

A. J. SPRINGER.
AUTOMATIC PHOTO MACHINE.

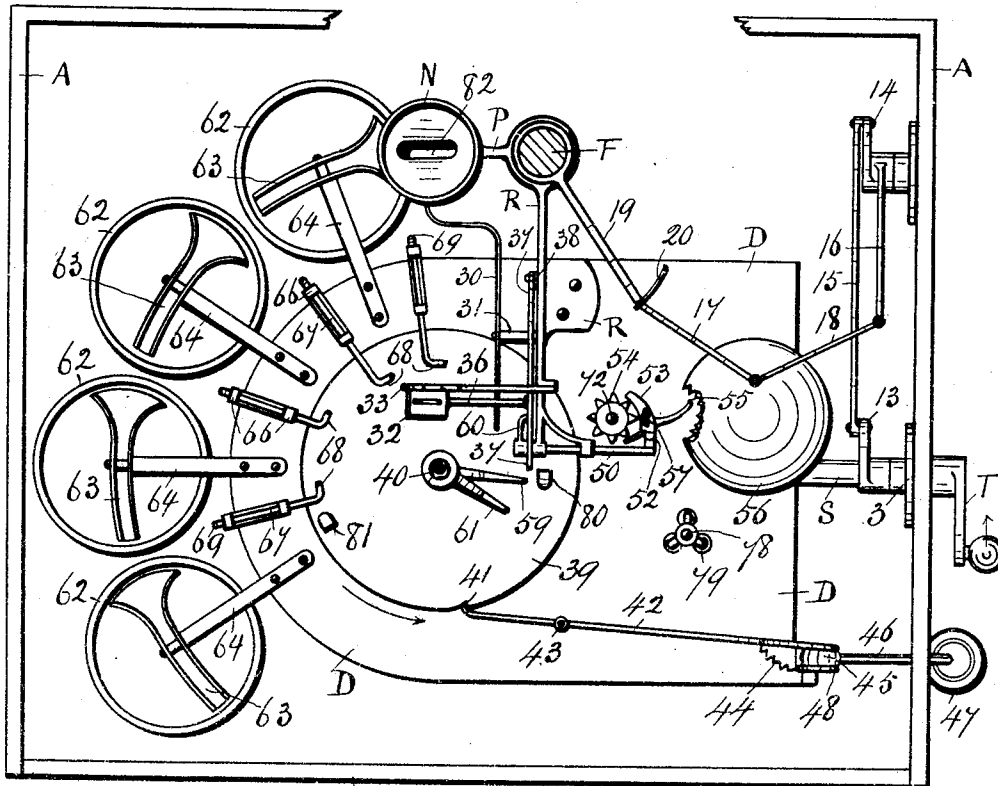
APPLICATION FILED AUG. 24, 1904.

2 SHEETS—SHEET 1.

Inventor.
Aaron John Springer.
By John H. Hendry, Atty.

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2 SHEETS—SHEET 2.



A Fig. 2.

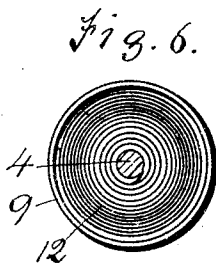


Fig. 6.

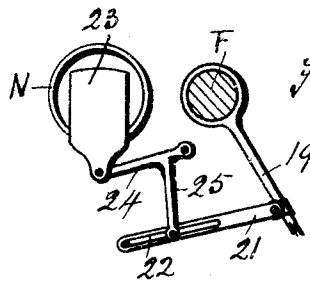
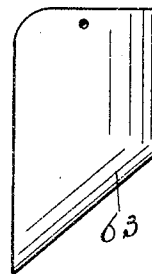
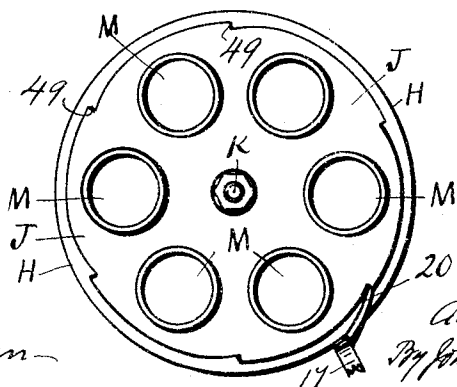


Fig. 4.

Fig. 7.

Fig. 5.



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UNITED STATES PATENT OFFICE.

AARON JOHN SPRINGER, OF HAMILTON, CANADA, ASSIGNOR OF ONE-THIRD TO HENRY EDWARD RALSTON AND ERNEST REGINALD CLARKSON, OF HAMILTON, ONTARIO, CANADA.

