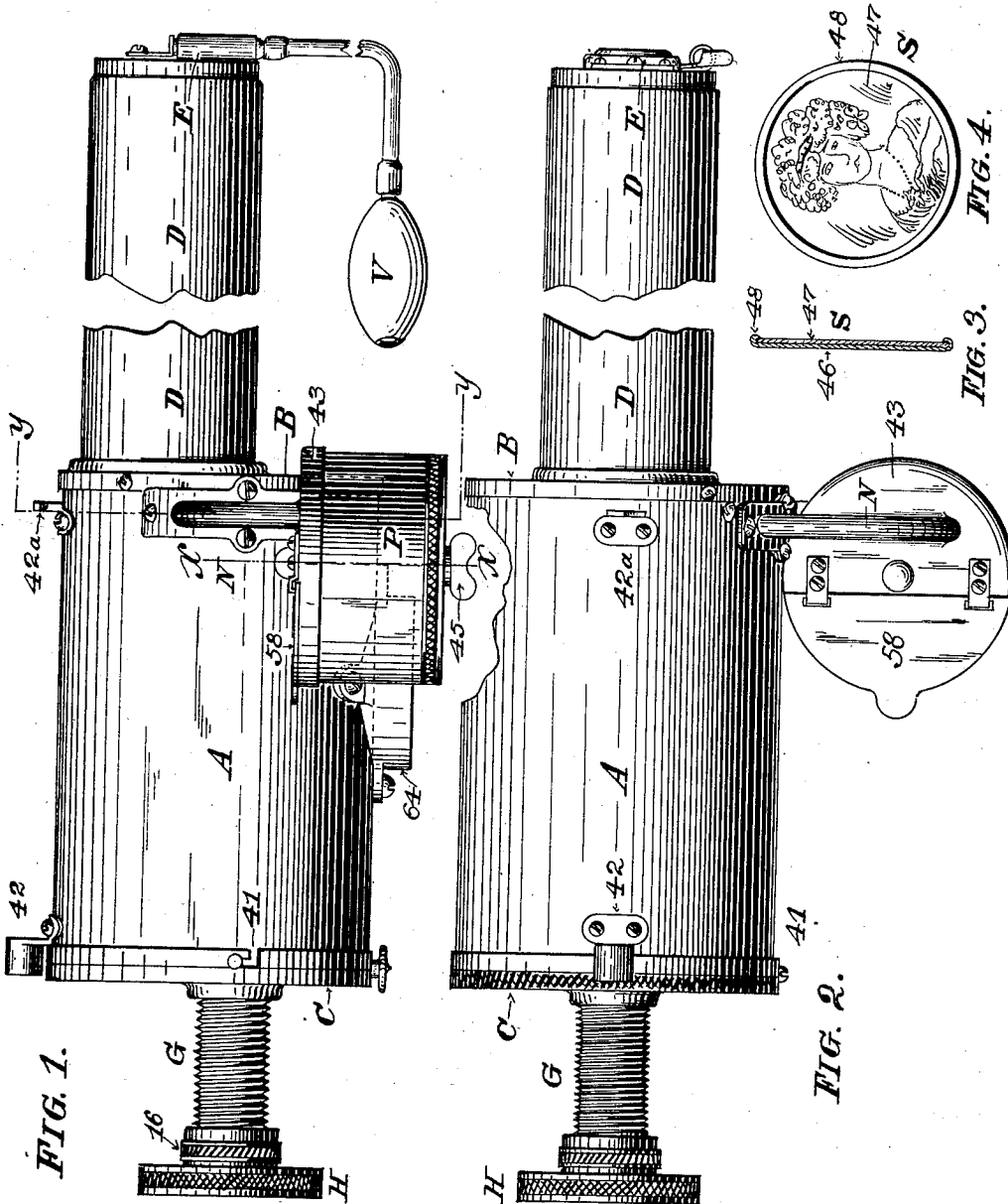


P. F. SPERY.
MAGAZINE DEVELOPING CAMERA.
APPLICATION FILED JAN. 14, 1911.

1,003,534.

Patented Sept. 19, 1911.

