

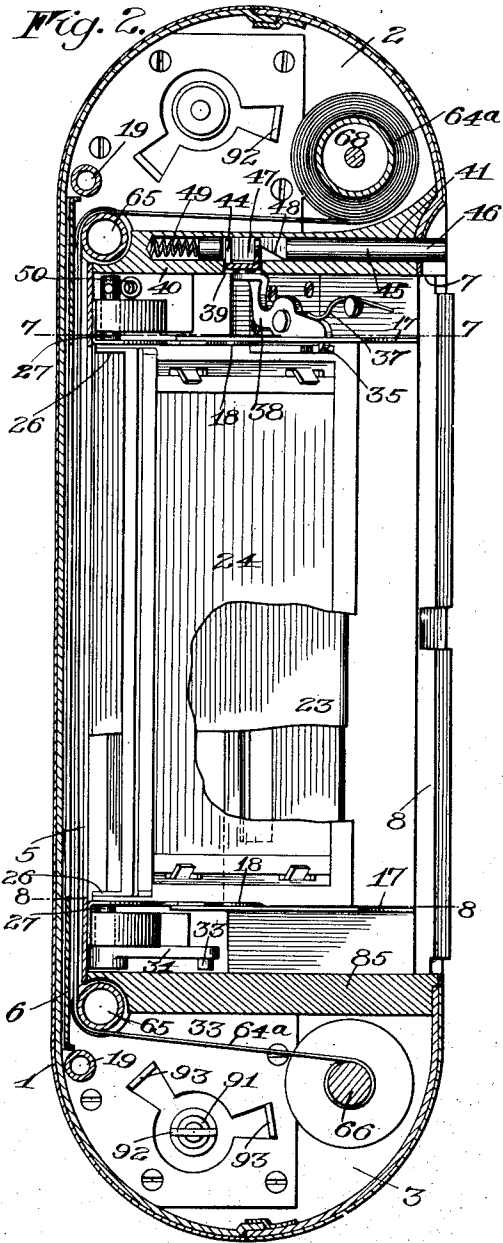
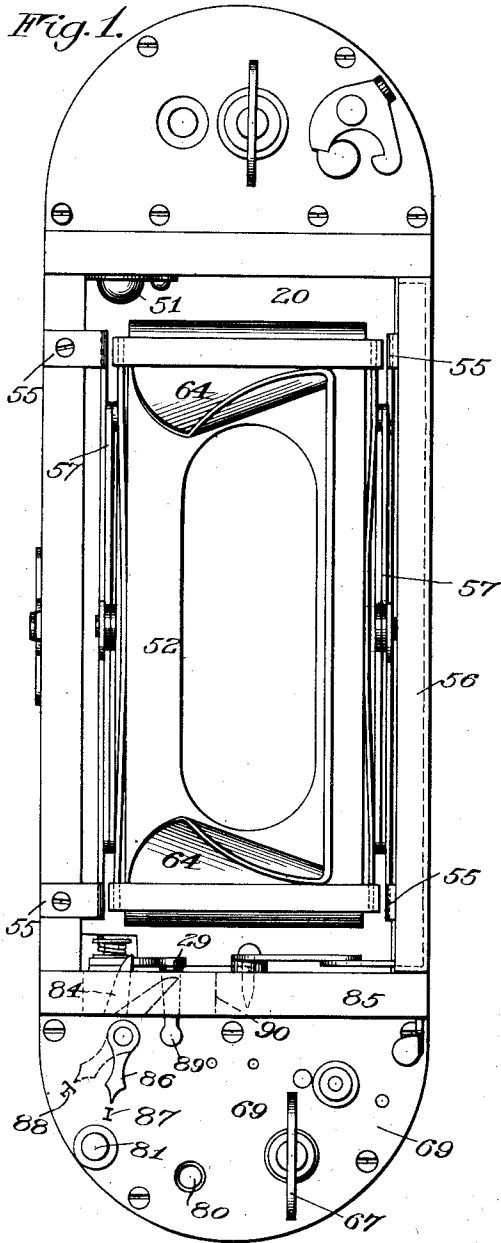
W. F. FOLMER.
CAMERA.

APPLICATION FILED MAR. 26, 1909.

Patented Apr. 23, 1912.

5 SHEETS—SHEET 1.

1,023,931.