AUTOMATIC PHOTO-MACHINE.

SPECIFICATION forming part of Letters Patent No. 781,377, dated January 31, 1905.

Application filed August 24, 1904. Serial No. 221,967.

To all whom it may concern:

Be it known that I, AARON JOHN SPRINGER, a citizen of Canada, and a resident of Hamilton, in the county of Wentworth and Province of Ontario, Canada, have invented new and useful Improvements in Automatic Photo-Machines, of which the following is a specification.

My invention relates to improvements in automatic photo-machines in which certain automatic mechanism is so arranged and devised that a number of photos may be produced in rapid succession and consecutively deposited in a convenient receptacle.

The objects of my invention are, first, to provide a photo-machine charged with a number of light-sensitive photo dry plates or disks of suitable material and of small size, each said plate to bear a photo and adapted to feed said plates one at a time and in succession to the focal point of a lens and to consecutively convey said dry-plates to certain baths and then deposit them consecutively to a receiver; second, to provide a photo-machine which is capable of producing the photo of the person operating the machine, and, third, to afford facilities for the production of a number of photos in a short period of time. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of the automatic photo-machine, showing most of the operating mechanism and the front of the lens, the front chemical or bath vessels being removed in order to show more fully the operating mechanism in rear of said chemical vessel, all the several parts being in normal position and the machine in condition for winding. Fig. 2 is a plan of the machine, the magazines or photographic-dry-plate holders with their stationary circular plate being removed to show the under mechanism of the machine. Fig. 3 is a detail elevation of the magazine horizontal plates, the supporting-standard, and the dry-plate duct, with the lever for retaining and releasing the dry-plate. Fig. 4 is a detail plan of mechanism for releasing the dry-plates from the magazines and immedi-

ately below the stationary circular plate of the magazines. Fig. 5 is a plan of the dry-plate magazines on their rotary plate and on the stationary plate. Fig. 6 is a plan of the coil machine-operating spring in its stationary casing. Fig. 7 is an elevation of one of the dry-plate conveyers.

Similar characters refer to similar parts throughout the several views.

In the drawings the frame or casing of the machine is indicated by A and is constructed of wood, with lower horizontal stationary plate B. Above the plate B are the stationary plates C and D, which are rigidly supported by standards E in convenient places on said plates, thereby connecting the plates B, C, and D, together with the frame A, that the whole may be rigid. The rear vertical standard F extends from the lower plate B to the stationary magazine-plate H and through and is secured thereto. On the plate H is the rotary magazine-plate J, which is adapted to rotate loosely on said plate H and on the reduced upper extending end K of the standard F.

M represents the photographic-dry-plate holders or magazines on the rotary plate J, and the bore of the magazines extends through the plate J, each said bore having access to the plate H, which has a through-opening opposite to the left-hand magazine and over the dry-plate duct N, which is rigidly secured to the standard F by means of the arm P of the bracket-bearing R. The bearing R extends from an upper part of the standard F to the stationary plate D and is secured to said plate.

S is the main horizontal shaft in bearings 2 and 3 and is rotated by means of the crank-handle T on said shaft and on the outer side of the frame A. A bevel-wheel U is secured to the shaft S and revolves the pinion-wheel V, together with its vertical shaft 4, which extends from the wheel V to and through the stationary plate D and flush with the top of said plate. The wheel V and the lower part of the claw-coupling 5 are secured to the shaft 4. The ratchet-wheel 6 is also secured to the shaft 4, and the dog 7 is pivoted on the spur-

wheel 8, which rotates loosely on said shaft 4. The dog 7 allows the ratchet-wheel 6 to rotate when the shaft 4 is being wound.

9 is a stationary casing secured to the plate D by a strap 10. A coil-spring 12 is incased in the casing 9. One end of the spring is secured to the casing, and the opposite end of the spring is secured to the through-shaft 4 in the usual manner. Immediately the spring 12 is wound up to tension by means of the crank T the machine is in operative condition. At the rotation of the crank T the crank 13, secured on the shaft 4, is rotated. Consequently the higher crank 14, journaled to the frame A, is operated by means of the connecting-rod 15, which connects the two said cranks together. The crank 14 has an arm 16, which is connected to the arm 17 by means of the rod 18, which is pivotally connected at both ends to said arms. The arm 17 is secured to or forms a part of the end of the crank 19. The crank 19 rotates loosely on the rear standard F. A spring-dog 20 is secured to the upper part of the arm 17 and operates with said arm, together with the crank 19. The crank 19 is provided with a pivotally-connected arm 21 with slot 22. (Shown in Fig. 4 of the drawings.) The upper part of the dry-plate duct N has a slide 23, connected to an arm 24. The opposite end of the arm 24 is pivotally connected or fulcrumed to the under side of the stationary plate H. The arm 24 has a branch arm 25, with vertical pin 26. Said pin operates in the slot 22 of the arm 21, whereby the slide 23 is partially withdrawn to allow the photographic dry-plate 27 to drop and be seen in the opening 28 in the front of the duct N. The dry-plate 27 is held in the opening 28 by the upper end 29 of the bent lever 30, which is fulcrumed at 31 on the bracket R. The bracket R supports the lens 32 by means of the secured arm 33, and the lens-shutter 34, with opening 35, is pivotally connected to an arm 36, the lower end of which is pivotally connected to a lever 37, which is fulcrumed at 38 to the bracket R.

