M. NIELL.

PHOTOGRAPHIC CAMERA.

APPLICATION FILED JUNE 25, 1915.

1,307,512.

Patented June 24, 1919.

7 SHEETS—SHEET 1.

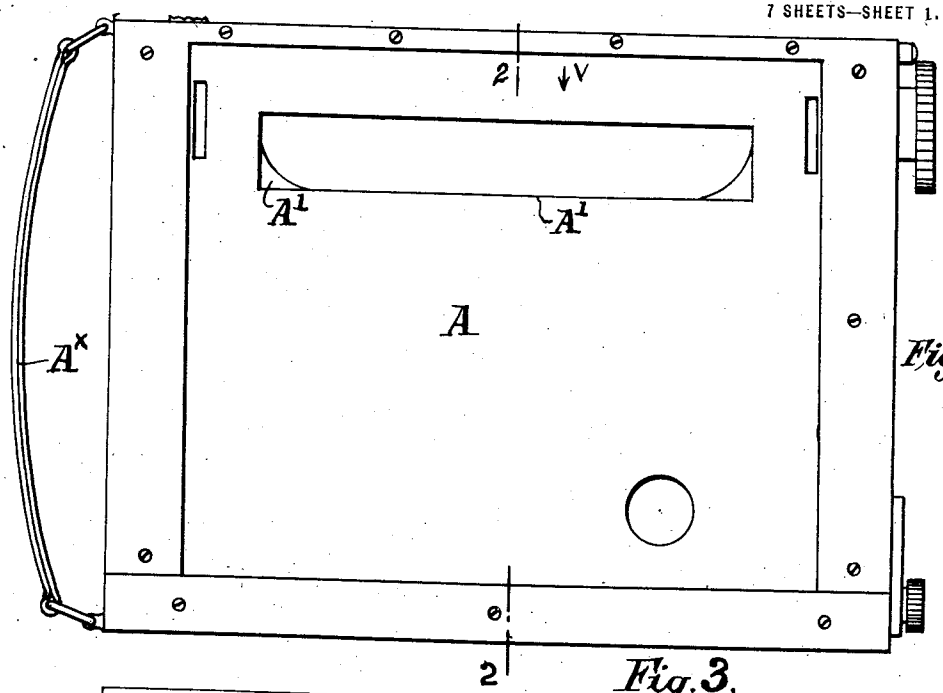
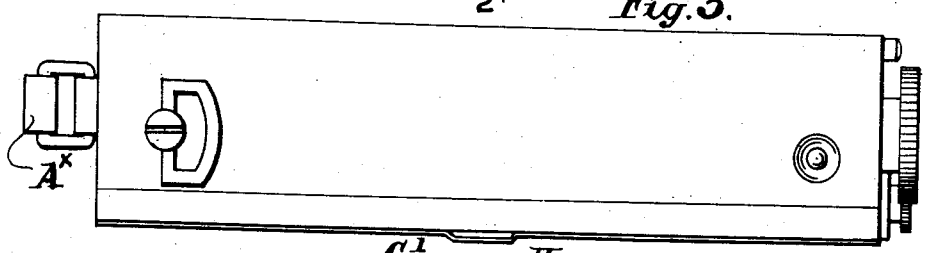


Fig. 1.

Fig. 3.



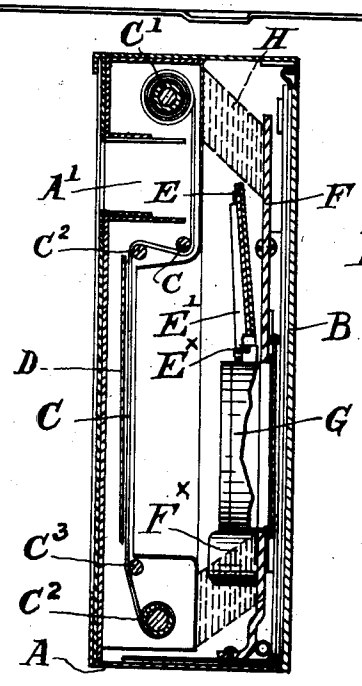


Fig. 2.

INVENTOR

Magnus Niell

BY Carl T. Zoepel

ATTORNEY.

M. NIELL.

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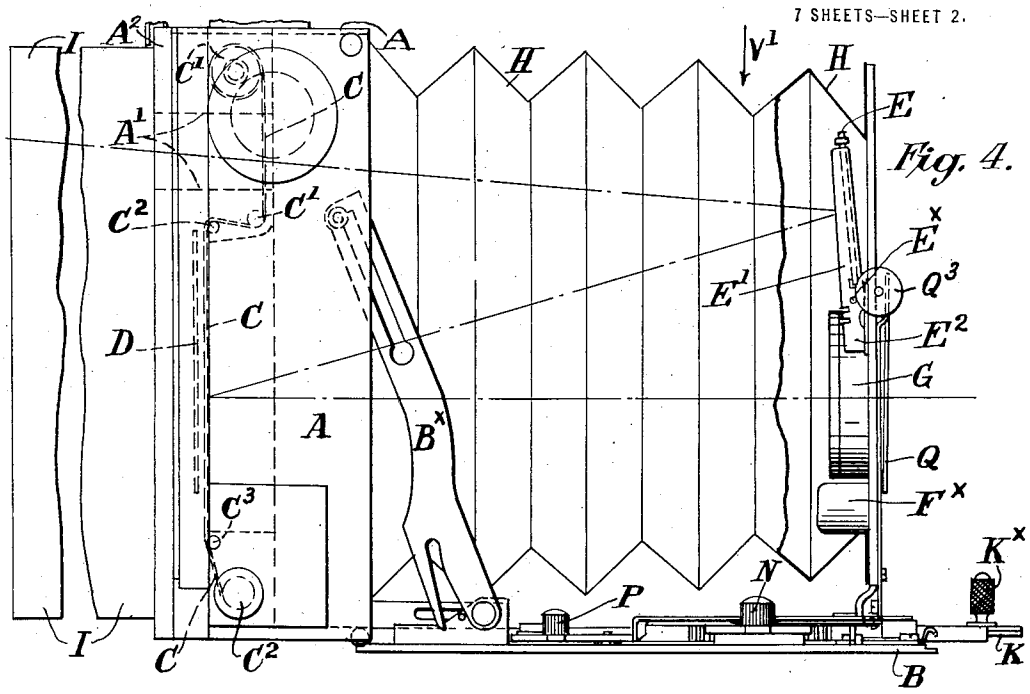


Fig. 4.

