

F. J. WENDE.

CAMERA.

APPLICATION FILED APR. 27, 1914.

Patented Dec. 19, 1916.

4 SHEETS—SHEET 1.

1,209,239.

Fig. 1.

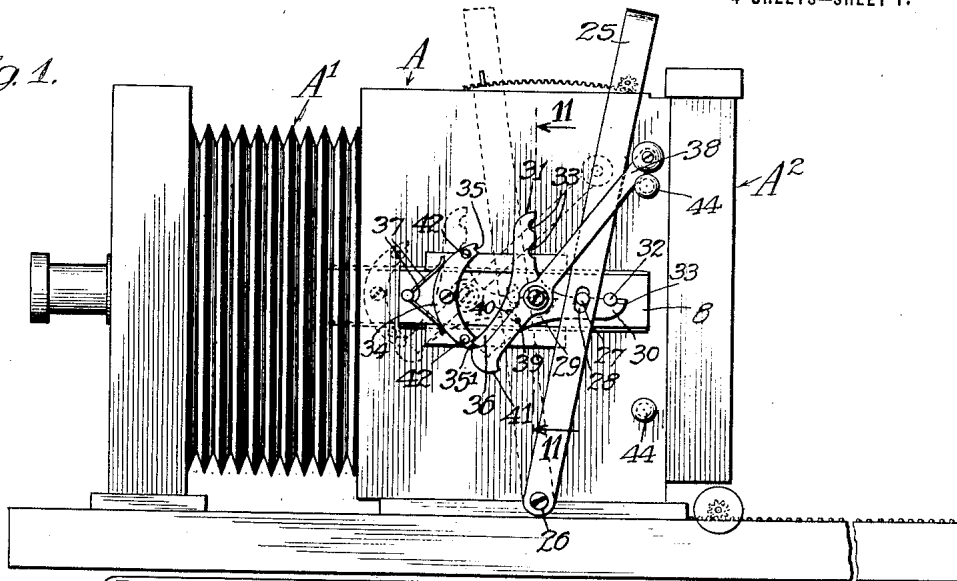
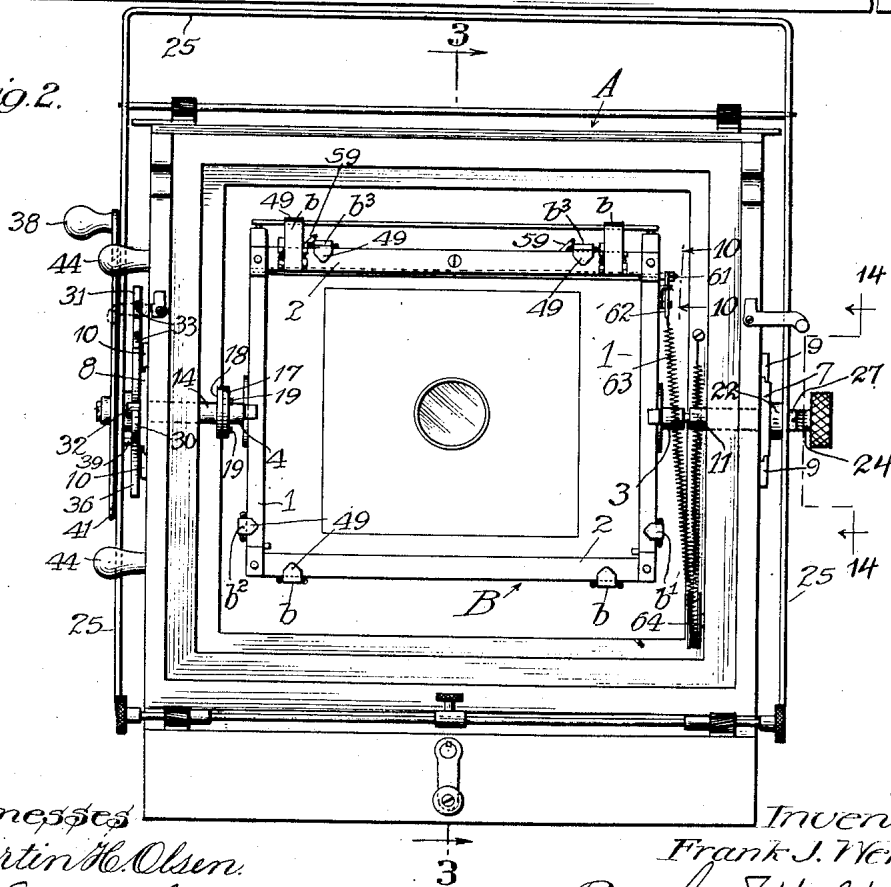


Fig. 2.