3 SHEETS—SHEET 1.



Witnesses:

C. R. Knudsen
A. S. Peterson

Inventor:

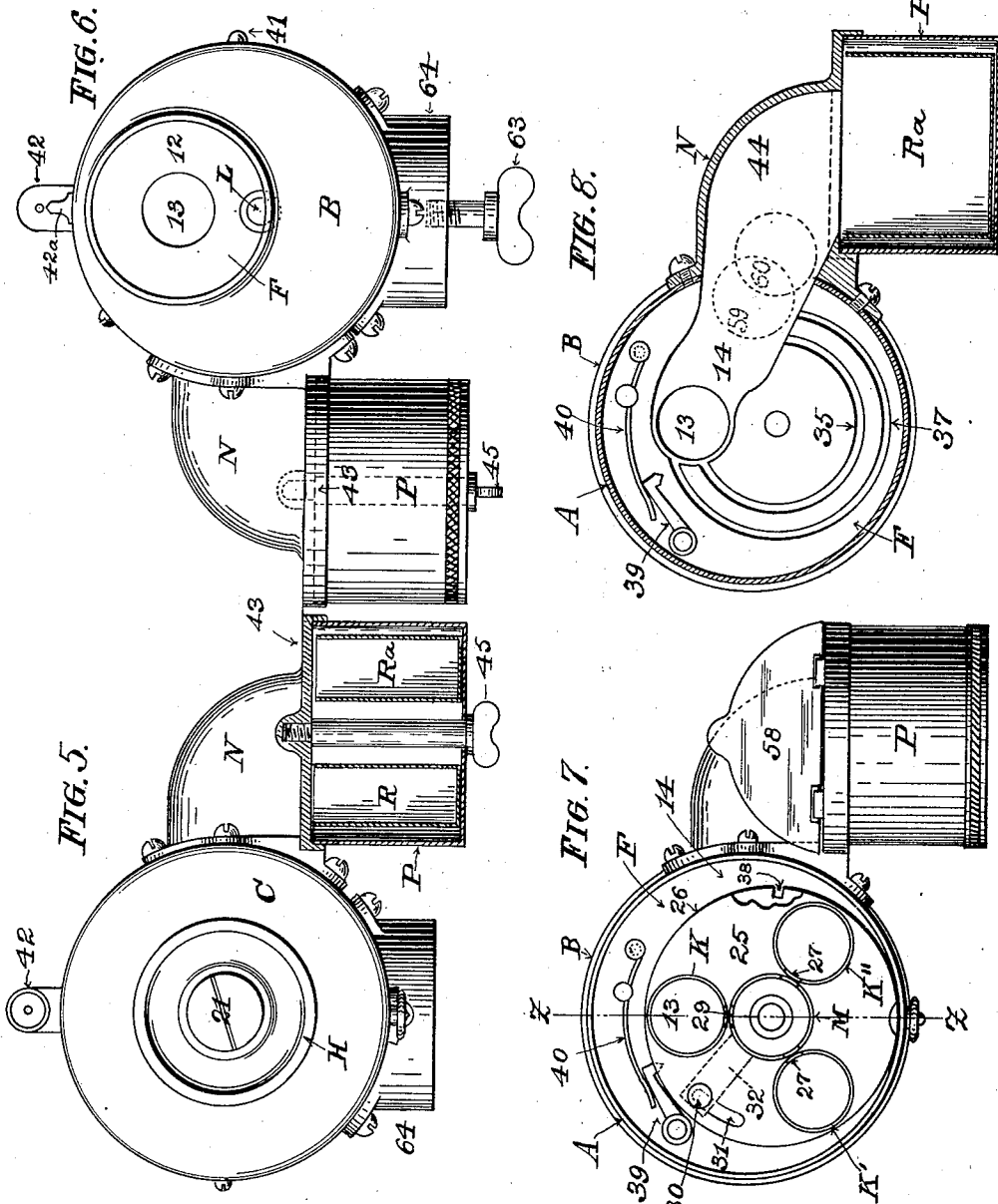
PHILMORE F. SPERY,
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