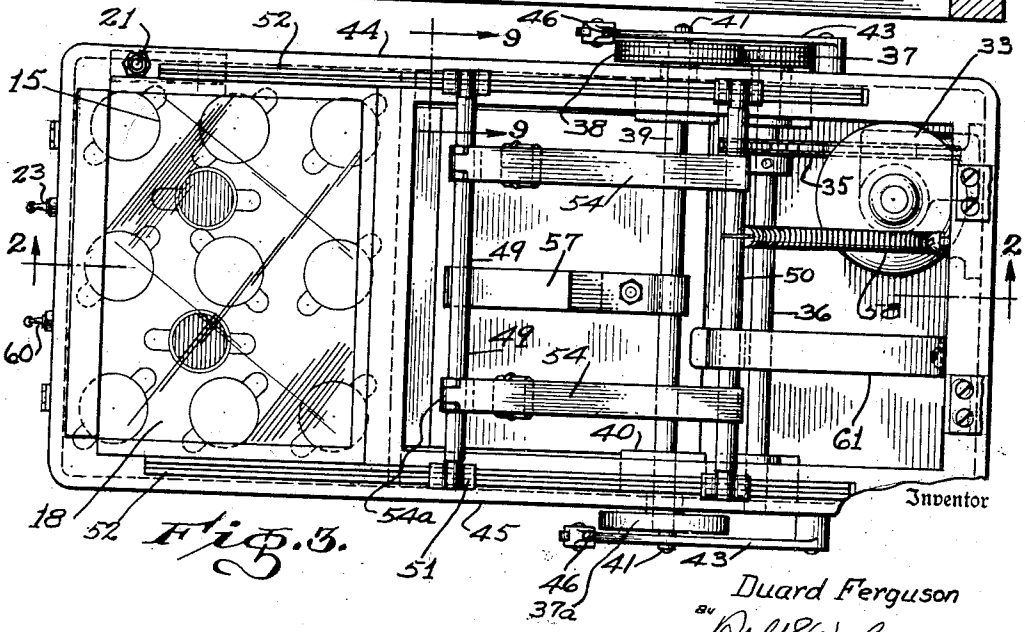


Fig. 3.

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PHOTOPRINT EJECTOR

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Fig. 5.

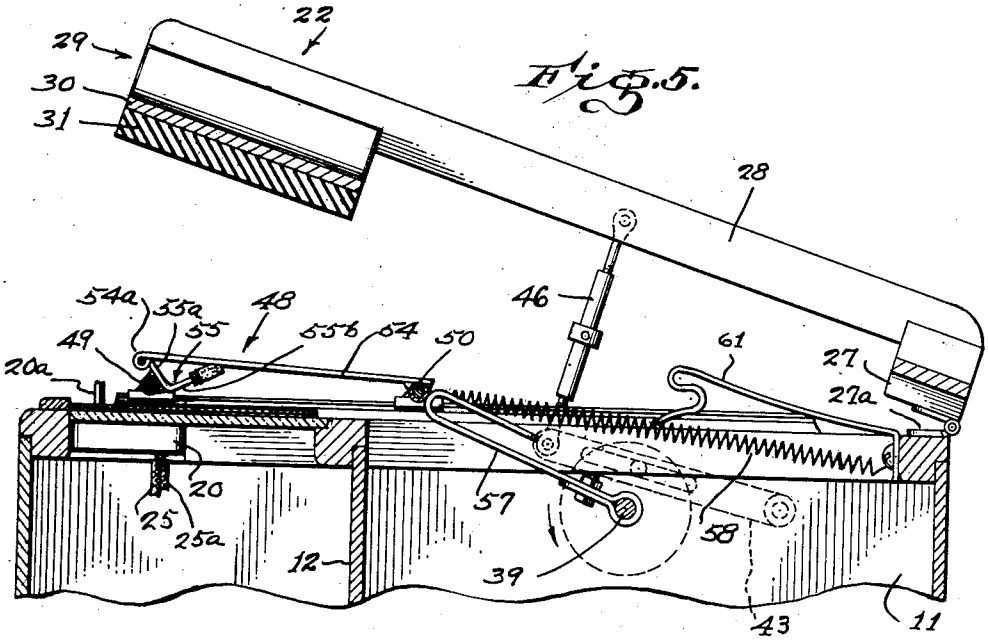


Fig. 6.

