

PATENT SPECIFICATION

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(19)



(54) PHOTOGRAPHIC APPARATUS

(71) We, POLAROID CORPORATION, a corporation organised under the laws of the State of Delaware, United States of America, of 730, Main Street, Cambridge, Massachusetts, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

Photographic apparatus for use with film units of the self-developing type are generally provided with film-advancing apparatus which may be driven by a source of energy, e.g., a battery-operated motor, or may be driven manually. While film-advancing apparatus of the former type may have certain advantages over manually operated film-advancing apparatus, they also have numerous disadvantages, e.g., a dependence upon a source of energy which may drop to a level whereat it can no longer operate the film-advancing apparatus, thereby possibly resulting in the photographer being unable to expose and process all of the film units located within the photographic apparatus; also, their relative complexity and attendant higher costs place them at an economic disadvantage relative to manually operated film-advancing apparatus. Although photographic apparatus having manually operated film-advancing apparatus obviate the above disadvantages, the state of the art is such that there is a need for a manually operated film-advancing system which will completely process an exposed film unit in response to a single act by the photographer. Generally, the manually operated film-advancing systems presently available require the photographer to perform a series of acts in order to move an exposed film unit out of its exposure position and through a pair of pressure-applying rollers.

Photographic apparatus according to the

present invention includes: means for locating a film unit in position for exposure; means for exposing a film unit in the exposure position through an exposure aperture in the apparatus; film-advancing means adapted to engage a film unit in the exposure position and to initiate movement of the film unit out of the exposure position; pressure-applying means in the path of a film unit advanced by the film-advancing means, for engaging the leading end of a film unit advanced by the film-advancing means and for applying pressure to the film unit as its advancement continues, the pressure-applying means serving to spread over the film unit any processing liquid that has been deposited thereon; manually operable means arranged co-operatively to drive the film-advancing means and the pressure-applying means; and means preventing movement of an unexposed film unit by the film-advancing means but responsive to operation of the exposing means to permit such movement after exposure of the film unit has taken place.

In the preferred form of apparatus embodying the invention, the manually operable means includes a crank rotatably mounted on an external wall of a camera. The crank is connected to drive a roller of a pair of rollers constituting the pressure-applying means, one revolution of the crank causing a roller rotation for a period of time sufficient to completely advance a film unit through the bite of the rollers. In this preferred form, the film-advancing apparatus includes a film engaging member which is reciprocated by means of a pin mounted on a gear wheel rotated by the crank. Means are provided for engaging the crank after each rotation to prevent a further rotation of the crank until the exposing means is again actuated. This disengaging means may include a pivotally mounted stop which initially engages a land on the crank but

which can be pivoted, by actuation of a shutter-release button, to an inoperative position

5 This preferred apparatus is particularly intended for use with a film cassette containing a number of stacked film units and having an exposure opening to permit exposure of the foremost film unit of the stack, a further opening to permit the film-advancing means to engage this foremost film unit, and a slot with which the first film unit is aligned to permit removal of the film unit from the cassette. Each film unit includes at its leading end a rupturable container of processing liquid. As the crank is rotated, the film-advancing means engages and initiates a movement of the foremost film unit through the slot and into the bite of the pressure-applying rollers. The rollers continue to advance the exposed film unit away from its exposure position at a rate at least equal to the rate of advance of the film-advancing means, thereby preventing buckling of the exposed film unit as it enters the bite of the rollers. The rollers rupture the container of processing liquid and spread its contents across a photo-sensitive element of the exposed film unit to initiate a diffusion transfer process.

30 The exit slot of the cassette is preferably provided with a flexible light seal which can be deflected by the leading end of the advancing film unit. Preferably, this also functions as a means for releasably retaining the film unit after it has moved out of engagement with the rollers.

A cam may be driven by the manually operable means to re-cock the shutter during each revolution of the crank.