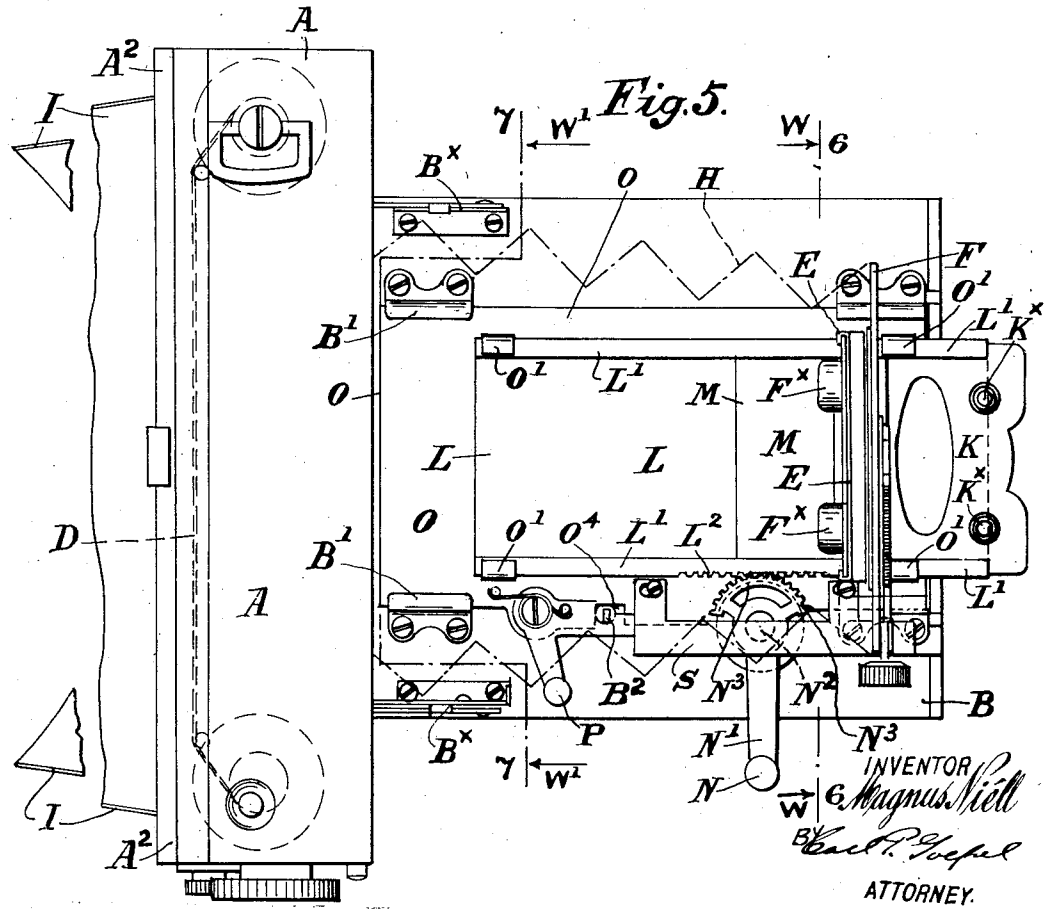


Fig. 5.

INVENTOR
Magnus Niell
BY
ATTORNEY.

M. NIÉLL.

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7 SHEETS—SHEET 3.

Fig. 6.

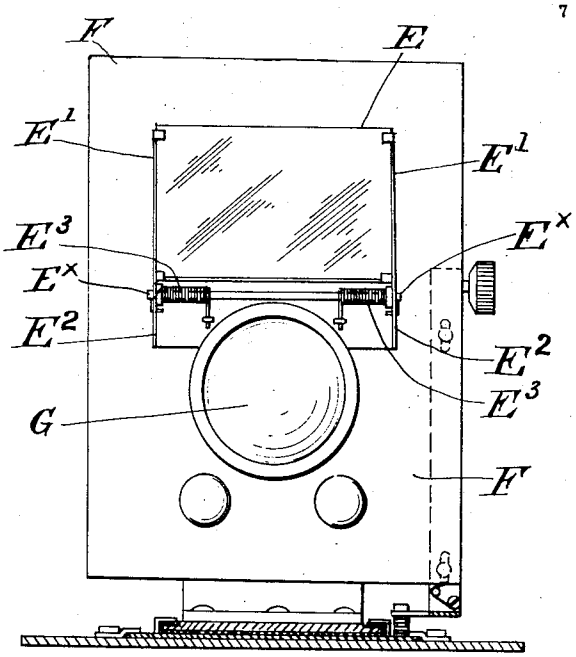
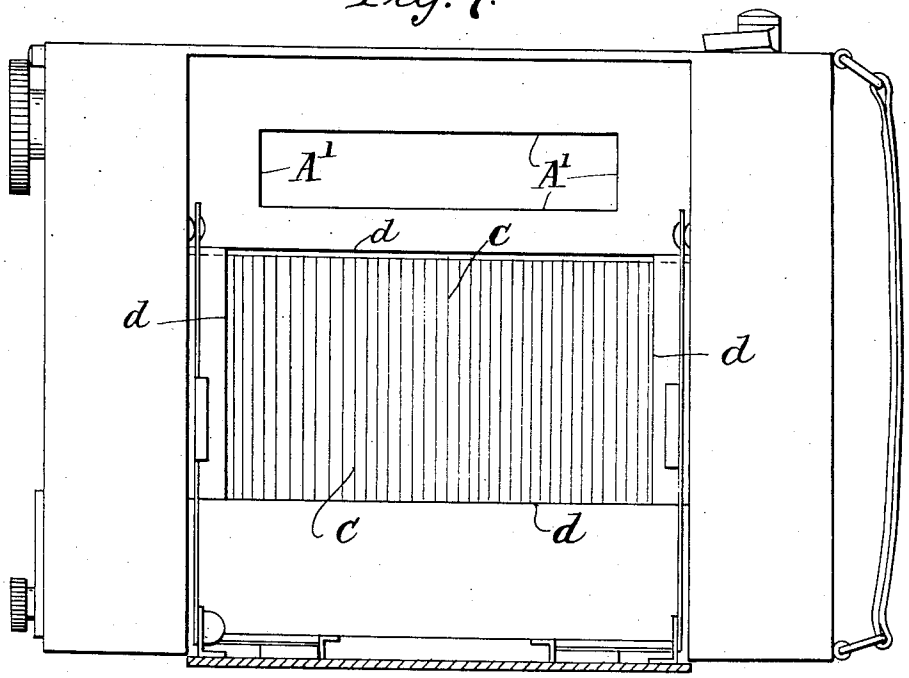


Fig. 7.



INVENTOR
Magnus Niell
BY Carl P. Goepel
ATTORNEY

M. NIÉLL.

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7 SHEETS—SHEET 4.

Fig. 8.

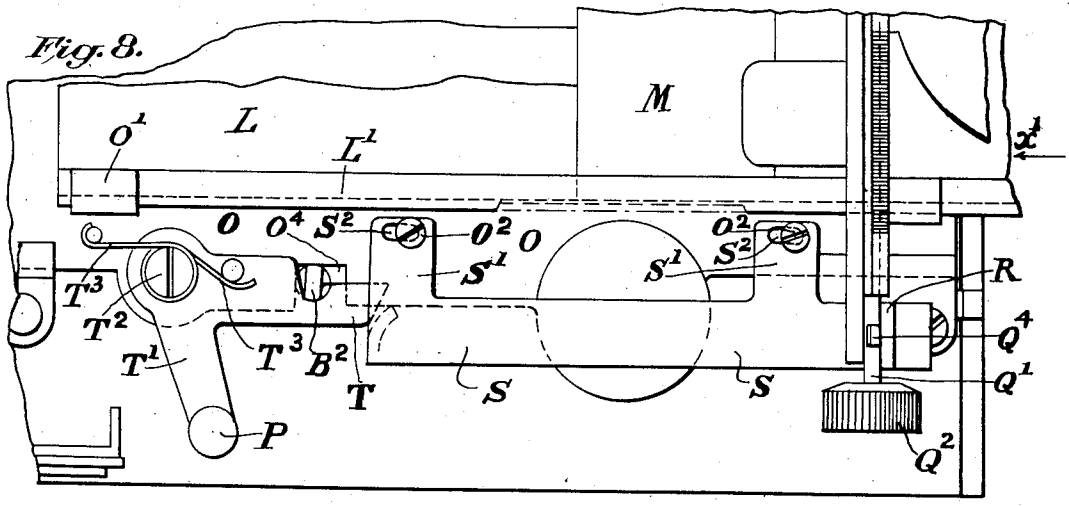


Fig. 9.