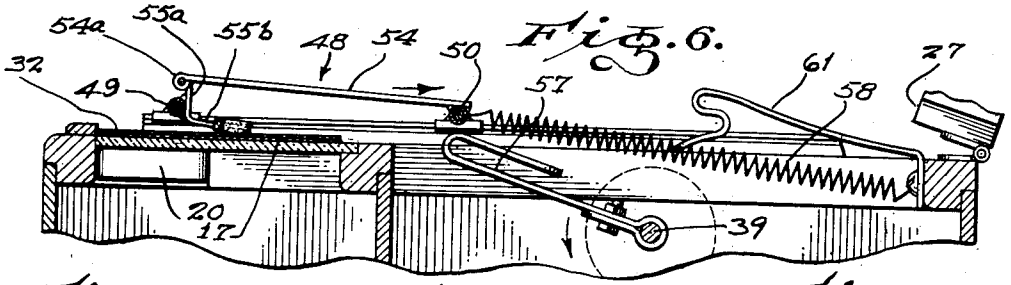


Fig. 7.

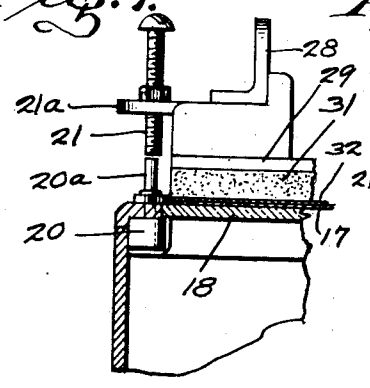


Fig. 8.

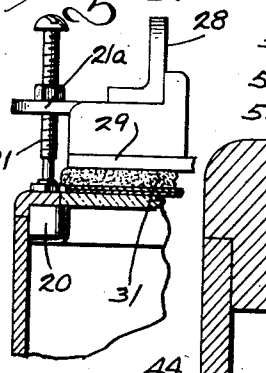
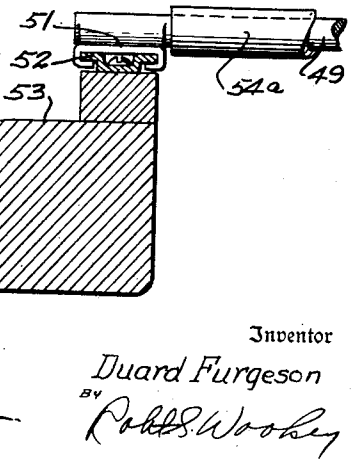


Fig. 9.



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Patented Sept. 8, 1953

2,651,244

UNITED STATES PATENT OFFICE

2,651,244

PHOTOPRINT EJECTOR

Duard Ferguson, Los Angeles, Calif.

Substituted for abandoned application Serial No. 107,907, August 1, 1949. This application December 19, 1951, Serial No. 262,368

5 Claims. (Cl. 95—73)

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This application is a substitute for abandoned application Serial No. 107,907, filed August 1, 1949.

This invention relates to automatic means to print photographs from a negative.

For the purpose of advertising, and other publicity, it is frequently necessary to run a great number of low cost prints from a photographic negative. To facilitate this work, manually operated printers have been developed, and while such printers represent an advance over individualized treatment of a contact print, all manually operated printers of which I am aware, require that the sensitized paper be manually placed upon the negative, that a platen be manually lowered to pressurize the paper into contact with the negative, that thereafter the platen be manually lifted from functional position, and that the exposed paper be manually removed from contact with the negative.

This operation is slow and tedious for a number of reasons, among which may be mentioned, the inherent tendency of sensitized paper to curl in various and sundry places and shapes, so that it is difficult to lay the paper in proper contact with a negative, while at the same time lowering the platen to hold the paper upon the negative.

Regardless of how dextrous an operator may be, the use of a manually operated printer is slow and tedious work at best, and is physically exhausting, especially when a large number of prints are run off in a limited time.

In contra-distinction to the afore-described operation, the only required manual operation in connecting with the use of the printer of this invention, is, that the sensitized paper be placed upon the negative, all other operations in connection with the exposure being automatic, thus the hands are free for but a single task, with a resulting increase of production, together with better prints because of uniformity of machine operation.

Accordingly, it may be considered that it is a prime object of the present invention to provide means to make contact photographic prints in substantially an automatic manner.

Another object of the invention resides in the provision of an improved platen construction wherein the paper and the negative are blanketed into a more uniform pressurized yet, yieldable surface contact than is feasible by hand operation.