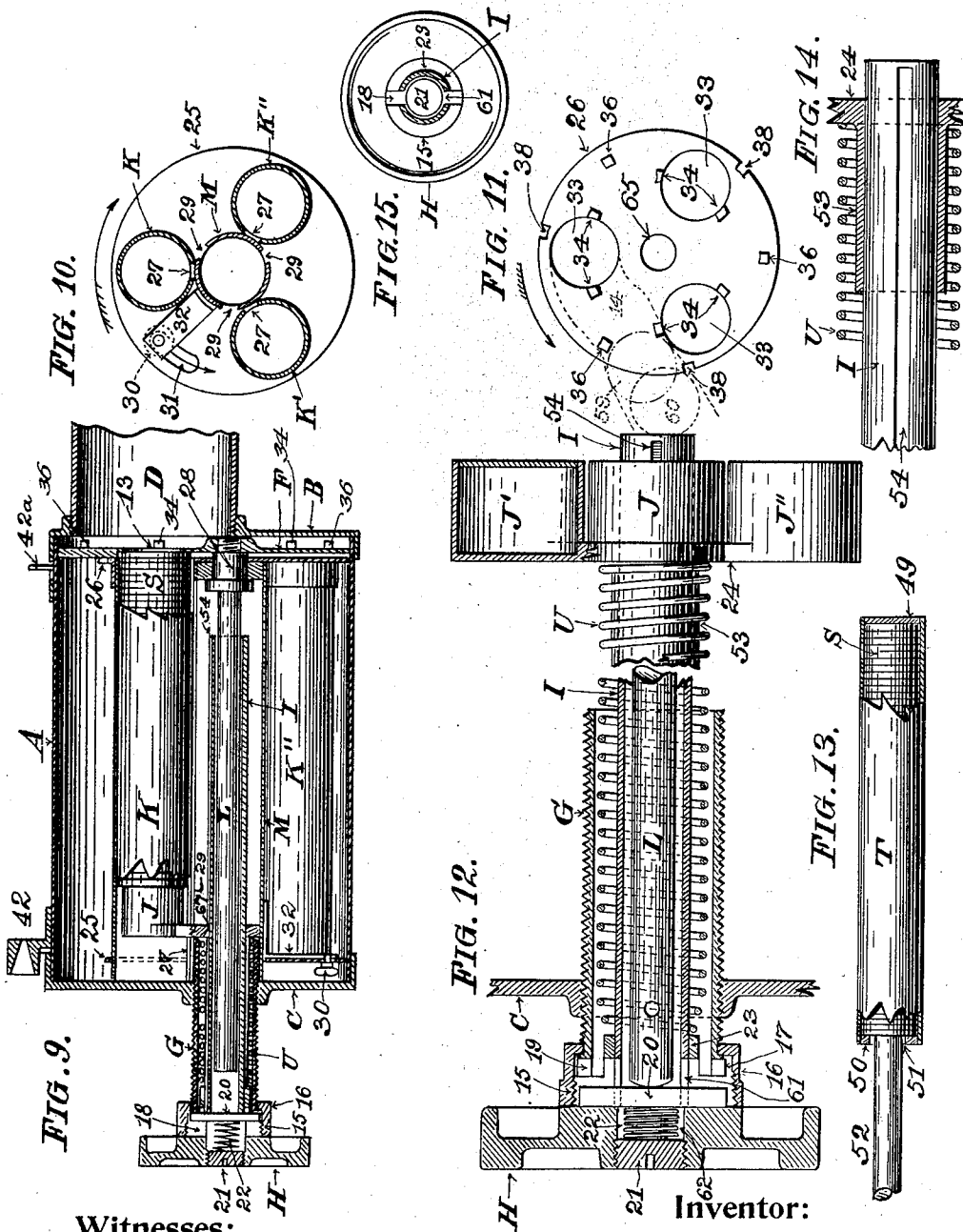
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3 SHEETS—SHEET 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

