

1,041,122.

Patented Oct. 15, 1912.

4 SHEETS—SHEET 1.

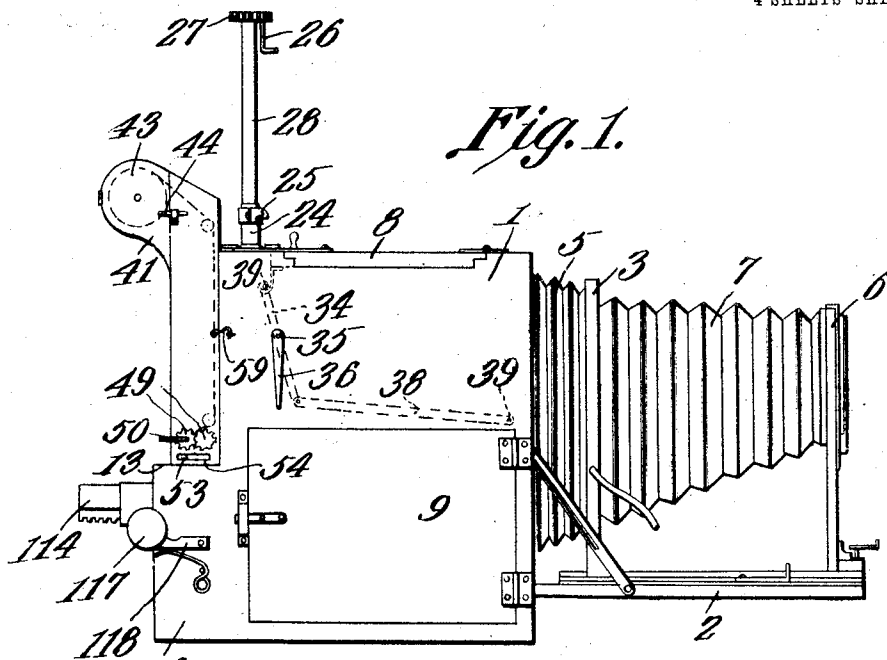


Fig. 1.

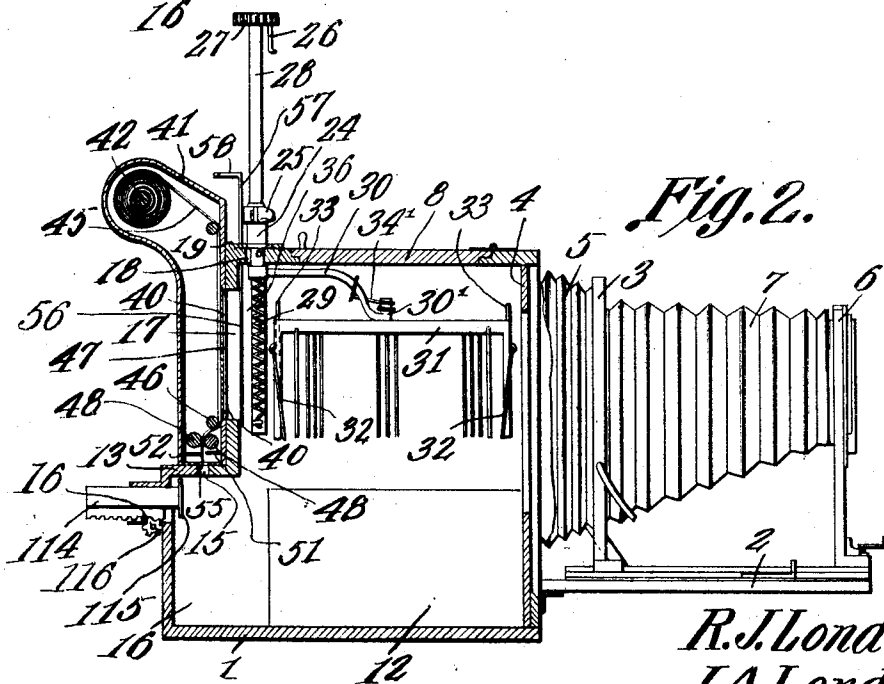


Fig. 2.