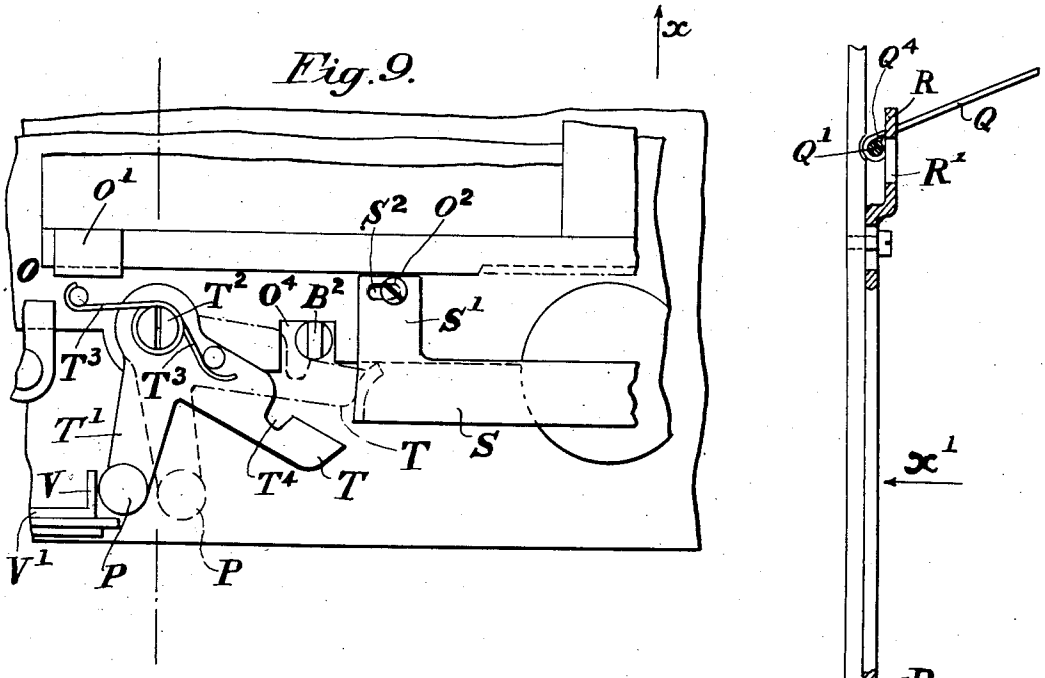
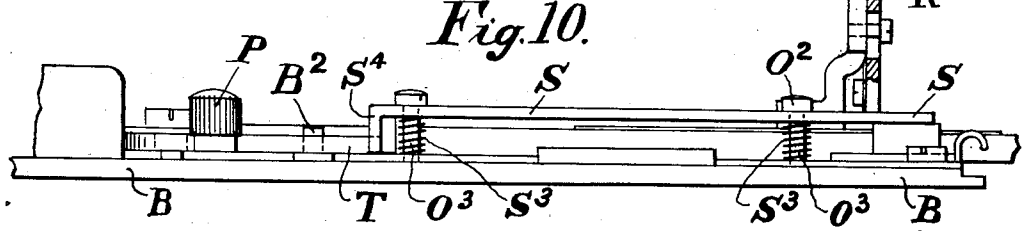


Fig. 10.



INVENTOR
Magnus Niéll
BY Carl P. Goepel
ATTORNEY

M. NIÉLL.

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7 SHEETS—SHEET 5.

Fig. 11.

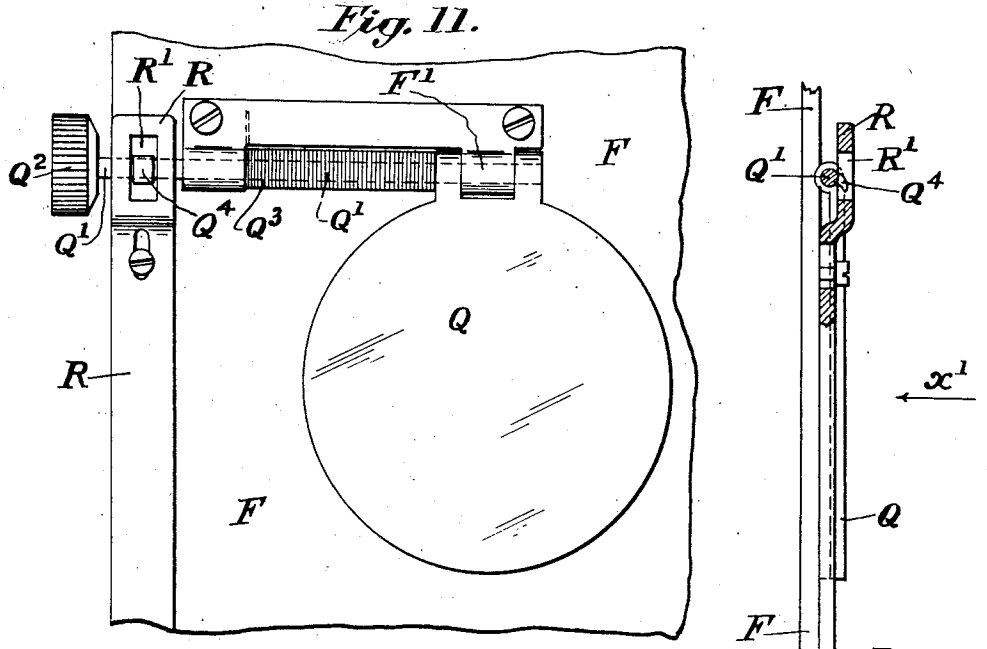


Fig. 12.

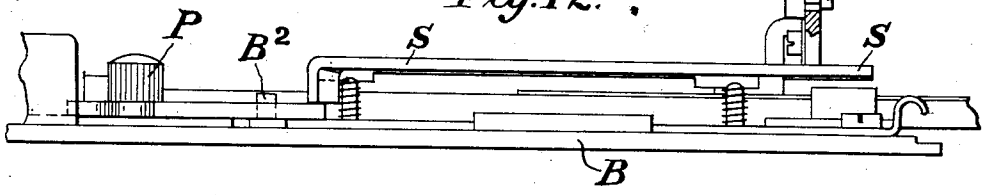


Fig. 13.

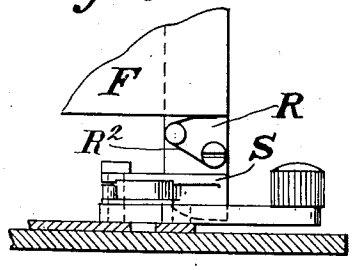
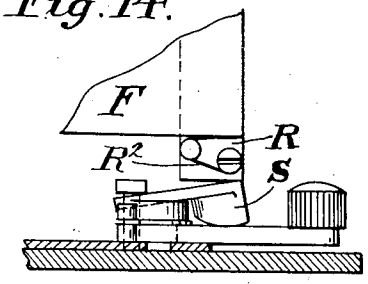


Fig. 14.



INVENTOR

Magnus Niell

BY Carl P. Goepel

ATTORNEY

M. NIELL.

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7 SHEETS—SHEET 6.

Fig. 15.