40 In order that the invention may be better understood, one example of apparatus embodying the invention will now be described with reference to the accompanying drawings, in which:—

45 Figure 1 is a perspective view, partly in section of photographic apparatus embodying the invention;

Figure 2 is an elevational view taken generally along the line 2—2 of Figure 1, and

50 Figure 3 is an enlarged exploded view, in perspective, of components of the apparatus of Figures 1 and 2.

In Figure 1, a camera 10 of the self-developing type includes a housing defined by a top wall 12, depending side walls 14, 16, 18 and 20, and a bottom wall 22 which is pivotally connected to side wall 16 by a piano-type hinge 24 and which functions as a loading door. Extending upwardly from top wall 12 are a conventional rangefinder and/or viewfinder 26 and a shutter release button 28. Wall 14 is formed with a pair of spaced, outwardly directed flanges 30 and 32 (see Fig. 2) which extend substantially

from wall 18 to wall 20 to define an exit slot 34 through which a film unit may leave the camera. An elongate strip 36 of resilient opaque material is attached at one end to an interior surface of wall 14 and has its free end 38 in engagement with flange 34. Resilient strip 36 extends across the entire length of slot 34 to prevent light from entering the interior of the camera via the slot 34. Wall 14 further includes an opening 40 for receiving a lens and shutter assembly 42.

Camera 10 is adapted to receive a film assemblage including a cassette 44 having therein a plurality of thin, discrete and flexible film units 46 (only two being shown) and a resilient pressure plate 48. The film assemblage is located in position for exposure of the foremost film unit by an angle bracket 50 and spring 52 mounted on the interior surface of wall 22, spring 52 urging the film assemblage against support members 54 and 56. Cassette 44 includes a forward wall 58 having an exposure aperture 60, and an opening 62 (see Figure 1) therein for receiving a film engaging member as will be more fully explained hereinafter. A leading end wall 64 of the cassette has an exit opening 66 therein which is dimensioned to allow the passage therethrough of a single film unit as it is advanced into the bite of a pair of pressure-applying members 68 and 70, herein shown as a pair of rollers.

The camera is provided with a manually operable film-advancing apparatus for moving a film unit, subsequent to exposure, from the cassette 44, through the rollers 68 and 70, and out of exit slot 34 in the camera. Specifically, the film-advancing apparatus includes the pair of rollers 68 and 70, manually operable means in the form of a crank 72 coupled to roller 68 by a drive gear 74 and a driven gear 76 fixedly attached to one end of roller 68, and the film-advancing means 78. Crank 72 is pivotally connected to an exterior surface of wall 18 by a shaft 80 which extends through an opening 82 in wall 18. Shaft 80 includes a portion 84 which is adapted to receive a collar 86 having a set screw 88 for securing crank 72 against movement away from wall 18. Shaft 80 also includes a portion 90 of reduced diameter which extends through (1) an opening 92 in a support plate 94, (2) an opening 96 in drive gear 74, (3) an opening 98 in a plate 100, and (4) through an opening 102 in a cam 104. Mounted adjacent to and in contact with the peripheral surface of cam 104 is one end 106 of a shutter recocking arm (only a portion being shown) which is pivotally secured intermediate its ends to the camera and has its other end connected to the blades of the lens and shutter assembly 42 such that upward and downward movement of end 106 moves the shutter blades into a cocked position. From the foregoing it can be seen

that counterclockwise rotation (as viewed in Figure 3) of crank 72 will rotate drive gear 74 and cam 104 in a similar direction. Rotation of drive gear 74 in the manner described is transferred to roller 68 via gear 76, mounted on a shaft 69, to rotate roller 68 in a clockwise direction. Rotation of cam 104 in the manner described is effective to rock end 106 of the shutter recocking arm (end 106 being in engagement with portion 108 of cam 106 at the start of the cycle) to recock the blades of the shutter