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 Inventors

Witnesses

*J. P. Tiney
 L. H. W. Brown*

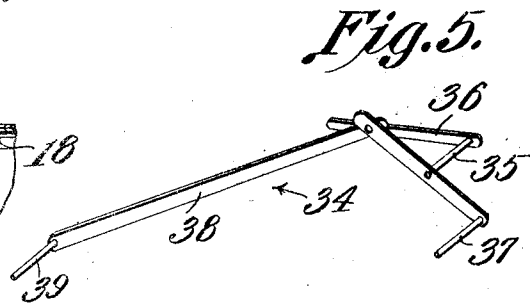
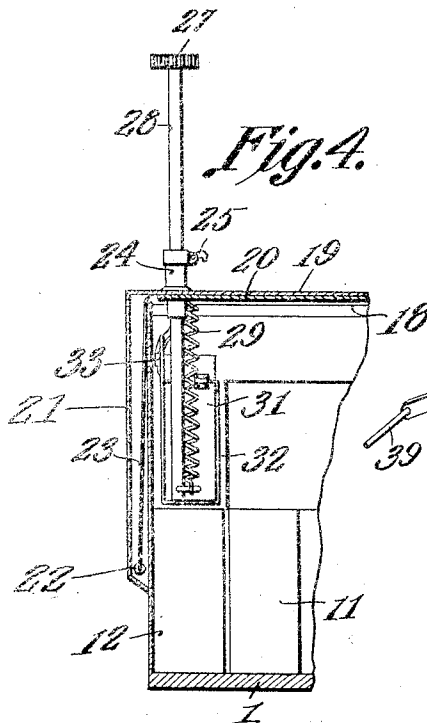
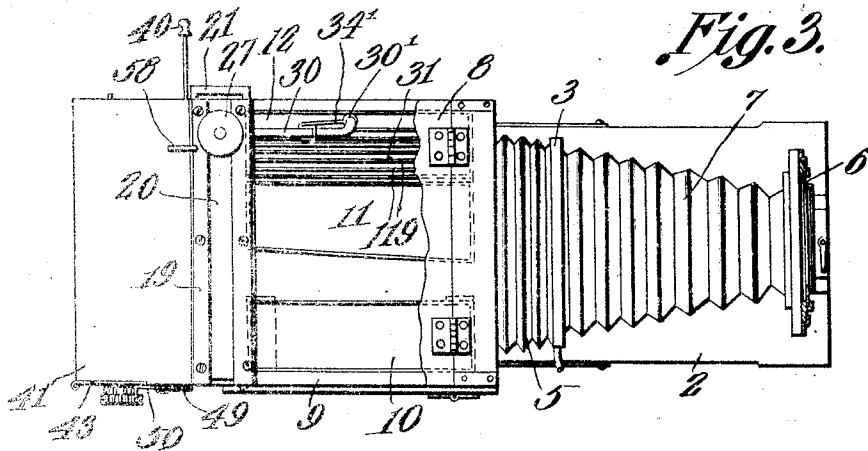
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4 SHEETS—SHEET 2.



Witnesses

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 PHOTOGRAPHIC APPARATUS.
 APPLICATION FILED FEB. 2, 1912.

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4 SHEETS—SHEET 3.

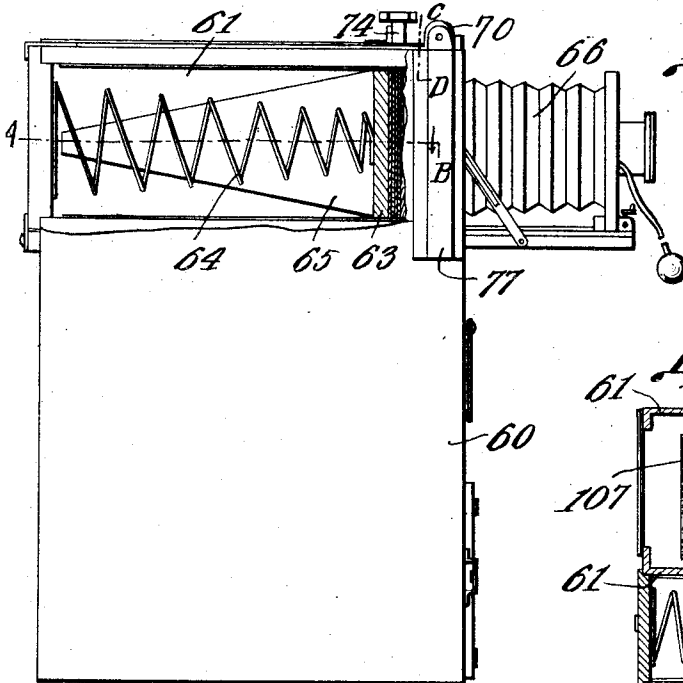


Fig. 6.