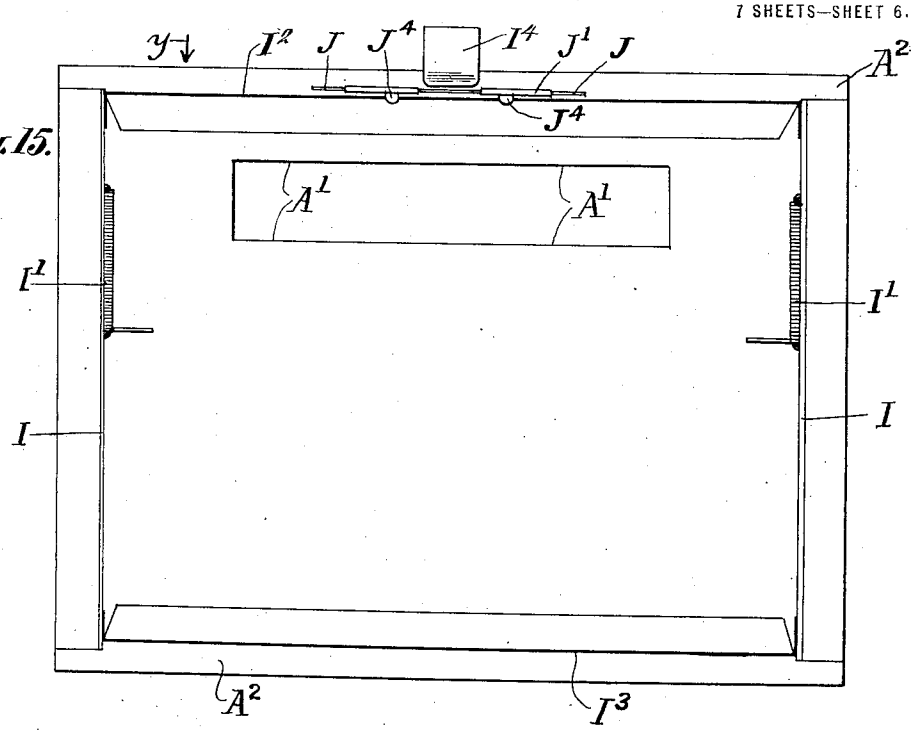


Fig. 16.

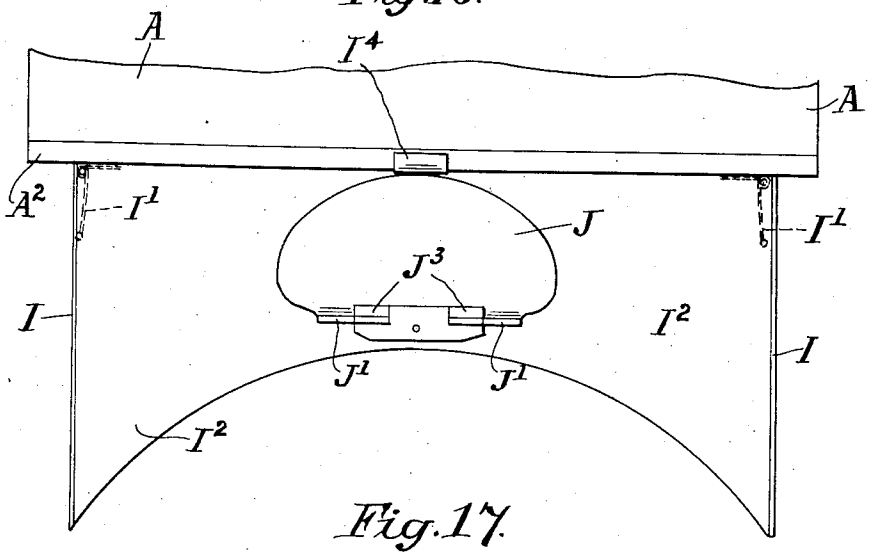
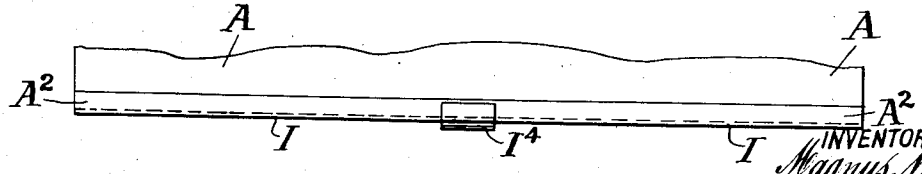


Fig. 17.



INVENTOR
Magnus Niell
BY Carl P. Goepel
ATTORNEY.

M. NIELL.

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7 SHEETS—SHEET 7.

Fig. 18.

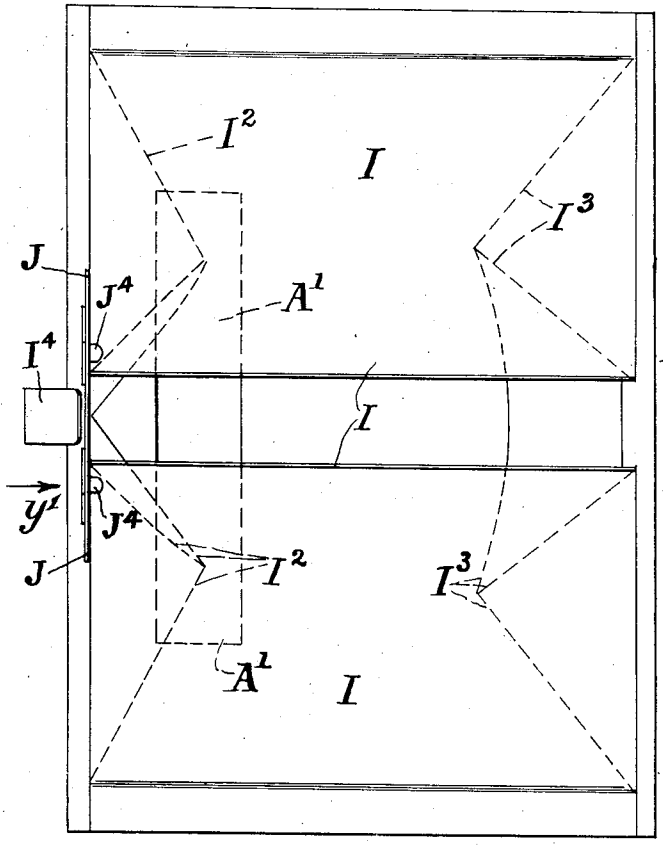
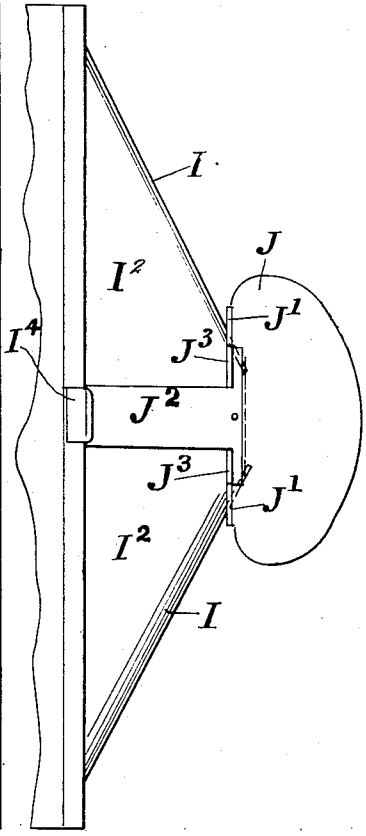


Fig. 19.



INVENTOR

Magnus Niell

BY Earl P. Yoder

ATTORNEY

UNITED STATES PATENT OFFICE.

MAGNUS NIÉLL, OF STOCKHOLM, SWEDEN.

PHOTOGRAPHIC CAMERA.

1,307,512. Specification of Letters Patent. Patented June 24, 1919.

Application filed June 25, 1915. Serial No. 36,185.

To all whom it may concern:

Be it known that I, MAGNUS NIÉLL, engineer, a subject of the King of Sweden, residing at Stockholm, Sweden, have invented certain new and useful Improvements in or Relating to Photographic Cameras, of which the following is a specification.