Counterclockwise rotation of crank 72 (as viewed in Fig. 3) is also effective to move a film-advancing means 78 toward the rollers 68 and 70. As shown in Fig. 3, film-advancing means 78 includes an elongate support member 110 mounted on a pair of fixed support brackets 112 and 114 for reciprocating movement via a slot and rivet arrangement 116, 118, 116' and 118'. A film-engaging member 120 is pivotally coupled to one end of support member 110 by a rivet 122 extending through holes 124 and 126 in the film-engaging member and support member. The film-engaging member is biased in a clockwise direction by a spring 128 located on the shaft of rivet 122. The spring includes a first end 130 attached to support member 110 and a second end 132 attached to one end of a pin 134 extending through film-engaging member 120. The other end of pin 134 rides in a slot 131 in support member 110 for limiting rotation of film-engaging member in a clockwise direction. Film-engaging member 120 includes a first portion 136 which is adapted to engage a top surface of a film unit and a second portion 138 which is adapted to engage the film unit along its trailing end. The distance between the end of portion 138 and portion 136 is such that the film-engaging member can engage only one film unit, i.e., the foremost film unit, at a time. The other end of elongate support member 110 is provided with a recess 140 for receiving a pin 142 mounted on a face of drive gear 74.

At the start of each cycle, pin 142 is located in recess 140. Initial rotation of crank 72 in a counterclockwise manner (as viewed in Fig. 3) rotates gear 74 and pin 142 in a similar manner thereby moving elongated support member 110 and film-engaging member 120 to the left (as viewed in Fig. 3) to advance the foremost film unit 46 into the bite of rollers 68 and 70. After pin 142 has been rotated through a predetermined angle, it leaves recess 140 thereby allowing the film-advancing means 78 to be returned to its original position (as shown in Figure 1) by a spring 144 having one end attached to a lug 146 on plate 94 and its other end attached to rivet 118. As gear 74 completes one revolution, pin 142 moves

back into recess 140 in preparation for the next cycle.

Crank 72 is provided with means for initially preventing rotation of the crank in the wrong direction, i.e., in a clockwise direction as viewed in Fig. 3. These means take the form of a stop 148 pivotally secured to wall 94 by rivet 150 and having suitable means such as a spring 152 and stop pin 154 (see Figure 1) for resiliently biasing stop 148 in a clockwise direction into the position shown in Figure 1. Stop 154 includes an outwardly turned flange 156 which is positioned to engage a bottom surface of an arm 158 extending from collar 86 to prevent counterclockwise rotation of crank 72 from the position shown in Figure 1. From an inspection of Figure 1 it can be seen that stop 148 does not prevent clockwise rotation of crank 72, i.e., as crank 72 approaches the completion of one revolution in a clockwise direction, arm 158 rotates into engagement with the face of flange 156 and cams it and stop 148 in a counterclockwise direction against the bias of spring 152 until arm 158 reaches a substantially horizontal position wherein stop 148 moves back under arm 158. Alternatively, stop 148 and arm 158 could be replaced by a conventional one-way clutch which would prevent rotation of crank 72 in a counterclockwise direction, as viewed in Figure 1.

The photographic apparatus further includes disengabling means movable from a first position in which it prevents rotation of crank 72 in a direction to advance a film unit from the cassette and a second position wherein the crank may be rotated. The disengabling means includes first and second levers 160 and 162 pivotally attached to opposite sides of wall 18 by a rivet 164 such that movement of arm 162 will produce a similar movement of arm 160. Stated another way, rivet 164 couples arms 160 and 162 together for movement between a first operative position, shown in solid lines in Fig. 3, wherein a flange 166 on arm 160 is in position to engage a land 168 on crank 72 to prevent rotation of crank 72 in a direction to move a film unit out of the cassette 44, and a second inoperative position, shown in broken lines in Fig. 3, wherein flange 166 is in alignment with a groove 170 in crank 72 and may be rotated to advance the film unit. A spring 172 is attached at one end to arm 162 and at its other end to wall 18 for biasing the disengabling means toward the inoperative position. Spring 172 functions as a means responsive to actuation of the shutter release button 28 for moving the disengabling means to the broken line position. When crank 72 is located in a horizontal position, as shown in Figures 1 and 3, arms 160 and 162 are held in the solid line position by the engagement between arm 162 and a tab 174