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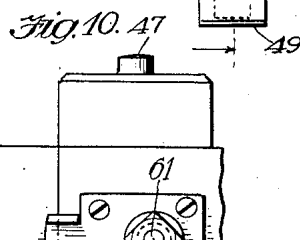
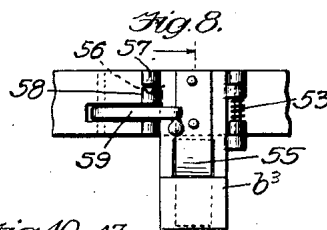
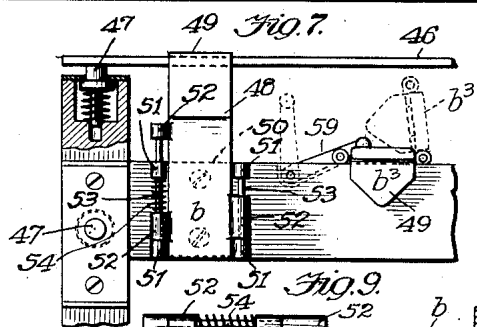
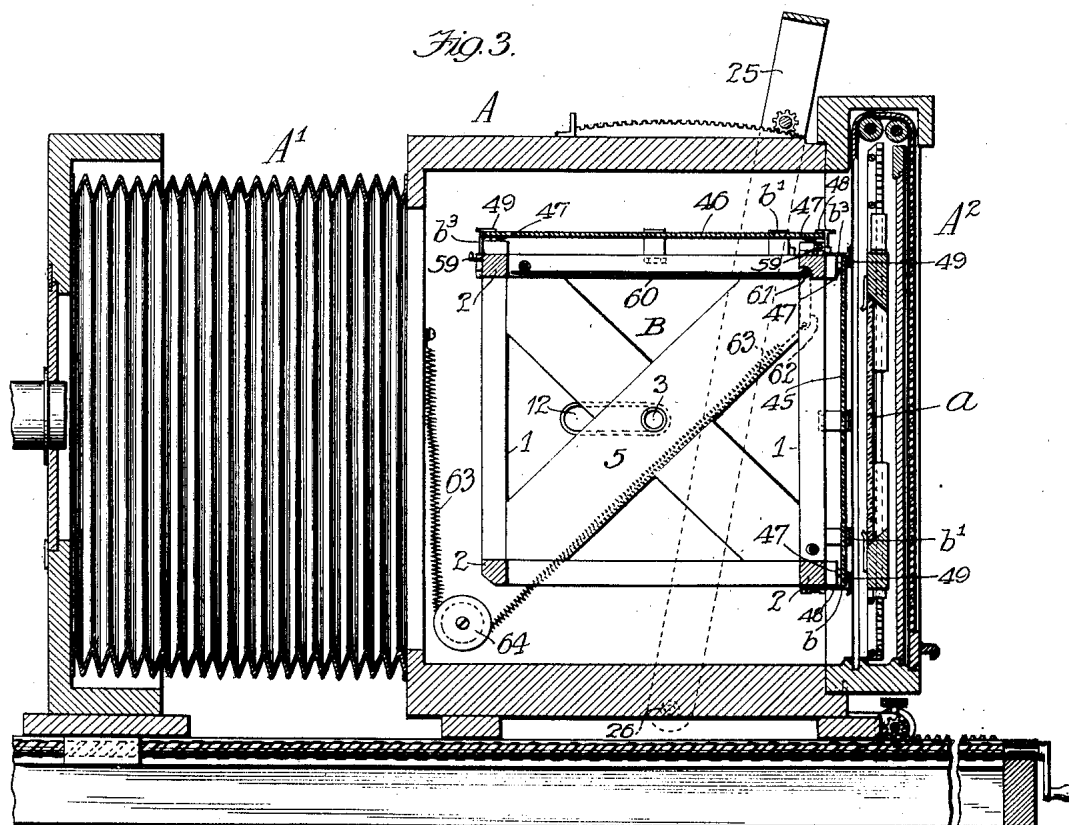
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4 SHEETS—SHEET 2.

1,209,239.



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4 SHEETS—SHEET 3.

1,209,239.