This invention relates to the photographic cameras of the type or character in which the picture or image of the object to be taken, projected through the lens employed for taking the photograph, is seen (for the purpose of view finding, focusing, etc.) up to the moment the photograph is taken, and I am aware that in such type or character of camera it has heretofore been proposed to employ an opaque reflecting surface adjacent to the focal plane and just in front of the sensitive surface as a means for focusing and adjusting said picture or image thereon up to the moment of exposure and to employ in conjunction therewith a mirror so arranged as to enable the picture or image on said opaque reflecting surface to be viewed from or through the back of the camera.

Now in carrying out the present invention I employ in front of the sensitive surface a white or other suitable opaque reflecting surface or screen adapted to show thereon the image or picture cast or projected thereon by or through the lens of the camera (which surface I will hereinafter refer to as the "viewing surface") and this viewing surface may either be provided on the inside face of the roller blind or focal plane shutter or on a movable flap or viewing surface provided for this purpose at the rear of the interior of the camera adjacent to the sensitive surface on which the next photograph is to be taken and opposite the lens through which the photograph is to be taken whereby the view projected through said lens onto said viewing surface can be seen in a mirror located in the interior of the camera the said mirror facing toward the rear of the camera and arranged at a suitable angle to enable the view reflected therein to be seen by the photographer through an aperture or apertures provided for this purpose in the rear or back part of the camera—advantageously through a longitudinal slot provided in the back wall of the camera above the position occupied by the sensitive surface.

Now the principal feature of the present invention is the provision of two apertures in the roller blind focal plane shutter viz. (1) A narrow slit used for the dual purposes of (*a*) viewing and (*b*) giving an instantaneous exposure and (2) a large aperture for giving a time exposure; and furthermore according to the present invention the focal plane shutter blind may be made to travel in two different vertical planes for the purpose of opening or uncovering the viewing aperture or apertures after the sensitive surface has been covered by the blind in setting the shutter and for automatically closing or covering said viewing aperture or apertures before and while the exposure is made.

Also the present invention comprises:—

(*a*) Method and means for automatically capping or covering the lens after each exposure has been made and automatically preventing said cap or cover being retained in the open position until certain preliminary operations in connection with the camera have been performed, as hereinafter described.

(*b*) Method and means for compensating or allowing in focusing for the difference in distance between the viewing surface and the surfaces of the sensitive plate or film; the arrangement being such that before focusing for each exposure the lens is moved outwardly by hand so as to be in correct position relatively to the viewing surface during focusing, while after focusing, upon operating the trigger or means for releasing the shutter said trigger, etc., will first of all cause or permit the lens to "jump back" or travel rearwardly a short limited distance to compensate for the difference in focus between the viewing surface and the surface of the sensitive plate or film as aforesaid, and instantly thereafter the shutter is released and the exposure given.

The present invention is specially applicable to folding or collapsible cameras or may be applied to rigid or non-folding cameras such as are known as box cameras.

I will now proceed to describe my present invention with reference to the accompanying drawings as carried into practice in a folding reflex camera provided with a roller blind focal plane shutter and adapted for use with a roll film.

Description of drawings.

Figures 1 to 3 are views of this folding reflex camera (in accordance with the present invention) in the folded position but

with the folding and self-erecting hood or shade removed from the back thereof viz:—

Fig. 1 is a view in elevation of the back of said camera.

Fig. 2 is a vertical section on line 2—2, Fig. 1, of said folded camera.

Fig. 3 is a plan or top edge view (*i. e.* in the direction of the arrow V Fig. 1) of said folded camera.

Fig. 4 is a view in side elevation of said camera expanded ready for use.

Fig. 5 is a plan (*i. e.* looking in the direction of the arrow V^1 Fig. 4) but with the bellows removed and their position merely indicated in dotted lines.

Fig. 6 is a cross sectional view in elevation on line 6—6, Fig. 5, looking in the direction of the arrows W.

Fig. 7 is a cross sectional view in elevation on the line 7—7, Fig. 5, looking in the direction of the arrows W^1.

Fig. 8 is a local plan view on an enlarged scale of part of Fig. 5; and Fig. 9 is also a local plan on corresponding scale to Fig. 8 showing the mechanism in slightly different position.

Fig. 10 is a view in elevation of the part shown on a large scale in Fig. 8 (*i. e.* looking in the direction of the arrow *x* Fig. 8) with the flap for capping or covering the lens open.

Fig. 11 is a local view in elevation on an enlarged scale looking in the direction of the arrows x^1, Figs. 8 and 10 and 12.

Fig. 12 is similar view to Fig. 10 showing the flap for capping or covering the lens closed.

Figs. 13 and 14 are local detail views (also on a similar enlarged scale) showing details of certain parts of the mechanism for operating or controlling the flap for capping or covering the lens.

Fig. 15 is a view of the back end of the camera fitted with the folding and self-erecting hood or shade in the expanded position ready for use.

Fig. 16 is a local plan view showing said hood or shade in the expanded position *i. e.* looking in the direction of the arrow *y* Fig. 15.

Fig. 17 is a local plan corresponding to Fig. 16 but showing the hood or shade in the folded position.

Fig. 18 is a view of the back of the camera fitted with said folding and self-erecting hood held in the partly closed position for use with the viewing aperture in a vertical direction.

Fig. 19 is a side view in elevation of Fig. 18 *i. e.* looking in the direction of the arrow y^1.

A is the main body or case of the camera which as illustrated is of the known type arranged to hold and operate a roll film in any known or suitable manner; this case A being provided with a hinged baseboard B adapted to be swung out into the position shown in Figs. 4 and 5 and fixedly held in said position—for example by pivoted arms B^x—all in the well-known or any other suitable manner.

The back of this case A (above the path of travel of the roll film—and shut off from the latter) is provided with a view-finding aperture A^1 as and for the purposes hereinafter described and said case A may also be provided with a handle (such as A^x) in the usual way for carrying the camera.

Also said case A is fitted with a roller blind focal plane shutter which roller blind C takes the course indicated in Fig. 4 between the top roller C^1 (on which it is wound to set the shutter) and the bottom spring roller C^2 (onto which it is wound when the shutter is released) viz. this blind C as it comes off said top roller C^1 first vertically passes across the view-finding aperture A^1 (see Fig. 4) thence passes under a guide roller *c* then rearwardly and around the guide roller c^2 thence vertically downward adjacent to and parallel with the sensitive surface D thence around the guide roller c^3 onto the spring roller C^2 on which it is wound in the usual manner.

I may employ any of the well-known and suitable means for mounting and operating this roller blind C and for adjusting the speed of travel of same and for setting and releasing same; and as these are all well-known it is therefore not necessary for me to further describe the same with reference to the accompanying drawings; the features of novelty that I claim in respect of the roller blind focal plane shutter being (1) that the blind is made to travel across the viewing aperture as well as across the sensitive surface (and for this purpose is made to travel in two vertical planes) so that the usual narrow slit provided in such blinds is used for the dual purpose of (*a*) first allowing the view to be seen through the view-finding aperture and (*b*) thereafter giving an instantaneous exposure while said blind is furthermore provided with a second and separate aperture of large size for giving a time exposure—the blind being made of sufficient length for this purpose all as will be readily understood and need not be further described here; the arrangement being such that when the blind is set in readiness for giving an instantaneous exposure it will in such set position uncover the view-finding aperture while covering the sensitive surface and thereafter when released will first cover and keep covered the viewing aperture while the exposure is being made.