extending outwardly from a plate 176. Plate 176 is pivotally connected to support plate 94 by rivet 178. Plate 176 is biased in a clockwise direction, as viewed in Figure 1, by a spring 180 having one end attached to plate 176 at 182 and its other end attached at 184 to support plate 94, but is maintained in the position shown by a latch 186. Latch 186 is pivotally mounted on support plate 94 by a rivet 188 and is biased in a counter-clockwise direction (as viewed in Figure 1) by a spring 190 having one end attached to an upwardly extending arm 192 and its other end attached at 184 to support plate 94. Latch 186 includes a first end 194 which is adapted to be positioned within a recess 196 in plate 176 for preventing clockwise rotation of plate 176 under the influence of spring 180, and a second end 198 positioned for engagement with a shutter release arm 200. With reference to Figure 1, it can be seen that downward movement of shutter release button 28 moves the shutter release arm 200 downwardly to actuate the shutter and expose the foremost film unit. Downward movement of shutter release arm 200 moves it into engagement with end 198 of latch 186 to pivot the latter in a clockwise manner. Rotation of latch 186 in the manner just described moves end 194 of latch 186 out of recess 196 thereby allowing spring 180 to pivot plate 176 in a clockwise manner (as viewed in Figure 1), arm 162, under the bias of spring 172, follows tab 174 until flange 166 on arm 160 moves to the broken line position shown in Fig. 3, i.e., flange 166 is in alignment with recess 170. At this point, a pin 202, mounted in a slot 204, in support plate 94 and attached at 206 to plate 176, bottoms out in the slot 204. After crank 76 has been rotated in a clockwise manner, as viewed in Figure 1, a number of degrees sufficient for flange 166 to pass through recess 170, the arm 160 is automatically moved back into its operative position, i.e., the solid line position wherein flange 166 will engage land 168 as the crank reaches the end of one complete revolution. The structure for moving arm 160 back to the solid line position includes a pin 208 extending outwardly from one face of drive gear 74. As crank 72 rotates gear 74, pin 208 is rotated into engagement with pin 202. Further rotation of gear 74 results in pin 208 moving pin 202 and its attached plate in a clockwise manner, as seen in Fig. 3, until end 194 of latch 186 enters the recess 196 in plate 176. During this movement tab 174 moves the arm 162 and arm 160 back into the solid line positions.

Operation

At the beginning of each exposure cycle, the various parts of the camera are in the

positions shown in Figure 1, and a foremost film unit 46, which may be of the type shown and described in U. S. Patent No. 3,415,644, is located in position for exposure with its trailing end located adjacent the film-engaging member 120 and its leading end in alignment with exit opening 66. Depression of shutter release button 28 moves shutter release arm 200 downwardly to release the blades of the shutter and expose the foremost film unit 46 via light reflected by a mirror 210. It will be noted that prior to actuation of the shutter release button 28 the crank 72 could not be rotated because of the interference set up by arm 148 and the flange 166 on arm 160. As shutter release arm 200 moves downwardly, it engages end 198 of latch 186 and pivots it in a clockwise direction, as viewed in Figure 1, thereby moving end 194 of latch 186 out of recess 196 in plate 176. Once end 194 has been moved out of recess 196, spring 180 pivots plate 176 in a clockwise manner. This latter movement of plate 176 allows arms 160 and 162 to be pivoted to the broken line position, i.e., their inoperative position, under the influence of spring 172 thereby moving flange 166 on arm 160 out of latching engagement with land 168 and into alignment with recess 170 to allow rotation of crank 72 in a clockwise manner, as viewed in Figure 1. The crank 72 is then rotated, as described, to simultaneously drive the film-advancing means 78 and the roller 68. As the drive of crank 72 is transmitted to the film-advancing means via the aforementioned cooperation between pin 142 on the rotating drive gear 74 and recess 140, film-engaging member 120 drivingly engages the trailing end of the exposed film unit and advances it, leading end first, through exit opening 66 in cassette 44 and into the bite of rollers 68 and 70.