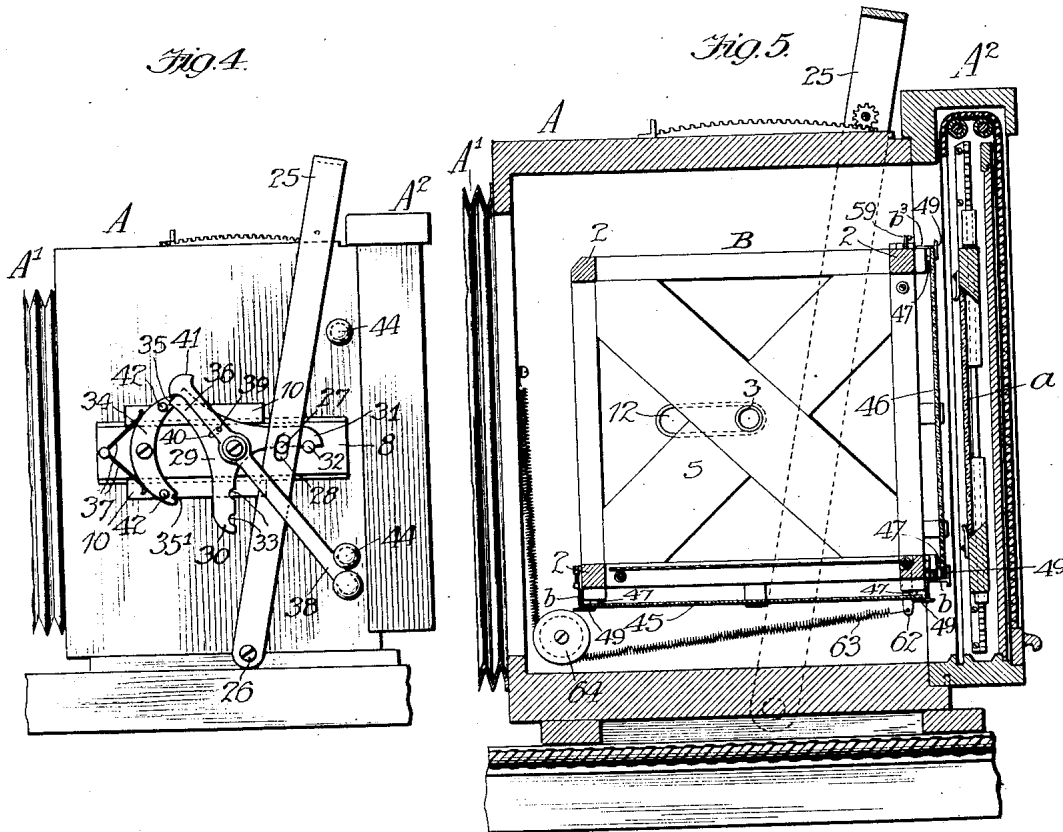
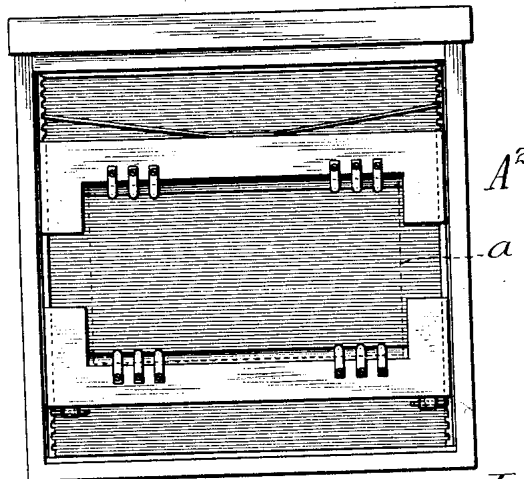


Fig. 6.



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4 SHEETS—SHEET 4.

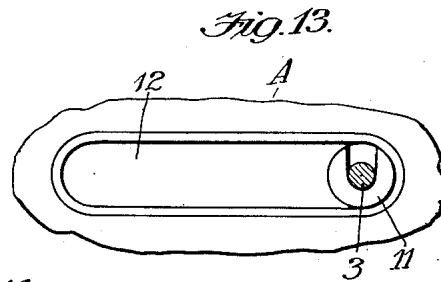
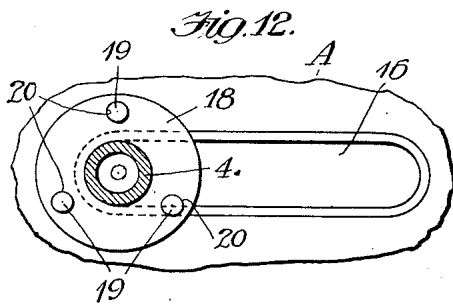
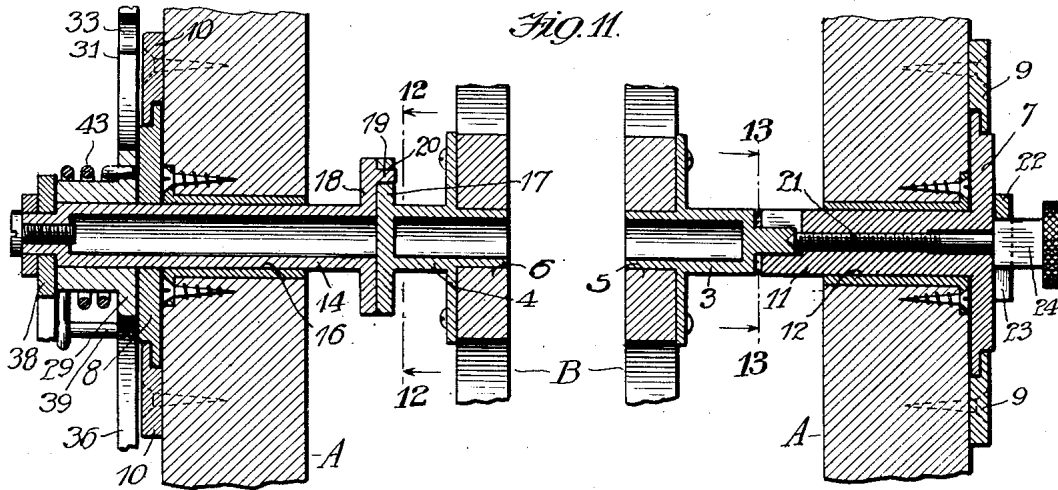
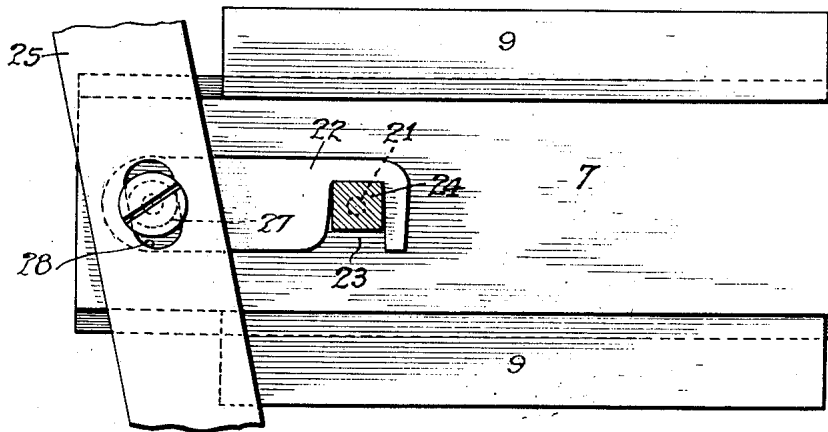