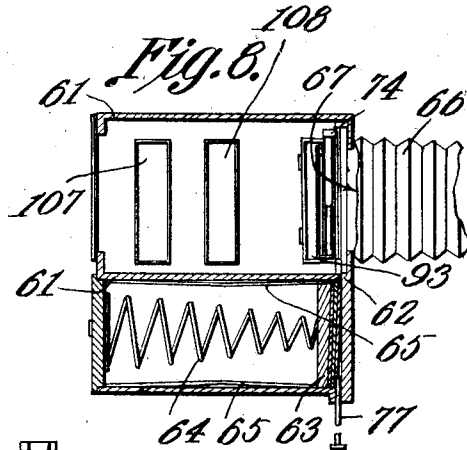


Fig. 8.

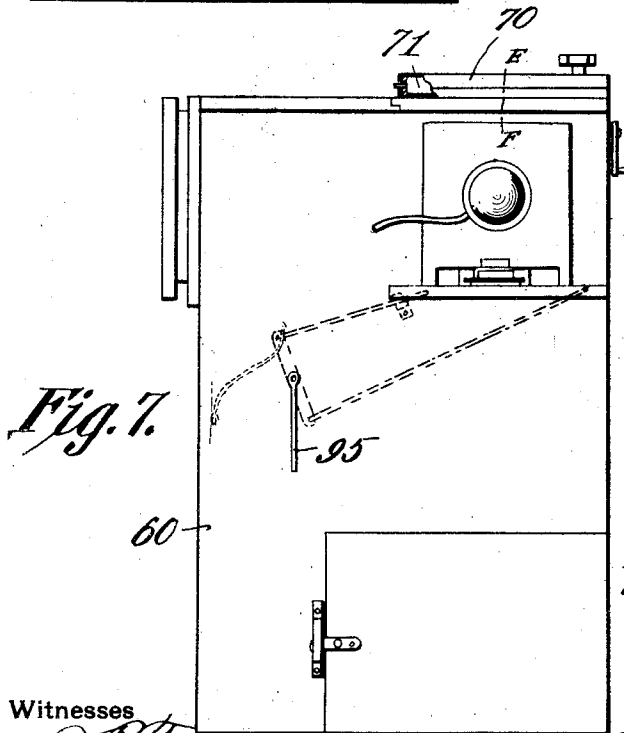


Fig. 7.

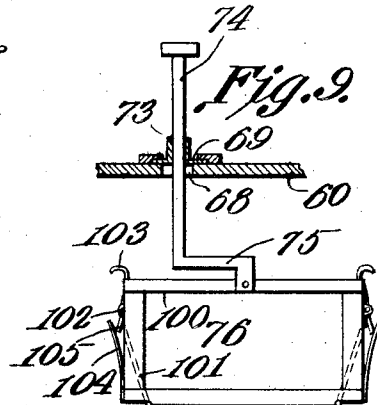


Fig. 9.



Fig. 10.

Witnesses
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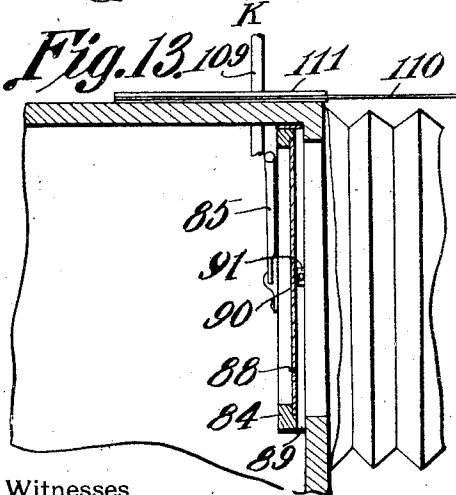
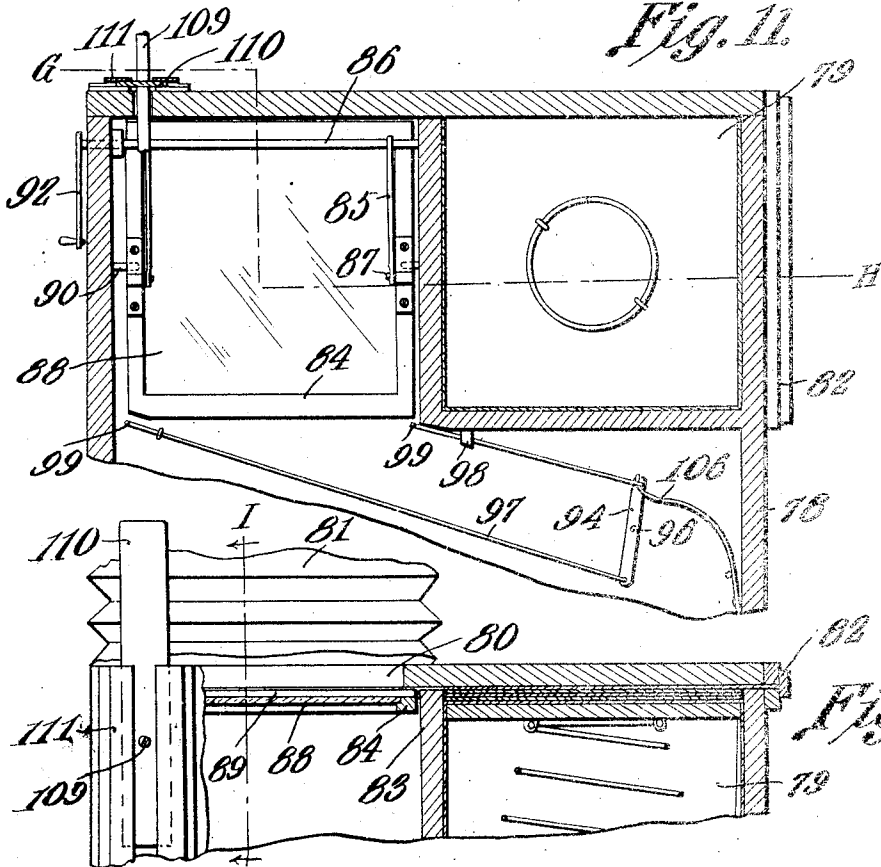
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 PHOTOGRAPHIC APPARATUS.
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4 SHEETS—SHEET 4.