As noted above, the leading end of the exposed film unit is located in alignment with exit opening 66 and, for that reason, should not be deflected by the engagement of the film-engaging member to a position wherein it is out of alignment with the exit opening. Accordingly, in order to minimize any deflection of the leading end of the exposed film unit, the exposed film unit is engaged at its trailing end.

When the exposed film unit enters the bite of rollers 68 and 70 the rotation of roller 68 is transferred, through the film unit, to roller 70. As the leading end of the exposed film unit enters the bite of the rollers, pin 142 leaves recess 140 and the film-advancing means 78 is returned to its original position by spring 144. The rotating rollers 68 and 70 advance the exposed film unit toward the exterior of the camera while simultaneously rupturing a container of processing liquid 47 attached near the leading end of the film

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unit and spreading the contents thereof across a photosensitive element of the exposed film unit to initiate a diffusion transfer process. The gear ratio between gears 74 and 76 and the diameter of rollers 68 and 70 are selected such that the rollers 68 and 70 will advance the exposed film unit at a rate at least equal to that at which it was previously being advanced by the film-advancing means 78 thereby preventing any buckling of the film unit between the time that the leading end of the film unit enters the bite of rollers 68 and 70 and when the trailing end moves out of engagement with the film-advancing means 78. Upon leaving the bite of the rollers, the leading end of the film unit engages the opaque strip of resilient material 38 and deflects it upwardly as the film unit moves through exit slot 34. Strip 34 cooperates with flange 32 to releasably hold the film unit near its trailing end, after it moves out of engagement with the rollers 68 and 70, until the photographer is ready to remove it. During the advancement of the exposed film unit by the rollers 68 and 70, pin 208 on drive gear 74 is rotated into engagement with pin 202 to rotate plate 176 in a counterclockwise direction, against the bias of spring 180, until end 194 of latch 186 enters recess 196. The rotation of plate 176 is transferred to arm 162 via flange 174 to move the arms 162 and 160 back into the solid line position wherein flange 166 on arm 160 will be located in position to engage the land 168 on crank 72 as the latter reaches the end of one complete revolution. Also, the above described rotation of the crank is transferred by cam 104 to shutter recocking arm 106 thereby recocking the shutter. The recocking arm 106 is pivoted upwardly until the arm reaches the high point 109 on the cam. Thereafter, the high point 109 is rotated out of engagement with the recocking arm 106 and the latter, under the bias of a spring, drops downwardly onto portion 108 of cam 104 and the shutter is now ready for another exposure. During the end of the cycle, i.e., as crank 72 approaches the end of one complete revolution, arm 158 engages the flange 156 on arm 148 and cams the latter in a counterclockwise direction (as viewed in Figure 1) until arm 158 has reached a position in which arm 148 can return to the position shown in Figure 1. In this latter position, rotation of crank 72 in a counterclockwise direction is prevented by the engagement between arm 158 and the top edge of flange 156, and clockwise rotation of crank 72 is prevented by the engagement between flange 166 and land 168. Once disabled, crank 72 cannot be rotated to advance the next film unit from the cassette until flange 166 moves into alignment with recess 170 in response to actuation of the shutter release button.