Another object of the invention resides in the provision of means to firmly and securely hold the paper in contact with the negative prior to

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switch closing to energize the lamps for the exposure.

An advantage of the invention resides in increased production per unit of time or man hour as compared with methods heretofore used.

Another advantage of the invention resides in production of a more uniform and superior quality of print than has heretofore existed in rapid, mass production of photographic prints.

A further advantage of the invention resides in the fact that exposed paper is automatically removed from the negative and delivered to a point along side the printer to facilitate ultimate removal thereof without interfering with the duties of the operator in feeding in sensitized paper for exposure.

Another advantage of the invention resides in the provision of a single power source to raise and lower the platen, for timing the exposure period and for ejecting the exposed paper.

Still another advantage, derived from simplicity and the automatic nature of the printer, resides in the fact that a single operator may now combine the printing and developing operations in producing photographic prints instead of the two or more persons heretofore required to turn out an equal number of prints, or alternatively, an unskilled person or apprentice help may now be employed in lieu of a skilled photographic printer and obtain better quality, low cost photographic prints than has heretofore been possible.

Other objects and advantages of the invention may be noted from the accompanying drawing, the detailed description, and the subjoined claims.

In the drawing of which there are 3 sheets:

Figure 1 is a perspective view showing my new and improved photographic printer.

Figure 2 is a longitudinal, mid-vertical sectional view taken along line 2—2, Figure 3, showing various details of construction within the printer cabinet; and,

Figure 3 is a top-plan view of the printer with the platen removed to better show construction otherwise hidden thereby.

Figure 4 is a view of a fragment of the printer showing the platen in functional position, that is, forcing the paper and negative into firm, non-slip contact, followed by closing a switch for lighting the lamps for the exposure.

Figure 5 is a similar view modified to the extent, that here the platen is raised from functional position, and the arm which forces the paper ejector carriage forwardly, is about to re-

lease it to permit spring pressure return thereof with concurrent operation of the fingers for ejecting an exposed paper.

Figure 6 is a view similar to Figure 5, modified in that the paper ejecting carriage is now released by its actuating arm, the view is sequential to Figure 5.

Figure 7 is a view showing a detail of construction involving the relationship between the operation of the platen and the lighting switch; while,

Figure 8 is a view sequential to Figure 7 showing the platen in full pressure contact with the paper and showing the switch as being closed in this position of the platen.

Figure 9 is a detail taken along line 9—9, Figure 3, showing the construction of the track or rail upon which the paper ejector carriage is slidably moved to and from the paper ejecting position.

In the drawing the numeral 10 indicates the automtaic printer of this invention, in which a cabinet or housing structure 11 is shown as being substantially rectilinear in shape and which is transversely partitioned at 12 to provide a compartment 13 for the operating mechanism, and a compartment 14 for the exposure lamps 15 and related accessories.

The compartment 14 is provided with a glass plate 16 which may be tinted with color for light filtering purposes if desired, or it may be used to support a light filtering material layed thereon to vary the quality and intensity of light upon the negative 17 which rests upon the glass cover 18 for the compartment 14, and which cover is supported by a collar or frame 19 formed integrally with the cabinet 11.

A micro-switch 20 is secured upon the frame 19 adjacent the cover 18, and is normally open, but is closable upon pressure contact with an adjustable screw 21 which moves with the platen press 22, as shown in Figures 7 and 8, while a two-way 23 upon the front panel 24 of the cabinet is electrically placed between the switch 20 and the lamps 15 to enable an exposure to be manually controlled to meet requirements based or predicated upon abnormally dense or thin negatives. The circuits involved in connection with the use of the aforementioned switches are simple and within the common knowledge of those familiar with lighting circuits, and for that reason have not been included in the drawing, only the incoming and out-going terminal wires 25 and 25*a* to the micro-switch 20 and like terminal wires 26 and 26*a* to the two-way switch 23 are shown.

A swingable door 27 is positioned upon the panel 24 of the cabinet to provide access to the lamps 15 or for other reasons, such as removing or changing the glass divider plate 16.

The platen press 22 is hingedly attached to the rear end of the cabinet, as shown, and comprises a frame having a rail 27 to which the hinges 27*a* are attached, and a pair of arms or stiles 28 which extend forwardly therefrom for support of the platen 29 which, in turn, comprises a plate 30 attached directly to the arms 28, and upon which plate 30 I place a thick sponge rubber facing 31 for compressive contact with the sensitized paper 32, so that the beginning of a printing operation in a minimum pressure is at first applied to a contact paper, but in sequence an increasingly greater pressure is applied thereto to insure complete and effective, non-slip contact between the entire surfaces of the paper and the negative prior to exposure of the paper.