39 is a disk on the plate D and is adapted to rotate on its stationary central shaft 40. The disk 39 has a notch 41, in which the bent end of the lever 42 enters and retains said disk. The lever 42 is fulcrumed at 43 on the plate D, and the opposite end of the lever is held by a spring 44, which holds the opposite end of said lever in engagement with the notch 41 of the disk 39. The spring end of the lever is adapted to receive the air-bulb 45 of the flexible air-tube 46, which passes through the frame A and connects with the hand air-bulb 47. The air-bulb 45 is between the end part of the lever 42 and the stationary plate 48 on the plate D.

49 represents six notches in the plate J to correspond with the six magazines M and in which the dog 20 engages to rotate said plate J. The lower part of the bracket R supports a

horizontal shaft 50, which has a bent arm 51, which when rotated strikes the bent lever 52 to cause the loosely-connected two-ended catch 53 to engage the ratchet-wheel 54, the teeth of which oscillates the catch 53, and hence the lever 55, which strikes the bell 56. The catch 53 oscillates on its center 57 in the slot of the catch. The shaft 50 has an arm 58, and the disk has a trip 59 to engage said arm. The shaft 50 has also a bent arm 60, which extends underneath the lever 37, which operates the sight of the lens previously referred to. The disk 39 has also a trip 61 to operate the lever 30, which retains and frees the dry-plate 27 when in the opening 28 of the duct N.

In Fig. 2 of the drawings is shown four bath vessels 62 for holding chemicals adapted to the development of dry-plates for photo production and certain dry-plate conveyers 63, suspended a certain distance in said vessels. The forward part of the conveyers 63 is sufficiently wide to allow the dry-plate to drop out by gravity, and the rear part of the conveyer is flared or widened out as a guide to receive the dry-plate from the duct N. The bottom of the conveyer is of suitable incline and holds the dry-plate on its bottom and against the front side of the vessel 62. The vessels 62 are stationary on the plate B and at equal distance from the center of the disk 39. The dry-plate is seen in the bottom of the conveyer in Fig. 2 of the drawings. The upper part of the conveyers 63 are secured to horizontal bars 64, and the bars 64 are secured to vertical slidable rods 65, which slide through the plates C and D when the conveyers are lifted.

66 represents bearings secured on and rigid with the plate D. Rotary bars 67 pass through the bearings 66. The inner crank ends 68 of said bars are bent downward, and the outer crank ends 69 are also bent downward and pivotally connected to the outer vertical rod 65 by means of pivotally-connected connecting-rods 70.

When the machine is wound, as referred to, and in operation, the previously-mentioned ratchet-wheel 6 revolves the spur-wheel 8 by means of the dog 7. The spur-wheel 8 runs loosely on the shaft 4 and revolves the pinion-wheel 71, which is secured on the vertical shaft 72, which in consequence revolves the upper spur-wheel 73, which is secured to said shaft. The spur-wheel 73 revolves the pinion-wheel 74, secured on the vertical shaft 75, consequently revolving the spur-wheel 76, secured on the lower end of said shaft. On the upper end of the shaft 72 is secured the ratchet-wheel 54, previously referred to. The wheel 76 gears into and revolves the pinion-wheel 77, which is secured on the lower end part of the vertical shaft 78. The upper end thereof extends through the plate D and revolves the governors 79, which when the balls thereof are expanded act in the capacity of a

fly-wheel to the machine as a regulator. The trip 80 on the disk 39 operates the first and second crank ends 68 and passes the third and fourth crank ends. The trip 81 on the disk 39 operates the third and fourth crank ends 68 and passes underneath the first and second cranks 68 referred to. It will be noticed that the trip 80 is the same distance from the center of the disk 39 as are the first and second cranks 68 and that the trip 81 is the same distance from the center of the disk 39 as are the third and fourth cranks 68. This feature allows the dry-plate to remain longer in the third and fourth baths 62 than in the first and second baths to facilitate the development of the photo on the dry-plate. The opening 82 in the duct N in Fig. 2 of the drawings represents the opening through the duct from near the top to the bottom thereof.