UNITED STATES PATENT OFFICE.

ROBERT J. LONDON AND JAMES A. LONDON, OF GLEN ALLEN, MISSOURI.

PHOTOGRAPHIC APPARATUS.

1,041,122.

Specification of Letters Patent.

Patented Oct. 15, 1912.

Application filed February 2, 1912. Serial No. 674,941.

To all whom it may concern:

Be it known that we, ROBERT J. LONDON and JAMES A. LONDON, citizens of the United States, residing at Glen Allen, in the county of Bollinger, State of Missouri, have invented a new and useful Photographic Apparatus, of which the following is a specification.

This invention relates to photographic apparatus and is more particularly an improvement upon the structure disclosed in Patent No. 999,238, issued to us on August 1, 1911.

One of the objects of the invention is to provide a structure having improved means for conveying the photo-sensitive material to the various tanks or receptacles used in developing and fixing the same.

Another object is to provide means whereby a roll of photo-sensitive material can be used in connection with the apparatus and moved so as to bring different portions thereof successively into focus, the exposed portions being shiftable to positions where they can be cut off subsequent to exposure and conveyed to the different baths provided therefor.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a side elevation of a copying camera having a roll carrying attachment applied thereto. Fig. 2 is a vertical longitudinal section through the structure shown in Fig. 1, the bellows and adjacent parts of the camera being shown in elevation. Fig. 3 is a plan view of the structure, the top of the box being broken away. Fig. 4 is an enlarged section through a portion of the camera, said section being taken longitudinally of the slide. Fig. 5 is a perspective view of the means employed for releasing the photo-sensitive material from the carrier. Fig. 6 is a view partly in side elevation and partly in sec-

tion of a modified form of apparatus. Fig. 7 is a front elevation thereof, a portion of the housing of the curtain being broken away. Fig. 8 is a section on line A—B Fig. 6. Fig. 9 is a section on line C—D Fig. 6 and taken through only a portion of the apparatus so as to show the carrier and its operating parts. Fig. 10 is a section through a portion of the apparatus on the line E—F Fig. 7. Fig. 11 is a vertical transverse section through the front portion of another modified form of apparatus, only the upper portion of the apparatus being shown. Fig. 12 is a section on line G—H Fig. 11. Fig. 13 is a section on line I—K Fig. 12. Fig. 14 is a horizontal section through a portion of the casing and showing the tanks in plan.

Referring to the figures by characters of reference 1 designates the box of the device, the same having the usual hinged front 2 on which the lens carrying board 3 is adjustably mounted and connected to the front wall 4 of the box by means of a bellows 5. A plate holder 6 is adjustably mounted on the hinged front 2 and is connected to the board 3 by a bellows 7. Thus it will be seen that the holder 6 can be adjusted to any desired distance from the lens carrying board 3 and said board can be shifted so as to properly focus the lens on the sensitized material contained within magazine portion of the device. The lens carrying board or plate 3 and the plate 6 constitute no part of the present invention inasmuch as they are described in our patent hereinbefore referred to.