Witnesses

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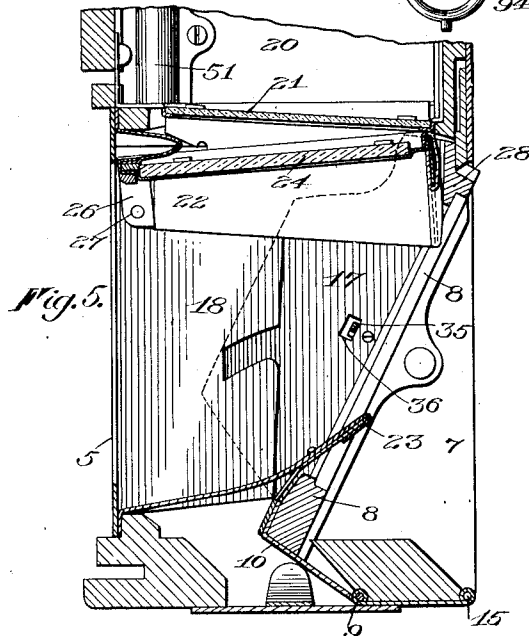
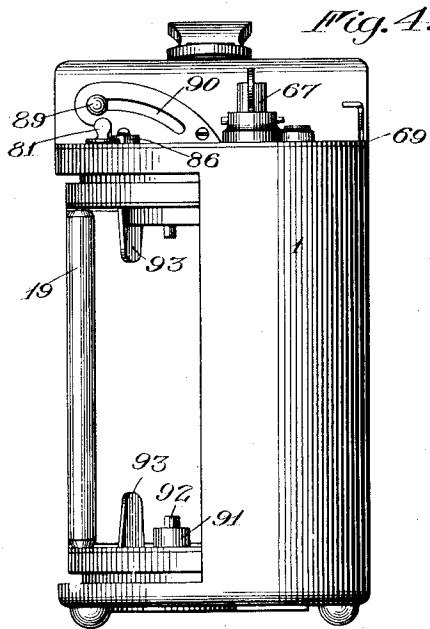
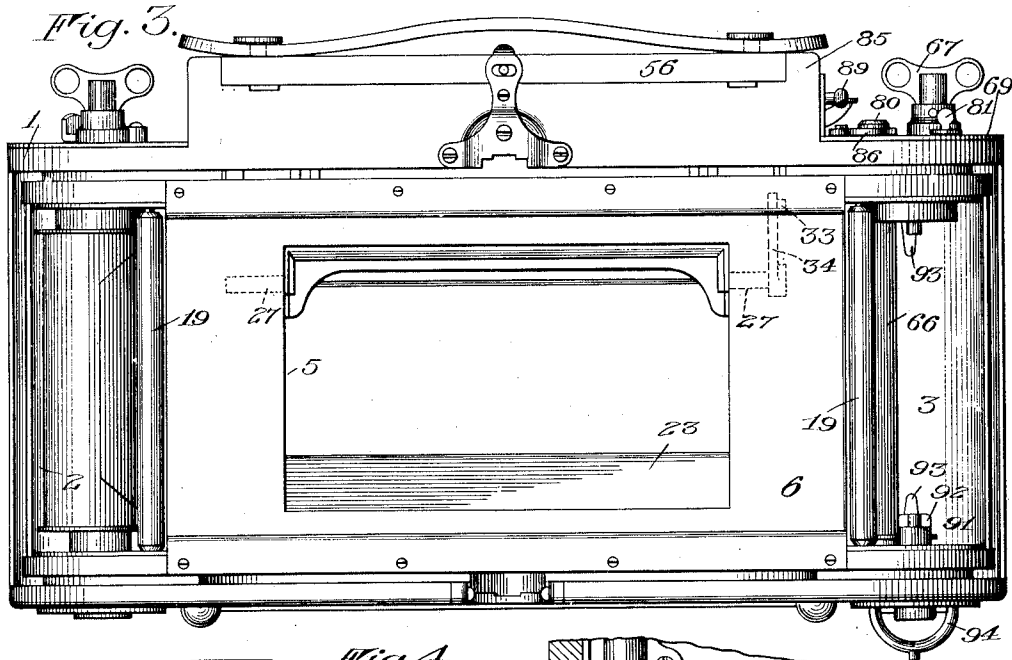
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5 SHEETS-SHEET 2.

1,023,931.



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5 SHEETS—SHEET 3.

1,023,931.

Fig. 6.