PHILMORE F. SPERY, OF CHICAGO, ILLINOIS.

MAGAZINE DEVELOPING-CAMERA.

1,003,534.

Specification of Letters Patent. Patented Sept. 19, 1911.

Application filed January 14, 1911. Serial No. 602,619.

To all whom it may concern:

Be it known that I, PHILMORE F. SPERY, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Magazine Developing-Cameras; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying three sheets of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which said invention appertains to make and use the same.

This invention has general reference to magazine developing cameras; and its object is the production of an efficient serviceable, and comparatively light camera in which there are stored a large number of photographic plates, and to which there is attached a developing and fixing bath, so that the exposed plates may be developed and fixed as soon as the plates have been exposed, without touching the plates until after they have been fixed.

To accomplish these desirable results, this invention consists, essentially, in the novel and peculiar combination of parts and details of construction, as hereinafter first fully set forth and described, and then pointed out in the claims.

In the drawings already mentioned, which serve to illustrate this invention more fully, Figure 1 is a side elevation of this improved camera. Fig. 2 is a plan of the same. Fig. 3 is a sectional view of one of the finished photographs. Fig. 4 is a face view of the same. Fig. 5 is a rear end view, the developing and fixing bath being in section on line *xx* of Fig. 1. Fig. 6 is a front end view, the lens tube being removed. Fig. 7 is an end view, the rear head with the three pistons being removed and the base of the camera omitted. Fig. 8 is a sectional view on line *xx* of Fig. 1, all the interior parts of the camera being removed. Fig. 9 is a longitudinal sectional elevation on line *zz* of Fig. 7. Fig. 10 a sectional view of the magazine tubes and one of the cylinder heads, the section being on line *yy* of Fig. 1. Fig. 11 is a face view of the forward cylinder head. Fig. 12 is a sectional plan showing the mechanism by which the three pistons are rotated and longitudinally

55 moved, the figure being drawn on a slightly magnified scale. Fig. 13 a plan, partly in section, of one of the cartridges containing the unexposed light-sensitive plates. Fig. 14 is a detail sectional view of a portion of the tubular piston rod and the spider located thereon. Fig. 15 is a rear view of the hand wheel, a portion of the tubular piston rod located therein being in section.

Like characters and symbols of reference indicate the same parts in all the various 65 figures.

The main portion or body of this camera comprises a cylindrical, preferably metallic shell A, closed at its forward end by a, preferably fixed, head B, and at its rear end by a removable head C. In this front head B there is an internally screw-threaded opening 12, wherewith engages a lens tube D, carrying at its forward end a suitable photographic lens and shutter operating mechanism E, of any approved construction, the length of the lens tube being determined by the back focus of said lens.

In the interior of the shell or casing A, there is located a partition, wall, or diaphragm F, in which there is an opening 13, in axial line with the center line of the lens tube D; and in the inner face of this diaphragm there is a curved downwardly-leading recess or depression 14, forming a chute, 85 as hereinafter more fully described.

The rear head of the casing A is bored and internally screw-threaded to receive a correspondingly screw-threaded tubular sleeve G, said sleeve being connected to a hand-wheel H, in the following manner: On the back of the circular disk H there is formed an externally screw-threaded tubular boss 15, best shown in Figs. 12 and 15, and upon this boss is located a coupling nut 16, which 95 engages a collar or shoulder 17, on the sleeve G, in rotative relation. In the wall of the tubular boss 15 there are oppositely located notches 18, Figs. 9 and 15; and in the end of the tubular sleeve G in the collar or shoulder thereof, there are similar notches 19, Fig. 12, a, preferably cylindrical, bar 20, located in either one or the other of these notches, being employed to connect, and disconnect, the tubular sleeve G and the 105 hand wheel H. The disk H is centrally bored and internally screw-threaded to receive a screw-plug 21, by which a spiral