Fig. 14.



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UNITED STATES PATENT OFFICE.

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CAMERA.

1,209,239.

Specification of Letters Patent.

Patented Dec. 19, 1916.

Application filed April 27, 1914. Serial No. 834,672.

To all whom it may concern:

Be it known that I, FRANK J. WENDE, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Cameras, of which the following is a specification.

This invention relates to photographic cameras for making negatives for half-tone engraving purposes, and relates particularly to cameras for making such negatives in accordance with the process of making half-tone negatives invented by me and which forms the subject-matter of my co-pending application filed Oct. 12, 1914, Serial Number 866,256.

The object of the present invention is to provide a camera for making half-tone negatives in accordance with my said improved process, which shall be effective for its designed purpose, and by means of which said half-tone negatives may be made quickly and economically.

To this end a camera of my invention comprises the various features, combinations of features and details of construction hereinafter described and claimed.

In the accompanying drawings, in which my invention is fully illustrated, Figure 1 is a side view of a camera proper, used for making half-tone negatives in accordance with my improved process, the means for manipulating and locking the screen holder being shown in position corresponding to operative position of one of said screens in full lines, and in advanced position, in which said screens may be turned or shifted, in dotted lines. Fig. 2 is a rear end view thereof with the plate holder removed. Fig. 3 is a vertical sectional view on the line 3—3 of Fig. 2. Fig. 4 is a fragmentary view similar to Fig. 1 showing the screen holder manipulating means in position corresponding to operative position of the screen other than that which is in operative position in Fig. 1. Fig. 5 is a sectional view substantially similar to Fig. 3 with the screen holder and screens in the same positions as in Fig. 4. Fig. 6 is a front view of the plate holder with the shutter raised. Figs. 7, 8 and 9 are enlarged fragmentary detail views of the means for securing the half-tone screens to the screen holder of the camera. Fig. 10 is an enlarged fragmentary side view from the position 10—10, Fig. 2 showing the shutter operating lever. Fig.

11 is an enlarged fragmentary sectional view on the line 11—11 of Fig. 1, showing the screen holder supporting means, the screen holder being entirely broken away between its lateral sides. Figs. 12 and 13 are enlarged fragmentary sectional elevations on the lines 12—12 and 13—13, respectively, of Fig. 11. Fig. 14 is an enlarged fragmentary sectional elevation on the line 14—14 of Fig. 2.

Referring now to the drawings, A designates the body portion or casing of the camera, A¹ the extension bellows thereof, A² the plate holder, as a whole, and *a* a sensitized plate secured therein. All of the foregoing parts are old and well known in the art and, excepting as hereinafter particularly described, said camera, as regards said parts or elements, may be of any usual or approved construction and will be readily understood by persons familiar with the art from an examination of the drawings, without a detailed description thereof.

Rotatably mounted in the body portion or casing A of the camera is a screen holding frame or screen holder designated, as a whole, B. As shown, said screen holder consists of a skeleton structure comprising substantially square end frames formed by frame members 1 which are rigidly connected at their corners by transverse frame members 2.