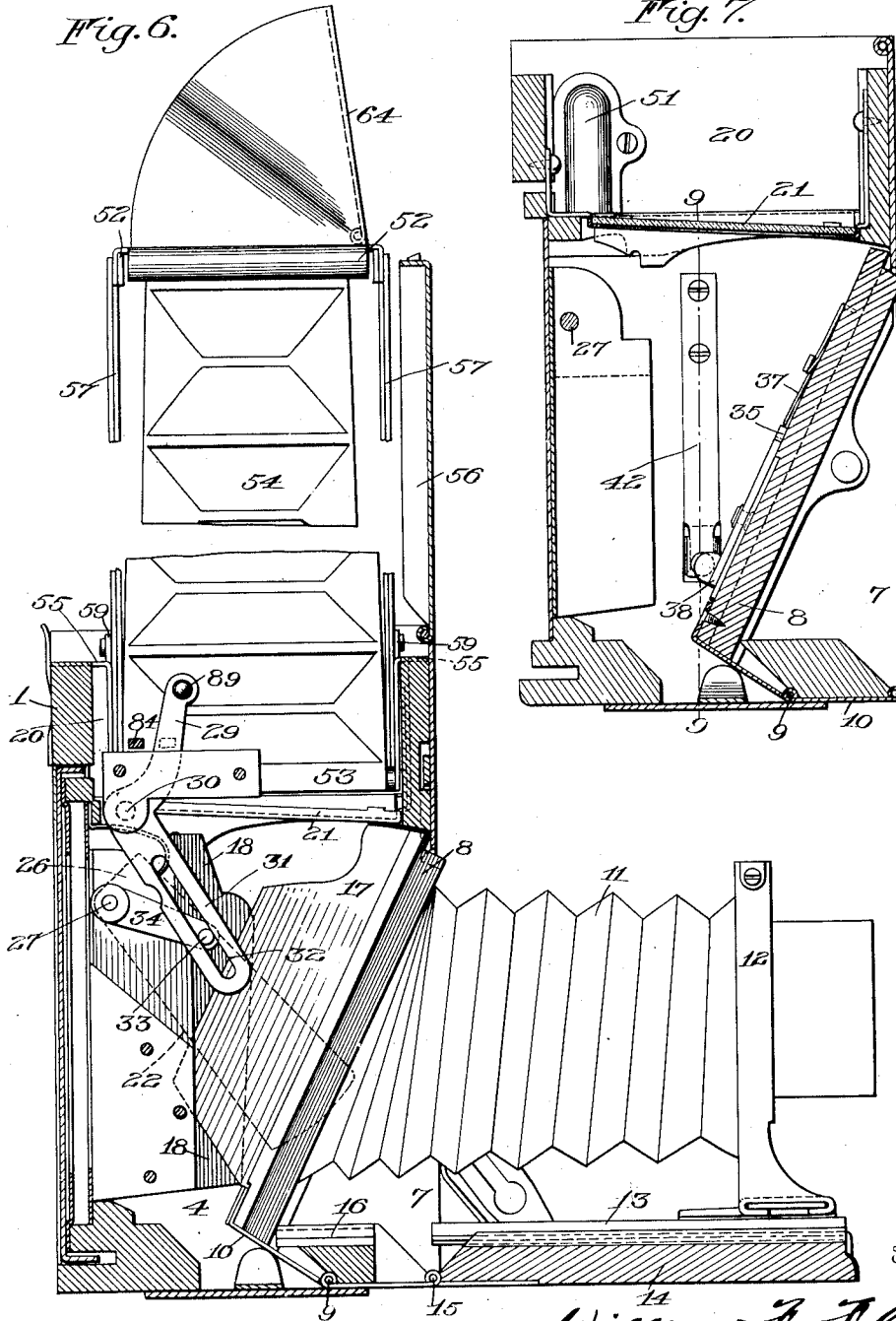
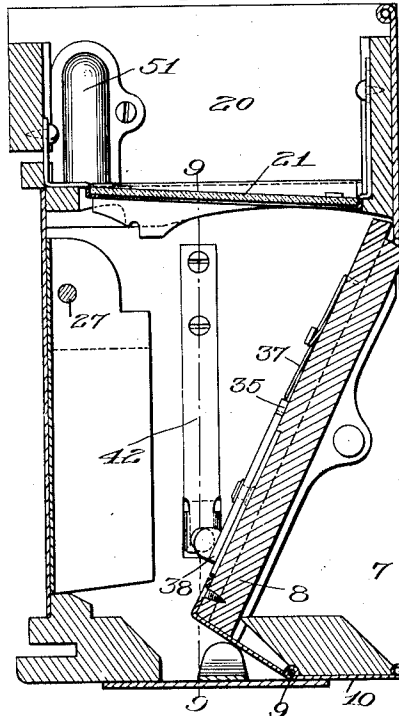


Fig. 7.