spring 22, is retained in this central bore, and caused to act upon the bar or key 20 to push the same, in normal position, into the notches 19 at the end of the tubular sleeve G, and thereby connect this sleeve to the disk H. In addition to the central, externally screw-threaded boss 15, the disk H has a smaller tubular boss 23, in which a tubular piston rod I is permanently secured, there being located upon this piston rod I a three-armed spider 24, each arm of which carries at its extremity a cylindrical, preferably hollow, plunger or piston J, J', J'', which pistons are constructed to engage tubular cylinders K, K', K'', secured to cylinder heads 25, 26, located at the ends of these tubes K, K', K'', said tubes K, K', K'', being longitudinally slotted at 27, Fig. 10, to admit the spider arms 24. The forward cylinder head 26 is centrally bored at 65, Fig. 11, for the reception of the shank or journal 28 of a centrally disposed rod L, which rod is in screw-threaded engagement with the diaphragm wall F and permits the magazine cylinder, consisting of the heads 25 and 26 and the tubes K, K', K'', and M, to revolve upon said journal within the camera casing A. In the center of these cylinder heads, and rotatively arranged therein, is a tube M, which tube has three longitudinal slots 29, corresponding in position to those in the magazine tubes K, K', K'', to permit of the passage of the spider arms 24, said tube M being adapted to be rotated by a button 30, the shank of which passes through a slot 31, in the cylinder head 25, into an arm 32, secured to the tube M, for the object hereafter described.

From the outer face of the cylinder head 26 project, at each side of the openings 33 therein, lugs 34, which lugs enter an annular groove 35, in the inner face of the diaphragm F, and further lugs 36, which enter an annular groove 37, concentric with the groove 35, said lugs being constructed to discharge the exposed plates from the magazine tubes into a receiver, as will hereinafter more fully appear. In the periphery of this cylinder head 26 there are three notches 38, and upon the inner face of the diaphragm F there is pivoted a dog 39, acted upon by a spring 40, in such manner as to cause the dog to engage one or the other of these notches 38 when the magazine cylinder is rotated to certain position, the position of this dog with reference to the notches 38 being such that when said dog is in engagement with one of said notches, one of the tubular magazines is in axial alignment with the axial line of the lens tube D.

In order that the casing head C may be readily withdrawn from the casing A, to remove the spider with its plungers for charging the magazine tubes, I prefer to attach this casing head to the casing by a so-called

bayonet catch 41, although other effective and satisfactory means may be employed for this purpose. And in order that the camera may be properly focused so that the object to be photographed may be correctly located upon the photographic plate S, I place upon the rear end of the casing a sight 42, and at the forward end a coacting sight 42^a, which sights are used in the well-known manner, the height of the front sight relative to that of the rear sight being governed by the focal distance from the lens to the object to be photographed.

At the forward end of the casing A, and projecting sidewise therefrom there is a bracket N, which bracket is formed, preferably integral, with an annular, rimmed head 43, said bracket being a hollow body the core of which, 44, forms a continuation of the race-way or chute 14. To this rimmed head 43 there is pivoted a receptacle P, by means of pivotal bolt 45, said receptacle being constructed to receive two rectangular vessels R, R^a, said receptacle P being so located with reference to the chute 44 that one of the tanks R, R^a will be underneath the latter when the other tank is in position to be removed from the receptacle P.

In Fig. 13, I have shown a cylindrical shell T, which, in practice, is of a diameter and length corresponding to the diameter and length of the magazine tubes K. Three of these shells which I denominate cartridges, are required to completely fill the magazine tubes K, and each of these cartridges is so designed as to contain approximately one hundred photographic plates S, so that when the magazines are fully charged, the camera will contain approximately three hundred plates. These plates comprise each a metallic back 46, Figs. 3 and 4, and a light-sensitive plate 47, which latter plate is secured to the metallic back by a peripheral rim 48, thereon overlapping the plate 47. This latter plate may be glass, celluloid, paper, or other suitable material coated with a silver haloid emulsion, which should be what is termed "very fast" so as to be affected in a very short time when exposed to the actinic rays of light. In filling these cartridges with properly prepared plates S, which plates must be carefully guarded against exposure to light, a plug 49, is first tightly forced into one end of the tube T. Then the plates S are dropped into the tube—the light sensitive sides toward the plug 49—until the tube is nearly full, when a closing plug 50 is forced into the other end of said tube. This closing plug 50 has a central opening 51, by which it may be determined which end of the cartridge should be foremost in inserting it into the magazine tube. These cartridges may be temporarily sealed at their punctured end by pasting a paper or other seal over the central opening