The compartment 13 contains a constant speed motor 33 and speed reduction device 34 thereon which is operatively connected by any suitable driving means, such as a chain 35, to a shaft 36 which is journalled in the side-walls of the cabinet 11 and which extends through one of the walls thereof to be fitted with a wheel 37 in chain drive connection with the wheel 38 upon a shaft 39 which is journalled in bearings 40 upon the inner surfaces of the walls 44 and 45 of the cabinet, and which extends transversely of and through the cabinet. The wheel 38 and a companion wheel 37*a* upon the opposite end of the shaft 39, are provided with wrist pins 41 which are operable in slots 42 in the rocker arms 43 fulcrumbed upon the exterior side of the walls 44 and 45, and which rocker arms are provided with adjustable links 46 which are swivelly connected to a rod 47 positioned in, and extending transversely of the arms 28 of the platen press, so that as the rocker arms oscillate in response to the motor 33, the plated press is also raised and lowered to and from a horizontal plane to hold the paper 32 upon the negative 17, and to effect closure of the micro-switch 20.

After the paper 32 has been exposed it is necessary to remove it to a place of convenient access for developing, this I accomplish by means of a paper ejector 48 which includes a pair of shafts 49 and 50 which are non-rotatably attached to slidable guide shoes 51. The ends of the guides are folded over and under the raised edges of channel-like rails 52 which are secured upon a frame 53 upon the walls 44 and 45 of the cabinet, and which extend substantially the full length thereof.

The shafts 49 and 50 are held in co-operable, spaced relationship by a pair of iron straps 54, the one end of which is welded or otherwise secured to the shaft 50, while the other of the ends of the straps are looped at 54*a* to be hingedly connected to the L-shaped paper ejecting fingers 55 by means of a pin 56.

There are two of the fingers 55, which as stated are L shaped to form legs 55*a* and 55*b*. The legs 55*a* are provided with tubular sleeves 57 which are fixedly secured thereto and which are oscillatably positioned upon the shaft 49 which extends therethrough, so that upon being rocked by the straps 54 to which they are hingedly connected, the rubber tipped leg 55*b* of the finger is raised and lowered to and from position to be in pressure contact with the paper 32, as will hereinafter be described.

An arm 57 which is clamped upon the shaft 39 for rotation therewith, is adapted to intercept and push the shaft 50, and hence the ejector carriage 48, forwardly upon its tracks to functional position upon each revolution thereof, while an extensile spring 58 attached to the rear of the cabinet and to the shaft 50 is adapted to return the ejector carriage to its place of beginning, that is, nested within and in abutment with the looped end of a forwardly extending springable arm or stop 61, and in so doing causes the finger 55 to be reversely rocked upon the shaft 49 to lower the rubber tipped leg 55*b* thereof into pressure contact with the paper 32, so that the paper is dragged inwardly across the glass plate with movement of the ejector carriage, to drop into the compartment 13 in substantially the manner indicated by the dotted lines and arrow B. The paper being later retrieved through the

access opening 11*a* in the wall 45 of the cabinet.

The press is placed in operation as follows: Upon closing the switch 60, the rocker arms 43 are caused to oscillate by reason of the intermediate power drive thereof, and such oscillation operating through the adjustable links 46, raises and lowers the platen press 22. Upon raising the platen press, the switch 60 may be opened to momentarily arrest the platen in raised position, thereafter, the two-way switch 23 is thrown in a direction which places one of its circuits in series with the micro-switch 20 to light the lamps 15 upon again lowering the platen.

A negative 17 is then placed upon the glass plate 18 and a sensitized paper 32 is placed upon the negative. The switch 60 is then closed to cause the platen to lower to functional position, that is, to hold the paper in contact with the negative during the exposure period.

During this movement of the platen, the face of the sponge rubber pad thereon will first contact the paper, and as the platen moves progressively downward, the rubber is compressed in substantially the manner illustrated in Figures 7 and 8, so that upon attainment of maximum pressure upon the paper, the paper and negative are brought into full and complete face contact, and in this connection it is to be noted, that since the platen approaches the paper 32 in an angular inclination, even though slight, all air pockets are forced from between the paper and the negative, thus giving further assurance of perfect face contact therebetween.