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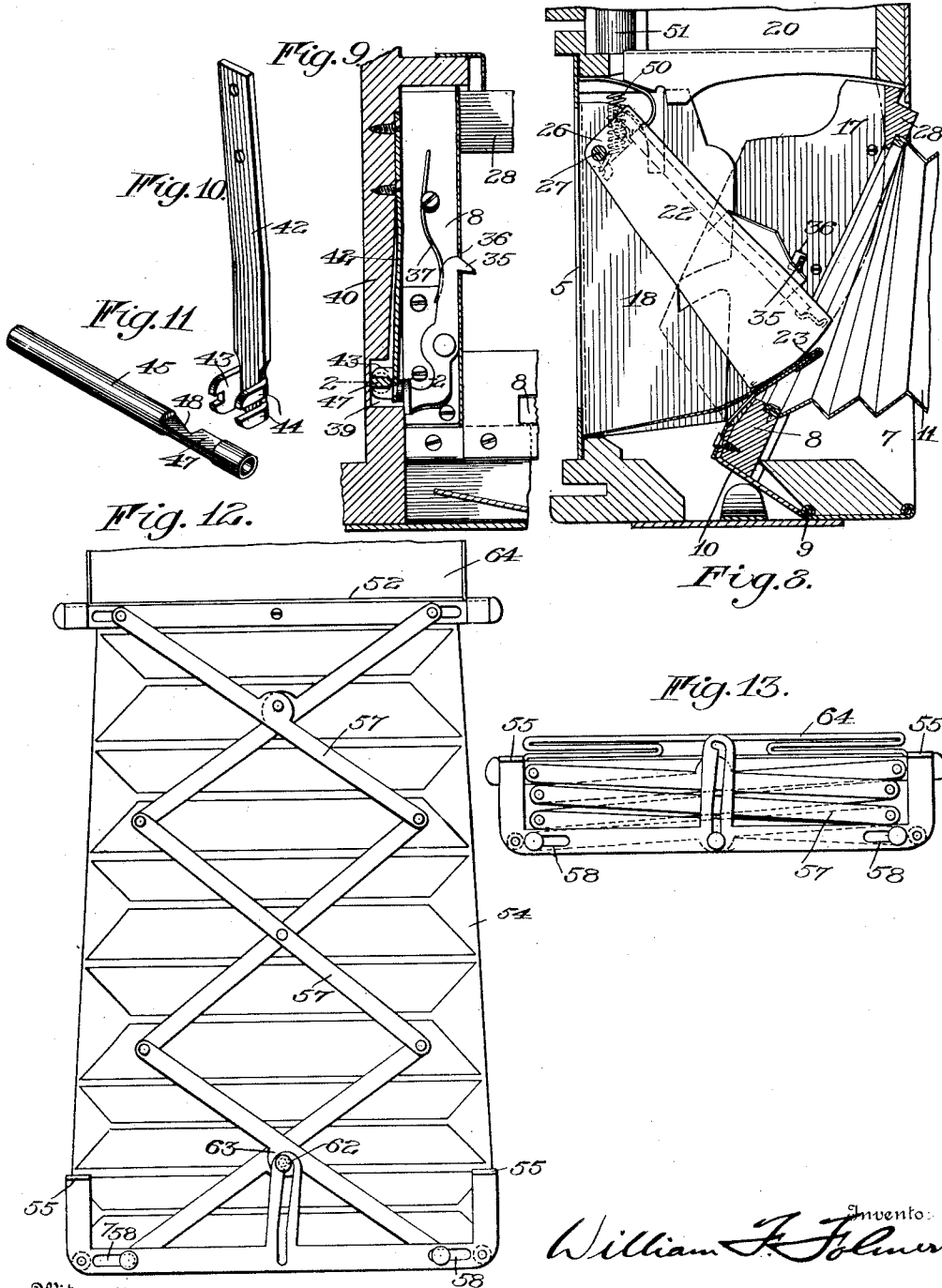
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5 SHEETS—SHEET 4.



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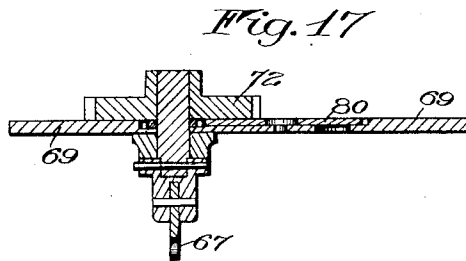
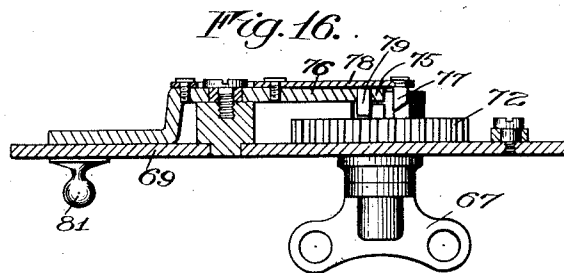
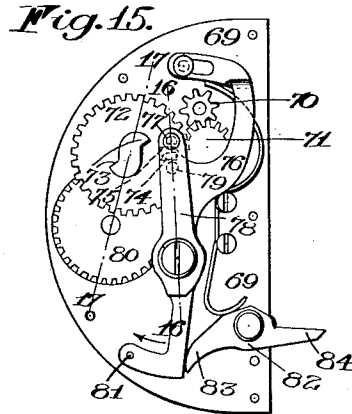
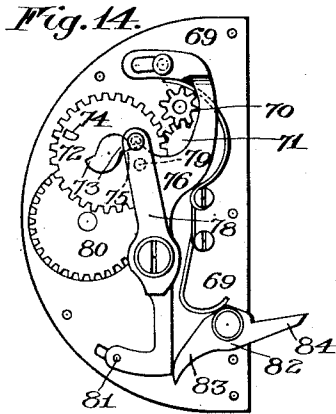
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Patented Apr. 23, 1912.

5 SHEETS—SHEET 5.

1,023,931.



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UNITED STATES PATENT OFFICE.

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CAMERA.

1,023,931.

Specification of Letters Patent.

Patented Apr. 23, 1912.

Application filed March 26, 1909. Serial No. 485,912.

To all whom it may concern:

Be it known that I, WILLIAM F. FOLMER, of Rochester, in the county of Monroe and State of New York, have invented certain
5 new and useful Improvements in Cameras; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals
10 marked thereon.