in the closing plug; and to discharge the contents of the cartridge into the magazine tubes, the rear casing head C with the spider and the plungers is first removed from the camera casing and then the central tube in the cylinder rotated to close the longitudinal slots 27 in the magazine tubes K to prevent light from entering these tubes while being charged after which the cartridge is pushed into the proper tube K. Now, one end of a rod of suitable diameter, 52, is placed into the central opening 51 in the closing plug and the tube T pulled out of the magazine tube to cause the photo plates to remain in the magazine tube, by pushing at the end of the rod 52 in an obvious manner. After the magazine tubes have been charged, the central tube M is again rotated, but in the reverse direction, to bring the three longitudinal slots 29 therein in coincident position with the longitudinal slots 27 in the magazine tubes K, and then the three plungers J are passed into these latter tubes and the rear end of the camera casing closed by replacing the casing head C.

Between the spider 24 and the end of the tubular boss 23 on the hand wheel H, and surrounding the tubular piston rod I, there is a spiral spring U, which bears at one end upon the end of the boss 23, and at the other end against the spider 24. This spider has a long tubular boss or hub 53 through which the tubular piston rod passes so that the spider may freely move longitudinally upon the said piston rod, but to prevent the spider from rotating on the piston rod, the latter is provided with a longitudinal groove or spline 54, and the hub fitted with a feather 67, Fig. 9, engaging said spline in the well-known manner. In this manner the rotating of the hand wheel causes the rotating of the spider with its plungers and the magazine cylinder, while the spiral spring U causes the lateral movement of the spider and the plungers, as will hereafter more fully appear.

In closing the camera casing by replacing its rear head care must be taken that the tubular sleeve G is first unscrewed until its inner end is approximately flush with the inner surface of the rear casing head. In this position the tubular hub of the spider will be located in the tubular sleeve G, and the spider be close to the end of this sleeve, the spiral spring U being entirely compressed and occupying the bore of the tubular sleeve. In this position there is also one of the magazine tubes in axial line with the axial line of the lens tube, and the dog 39 in engagement with the proper notch 38 in the cylinder head 26.

To make an exposure of a photographic plate the plugs 49 at the forward ends of the magazine tubes must first be ejected from the camera by rotating the hand wheel

one full revolution, the projections 34 and 36 on the front cylinder head forcing the plugs into the chute 14, and passing through the continuation 44 thereof drop into the tanks R, R^a, from which they may be removed by turning the lid 58. Now, only light sensitive plates are within the range of the photographic lens so that after an exposure has been made, the hand wheel H is turned one-third of a revolution to bring the next unexposed plate into the focus of the lens while the first-exposed plate is dropped into the tank R to be developed and fixed, the exposure being made by compressing the bulb V in the usual manner. In its passage from the camera casing, the exposed plate is first pushed into the race-way 14 by the projections 34 on the front cylinder head 26, until it reaches the position indicated in dotted lines in Figs. 8 and 11, and designated by the reference numeral 59, after which the projection 36 takes hold of the plate and pushes it farther down, to the position indicated by the numeral 60, to roll down the inclined chute 44 by gravity. The pitch of the thread on the exterior of the tubular sleeve G is equal to the thickness of the photographic plate S, so that when the hand wheel H, and with it the tubular sleeve G has made one complete revolution, the pistons or plungers J have advanced the thickness of one plate, the spider being pushed forward this distance by the sleeve G, and this movement is continued until the end of the central rod L reaches the clutch-key or rod 20 to push the same out of the notches 19 at the end of the tubular sleeve G into the notches 18 in the boss 15, this position of the respective parts being shown in Fig. 12, thereby disconnecting the tubular sleeve from the hand wheel H, but retaining the connection with the tubular piston rod I, so that while the hand wheel H will continue to rotate the spider with its plungers and through them the magazine cylinder, the longitudinal movement of the spider upon the piston rod I will be effected by the spiral spring U. It will, therefore, be observed that the initial movement of the spider and associated parts is effected by the rotation of the tubular sleeve G, and the remainder of this longitudinal movement caused by the action of the spiral spring U. This part of my invention is an important one for the reason that I am enabled to employ a much shorter spring U than what would otherwise be required to discharge the plates from the magazines; also that I require but one spring for the three magazine tubes; that an approximately uniform pressure is exerted upon the photographic plates S to keep them in close contact one with the other, and that I can considerably shorten the camera casing.