In the preferable construction shown, the screen holder B is rotatably supported by trunnions 3 and 4 on opposite ends of said screen holder, said trunnions being preferably carried by or secured to spiders or gudgeons 5 and 6 secured to opposite ends of said screen holder. To provide for moving the screen holder B backward and forward, toward and from the plate holder A² and the plate *a* supported therein, the bearings for said trunnions 3 and 4 are preferably formed on slide plates 7 and 8 which are fitted to and freely movable in suitable guide bearings formed in plates 9 and 10 secured to opposite sides of the body portion or casing A of the camera. As shown, the bearing for the trunnion 3 is formed by a socket in the inner end of a hub or projection 11 on the slide plate 7 and which projects inwardly therefrom through a slot 12 formed in the side wall of the body portion A of the camera.

The trunnion 4, is adapted to be connected to a stub shaft 14 rotatably mounted in a

suitable bearing in the slide plate 8 and which projects inwardly therefrom through a slot or opening 16 formed in the side wall of the body portion A of the camera. Formed on or secured to the adjacent ends of the trunnion 4 and stub shaft 14 are disks 17 and 18 secured in one of which, as shown the disk 18, are pins 19 which project inwardly therefrom and are adapted to engage holes 20 formed in the other disk 17. Said pins 19 will rigidly connect the disks 17 and 18, thus operating to support the adjacent end of the screen holding frame B and also to impart rotation to said screen holder with the shaft 14.

To provide for removing the screen holder B from the machine, if desired, provision is made for sufficient endwise movement of the trunnion 3 in its bearing to withdraw the holes 20 in the disk 17 from the pins 19 in the disk 18, after which said screen holding frame may be moved endwise in the opposite direction a sufficient distance to effect disengagement of the trunnion 3 from its bearing in the hub or projection 11 on the slide plate 7. Also, to prevent accidental disengagement of the bearings for the screen holding frame B, means are provided for securing said screen holder against endwise movement when in desired operative position. As shown, said means consists of a screw 21 threaded through the slide plate 7, and which may be turned either in or out, said screw being of such length that when screwed inward its end will extend into close proximity to the end of the trunnion 3 and will form a stop which will operate to prevent endwise movement of the screen holder to effect disengagement of the pins 19 and the holes 20. Also, when said screw is turned outward the inner end thereof will be retracted a sufficient distance to permit necessary movement of said screen holder to disengage said pins and holes. In order to prevent accidental turning of the screw 21, I provide a locking means therefor consisting, as shown, of a latch 22 pivoted to the slide plate 7, a notch 23 in which is adapted to engage a squared section 24 of the body portion of said screw 21.

Bodily movement toward and from the plate holder A² is adapted to be imparted to the screen holding frame B by suitable means consisting, as shown, of a bail shaped handle 25 which extends over the body portion or casing A of the camera with its downwardly extending sides in relatively close proximity to the sides of said body portion. The lower ends of said handle are pivoted to fixed studs 26 attached to said body portion adjacent to the bottom thereof. Between their ends, the end portions of the handle 25 are connected to the slide plates 7 and 8 in such manner that pivotal movement of said handle will impart movement to said slides

toward and from the plate holder A². As shown, the connections between said handle and the plates 7 and 8 consist of fixed studs or projections 27 on said slide plates which project through slots 28 formed in the handle 25.

For reasons presently apparent, means are also provided in connection with the stub shaft 14 for turning the screen holding frame B through an arc of 90 degrees, suitable stops being also provided for defining the extreme positions of said screen holding frame and for locking the same in its extreme positions. In the preferable construction shown, said rotating and locking means are as follows: Secured to the end of the stub shaft 14 which projects outside of the body portion or casing A of the camera, so as to rotate therewith is a plate or collar 29 formed on which are arms 30 and 31, the adjacent sides of which extend radially relative to the stub shaft 14 and at an angle of 90 degrees relative to each other. Rotation of said collar and arms is limited by means of a stop pin or pins secured in the slide plate 8 and which project laterally therefrom, said stop pins preferably include the studs 27 on said slide plate which connect the same to the handle 25 and another pin 32 secured in said plate slightly in the rear of said pins 27. Notches 33 are formed in the adjacent sides of said arms 30 and 31 which are adapted to receive the stop pins 27 and 32, the relation being such that rotation of stub shaft 14 will be limited to 90 degrees, in the manner described.