From the foregoing it can be seen that there has been disclosed a manually operable, film-advancing apparatus for use with cameras of the self-developing type. The structural cooperation between the various parts of the apparatus is such that the simple act of rotating a hand crank, subsequent to photographically exposing a film unit, is all that is required to deliver the exposed film unit to the photographer in a condition wherein no further physical operations are necessary in order for the photograph to be viewed within a relatively short period of time, e.g., one minute. The operation of the film-advancing apparatus is substantially foolproof in that the crank cannot be rotated until the foremost film unit in the cassette has been exposed, thereby obviating the possibility of advancing a non-exposed film unit from the camera, and, after the exposed film unit has been advanced to the exterior of the camera, the crank is disabled before it can advance a second film unit out of its exposure position. Rotation of the crank through one cycle, i.e., one revolution, is effective to (1) drive the film-advancing means, (2) drive at least one roller of the pressure-applying means, (3) recock the camera's shutter, and (4) move a disabling means into position to limit rotation of the crank to one cycle per exposure.

WHAT WE CLAIM IS:—

1. Photographic apparatus including: means for locating a film unit in position for exposure; means for exposing a film unit in the exposure position through an exposure aperture in the apparatus; film-advancing means adapted to engage a film unit in the exposure position and to initiate movement of the film unit out of the exposure position; pressure-applying means in the path of a film unit advanced by the film-advancing means, for engaging the leading end of a film unit advanced by the film-advancing means and for applying pressure to the film unit as its advancement continues, the pressure-applying means serving to spread over the film unit any processing liquid that has been deposited thereon; manually operable means arranged co-operatively to drive the film-advancing means and the pressure-applying means; and means preventing movement of an unexposed film unit by the film-advancing means but responsive to operation of the exposing means to permit such movement after exposure of the film unit has taken place.

2. Photographic apparatus in accordance with claim 1, in which the means for preventing movement of an unexposed film unit comprises disabling means mounted to engage the manually operable means after each operation of the manually operable means and to prevent a further operation

unit and spreading the contents thereof across a photosensitive element of the exposed film unit to initiate a diffusion transfer process. The gear ratio between gears 74 and 76 and the diameter of rollers 68 and 70 are selected such that the rollers 68 and 70 will advance the exposed film unit at a rate at least equal to that at which it was previously being advanced by the film-advancing means 78 thereby preventing any buckling of the film unit between the time that the leading end of the film unit enters the bite of rollers 68 and 70 and when the trailing end moves out of engagement with the film-advancing means 78. Upon leaving the bite of the rollers, the leading end of the film unit engages the opaque strip of resilient material 38 and deflects it upwardly as the film unit moves through exit slot 34. Strip 34 cooperates with flange 32 to releasably hold the film unit near its trailing end, after it moves out of engagement with the rollers 68 and 70, until the photographer is ready to remove it. During the advancement of the exposed film unit by the rollers 68 and 70, pin 208 on drive gear 74 is rotated into engagement with pin 202 to rotate plate 176 in a counterclockwise direction, against the bias of spring 180, until end 194 of latch 186 enters recess 196. The rotation of plate 176 is transferred to arm 162 via flange 174 to move the arms 162 and 160 back into the solid line position wherein flange 166 on arm 160 will be located in position to engage the land 168 on crank 72 as the latter reaches the end of one complete revolution. Also, the above described rotation of the crank is transferred by cam 104 to shutter recocking arm 106 thereby recocking the shutter. The recocking arm 106 is pivoted upwardly until the arm reaches the high point 109 on the cam. Thereafter, the high point 109 is rotated out of engagement with the recocking arm 106 and the latter, under the bias of a spring, drops downwardly onto portion 108 of cam 104 and the shutter is now ready for another exposure. During the end of the cycle, i.e., as crank 72 approaches the end of one complete revolution, arm 158 engages the flange 156 on arm 148 and cams the latter in a counterclockwise direction (as viewed in Figure 1) until arm 158 has reached a position in which arm 148 can return to the position shown in Figure 1. In this latter position, rotation of crank 72 in a counterclockwise direction is prevented by the engagement between arm 158 and the top edge of flange 156, and clockwise rotation of crank 72 is prevented by the engagement between flange 166 and land 168. Once disenabled, crank 72 cannot be rotated to advance the next film unit from the cassette until flange 166 moves into alignment with recess 170 in response to actuation of the shutter release button.