The present invention relates to photography and more particularly to photographic cameras, and it has for one of its objects to
15 provide a device of this character and of the type employing a movable flap within the exposure chamber (whether the latter be for the purpose of merely controlling the passage of light rays from the lens or lens
20 opening or in the form of a mirror to deflect the rays and project the image cast by the lens for focusing purposes) which device will offer certain improvements and advantages and embody features whereby it is rendered foldable into small compass without
25 narrowing its field of utility.

Further objects of the invention are to make the device more convenient for handling and in operation and to improve generally other features of camera construction.
30

To these and other ends the invention consists in certain improvements and combinations of parts all as will be hereinafter more fully described, the novel features being
35 pointed out in the claims at the end of the specification.

In the drawings: Figure 1 is a top plan view of a camera constructed in accordance with and illustrating one embodiment of my
40 invention, the focusing hood being extended in position for use and the other parts being in corresponding positions; Fig. 2 is a horizontal section thereof taken in a plane substantially coincident with the top of the exposure chamber and also partially in a plane indicated by the line 2—2 of Fig. 9; Fig. 3
45 is a rear view with the back removed, the focusing hood collapsed and the focusing mirror or flap in its inoperative position; Fig. 4 is an end view; Fig. 5 is a vertical central section with the parts in the same position as in Fig. 3; Fig. 6 is a vertical section with the camera fully extended and the focusing devices in the same position as
50 in Fig. 1, said section being taken substantially

in the plane of the inner face of an end wall of an exposure chamber; Fig. 7 is a central vertical section through the exposure and focusing chambers taken substantially in the plane indicated by the line 7—7
60 in Fig. 2, the flap and the other parts being omitted to reveal the flap retaining latch and its operating devices; Fig. 8 is a view similar to Fig. 7 but taken on the line 8—8 of Fig. 2; Fig. 9 is a fragmentary detail vertical section of the flap controlling latch taken substantially on the lines 9—9 of Fig. 7; Figs. 10 and 11 are detail perspective views of the latch operating devices; Fig. 12 is a front elevation of the focusing hood extended; Fig. 13 is a similar view of the focusing hood in folded position; Fig. 14 is a bottom plan view of the plate carrying the shutter actuating devices, the parts being set
70 to produce an instantaneous exposure; Fig. 15 is a similar view of the same plate with the parts as they appear at the completion of the exposure; Fig. 16 is a section substantially on the line 16—16 of Fig. 15; and Fig. 17 is a section in a plane indicated by
80 the line 17—17 in Fig. 15.

Similar reference numerals in all the figures indicate the same parts.

I have in the present instance shown my improvements embodied in a camera of a
85 general type comprising as major elements a casing 1 provided at opposite ends with chambers 2 and 3 and an intermediate exposure chamber 4 having an exposure opening 5 in its rear wall past which is fed, over
90 rollers 19, the sensitized film in supporting guides 6 and between spools or other suitable feed and take up devices arranged in the chambers 2 and 3, respectively. The front of the casing 1 is also provided with an
95 opening 7 with which coöperates; when the camera is ready for use, a frame 8 pivoted at 9 to the bottom of the casing on a forward extension 10. The rear end of a bellows 11 is connected to this frame 8 while the front
100 end thereof is connected to the camera front 12 which slides upon a track section 13 on a bed 14 that is hinged at 15 to the casing 1 and forms a door that closes the forward opening 7 of the camera casing when the
105 camera is in folded position. In the latter event the front 12 is pushed within the casing on a track section 16 on the bottom of the latter, the frame 8 being thereby moved rearwardly upon its pivot 9 to a substan-
110

tially vertical position within the casing or parallel with the front and rear walls thereof to accommodate the camera front and bellows between said frame and the door 14 when the latter is closed. The lateral sides of the frame 8 are preferably fitted with rearwardly extending blades or plates 17 that cooperate closely with similar plates 18 and constitute walls at the sides of the exposure chamber, to form light seals in these directions, their utility being evident in view of the hereinafter described arrangements.

The exposure chamber 4 and a focusing chamber or well 20 arranged in the casing thereabove are separated by a ground glass or other suitable focusing screen 21. A movable flap 22 is arranged to operate within the exposure chamber 4 between an inoperative position at the top thereof against the ground glass screen 21, as shown in Fig. 5, wherein it seals the exposure chamber against the passage of light admitted through the focusing chamber 20 and an operative and relatively angular position within the exposure chamber, as shown in Fig. 8, wherein it is seated preferably against a yielding plate 23 carried on the lower side member of the frame 8 in which latter position the flap intercepts the passage of light between the lens and the sensitized material in the support 6. The flap in the present instance comprises a frame in which is carried a focusing mirror 24 (Figs. 2 and 5) that, in the operative position, casts the image upon the focusing screen. In the practice of my present invention this flap 22 is provided at its upper edge with rearward extensions 26 that are provided with studs 27 projecting laterally at either side and journaled at the sides of the exposure chamber. The studs are arranged below the level of the upper edge of the exposure opening 5 of the exposure chamber so that the flap is pivoted upon an axis extending across the field of said opening but as they are also arranged to extend laterally only upon opposite sides of the planes of the extensions 26 of the flap from the sides upon which lie the body of the latter, when the flap is in its upper inoperative position, the pivotal arrangements thereof do not obstruct the exposure opening in any way while the body portion of the flap, which is, in the present instance, the mirror carrying frame, is snugly fitted at the top of the chamber between the upper ground glass thereof and its own axis.