A door 8 is hingedly connected to the top of the box 1 and another door 9 is hingedly connected to one side thereof and has a fixing tank 10 secured to the inner face thereof and adapted, when the door 9 is swung open, to move outwardly through the door opening, as will be apparent by referring to Fig. 3. An intermediate washing tank 11 is arranged adjacent the tank 10 and upon the middle portion of the bottom of the box 1 and another or developing tank 12 is arranged on the bottom of the box between the tank 11 and that side of the box farthest removed from the door 9.

A ledge 13 is formed by the back wall 14 of the box and this ledge has a longitudinal slot 15 therein overhanging a pocket 16 which is formed within the box and under the ledge 13, said pocket extending

throughout the width of the interior of the box. An exposure opening 17 is formed in the back wall 14 above the ledge 13.

A slot 18 is formed in the top of the box 1 between the door 8 and the back wall of the box, this slot extending from one side to the other of said box and having guide strips 19 overhanging the side walls thereof. A slide 20 has its edge portions located between these guide strips 19 and the walls of the slot 18 and is sufficiently long to close the slot when the slide is in normal position.

A casing 21 is secured to one side of the box and has a spring roller 22 mounted in one end portion thereof and connected, by means of a flexible strip 23, to one end of the slide 20. As the spring in the roller 22 is normally under stress, it will be understood that it constantly pulls on the strip 23 and thus holds the slide 20 normally closed. When the slide is pulled open the strip 23 will be unwound from the roller 22 and the spring in the roller placed further under stress. It is not deemed necessary to illustrate the spring roller in detail as the same will be similar to the ordinary shade roller only on a smaller scale. Strip 23 is preferably made of a material which will not admit the actinic rays to the interior of the box through slot 18 when the slide 20 is open.

A tubular guide 24 is mounted on that end of slide 20 nearest the flexible strip 23 and has an outstanding hook 25 adapted to be engaged by the hooked end of a stem 26 projecting downwardly from the head 27 of a rod 28. This rod is mounted to slide and rotate within the guide 24 and projects downwardly into the box 1, the lower end of the rod being connected to the top of the box by a coiled spring 29 or the like whereby the rod is held normally elevated. An arm 30 is fastened to the rod and is held normally close to or in contact with the top of the box, the free end of this arm being downturned and terminating in a stud or projection 30'. This projection is pivotally connected to the middle portion of one side of a carrier 31 of that type disclosed in our patent hereinbefore referred to, the bottom of the carrier being open and there being bails 32 pivotally connected to the ends of the carrier and normally projecting under the end portions of the bottom thereof so as to support photo-sensitive material deposited in the carrier. Each of these bails has an upwardly extending arm 33 adapted to be actuated for the purpose of swinging the lower ends of the bails outwardly so as to release the material contained within the carrier and permit it to gravitate in the manner hereinafter set forth. A spring 34' connects the carrier to the arm 30 and serves to hold said carrier normally at a predetermined angle relative to the arm.

Mounted on one wall of the box 1 and di-

rectly above the door 9 is a release attachment 34 having a revoluble pivot element 35 connected thereto and extending through said wall, an actuating arm 36 being attached to the outer end of the pivot device. A finger 37 extends inwardly from the upper end of lever 34 while a rod 38 is pivotally connected to the lower end of said lever and extends along the walls of the box close to the upper end of the door 9 and terminates in an inwardly extending finger 39, as will be seen by referring to Fig. 5. Thus it will be seen that when arm 36 is swung in one direction fingers 37 and 39 will be moved toward each other while, when the movement of arm 36 is reversed, fingers 37 and 39 will be moved away from each other. These fingers lie in the paths of the bails 32 when the carrier 31 is brought into position above the fixing tray or tank 10.