During the initial stages of platen contact with the paper, the arms of the platen press have not moved downwardly far enough to bring the screw 21 into contact with the closing element 20*a* of the micro-switch 20, but as such movement develops, the switch 20 is closed to cause the lamps 15 to be lighted. The period during which the switch 20 is closed may be varied by running-down or raising the screw 21, thereby actuating the switch earlier or later as may be required to obtain a variable length of illumination, depending upon the speed of the paper and the condition of the negative.

Concurrently with the afore-described movement of the platen and actuation of the switch 20, and in timed sequence therewith, the shaft 39 rotates the arm 57, so that by the time the platen is released from pressure contact with the paper 32, the arm 57 pushes the ejector carriage 48 forwardly along its track, and in so doing places the spring 58 under tension. Forward movement of the ejector carriage causes the finger 55 to be unbalanced, and in tipping forwardly raises the rubber tipped portion 55*b* in clearance of the paper 32. Upon release of the shaft 50 by the arm 57 (due to rotational movement thereof), the spring 58 withdraws the paper ejecting carriage from its forward position and in so doing rocks the finger 55 to its other extreme position which places the rubber tipped portion 55*b* thereof in frictional contact with the paper 32, so that the paper is carried therewith and is released as it passes over the inner edge of the plate 18 and falls into the compartment 13 from which it is retrieved through the access opening 11*a* in the side of the cabinet.

Repetitious movement of the platen enables new paper to be placed upon the glass plate 18 for exposure, and repetitious movement of the paper ejector withdraws exposed paper and deposits it in the compartment 13, for later developing.

Thus it will be seen that the sole duty of an operator of the printer of this invention, is to merely feed in raw or unexposed sensitized paper, the printer automatically taking care of all subsequent operations. It is also to be noted that since the platen is faced with sponge rubber, no harm can come to an operator who is late in withdrawing the hands from adjustment of the paper upon the negative, for the rubber yields around the flesh and only a sense of firm pressure is experienced.

Having thus described my invention in its presently preferred form, that which I believe to be novel and for which I seek Letters Patent, is:

1. In a photographic exposure apparatus including a housing therefor, an ejector for removal of sensitized photographic paper from a negative, said ejector comprising a pair of spaced and parallel guide rails on said housing, a frame adapted to sliding movement on said rails, a pair of L-shaped fingers fulcrumed on said frame and comprising paper contacting elements and lugs, a strap hingedly connected to each of said lugs and to said frame, a power driven rotatable arm adapted to cyclically engage and slide said frame on said rails to a work position and spring means adapted to effect return sliding movement of said frame to its point of beginning intermediately of engagement by said rotatable arm, said straps being arranged to rock said lugs and raise said paper contacting elements in clearance of said sensitized paper in moving to a work position under pressure of said rotatable arm and being reversely moved into contact with said sensitized paper in being returned to their point of beginning by said spring whereby an exposed photographic paper is carried from a place of exposure to a repository.

2. The combination in a photographic printer including a frame therefor, of an ejector to remove sensitized photographic paper from a negative contact after exposure thereof, said ejector being formed of a pair of spaced and parallel rods having shoes on the ends of each thereof, a pair of spaced and parallel rails upon said frame adapted to be engaged by said shoes for guided slidable movement thereon, a pair of bell-cranks fulcrumed upon one of said rods, a paper grip cot upon one of the legs of each of said bell-cranks, a strap hingedly connected to the other of the legs of each of said bell-cranks and fixedly connected to the other of said parallel rods, a power driven arm adapted to rotate and cyclically bear against the last mentioned of said rods in forward movement thereof including said straps whereby upon being so moved the associated leg of said bell-crank is rocked by inertia resistance to movement so as to raise said cots in clearance of said sensitized paper, and a spring connected to the last mentioned of the rods of the ejector to effect return movement thereof to its point of beginning, said bell-crank being reversely rocked by inertia resistance to movement so as to lower said cots into engagement with a sensitized paper and effect dragging thereof from a photographic negative to a place of deposit.

3. The structure set forth in claim 2 in which the engaged sensitized paper is drawn rearwardly of the front of said printer for gravitational release from said paper grip cots.

4. The structure set forth in claim 2 in which a repository within the frame of said pho-

tographic printer is located rearwardly of the place of exposure of said paper.

5. The structure set forth in claim 2 in which a repository within said photographic printer is located rearwardly of the place of exposure of said paper, said repository being accessible from one of the sides of the frame of the printer for removal of exposed sensitized paper therefrom.

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