The inside surface of that part of the said blind C which lies in front of the sensitive surface and covers same while viewing, focusing, etc., is formed as or provided with

a viewing surface advantageously white; and a mirror E is mounted upon or near the inside of the lens-carrying front F advantageously between the lens indicated as G and the top of the bellows H; for example such mirror E may advantageously be mounted by hinging same along its bottom edge $E^{\times}$ (by means of a spring hinge) to the inside of the lens-carrying front F so that normally said mirror E will be tilted or inclined at a slight angle as shown in Fig. 4 so as to reflect the image shown on the white surface (on the inside of the blind C) at the rear of the camera—the extent of the tilting or inclination of the said mirror E being limited by any suitable means for example by mounting the mirror E in metal rockers or frames E^1 E^1 at each side which rockers or frames E^1 are pivoted at $E^{\times}$ and prolonged at E^2 below said pivot and the lower ends E^2 of said rockers bear against the inside surface of the lens-carrying front F and thus limit the extent to which the springs E^3 (see Fig. 6) can tilt the mirror E toward the blind C while leaving said mirror E free to swing back into the vertical position (*e. g.* flush against the inside of the lens-carrying front F) when the camera is folded.

At the rear of the camera above the position occupied by the sensitive surface D and above the frame *d d d* (see Fig. 7) surrounding the sensitive surface D to be exposed, I provide according to the present invention, the slot or aperture or passage A^1 (see Figs. 1, 2, 4 and 7) for view-finding, focusing, etc., (which I will hereinafter refer to as the "view-finding aperture" A^1,) of suitable length and width (say about 3 or $3\frac{1}{2}$ inches long and about $\frac{1}{2}$ or $\frac{3}{8}$ of an inch wide) said view-finding aperture A^1 extending from the back of the camera into the interior of the camera opposite the aforesaid mirror E; and any suitable hood or means may be provided to shade said view-finding aperture and the eyes of the photographer during view-finding, etc.

A shade or hood or means of shading said view-finding aperture A^1 according to the present invention and as illustrated in Figs. 15 to 19 of the drawings is as follows:—

To the back of the camera case A there are vertically hinged two spring flaps or doors I each having a spring I^1 tending to force same open (see Figs. 15 to 19) meeting at the center of the back of the camera case A (these spring flaps I may advantageously be hinged to the frame or mount A^2 which latter is fixed to the back of said case A) and to the inside of the top of said flaps or doors I and along the top of the back part of the frame A^2 there is secured flexible light-tight material I^2 (and similar material I^3 at the bottom of said flaps I and back part) adapted to fold snugly inside said flaps I at the rear end of the camera when said flaps I are closed in which position they are held by the clip or slide I^4 see Fig. 17 and adapted to be extended into position for use when the spring flaps I are opened as shown in Figs. 15 and 16.

The method and means for enabling this foldable and self-erecting shade or hood I I^1 I^2 I^3 to be readily adapted for use when it is desired to employ the camera with the view-finding aperture A^1 in a vertical direction as shown in Fig. 18 (instead of horizontally) is as follows:—

Toward the free edge of the top of the flexible material I^2 and about midway of the length thereof I hinge at J^1 the disk J said hinges being carried on the metal strip or plate J^2 fixed to the flexible material I^2; said hinged disk J being so hinged at J^1 that (when not required for use) it can be laid back flat against the flexible material I^2 (as shown in Figs. 15 and 16) while when moved in the opposite direction it is hinge bound in the position shown in Figs. 18 and 19.

The barrel J^3 (of said hinge) fixed to the plate J^2 has formed or fixed thereon the inwardly extending lugs or projections J^4 (see Figs. 15 and 18) so that when the flaps I are partly closed into the position shown in Figs 18 and 19 each flap at its top outer edge will be caught under and held in said position by said lug or projection J^1 and the hinged disk J turned up into the position shown in Figs. 18 and 19 to form a shade while using the camera with the view-finding aperture A^1 in the vertical position shown in Fig. 18.

Any suitable means may be provided to enable the view-finding aperture A^1 to be automatically and completely covered before exposure of the sensitive surface begins; for example the focal plane shutter blind C (as before mentioned) may be made to travel in two different vertical planes, viz. the slot in the blind, having been wound into the viewing position opposite the aperture A^1, when released (for giving an exposure) after traveling in the first vertical plane across the view-finding aperture A^1 on reaching the bottom of the latter is made to turn a corner at c^1 and travel horizontally (toward the plane of the sensitive surface) under the view-finding aperture A^1 and then made to turn another corner at c^2 and travel downwardly in a vertical plane near the sensitive surface and to the rear of the vertical plane of the first named path of travel; thus when the shutter is wound and the slit in the blind C comes opposite the view-finding aperture A^1 in the rear of the camera, the view coming through the lens is projected onto the inside of the blind C (*i. e.* onto the aforesaid viewing surface on said blind C) and can then be viewed in the aforesaid mirror E (as indicated in

Fig. 4); and moreover upon releasing the shutter before the slit in the blind C reaches the sensitive surface the opaque part of the blind C has covered the view-finding aperture A^1 aforesaid.

Or any other suitable means may be employed for preventing light reaching the sensitive surface otherwise than through the slit in the blind when giving the exposure.

The aforesaid viewing surface on the inside of the blind C may be formed in any suitable manner for example in the manufacture of the material of which said blind is formed, or two separate materials may be employed—adhered together or otherwise, or a suitable coating provided on a black fabric or a black coating on the back of a white fabric.

The blind C is provided with a narrow aperture or slit (say for example $\frac{1}{2}$ or $\frac{3}{8}$ of an inch) which narrow aperture or slit serves two purposes according to the present invention viz. (1) it allows the photographer to view in the aforesaid mirror E the image or picture to be taken projected through the lens employed for taking the photograph as herein described and (2) thereafter serves in the usual manner to expose the sensitive surface while the opaque part of the blind C also serves two purposes viz. (1) it covers the sensitive surface D in the usual manner while viewing, focusing, etc., is effected and (2) next covers the said view-finding aperture A^1 before and during the exposure of the sensitive surface and thereafter until the shutter is re-set which sensitive surface would otherwise be liable to be fogged by light coming through said aperture A^1.

For enabling the camera to be folded; any suitable lens is carried on any suitable movable lens-carrying front such as F, any suitable bellows such as H being attached to said lens-carrying front F and to the inside of the body or case A of the camera in the usual way; the said lens-carrying front F being arranged and adapted to be drawn out for example by the knobs K^x K^x on the slide piece K (Figs. 4 and 5) hinged to the foot of the front F (and the bellows H thereby extended) over the hinged baseboard B in any known or suitable manner to or upon which baseboard (B or to a slidable mount or rack-slide L upon the latter) said lens-carrying front F is or can be readily attached; any suitable means being provided to rack or otherwise move or adjust the lens-carrying front such as F along said baseboard B toward or away from the sensitive surface D for the purpose of focusing, etc., for example the bottom part of the lens-carrying front F may have hinged thereto a parallel-sided frame M (which I will term the "foot") adapted to slide (advantageously stiffly) in grooves or guide ways formed for example by the overhanging edges L^1 in the aforesaid slide or slidable frame L (which I will term the "rack slide" L) which latter is adapted to slide longitudinally of the baseboard in guides formed by the overhanging guide pieces O^1 fixed to and carried on the slide part O which latter I will term the "focus compensating slide" O, this latter in turn being adapted to slide within a very limited distance along the baseboard B in guides formed by the overhanging guide pieces B^1 fixed to the baseboard B.

The rack slide L is provided with a rack L^2 operated by the circular rack teeth N^3 rotated around the axis N^2 by the crank arm N^1 and knob N thereon.

The circular rack or quadrant N^3 is pivoted at N^2 to the aforesaid focus compensating slide O so that by means of said knob N said rack slide L can be readily racked or moved back and forth (in the guides O^1) longitudinally of the baseboard for the purpose of focusing, etc.; or said slide L may be moved back or forth for this purpose by any other suitable means.