The ledge 13 is adapted to support a housing 41 so shaped and proportioned as to fit snugly against the apertured portion of the wall 14 and extending preferably throughout the width of the box. A shutter 40 is carried by the housing and normally closes an exposure opening 47 hereinafter referred to. A spool 42 is mounted for rotation in the upper portion of the housing and one end of the spool is journaled, detachably, within a hinged side plate 43 which is held normally closed against the housing by means of a catch 44 or the like. This spool has a strip of photo-sensitive material such as indicated at 45, wound thereon, said strip being extended into engagement with guide rods 46 extending transversely within the housing above and below the opening 47 in said housing and which registers with the opening 17. The lower end of the strip 45 passes between feed rollers 48 journaled within the lower portion of the housing 41 and which have gears 49 secured to one end thereof, said gears meshing, as shown in Fig. 1. A crank 50 or the like is connected to one of the gears and by means thereof the two gears and the feed rollers 48 can be simultaneously rotated in opposite directions so as to draw the strip 45 longitudinally and feed it downwardly through the slot 15. A stationary knife 51 is located in the housing 41 below one of the rollers 48 and cooperates with a movable knife 52 adapted to be actuated by means of a knob 53 or the like extending through a slot 54 in one side of the housing 41. The two knives are normally spaced apart at their cutting edges so as to permit the strip of photo-sensitive material to pass between them. The bottom of the housing 41 is of course slotted, as shown at 55, said slot registering with slot 15 so as to permit the strip of material to pass readily from the housing.

A swinging shutter 56 is mounted in the box 1 in front of opening 17 and has a rod 130

57 extending upwardly from the pivot end thereof and provided with a radial arm 58 whereby the rod can be turned so as to swing the shutter into open or closed position.

5 It is to be understood that the parts are normally positioned with the shutter 56 closed, the rod 28 elevated, and the carrier 31 pressed against one side wall of the box 1. After a roll of photo-sensitive material has been placed in housing 41, the said housing with its shutter 40 closed across the opening 47, is placed on the ledge 13 and secured by any suitable means, such as a latch 59. The free end of the strip 45 is of course 10 held between the feed rollers 48. If a picture is to be taken, the lens carried by the board 3 is focused prior to the exposure of the sensitive surface upon the object to be photographed and the shutters 40 and 56 20 are opened after which the ordinary pneumatic shutter, not shown, can be actuated so as to effect the desired exposure. If preferred however, the hinged shutter 56 can be used for regulating the exposure, this shutter being particularly advantageous for time 25 exposures. After the strip of sensitized material has been exposed one of the shutters is closed and the crank 50 is rotated so as to cause the rollers 48 to shift the material downwardly. This is not done however, until after the rod 28 has been rotated ninety degrees and then pressed downwardly so as to bring the stem 26 into engagement with the projection 25. Carrier 35 31 will thus be lowered and brought into position in the pocket 16 and directly under slot 15. Obviously, therefore, when the strip 45 is fed downwardly by the rollers 48, it will pass into the carrier and into contact 40 with the supporting bails 32. The moveable knife 52 can then be actuated by means of the knob 53 and that portion of the strip which has been exposed, is thus severed and permitted to drop into the carrier. The carrier 45 is then swung out of the pocket 16 and raised by means of rod 28 and spring 29 and is brought to position at one side of the box and directly over the tank 12 containing the developing fluid. The carrier 50 is pushed downwardly into this tank by depressing rod 28 after which spring 29 is permitted to raise the rod and carrier. Slide 20 is then moved longitudinally until the carrier is brought over the tank 11 containing a washing fluid whereupon the preceding operation is repeated so as to bring the carrier into said fluid. The spring is then permitted to elevate the carrier out of tank 11 after which slide 20 is again shifted 55 longitudinally to bring the carrier above the fixing tank 10. During this movement the arm 33 of one of the bails 32 is brought into engagement with the finger 37 while the lower end of the other bail 32 is brought 60 into engagement with the finger 39. By

then shifting arm 36 the fingers 37 and 39 will be moved toward each other and cause the two bails 32 to move apart and thus release the photo-sensitive material and permit it to drop from the carrier and into the 70 fixing tank 10. As soon as this operation has been completed, stem 28 can be released whereupon the spring drawn strip 23 returns the slide 20 and the parts carried thereby to their initial positions. The foregoing operation can then be repeated. 75

In Figs. 6 and 7 a modified form of apparatus has been illustrated, this modified structure being used for producing, developing, and fixing negatives and having a box 80 60 one corner of which is divided off from the remainder of the box so as to form a magazine 61 having a slot 62 in the forward end of one side wall thereof and which is sufficiently wide to permit the passage there- 85 through of a plate or card of photo-sensitive material. A follower 63 is slidably mounted within the magazine and is normally pressed forward by means of a spring 64, there being spring guide strips 65 secured to 90 the walls of the magazine and which frictionally engage the edges of the follower. A camera 66 is mounted in front of an opening 67 in the box 60 at one side of the magazine 61. A slot 68 is formed in the top of 95 the box 60 and parallel with the magazine 61, this slot being normally closed by a slide 69. A housing 70 is secured to the top of the box adjacent one end of the slot and is adapted to contain a spring roller 71 connected, by means of a curtain or strip 72 to the slide, whereby the slide is held normally closed. A guide sleeve 73 is mounted on one end portion of the slide and a stem 74 is adapted to slide within the guide. This 100 stem is not rotatable and has an arm 75 at its lower end connected to a carrier 76. A slide 77 is mounted in one side of the magazine 61 directly opposite the slot 62 and is adapted, when pushed inwardly, to force 105 through the slot 62 and into position back of the opening 67, the first one of the plates located in front of the follower 63. The plate is thus brought into position where it is in focus. 110 115