As heretofore stated, the tubular piston rod I is secured to the hand wheel H at the tubular boss 15. This end of the tube I is notched at 61, Fig. 15, to receive the key 20 to permit it to be moved from the notches 19 into the notches 18, and vice versa. I have heretofore also stated that the receptacle P has a hinged cover or lid 58, which lid when closed makes the receptacle light-secure so that an exposed plate will not be injured by actinic rays of light striking its sensitive surface on its passage from the camera casing to the developing and fixing bath. The result is that these exposed plates, and for that matter, all the plates in the magazines are never touched by the fingers of the operator until after they have reached, and been submerged in, the fixing bath. The receptacle P contains two of these baths R, R^a, so that when one tank is under the lid 58, the other tank is underneath the chute 44 ready to receive the next exposed plate, the change from one to the other of these tanks being accomplished by rotating the receptacle P one-half of a revolution.

This camera when in actual use is generally mounted upon a tripod, not shown, to the head of which it is secured by the usual tripod screw 63, Fig. 6, engaging a base 64, secured to the under side of the camera casing A.

In constructing this camera, I prefer to produce many of the parts comprising the same in aluminum, which owing to its lightness combined with ample strength, is especially suited to the purpose of a camera which is usually carried about by the person operating the same. The interior parts thereof I varnish, stain, electro-plate or paint with a jet black, non-reflecting coating of material to prevent reflected rays of light acting upon the sensitive surfaces of the photographic plates.

I have heretofore described with considerable detail the preferred embodiment of my invention, but I desire it to be understood that many of the details described may be varied by persons skilled in the art to which this invention appertains, without departing from the scope of my invention.

Having thus fully described this invention, I claim as new and desire to secure to me by Letters Patent of the United States—

1. A photographic camera, comprising, in combination, a casing, a lens tube on said casing constructed to receive a photographic lens, a series of magazine tubes in said casing adapted to receive photographic plates, said magazine tubes being rotatably mounted in said casing, plungers in said tubes constructed to move said photographic plates longitudinally in said magazine tubes, means connected to said plungers constructed to rotate all of said magazine tubes

with their plungers simultaneously, means for imparting an initial axial movement to said plungers, and means for completing said axial movement after the said initial axial movement is completed.

2. A photographic camera, comprising a casing, a lens tube on said casing constructed to receive a photographic lens, a series of magazine tubes in said casing adapted to receive photographic plates, plungers in said tubes, means for rotating said tubes, means for imparting an initial longitudinal movement to said plungers, and means for completing said longitudinal movement after the initial movement is completed, and a central rod around which said magazine tubes are located, the rotating means and means for imparting the initial longitudinal movement being operated from the outside of the said camera casing.

3. A photographic camera, comprising a casing, a lens tube on said casing constructed to receive a photographic lens, a magazine cylinder in said casing and including end plates and a series of tubes connecting said end plates, a central rod in said casing upon which said cylinder is constructed to revolve, means for revolving said magazine cylinder, plungers in each of said tubes, means for initially moving said plungers axially in said tubes, and further means for completing the axial movement of said plungers.

4. A photographic camera, comprising, a casing, a lens tube on said casing constructed to receive a photographic lens, a magazine cylinder in said casing and including end plates and a series of tubes connecting said end plates, a central shaft in said casing upon which said cylinder is constructed to revolve, plungers in said tubes, means for revolving said cylinder, means for imparting an initial longitudinal movement to said plungers, and means located in said casing for completing said longitudinal movement of said plungers after said initial movement is completed, the revolving of said cylinder and the initial longitudinal movement of said plungers being effected from the outside of said casing.