The means for locking the stub shaft 14 and thus the screen holding frame B against rotation when at the limits of its rotatable movement consists of a bar 34, pivoted at its longitudinal center to the slide plate 8 at a distance in front of the stub shaft 14, formed in the ends of which are notches 35, 35', which are adapted to be engaged by the end of an arm 36 formed on and which projects frontward from the plate or collar 29. In order that the end of the arm 36 shall not strike the bar 34, the side of said bar 34 adjacent to said arm 36 is curved in such manner that the end of said arm 36 will clear the center of said bar 34, but the ends of said locking bar will project into the path of travel of said arm as said arm turns pivotally in either direction. Said locking bar 34 is maintained yieldingly in locking position by means of a spring 37 applied thereto. Thus, as the arm 36, moving pivotally, strikes the adjacent side of the locking bar 34, said arm 36 will turn said locking bar pivotally against the force of the spring applied thereto and will permit said arm 36 to pass the ends of said locking bar into engagement with the notches 35, 35' formed in the ends thereof. Said spring 37 will also operate to return the end of said locking

bar to its normal position when the end of the arm 36 passes into engagement with one or the other of notches 35, 35', which will bring one side of said notch beneath the side of the arm 36 and will lock the same against rotation in one direction, rotation of said arm 36 in the opposite direction being prevented by engagement of one or the other of the arms 30, 31 with the stop pins 27 and 32.

Pivotal movement is adapted to be imparted to the stub shaft 14 and thus to the screen holding frame B and pivotal movement imparted to the locking bar 34 to release the arm 36 and thus permit pivotal movement of said stub shaft and screen holding frame, by means of a lever or crank 38 which is loosely pivoted on the stub shaft 14 outside of and closely adjacent to the plate or collar 29. Secured in said crank or lever 38 is a pin 39, which engages a slot 40 formed in the arm 36 concentric with the axis of rotation of the stub shaft 14, said slot being of such length that it will permit limited rotation or play of the crank or lever 38 relative to the arm 36. Said crank or lever 38 projects frontward beyond the stub shaft 14 and formed on the end thereof is a cam surface 41 adapted to cooperate with pins 42 secured in the locking bar 34 adjacent to its ends and which project laterally therefrom, the relation being such that when said crank or lever 38 is turned pivotally to effect engagement of the arm 36 with one or the other of the notches 35, 35', the end of said arm 36, riding along the curved side of the locking bar 34, will operate to turn said locking bar pivotally against the force of the spring 37 applied thereto to permit the cam surface on the end of the crank or lever 38 to pass the pin 42 in the end of said locking bar toward which the end of said arm 36 is moving. Thus, when the end of the arm 36 engages one of the notches 35, or 35' in the ends of said locking bar, the cam surface on the end of said crank or lever 38 will have passed the corresponding pin 42, the relation being such, however, that the cam surface formed on the end of said crank or lever 38 will be in close proximity to said pin 42, so that the initial play or movement of the crank or lever 38 relative to the arm 36 in the reverse direction, will cause said cam surface to engage said pin and to turn said locking bar pivotally to release the arm 36 just before the pin 39 in the crank or lever 38 reaches the end of the slot 40 in the arm 36 toward which it is moving. Thus, when said pin reaches the end of said slot said arm 36 will be released and free to rotate with said crank or lever 38.

To prevent the pin 39 from striking the ends of the slot 40 in the arm 36 with a sudden jar or jolt, the crank or lever 38 is preferably connected to the arm 36 by means of a spring 43, the ends of which are connected

to said arm 36 and crank or lever 38, respectively, and which preferably comprises a coiled section which surrounds and is confined in position by the pin 39.

In order to prevent rotation of the screen holding frame B when in its rearward position, in which position the transverse corners of said screen holding frame would strike the plate *a* secured in the plate holder A², suitable stops are provided which will prevent rotation of said screen until it is moved frontward away from the plate holder A² a sufficient distance to permit the transverse corners of the screen holding frame to clear the plate *a* secured in said plate holder. As shown, said stops consist of knobs 44 secured to the body portion or casing A of the camera in such position that, when the screen holding frame is in such rearward position that rotation thereof would cause the transverse corners thereof to strike the plate *a*, one or the other of said knobs will project into the path of travel of the rear end of the crank or lever 38 so as to lock the same against pivotal movement. The position of said stop knobs 44 is such, however, that when the screen holding frame has been moved frontward away from the plate holder A² a sufficient distance so that the corners thereof will clear the plate *a*, the end of said crank or lever 38 will clear said stop knobs 44, thus permitting rotation of said crank or lever 38 to turn the screen holding frame from one of its extreme positions to the other.

The screen holding frame B is connected to the stub shaft 14 in such angular relation that when said stub shaft is in its extreme rotative positions, adjacent sides of said screen holding frame will be parallel with the plate *a* secured in the plate holder A², and the extreme rearward position of said screen holding frame is such that the screen secured to the side of said screen holding frame adjacent to the plate holder, as presently described, will be in desired operative proximity to the plate *a*.

Secured to the sides of screen holding frame B which respectively form the rear sides thereof when said frame is at opposite limits of its rotative movement are screens 45 and 46, one of said screens, being finer than the other. For present purposes we will assume that the screen 45 is the fine screen and the screen 46 the coarse screen. The positions of said screens on said screen holding frame are such that when said holding frame is turned to bring said screens respectively into operative position at the rear side of said frame, the lines of the coarser screen 46 will register with lines of the finer screen 45. As stated in the preamble of the specification I have, in actual practice, obtained highly satisfactory results with fine and coarse screens ruled with

and 60 lines to the inch, respectively, and also with screens ruled 150 and 100 lines to the inch, respectively.