In Figs. 11, 12, 13 and 14 another modified structure has been illustrated, the same being similar to that shown in Figs. 6 to 9 inclusive in that it is adapted to expose, develop and fix negatives. In this modified 120 form the casing 78 is similar to that hereinbefore described with reference to Figs. 6, 7 and 8, said casing having a magazine 79 at one side of the opening 80 in front of which the camera 81 is to be placed. A slide 82, 125 similar to slide 77, is mounted in the front end of the magazine 79 and is adapted to expel plates one at a time through a slot 83 in one side wall of the magazine 79 and into position back of the opening 80. 130

In both the form shown in Figs. 6, 7 and 8 and the form shown in Figs. 11 to 14 inclusive, a frame 84 is supported back of the opening 80 by arms 85 extending downwardly from a shaft 86 mounted to rotate within the casing of the apparatus and above the opening 80. The lower ends of the arms 85 are pivotally connected to the sides of frame 84 close to the centers of said sides, as shown at 87. A ground glass 88 is mounted in the frame 84 and a plate supporting ledge 89 extends forwardly from the lower edge of frame 84 and is adapted to support each plate as it is projected through the slot 83 and back of the opening 80 or 67. Lugs 90 extend inwardly from the casing 78 or 60 so as to extend in front of the sides of frame 84, there being recesses in said sides, as shown at 91, to receive the ends of the lugs. A lever 92 is connected to the outer end of shaft 86 and by means thereof said shaft can be rotated so as to move the frame 84 inwardly away from the pins or lugs 90. Thus it will be seen that any plates supported by the ledge 89 will be dropped into the carrier 76 which is normally supported under the frame 84 and above the fixing tank 93.

Each of the forms shown in Figs. 6 to 14 inclusive, has means, similar to that shown in Fig. 5, for releasing a plate or the like from the carrier. As shown in Figs. 7 and 11 a centrally fulcrumed lever 94 is mounted in the casing 60 or 78 and is adapted to be shifted by a lever 95 located outside of the casing and connected to the pivot pin 86 of the lever 94. Rods 97 are pivotally connected to the ends of lever 94 and are mounted in guides 98, each rod terminating in a finger 99 extending at right angles therefrom and disposed at opposite sides of the position normally occupied by the carrier 76. As shown in Fig. 9 this carrier can include, in addition to the plate receiving frame 100, plate supporting arms 101 extending under the side portions of the frame and thence upwardly to points adjacent the upper ends of the sides of the frame where the arms are pivotally connected to the frame as shown at 102. Said arms then extend upwardly above the frame to form releasing fingers 103. Springs 104 may be provided, these springs bearing against fingers 105 extending downwardly from arms 101 at acute angles thereto. Obviously said springs will serve to hold the arms 101 normally in position to support a plate located within the frame 100. When the carrier 76 is in its normal position under the frame 84 and above the fixing tank 93, the fingers 103 are supported between the fingers 99. Thus it will be seen that, when lever 94 is shifted by means of lever 95, the fingers 99 will be moved toward each other and will cause fingers 103 to also move toward each other, thereby shifting the lower ends of the arms

101 from under the plate in the carrier 76 and permitting the plate to gravitate into the fixing tank 93. As shown in Fig. 11, a spring 106 may be employed for holding the lever 94 and the parts connected thereto, normally in a predetermined position.

In the form shown in Figs. 6 to 10 inclusive, the plates when ejected from the magazine 79 will move onto the ledge 89 and, after exposure, can be dropped into the carrier 76 thereunder by swinging frame 84 in the manner hereinbefore described. The carrier can then be shifted successively into tanks 107 and 108 in the manner hereinbefore described with reference to Figs. 1 to 4 inclusive after which the carrier is brought to its normal position above the tank 93 and actuated, by means of lever 95 so as to deposit the plates in the fluid contained in the fixing tank.