5. A photographic camera, comprising, a casing, heads on said casing, a lens tube on one of said heads constructed to receive a photographic lens, a cylinder in said casing including two end plates and a series of tubes connecting said end plates, said tubes being constructed to receive photographic plates, a plunger in each of said tubes, a spider to which said plungers are secured, a tubular piston rod upon which said spider is slidably but not rotatably mounted, a shaft upon which said cylinder is adapted to rotate, means for rotating said piston rod and the cylinder, means for imparting an initial axial movement to said plungers,

and means for completing said axial movement of said plungers after said initial axial movement is completed.

6. A photographic camera, comprising, a casing, a lens tube on said casing constructed to receive a photographic lens, heads on said casing, a cylinder in said casing including two end plates and a series of tubes connecting said end plates, said tubes being constructed to receive photographic plates, a plunger in each of said tubes, a spider to which said plungers are secured, a tubular piston rod upon which said spider is slidably but not rotatably mounted, a shaft in said casing upon which said cylinder is adapted to rotate, means for rotating said piston rod and said cylinder, means for initially moving said spider longitudinally upon said piston rod, and further means for completing the longitudinal movement of said spider independently of the means for initially moving the same.

7. In a photographic camera, the combination of a casing, heads at the ends of said casing, a lens tube on said casing constructed to receive a photographic lens, a magazine cylinder in said casing including end plates and a series of tubes connecting said end plates, a piston in each of said tubes, a piston rod, means for securing said pistons to said piston rod, means for rotating said cylinder by said piston rod, means for initially moving said pistons longitudinally in said tubes, said means including a hand wheel, an externally screw-threaded sleeve rotatably located in one of the end heads of said casing, and a clutch constructed to engage and disengage said sleeve from said hand wheel, whereby said clutch when engaging said hand wheel effects the rotation of said externally screw-threaded sleeve and thereby the initial axial movement of said plungers, and when disengaged from said hand wheel permits the latter to revolve upon said sleeve.

8. In a photographic camera, the combination, of a casing, heads at the ends of said casing, a lens tube on said casing constructed to receive a photographic lens, a magazine cylinder in said casing including end plates and a series of tubes connecting said end plates, a diaphragm wall in said casing, a central shaft in said casing secured within said diaphragm wall, a tubular piston rod surrounding said central shaft, a spider upon said tubular piston rod, plungers on said spider constructed to move in said tubes, and to rotate said magazine cylinder, means for retaining said cylinder in various predeter-

mined positions, means for rotating said piston rod with said spider and said plungers, and means for moving the plungers longitudinally in said tubes.

9. In a photographic camera, the combination, of a casing, heads on said casing, a lens tube on said casing constructed to receive a photographic lens, a magazine tube in said casing adapted to receive photographic plates, a piston rod in said casing, a plunger in said tube, means for initially moving said plunger in said cylinder, and further means for continuing the movement of said plunger after the initially-moving means ceases to operate.

10. In a magazine photographic camera, a casing, a lens tube on said casing constructed to receive a photographic lens, heads at the ends of said casing, a rotatable cylinder in said casing including end plates and a series of tubes adapted to receive photographic plates, said tubes being longitudinally slotted, and a central tube located between said cylinder tubes and in contact with each, said central tube being provided with longitudinal slots corresponding with the number of cylinder tubes and adapted to coact therewith, whereby said central tube is adapted to open and close the longitudinal slots in said cylinder tubes by being rotated, as stated.

11. A magazine developing camera, including, a casing, a lens tube on said casing constructed to receive a photographic lens, heads on said casing, one of which is fixed, and the other removably attached, to said casing, a rotatable magazine cylinder in said casing including a series of magazine tubes adapted to receive photographic plates, means for moving said photographic plates longitudinally when said cylinder is rotated, a receptacle located on the outside of the casing, tanks in said receptacle, a race-way connecting the interior of said casing to said receptacle, means on the magazine cylinder constructed to push said photographic plates which have been exposed into said race-way when the magazine cylinder is rotated to locate an unexposed plate in position for exposure, and means for rotating said magazine cylinder.

In testimony that I claim the foregoing as my invention, I have hereunto set my hand in the presence of two subscribing witnesses.

PHILMORE F. SPERY.

Witnesses:

FRIEDA T. LEBERSTEIN,
MICHAEL J. STARK.