This rack slide L is thus mounted and adapted to slide in the guides O^1 (or in any other suitable manner) in or upon the "focus compensating slide" O, which latter as aforesaid is mounted on baseboard B in such manner that this focus compensating slide O is capable of a sliding movement within narrow limits in the same direction as the rack slide L, *i. e.*, such sliding movement of such focus compensating slide O is only sufficient to compensate or allow in focusing for the difference in distance between the inside surface (*i. e.*, the viewing surface) on the focal plane shutter blind (or flap) and the surface of the sensitive film D (or plate) the arrangement being such that, after focusing, upon moving the trigger or means such as the knob P (Figs. 4 and 5) for releasing the shutter said trigger, etc., will first of all release the focus compensating slide O and allow same to travel rearwardly (jump back) a short limited distance to thereby move the lens rearwardly a sufficient distance to compensate for the difference in focus between the inside surface (*i. e.*, viewing surface) of the said blind C (or flap) and the surface of the sensitive film D (or plate) as aforesaid; and thereafter the shutter is released and the exposure given.

Or any other focus compensating method and means may be employed in carrying out the present invention.

Any suitable cap or cover (*e. g.* a flap hinged to the lens-carrying front) may be provided for covering the front of the lens for example a flap Q.

The method and means of limiting the rearward travel (jump back) of the focus

compensating slide (as well as the forward movement thereof) and for automatically capping or covering the lens after each exposure has been made and automatically preventing said cap or cover being retained in the open position until the focus compensating slide has been moved outwardly (and the shutter set for next exposure) are as follows:—

The flap Q for capping or covering the lens G is spring mounted and mechanism or means are interposed between same and the means such as the trigger P for releasing the focus compensating slide O and then the shutter; so that, after the focus compensating slide O has "jumped back" and the shutter been released by the further movement of said trigger P and the exposure made thereupon said hinged flap Q will be automatically closed and the means for holding (retaining) this hinged flap Q in the open position will not become operative again until the focus compensating slide O has first been moved outwardly by hand the slight distance required to compensate in focusing as aforesaid and in readiness for the next "jump back"; it being necessary to also set the shutter in readiness for the next exposure before opening the hinged flap Q.

For this purpose the flap Q (see Figs. 11 and 12) is fixed to a horizontal shaft Q^1 carried in suitable bearings F^1 on the lens-carrying front F the end of said shaft Q^1 extending to one side of said lens-carrying front F and being provided with a milled head Q^2 (or other suitable means) for turning said shaft Q^1 to raise the flap Q into the open position against the action of a spring (such as a coiled spring Q^3 mounted on said shaft Q^1) which tends to close and keep closed the flap Q over the lens G.

This shaft Q^1 is provided with a short crank arm or nose Q^4 (by which the flap Q is retained in the open position) and in vertical alinement with this nose Q^4 I arrange a slide or rod R mounted on the front F so as to be vertically slidable thereon with a spring R^2 acting on said slide or rod R to normally keep same pressed downward toward or against the horizontally mounted lifting bar S while the upper end of this vertically slidably mounted slide or rod R is provided with a short vertical slot R^1 therein (see Figs. 10 to 12) in such position and of such length that when said vertical slide or rod R is in its lowermost position as shown in Fig. 10 the nose Q^4 (on the shaft Q^1) will bear against the solid part of said vertical rod or slide R (see Fig. 10) and thus hold the flap Q in the open position (as shown in Fig. 10) while upon said rod or slide R being raised slightly the nose Q^4 is released (by entering the slot R^1) and the flap Q is then closed by the action of its spring Q^3 (see Fig. 11).

The lifting bar S before referred to is hinged or so attached to the focus compensating slide O (for example by the arms S^1) of said lifting bar S each having a slot S^2 therein engaging the shank O^3 of a headed stud O^2 fixed on the focus compensating slide O (see Figs. 8 to 10) as to be capable of being lifted or tilted to the required extent, and also said lifting bar S is capable of slight horizontal movement in the same direction as the slide O and limited by the length of the slots S^2; such movement being controlled by spring action (such as the springs S^3 coiled around the shank O^3 of each such headed stud O^2) adapted to normally keep said lifting bar S pressed rearwardly *i. e.* toward the body or case A of the camera and also adapted to normally keep said lifting bar S forced downward toward the baseboard B.

The rear or inner end of this lifting bar S *i. e.* the end toward the camera body is arranged to extend just over the end of one arm T of the bell crank forming the trigger or releasing device (when said arm T is in its normal position) the other arm T^1 of said bell crank being provided with the releasing knob P see Figs. 9 and 10, and the under side of said rear or inner end of said lifting bar S is provided with a downwardly extending projection or lug S^4 (see Fig. 10) suitably curved on the underside thereof so as to lie in the path of travel of the end of the arm T of the bell crank hereinbefore referred to; this lug S^4 and the end of said rocking arm T respectively being so shaped that when the trigger (and arm T) is moved to release the focus compensating slide (and thereafter release the shutter) the said arm T will act endwise against the lug S^4 and thereby slide the lifting bar in a horizontal direction outwardly (*i. e.* away from the case A) without lifting same, and on the return movement of the arm T the latter will pass under said lug S^4 and thereby raise the said lifting bar S (against the action of the aforesaid spring or springs which normally keep said lifting bar pressed toward the baseboard) and thus lift the vertical slide rod R and release the hinged flap Q which will thereupon cap or cover the lens G.

This bell crank T T^1 is pivoted at T^2 to the focus compensating slide O; and this slide O is provided with a recess or cut away portion O^4 (see Figs. 5, 8 and 9) of limited length in which recess O^4 is located a fixed stud B^2 fixed to the baseboard B (see Figs. 5, 8, 9, 10 and 12) so that the length of movement in and out of the focus compensating slide upon the baseboard B is limited by this fixed stud B^2 in said recess O^4 in said slide O.

The aforesaid bell crank arm T is provided with a recess T^4 adapted to fit against

or engage the said fixed stud B^2 when the focus compensating slide O (and all the parts carried thereby—including the lens-carrying front F) is moved by hand outwardly until the recess T^4 in the arm T comes opposite the fixed stud B^2 (*i. e.* the slide O is moved from the position shown in Fig. 9 into the position shown in Figs. 5 and 8) whereupon the arm T of the bell crank with recess T^4 therein is forced into engagement with said fixed stud B^2 by means of a spring T^3 on said bell crank which normally tends to keep said arm T pressed toward said stud B^2 and by this means the focus compensating slide is held in the outward position while focusing, etc., takes place, after which when the knob P of the trigger or release is moved (by the operator) from the position shown in Figs. 5 and 8 into the position shown in dotted lines in Fig. 9 this movement of the trigger will first of all disengage the arm T from the stud B^2 and thereby cause or permit the focus compensating slide O to move back (jump back) until the outer end of the recess O^4 meets the fixed stud B^2 while the end of the arm T will simply push the lifting bar S endwise out of its path without lifting same; and the further movement of the knob P from the position shown in dotted lines into the position shown in full lines in Fig. 9 will bring same against the end V of the slidable releasing bar V^1 by which latter the roller blind shutter is released and the exposure given by the shutter in the manner hereinbefore described while upon the operator releasing the knob P the spring T^3 will return the bell crank T T^1 into the position indicated in dotted lines in Fig. 9 and in so doing the end of the arm T will then ride under the lug S^4 on the lifting bar S and lift the latter and thereby release the hinged flap Q which will thereupon cap or cover the lens.