From the foregoing it can be seen that there has been disclosed a manually operable, film-advancing apparatus for use with cameras of the self-developing type. The structural cooperation between the various parts of the apparatus is such that the simple act of rotating a hand crank, subsequent to photographically exposing a film unit, is all that is required to deliver the exposed film unit to the photographer in a condition wherein no further physical operations are necessary in order for the photograph to be viewed within a relatively short period of time, e.g., one minute. The operation of the film-advancing apparatus is substantially foolproof in that the crank cannot be rotated until the foremost film unit in the cassette has been exposed, thereby obviating the possibility of advancing a non-exposed film unit from the camera, and, after the exposed film unit has been advanced to the exterior of the camera, the crank is disenabled before it can advance a second film unit out of its exposure position. Rotation of the crank through one cycle, i.e., one revolution, is effective to (1) drive the film-advancing means, (2) drive at least one roller of the pressure-applying means, (3) recock the camera's shutter, and (4) move a disenabling means into position to limit rotation of the crank to one cycle per exposure.

WHAT WE CLAIM IS:—

1. Photographic apparatus including: means for locating a film unit in position for exposure; means for exposing a film unit in the exposure position through an exposure aperture in the apparatus; film-advancing means adapted to engage a film unit in the exposure position and to initiate movement of the film unit out of the exposure position; pressure-applying means in the path of a film unit advanced by the film-advancing means, for engaging the leading end of a film unit advanced by the film-advancing means and for applying pressure to the film unit as its advancement continues, the pressure-applying means serving to spread over the film unit any processing liquid that has been deposited thereon; manually operable means arranged co-operatively to drive the film-advancing means and the pressure-applying means; and means preventing movement of an unexposed film unit by the film-advancing means but responsive to operation of the exposing means to permit such movement after exposure of the film unit has taken place.

2. Photographic apparatus in accordance with claim 1, in which the means for preventing movement of an unexposed film unit comprises disenabling means mounted to engage the manually operable means after each operation of the manually operable means and to prevent a further operation



thereof until the exposing means is actuated again.

3. Photographic apparatus in accordance with claim 2, in which the manually operable means includes a crank and the disabling means is mounted for movement into the path of rotation of the crank to limit its rotation.

4. Apparatus in accordance with claim 2, in which the disabling means is movable between first and second positions, in the first of which it prevents operation of the manually operable means and in the second of which it permits such operation, the disabling means being moved from its first to its second position in response to operation of the exposing means.

5. Apparatus in accordance with any one of claims 1—4, in which the manually operable means includes a rotatable device having thereon means movable into and out of driving engagement with the film-advancing means during each revolution of the rotatable device, the movable means being movable out of driving engagement with the film-advancing means when the film unit is in engagement with the pressure-applying means.

6. Apparatus in accordance with any one of the preceding claims, including means engageable with the exposing means and responsive to actuation of the manually operable means to cock a photographic shutter forming part of the exposing means subsequent to exposure of the film unit, the cocking means including a cam mounted for rotation by the manually operable means.

7. Apparatus in accordance with any one of the preceding claims, in which the manually operable means is rotatable, the apparatus further including a device for preventing rotation of the manually operable means in a sense opposite to that required to advance the film unit out of the exposure position.

8. Apparatus in accordance with any one of the preceding claims, in which the pressure-applying means is a pair of rollers, one of which is driven by the manually operable means.

9. Photographic apparatus in accordance with any one of claims 1—8, in combination with a cassette containing a number of stacked film units and having an exposure opening to permit exposure of the first film unit, an opening to permit the film-advancing means to engage the first film unit and a slot with which the first film unit is aligned to permit removal of the film unit from the cassette, the cassette being so positioned in the apparatus that the foremost film unit is in position for exposure by the exposing means, and each film unit including at its leading end a rupturable container of processing liquid.

10. Photographic apparatus in accordance with claim 1, substantially as herein described with reference to the accompanying drawings.

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