It will be noted by an inspection of Fig. 8 of the drawings, particularly, wherein the path of the flap is indicated in dotted lines, that the latter in its upward movement from the seat 23, first passes forwardly to project at its forward edge within the frame 8 but reaches the extreme of said forward movement at the level of its axis 27 which

is below the lower edge of the upper side piece 28 of the frame 8 and thereafter follows a rearward tendency by virtue of which it is positioned behind the frame piece 28 to completely fill the space between the latter and the rear wall of the chamber, thus utilizing the upper rear corner of the latter and allowing a cone of light of maximum proportions to pass from the lens through the exposure opening 5 and become effective in the focal plane of the camera over an area limited only by the exposure opening 5. Conversely, when the flap is rotated back to its operative position it is at the same time projected forwardly by reason of the fact that its pivot lies at one side of instead of within its plane and all these features of construction contribute toward lessening the proportions of the camera as a whole, and particularly toward reducing its thickness from front to rear. When the camera is in folded position with respect to the parts previously described, the flap is also forced rearwardly from its operative position by the receding frame 8 to a position substantially parallel with the rear wall of the chamber, the frame 8, and the front 12, in which position the axis of the flap is between the body thereof and the rear wall of the chamber. The flap is, in the present instance, moved from its inoperative position at the top of the chamber to its operative position against the seat 23 by means of an operating lever 29 located preferably in the focusing well or chamber 20 and pivoted in any convenient manner to the casing at 30. A link or extension 31, movable with the lever, is provided with a slot 32 with which cooperates a pin 33 on the mirror shaft arranged eccentrically to the latter on an arm 34. When the flap in its downward movement has reached what has been before defined as its operative position against the seat 23, it is engaged by a latch 35 (Figs. 2, 7, 8 and 9) that is preferably mounted upon a lateral side piece of the frame 8 and projects through an opening 36 in the plate 17 of the latter under the yielding influence of a spring 37. The opposite end 38 of the lever which in the present instance constitutes the latch, comes opposite a transverse recess 39 in an adjacent wall 40 of the exposure chamber and casing, the wall being in the present instance one of those which divide the latter into the three chambers 2, 3 and 4, and also provided longitudinally in this wall, to extend preferably from front to rear of the camera, is a recess 41 intersecting the recess 39. Secured to one end of the wall 40 is a resilient member or spring plate 42 (Fig. 7, 9 and 10) provided at its free end with parallel, slotted ears or projections 43, 44 which latter extend within the transverse recess 39 while the opposite face of the end of the

yielding member lightly contacts the latch lever 38. The recess or chamber 41 is occupied by a push rod 45 (Fig. 11) terminating exteriorly of the camera in a finger portion 46, the said push rod being provided with a flattened portion 47 in which is cut a cam 48 guided in the slotted ear 44 that engages the slotted ear 43 and, under the influence of the operator, in moving the rod longitudinally, forces the resilient member 42 outwardly to trip the latch lever 38 and release the flap. When the push rod itself is released, it is returned by a spring 49 arranged preferably between its end and the bottom of the chamber 41 until the abutment formed by the cam notch 48 engages the ear 43.

The flap 22 in its set or operative position is held against the latch 35 by a spring 50 arranged in the present instance partly within a housing 51 in the focusing well 20 and operating to return the mirror, when released, to its inoperative position against the focusing screen.

In conjunction with the focusing screen, I provide a focusing hood, certain features of which I have claimed in a separate application forming a division of this one, Serial No. 581,987, filed September 14, 1910. The body of the hood is constructed in the present instance, of opposite outer and inner frame pieces 52 and 53 connected by an intermediate collapsible bellows 54 the outer frame being fitted with a collapsible eye-piece or shield 64. The lower or inner frame piece 53 is supported upon stirrup straps or hangers 55 that engage over the edges of the walls of the focusing well and position the hood therein above the ground glass 21 but render the hood a separate and, if desired, detachable unit. The opposite end frames 52 and 53 are connected for relative movement in a manner permitting the hood to be collapsed or folded within the focusing well beneath a suitable cover 56 therefor, or supported rigidly in an extended position by means of a system of pivoted levers 57 that, in the present instance, and because of the length of the hood, constitute a lazy-tongs, the free end members having slot and pin connections 58 with the frame pieces.