In this last named position *i. e.* with the bell crank in the position indicated in dotted lines in Fig. 9 the lifting bar S is maintained in the raised position and so remains until a slight forward outward movement is given by hand to the focus compensating slide O (after each exposure has been made) and consequently the vertical slide rod R is correspondingly maintained in the raised position so that if now the spring flap Q is turned up it will not be retained in the "open" position but will immediately, on release of the knob Q^2, return to the closed position and thereby indicate to the operator that it is necessary to impart the slight outward movement to the focus compensating slide O in readiness for focusing (and also to set the shutter) for the next exposure and after this has been done the arm T moved from the dotted position shown in Fig. 9 into the position shown in Fig. 8 and thereby allows the tilting bar S to descend into the lowered position and the flap Q can then be opened and retained in the opened position until the trigger P is again operated and so on.

F^x F^x (Fig. 5) are pockets formed on the inside of the front F to receive therein the knobs K^x on the hinged slide piece K when the camera is folded.

Instead of the inside surface of the roller blind being provided with a viewing surface as hereinbefore described it will be obvious that I may employ a separate and special flap or surface to act as the viewing surface between the lens and the sensitive surface and parallel and close to the latter.

Any other suitable means may be employed as desired to shade the said viewing aperture and the eyes of the photographer during viewing, focusing, etc., in place of the folding and self-erecting hood or shade hereinbefore described and for enabling any such shade or hood to be readily adapted for use when it is desired to employ the camera with the aforesaid (normally horizontal) viewing aperture in a vertical direction instead of the horizontal direction.

What I claim is:—

1. A photographic camera having a viewing surface adapted to be brought into position in the rear of the interior of the camera opposite the lens and to show on said surface the image formed by said lens, a back to said camera having a viewing aperture and a focal plane roller blind shutter having a slit and so arranged that said slit serves both (*a*) to uncover the said viewing aperture and when the latter is covered (*b*) to then expose the sensitive surface while the opaque part of said blind serves to prevent light reaching the sensitive surface through said viewing aperture while the latter is open and to close the latter while the exposure is given substantially as described.

2. A photographic camera having a viewing surface adapted to be brought into position in the rear of the interior of the camera opposite the lens and to show on said surface the image formed by said lens, a back to said camera having a viewing aperture formed as a horizontal slot and located above the sensitive surface and a focal plane roller blind shutter having a slit so arranged that said slit serves both (*a*) to uncover the said viewing aperture and when the latter is covered (*b*) to then expose the sensitive surface while the opaque part of said blind serves to prevent light reaching the sensitive surface through said viewing aperture while the latter is open and to close the latter while the exposure is given substantially as described.

3. A photographic camera having a viewing surface adapted to be brought into position in the rear of the interior of the camera opposite the lens and to show on said

surface the image formed by said lens, a back to said camera having a viewing aperture and a focal plane roller blind shutter having a slit so arranged that said slit serves both (*a*) to uncover the said viewing aperture and when the latter is covered (*b*) to then expose the sensitive surface while the opaque part of said blind serves to prevent light reaching the sensitive surface through said viewing aperture while the latter is open and to close the latter while the exposure is given and a mirror arranged—in the interior of the camera—opposite said viewing surface and viewing aperture substantially as described.

4. A photographic camera having a viewing surface adapted to be brought into position in the rear of the interior of the camera opposite the lens and to show on said surface the image formed by said lens, a back to said camera having a viewing aperture and a focal plane roller blind shutter having a slit and arranged to travel in two vertical planes viz:—in one said plane across the viewing aperture and in the other said plane across the sensitive surface and so arranged that said slit in said blind serves both (*a*) to uncover the said viewing aperture and when the latter is covered (*b*) to then expose the sensitive surface while the opaque part of said blind serves to prevent light reaching the sensitive surface through said viewing aperture while the latter is open and to close the latter while the exposure is given substantially as described.

5. A photographic camera having a focal plane roller blind shutter having a slit, a viewing surface provided on the said blind in suchwise as to be adapted to be brought into position opposite the lens when the said shutter is set ready for giving an exposure, a mirror mounted opposite said viewing surface and carried (at a suitable angle) on the inside of the lens-carrying front just above the lens, a lock to said camera having a viewing aperture above the sensitive surface and opposite said mirror, means to prevent light reaching said sensitive surface from said aperture, and said roller blind and the slit therein for giving the exposure so arranged and mounted that (*a*) said slit will uncover the viewing aperture when the shutter is set and (*b*) said blind will cover said aperture when the shutter is released to make the exposure.

6. A photographic camera having a viewing surface adapted to be brought into position in the rear of the interior of the camera opposite the lens, and to show on said surface the image formed by said lens, a back to said camera having a viewing aperture and a focal plane roller blind shutter provided with a slit so arranged that said slit serves both to uncover the said viewing aperture, and when the latter is covered to then expose the sensitive surface while the opaque part of said blind serves to prevent light reaching the sensitive surface through said viewing aperture while the latter is open, and to close the latter while the exposure is given, and a cover for the lens adapted to open only after the outward focus compensating movement has been imparted to the lens.

7. A photographic camera having a viewing surface adapted to be brought into position in the rear of the interior of the camera opposite the lens, and to show on said surface the image formed by said lens, a back to said camera having a viewing aperture and a focal plane roller blind shutter provided with a slit so arranged that said slit serves both to uncover the said viewing aperture, and when the latter is covered to then expose the sensitive surface while the opaque part of said blind serves to prevent light reaching the sensitive surface through said viewing aperture while the latter is open, and to close the latter while the exposure is given, and a cover for the lens adapted to open only after the outward focus compensating movement has been imparted by hand to the lens, and means adapted to automatically release said cover to close the lens after each exposure.

8. A photographic camera wherein the lens is so mounted as to require a slight outward movement by hand to bring same into correct position to focus the image on the viewing surface and to be there retained by a catch operated by the shutter releasing mechanism which latter just prior to releasing the shutter will first cause or permit the lens to "jump back" or travel rearwardly the short limited distance necessary to compensate for the difference in focus between the viewing surface and the sensitive surface and instantly thereafter release the shutter and give the exposure substantially as described.

9. A folding photographic camera having a focal plane roller blind shutter arranged to travel in two vertical planes and having a slit for giving instantaneous exposure, a viewing surface provided on the said blind in suchwise as to be adapted to be brought into position opposite the lens when the said shutter is set ready for giving an exposure, a movable lens-carrying front adapted to be drawn out over a hinged baseboard, a back to said camera having a viewing aperture formed as a horizontal slot located above the sensitive surface, a mirror arranged in the interior of the camera opposite said viewing surface and viewing aperture and supported on the inside of the lens-carrying front just above the lens, means to prevent light reaching said sensitive surface through said viewing aperture, said slit in said roller blind for giving instantaneous ex-

posure so arranged and the blind so mounted that (*a*) said slit will uncover the viewing aperture when the shutter is set and (*b*) said blind will cover said aperture when the shutter is released to make the exposure, a focus compensating slide for the lens-carrying front adapted to be moved by hand a short distance outward, a catch to retain said focus compensating slide in position when so moved outwardly by hand, means operated by the shutter releasing mechanism to release said catch and cause or permit a "jump back" or inward focus compensating movement of said slide immediately before the shutter is released, a cover for the lens so arranged and mounted that same will only keep open after the outward focus compensating movement has been imparted by hand, means to automatically release said cover to close the lens after each exposure, and a foldable hood or shade on the back of said camera adapted to shade the said viewing aperture, all combined and arranged to act substantially in the manner and for the purposes hereinbefore described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

MAGNUS NIÉLL.

Witnesses:
ELIN WAHRMAN,
SALLY GÜLE.