As shown, the means for securing the screens 45 and 46 to the frame B in proper operative positions, is as follows:—Formed on the frame B are bearing surfaces for said screens, said bearing surfaces preferably being yielding so as to coöperate with the securing means proper and also to provide for the use of screens of different thickness, all as will presently appear. In the preferable construction shown, said bearing surfaces are formed by the ends of the pins 47, yieldingly mounted at the corners of the sides of said screen holding frame to which said screens are designed to be secured. Simple means for thus yieldingly mounting the pins 47 in the frame B are shown in Fig. 7, of the drawings and will be readily understood by skilled mechanics without a detail description thereof.

The securing means proper, consists of clips mounted on the frame B, all of which, as shown, are adapted to grip the edges of said screens and which comprise stop clips which form stops to position said screens, clips which carry springs and which coöperate with said stop clips, and pivoted clips to permit the screens to be conveniently screened to and detached from said frame. For purposes of convenient reference, the different kinds of clips will be designated, respectively, by the reference letters \bar{b} , \bar{b}^1 , \bar{b}^2 and \bar{b}^3 and will be described in order. For convenience, the positions of all of said clips have reference to the sides of the frame B when said sides form the rear sides of said frame, that is when the screens attached to said sides are in operative positions, and all of said clips consist of metal plates 48, the ends of which are turned in, substantially at right angles, forming hooks 49, adapted to engage and grip the edges of the screens 45 and 46. The clips \bar{b} are secured to the lower edges of the sides of said frame (when they form the rear sides thereof), there being two of said clips \bar{b} secured to each "rear" lower edge of said frame, preferably adjacent to the lateral edges thereof. The clips \bar{b}^1 and \bar{b}^2 are secured to the right and left hand lateral edges, respectively, of the "rear" sides of said frame, when facing said camera from the rear, there being only one of said clips preferably adjacent to the lower edges thereof. And the clips \bar{b}^3 are secured to the "rear" upper edges of said frame, there being two of said clips secured to each "rear" upper edge of said frame, located in substantial vertical alinement with the corresponding clips \bar{b} .

The clips \bar{b} are supported on suitable guides so as to be freely movable endwise, but so that they will be rigid to sustain the

weight of the screens supported thereon. As shown, the means for thus supporting said clips is as follows: Secured directly to the edges of the frame B are plates 50 formed on which are lugs 51 which aline with lugs 52 on the lateral edges of the plates or body portions 48 of the clips \bar{b} and fitted to holes or bearings in which are guide rods 53, said guide rods, as shown, being secured in fixed position in the lugs 51 and being slidable in the holes or bearings 52. Light springs 54 inserted between lugs 51 and 52 and which surround guide pins 53 as guides, operate to maintain the clips \bar{b} normally retracted so that they will hold the screens yieldingly in contact with the bearing pins 47.

The clips \bar{b}^1 are in all respects similar to the clips \bar{b} and are mounted on the frame B in the same manner as said clips \bar{b} and the same reference numerals are used in the drawings, to designate corresponding parts thereof. Also, excepting as hereinafter particularly described, the clips \bar{b}^2 are in all respects similar to the clips \bar{b} and \bar{b}^1 and corresponding parts thereof are designated by the same reference numerals in the drawings. Mounted on the inner surfaces of the clips \bar{b}^2 are leaf springs 55, which bear directly against the edges of the screens and force them firmly into contact with the opposed clips \bar{b}^1 , which define the transverse operative positions of the screens on the frame B.

At one edge thereof, respectively, the clips \bar{b}^3 are connected to the frame B in the same manner as the other clips, the same reference numerals being used to designate corresponding parts thereof as on said other clips. The guide rod or pin 53 also forms a pivot pin around which the said clips \bar{b}^3 may be turned pivotally into the position shown in dotted lines, Fig. 7, and said clips are adapted to be detachably connected to the supporting plates 50 by means of pins 56 secured in lugs 57 which are adapted to slidably engage holes formed in alined lugs 58 on the clips \bar{b}^3 , said pins 56, when in engagement with the holes in the lugs 58 also forming endwise guides for said clips. Said clips are adapted to be maintained in position with the pins 56 in engagement with the holes in the lugs 58 by means of pivoted stops 59 on the frame B which are adapted to be turned into position to engage the lugs 58 and to prevent movement thereof sufficient to disengage said pins from said holes. The relation is such, however, as to permit limited endwise movement of said clips \bar{b}^3 . Like the clips \bar{b}^2 , the clips \bar{b}^3 are provided with springs adapted to bear against the edges of the screens 45 and 46 to hold the opposite edges thereof into contact with the clips \bar{b}^1 .

Pivotally connected to the screen-holding

frame B in the angle between the sides of said frame to which the screens are to be secured and with its pivotal axis parallel with the axis of said frame, is a shutter 60.