Referring now more particularly to Figs. 1 and 2 and 14, *et seq.* the camera herein illustrated is designed to be fitted with a focal plane shutter of a familiar type embodying a continuous curtain 64^a having successive openings therein of graduated size, which openings define the extents of the exposures as the curtain is driven at a speed that determines the duration of the same across the exposure opening 5 in front of the sensitized material and over the guide rollers 65 from a winding roller 66, operated by a key 67 on the exterior of the

camera, to be received by a tension driving roller 68. The winding roller 66 is in the present instance journaled in a plate 69 mounted on the top wall of the camera casing above the chamber 3 (in which, by the way, are preferably arranged both the film spool and roller 66) and this plate also carries shutter controlling mechanism in the present case in the form of a clock train comprising a gear 70 on the winding roller 66 that meshes with an intermediate gear 71 which in turn drives the disk 72 having ratchet stops 73 and an abutment 74 thereon. The winding key 67 is attached to the disk 72, and in winding the curtain the stops 73 are engaged in turn at each half revolution by an abutting shoulder 75 (shown in dotted lines in Figs. 14 and 15) on a spring pressed controlling arm 76. The latter also carries a tapered abutment 77 mounted on a spring arm 78 in alinement (in respect to the path of the abutment 74) with a fixed abutment 79 on the arm 76. The shutter apertures are so arranged in the curtain that when the curtain is wound to a proper extent, as shown by an indicator wheel 80, driven by the disk 72, and then released through the medium of a finger piece 81 on the lever 76 projecting through the plate 69, an aperture of a prearranged size will flash across the exposure opening of the camera. This is brought about by one of the ratchet stops 73 on the disk 72 being released from the abutting shoulder 75 on the lever 76, such movement of the latter bringing the abutment 79 in the path of the abutment 74 on the disk. The latter halts with the consequent engagement, the spring abutment 77 having been displaced and being merely for the purpose of preventing a rebound. When the lever 76 is released or rather let go by the operator, the abutment 74 is freed, but one of the ratchet stops 73 is again engaged by the abutment 75 in its initial position and no appreciable movement of the shutter mechanism results from the movement. When a time exposure is being made, the maximum aperture of the curtain is brought into coincidence with the whole of the exposure opening by one full operation of the shutter controlling means, just described, and an opaque portion of the curtain follows across the exposure opening with a subsequent and similar operation, the duration of the exposure being within the immediate judgment of the photographer. For an instantaneous exposure or one in which a shutter aperture is flashed across the exposure opening with a preadjusted mechanical decision, it is desirable that the curtain be released simultaneously with the actuation of the flap or mirror 23 to its inoperative position. For the time exposure the mirror is sprung out of the way in a previous and separate operation. To bring

this about in a simple and convenient manner, I arrange upon the plate 69 a lever 82 having an arm 83 engaging the shutter controlling lever 76 and an arm 84 that projects through a wall 85 corresponding to the wall 40 that rises angularly to the top wall of the casing of the body of the camera and constitutes one wall of the focusing well or chamber 20, said arm 84 being, when in its operative position, in rear of and in the path of the operating lever 29 of the flap, as shown in full lines in Figs. 1 and 6. It will be seen from an inspection of these figures that when the flap and lever 29 is released and flies back into engagement with the arm 84 of the intermediary member 82, it will cause the latter to trip the shutter controlling lever 76 and actuate the shutter in the manner previously described. When the member 82 is in operative position the fact is made known by a combined finger piece and indicator 86 connected therewith and arranged on top of the plate 69 to point to a character 87 indicating such position, whereas the said indicator 86 is movable to point to a character 88 that indicates that the flap and shutter are not set for communicative operation, or in other words, for a time exposure. In this event the lever 82 is in a neutral or inoperative position out of engagement with and independent of both the lever 76 and the flap lever 29, as indicated in dotted lines in Figs. 1 and 6. But in order to adjust the member 82 to its inoperative position it is necessary, because of the range of movement of the flap lever 29 with relation to the radius of the arm 84, to first move the former forwardly to a position in which the flap 23 is in an abnormal position in rear of its seat or practically in the position it occupies when the camera is folded. This is for the purpose of preventing the photographer from inadvertently moving the indicator 86 and changing the adjustment that controls the character of the exposure. Such accidents might otherwise occur as the various parts 67, 81 and 86 are all grouped together on the plate within a small area together with the finger portion 89 that is preferably arranged to project exteriorly from the flap operating lever 29 through a slot 90 in the wall 85. It will also be noted that the spring abutment 77 on the shutter controlling lever 76 prevents the rewinding of the curtain until the lever 76 has been released and the intermediary lever 82 does not release the lever 76 until it in turn is released from the pressure of the flap operating lever 29. It is therefore impossible for the operator to rewind the curtain and cause the apertures therein to traverse the exposure opening until the flap or mirror has been restored to its operative position in which it can protect the sensitized material from light admitted

through the lens. On the opposite and lower wall of the film and roller chamber 3 is an axially movable journal 91 having a feather 92 thereon that is adapted to be thrust into the suitably formed end aperture of a film spool to rotate the latter to wind up the film. To center this journal and the feather carried thereby in the spool aperture I provide projections 93 arranged concentrically with respect to the journal and forming a cradle in which the end flange of the spool rests. When the journal is retracted to permit the entrance of the spool by means of the operating handle 94 and then thrust back the projections 93 rigidly support the spool until the feather 92 finds its seat therein. This feature will be found to be of great advantage especially during a hasty loading of the camera.