Instead of mounting the carrier so that its stem 74 cannot rotate, said carrier may be provided with a cylindrical stem 109 adapted to slide and to rotate, this form shown in Figs. 11, 12 and 13. Furthermore the said stem can be mounted in a metal slide 110 instead of in a curtain such as shown in Figs. 6 to 10 inclusive, said metal slide 110 being mounted in guides 111, as shown in Figs. 11 and 12. With this arrangement the tanks 92, 112, and 113 can be arranged as shown in Fig. 14, the carrier being first moved into position above the tank 112 and lowered thereinto after which it is raised and swung at right angles and then shifted with the slide 110 until the carrier is brought above tank 113 whereupon the carrier is lowered into said tank and washed. The carrier is then raised and moved with the slide 110 until it assumes a position above the fixing tank 93 whereupon the fingers 103 of the carrier can be actuated in the manner hereinbefore described so as to discharge the plate from the carrier and into the fixing tank.

In the form of the device shown in Figs. 1, 2 and 3, an adjustable stop is preferably provided for limiting the movement of the carrier into the pocket 16. This stop is in the form of a rack bar 114 having a head 115, there being a gear 116 meshing with the rack bar and adapted to be rotated by means of a knob 117 or the like. Any suitable means such as a spring pressed dog 118 may be provided for holding the knob against rotation. It will be apparent that by adjusting the head 115 into the pocket 16 the carrier can be stopped so as to bring any desired portion thereof under the slot 15. By dividing the carrier 31 into separate receiving portions, by means of longitudinal rods 119 the severed portions of the photo-sensitive material can thus be caused to drop into the different compartments or divisions of the carrier. Thus several sepa-

rate strips of photo-sensitive material can be held within the carrier at the same time and simultaneously developed and fixed.

What is claimed is:—

5 1. Photographic apparatus including a box, tanks within the box for containing materials employed in the development and fixing of photographic images, means for holding a photo-sensitive material, means for feeding said material into focus, a slide, a carrier movable therewith, means for shifting the carrier into position to receive the exposed photo-sensitive material, and successively into and out of certain of the tanks, and means for releasing the contents of the carrier when above one of the tanks.

2. Photographic apparatus including a box, tanks within the box for holding materials used in the development and fixing of photographic images, means for holding photo-sensitive material, means for feeding said material into focus, a carrier for receiving material subsequent to exposure, yielding means for holding the carrier above the tanks, a slide, the carrier and slide being movable together to bring the carrier above any one of the tanks, and yielding means for holding the slide normally in a predetermined position.

3. Photographic apparatus including a box, tanks within the box for holding materials used in the development and fixing of photographic images, means for holding photo-sensitive material, means for feeding said material into focus, a carrier for receiving material subsequent to exposure, yielding means for holding the carrier above the tanks, a slide, the carrier and slide being movable together to bring the carrier above any one of the tanks, and a spring drawn curtain for holding the slide normally closed, said curtain constituting means for preventing the admission of actinic rays to the box when the slide is shifted out of normal position.

4. Photographic apparatus including a box, tanks therein for holding materials to be used in the development and fixing of photographic images, there being a slot within the box, a slide normally closing the slot, a stem slidable within and movable with the slide, a carrier movable with the stem and slide into position above any one of the

tanks, and a spring drawn curtain for holding the slide normally closed, said curtain constituting means for preventing the admission of actinic rays through the slot when the slide is out of normal position.

5. Photographic apparatus including a box having a slot therein, tanks within the box for holding materials used in the development and fixing of photographic images, a slide normally closing the slot, a normally rolled spring drawn curtain connected to the slide and holding it normally in a predetermined position, and a carrier movable with the slide and into position above the respective tanks, said curtain constituting means for closing the slot when the slide is moved out of normal position and for preventing the admission of actinic rays through the slot.

6. Photographic apparatus including a box, tanks therein for holding materials to be used in the development of photographic images, a carrier, dividing elements in the carrier, means for feeding photo-sensitive material into the box, means for shifting the carrier into position to receive the photo-sensitive material, and adjustable means for regulating the position of the carrier while in receiving position.

7. Photographic apparatus including a box having an exposure opening, a magazine, a frame removably supported back of the opening and having a supporting ledge, a ground glass carried by the frame, means for directing plates one at a time from the magazine and onto the ledge, a carrier movable under the frame, means for shifting the frame to withdraw the ledge from under the plate thereon and to permit said plate to gravitate into the carrier, tanks within the box for holding materials used in the development and fixing of photographic images, and means for actuating the carrier to convey the plates successively to the said tanks.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

ROBERT J. LONDON.

JAMES A. LONDON.

Witnesses:

EMMA C. BERRY,

HARVEY M. HUTCHINGS.