5 Said shutter 60 is of opaque material, preferably suitable sheet metal, and the sides thereof are dark in color, preferably black, and have a dull finish in order that said shutter will not reflect light. As preferably
10 constructed, both sides of said shutter are covered with suitable black fabric. Said shutter is of such size that it will cover the inner surfaces of the screens 45 and 46 and is adapted to cover said screen, respectively,
15 when in operative position, suitable means being provided for automatically moving said shutter pivotally to cover the inoperative screen. The object and purpose of said shutter is to prevent the exposure through
20 the screen which is in operative position from being affected by reflected light from the inoperative screen.

The means for operating said shutter are as follows:—Secured to the rod 61 by means
25 of which said shutter is pivotally supported is an arm 62 attached to the outer end of which is a coiled spring 63 which passes over a pulley 64 mounted to rotate freely on the inner wall of the body portion or casing
30 A of the camera, and the opposite end of which is attached to a pin or the like secured in said casing or body portion. The relation is such that when the frame is turned to bring the screen 46 into operative position and the screen 45 on the bottom side
35 of the frame B, see Fig. 5, the rotatory movement of said frame will relieve the spring 63 from tension and will permit the shutter 60 to turn pivotally by gravity to cover the bottom screen 45. The construction and arrangement is such also, that when
40 said frame B is turned to bring the screen 45 into operative position, which will also bring the other screen 46 on the top side of said frame, the spring 63 will be brought
45 into tension which will turn the shutter 60 pivotally so as to cover said screen 46, see Fig. 3.

The manner of using my improved camera is as follows:—The screens 45 and 46 having
50 been secured to the frame B, and the sensitized plate *a* inserted into the plate holder A², the frame B is turned to bring the finer screen 45 into operative position. The exposure is then started and is continued a sufficient length of time to partly
55 photograph the shades and shadows but not appreciably to affect the high-lights. The length of this initial exposure is a matter of experience which will readily be acquired
60 by a skilled half-tone photographer. After this exposure has continued a desired length of time, the frame B is turned to bring the coarser screen into position and the exposure continued until completed. While

the frame B is being turned between the initial and final exposures, the tube of the camera is preferably closed by the usual cap, not shown.

I claim:—

1. In a camera, the combination of a
70 screen-holding frame, means for securing screens to different sides thereof, a handle applied to said frame for turning the same, stops which define the positions of said
75 frame correspondingly to operative positions of said screens, respectively, locking means for securing said frame against rotation, and means controlled by the initial rotation of said handle for releasing said lock-
80 ing means, substantially as described.

2. In a camera, the combination of a screen-holding frame, means for securing
85 screens to different sides thereof, a handle for turning said frame, the connection between said handle and frame being constructed and arranged for permitting limited rotation of said handle and frame relative to each other, a stop plate secured to rotate with said frame, a pin which pro-
90 jects into the path of travel of rigid parts of said plate and defines the extreme positions of said frame corresponding to operative positions of the screens secured thereto, respectively, a pivoted locking pawl adapted
95 for engagement with rigid parts of said stop plate when said frame is in its extreme positions, means for maintaining said locking pawl yieldingly in operative position, and means controlled by rotation of the
100 frame operating handle relative to said frame for disengaging said locking pawl from said stop plate, and means for securing said handle against rotation when in its extreme positions, substantially as described.
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3. In a camera, the combination of a screen-holding frame, means for securing
110 screens to different sides thereof, means for turning said frame to bring different screens into operative position, means for imparting bodily movement to said frame toward and from the plate holder of the camera, and means to prevent turning of said frame when in proximity to said plate holder, substantially as described.
115

4. In a camera, the combination of a rotatable screen-holding frame, means for securing screens to different sides thereof, whereby turning said frame will bring different screens into operative position, and a
120 shutter for covering the inoperative screen, substantially as described.

5. In a camera, the combination of a rotatable screen-holding frame, means for securing screens to different sides thereof,
125 whereby turning said frame will bring different screens into operative position, a shutter and means for operating said shutter to cause it to cover the inoperative screen, substantially as described.

6. In a camera, the combination of a rotatable screen-holding frame, means for securing screens to different sides thereof, whereby turning said frame will bring different screens into operative position, a shutter, and means controlled by turning said frame for imparting movement to said shutter to cause it to cover the inoperative screen, substantially as described.
- 10 7. In a camera, the combination of a rotatable screen-holding frame, means for securing screens to different sides thereof, means for turning said frame to bring dif-

ferent screens into operative position, and means for locking said frame in different positions corresponding to operative positions of said screens respectively, substantially as described.

In testimony that I claim the foregoing as my invention, I affix my signature in the presence of two subscribing witnesses this 24 day of April, 1914.

FRANK J. WENDE.

Witnesses:

A. H. GUNGGOLL,
ALEX. D. KING, Jr.