Aside from its other advantages a camera constructed in the manner illustrated is extremely convenient in use in that it may be grasped by the operator with one hand at each end adjacent the rounded walls of the end chambers 2 and 3 in such manner that the left hand is in position to control the push rod 46 for releasing the flap while the fingers of the right hand may be applied to the various members on and adjacent to the plate 69.

I claim—

1. The combination with a camera having a movable flap arranged therein, of a latch cooperating with the flap, a yielding member cooperating with the latch and having a guide, a push rod operating in the guide, and cooperating cam elements on the push rod and yielding member, respectively, for operating the latch by means of the push rod through the medium of the yielding member.

2. The combination with a camera having a movable flap arranged therein, of a latch cooperating with the flap, a resilient member attached to a wall of the camera to cooperate with the latch and having parallel ears thereon, one of said ears being provided with an opening, and a push rod guided in the latter and provided with a cam engaging the other ear to operate the latch through the medium of the resilient member, said rod being also provided with an abutment engaging one of the ears to limit its movement.

3. The combination with a camera having communicating longitudinal and transverse recesses in one of its walls, and a movable flap operating within the camera, of a latch cooperating with the flap, a resilient member attached to a wall of the camera to cooperate with the latch and having parallel ears thereon projecting within the transverse recess, one of said ears being provided with an opening, and a push rod guided in the latter and extending through the longi-

tudinal recess in the camera wall to the exterior of the camera, said rod being provided with a cam engaging the other ear to operate the latch through the medium of the resilient member and with an abutment engaging one of the ears to limit its movement.

4. In a camera, the combination with an exposure chamber and a movable flap arranged therein, of a focusing chamber arranged adjacent thereto, and an operating member for the movable flap arranged in the focusing chamber.

5. In a camera, the combination with an exposure chamber and a movable flap operating therein, of a focusing chamber arranged adjacent thereto, and an operating member for the movable flap arranged in the focusing chamber and having a finger portion projecting exteriorly of both chambers.

6. In a camera, the combination with the camera body, an exposure chamber therein and a movable flap operating in the exposure chamber, of a focusing chamber arranged adjacent to the exposure chamber and having a wall projecting beyond the body portion and angularly to a wall of the latter, and an operating member for the movable flap arranged in the focusing chamber and projecting through the wall thereof into the angle formed by the latter and the wall of the camera body.

7. The combination with a camera having a film chamber and a movable journal for supporting a spool of film within the chamber, of projections arranged concentrically to the journal for centering a spool with respect to the journal by engagement with an end flange thereof.

8. The combination with a camera provided with a focusing well or chamber, of a frame arranged in the chamber, a focusing hood having one end attached to the frame, and stirrup straps or hangers for supporting the frame within the chamber.

9. In a camera, the combination with an exposure chamber, a movable flap operating therein, a shutter, and shutter actuating means, of a part movable with the flap, and an intermediary member for establishing an operative connection between the said part and the shutter actuating means for controlling one through a movement of the other, said intermediary member being movable to a neutral position wherein it is unaffected by the movements of either of the other members.

10. In a camera, the combination with an

exposure chamber, a flap arranged therein and movable from an operative to an inoperative position, a shutter and shutter actuating means, of an intermediary member adjustable to an operative position establishing connection between the flap and the shutter actuating mechanism for controlling one through the movement of the other and also adjustable to a neutral or inoperative position relatively thereto, said intermediary member being normally locked against movement between its two positions and released through an abnormal movement of one of the elements which it operatively connects.

11. In a camera, the combination with an exposure chamber, a flap arranged therein and movable between operative and inoperative positions, a shutter, shutter actuating means and an operating member for the flap movable therewith, of an intermediary member adjustable to an operative position establishing operative connection between the flap operating member and shutter actuating mechanism for releasing the latter as the flap is moved from an operative to an inoperative position and to an inoperative or neutral position, said intermediary member being normally locked against movement from its operative to its inoperative position by the flap operating member and released by an abnormal movement of the latter out of the path thereof.

12. In a camera, the combination with an exposure chamber, a movable flap arranged therein, and an operating lever for the flap, of a shutter, shutter actuating mechanism, and an intermediary lever extending transversely to the path of movement of the flap operating lever and movable into and out of a position in which it operatively connects the latter with the shutter actuating means.

13. In a camera, the combination with an exposure chamber, a flap arranged therein normally movable between operative and inoperative positions and an operating lever for the flap, of a shutter actuating mechanism, and an intermediary lever arranged to operatively connect the latter with the shutter actuating means, said intermediary lever being movable to a neutral position out of the path of the operating lever only upon an abnormal movement of the latter.

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