At the lower end of the disk-shaft 40 is secured the spur-wheel 84, which is revolved by the pinion-wheel 85, which revolves loosely, together with its claw-coupling 86, on the shaft 4. The wheel 85, together with the coupling 86, slides slightly upward, and the claw-coupling disengages when the machine is being wound by the crank T.

The operation of the machine is as follows: At the winding of the machine by the crank T, which rotates about one-half revolution, the magazine is brought immediately over the duct N, and a dry-plate then drops in focal position in the opening 28 and on the end 29 of the lever 30. At this time the air-bulb 47 is compressed. Consequently the air-bulb 45 is inflated, thereby pressing the end of the lever 42 inward, and the opposite end of the lever is released from the disk 39, which now rotates, as indicated by arrow in Fig. 2 of the drawings. The trip 59 then engages the arm 58 and rotates the shaft 50, and the arm 51 of said shaft engages the bent lever 52 to bring the double catch in touch with the ratchet-wheel 54 to cause the ringing of the bell 56 by means of the lever 55. At this time the arm 60 on the shaft 50 has brought the lever 37, together with the arm 36, upward to bring the opening 35 of the shutter 34 opposite to the lens 32 to expose the dry-plate to the lens.

Immediately follows the trip 61 on the disk 39 and operates the lever 30 to bring the opposite end 29 of the lever out from below the opening 28 of the duct N to release the dry-plate which was in said opening 28 and allow the dry-plate to drop into the first conveyer 63 in the first bath vessel 62. The trip 80 on the disk 39 now travels to and engages the first crank 68, and consequently raises the outer crank 69 and lifts the vertical rods 65 by means of the connecting-rod 70. Consequently the first conveyer 63 is lifted by means of the bar 64 on said rods 65. This last action discharges the dry-plate into the second conveyer, which is operated by the same trip 80 and in a similar manner. The

trip 81 then travels to and operates the third and fourth conveyers 63 in a similar manner and by similar means as the first and second conveyers. The dry-plate, with photo on the face, is deposited from the fourth conveyer into any conveniently-located receiver. The disk 39 makes one revolution at every production of a photo. At the termination of the revolution of the disk 39 the winding-crank T resumes its normal position, as shown.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an automatic photo-machine, the combination with a lens, of a movable photographic-plate magazine, means for progressively moving said photographic-plate magazine and arresting it at intervals to bring the photographic plates successively in position for delivery to the focal plane of the lens, means controlled by said magazine-moving means whereby the plate is delivered to the focal plane of the lens, and means for developing the plate after it has been released from the focal plane of the lens.

2. In an automatic photo-machine, the combination with a lens, of a movable photographic-plate magazine, means for progressively moving said photographic-plate magazine and arresting it at intervals to bring the photographic plates successively in position for delivery to the focal plane of the lens, means controlled by said magazine-moving means whereby the plate is delivered to the focal plane of the lens, means for discharging the photographic plates after exposure, and means for developing the plate.

3. In an automatic photo-machine, the combination with a lens, of a movable photographic-plate magazine, means for progressively moving said photographic-plate magazine and arresting it at intervals to bring the photographic plates successively in position for delivery to the focal plane of the lens, means controlled by said magazine-moving means whereby the plate is delivered to the focal plane of the lens, automatic means for releasing said retaining means, and means for developing the plates after release from said retaining means.

4. In an automatic photo-machine, the combination with a motor, of means for energizing said motor, a lens, a movable plate-magazine, said energizing means operating other means whereby the plate-magazine is progressively moved to bring a plate to the focal plane of the lens, means for exposing and finishing the said plate, and means operated by the user for controlling the motor.

5. In an automatic photo-machine, the combination with a motor, of means for energizing the motor, a rotary plate-magazine, a lens, means for progressively moving the magazine so as to bring the plate to the focal plane of the lens, automatically-released means controlled by the motor for holding the plate

during exposure, means for developing the plate after exposure, and means for controlling the motor.

6. In an automatic photo-machine, the combination with a movable plate-magazine, of a chute in communication with said magazine, a lens having its focal plane in line with the chute, means for holding a plate during exposure, means for automatically releasing said holding means so that the plate will be discharged from the chute, means for developing the plate after exposure, and means for turning said magazine so that another plate will be delivered for subsequent exposure.
7. In an automatic photo-machine, the combination with a motor, of means for energizing said motor, a plate-magazine, a lens, means operated by said energizing means for progressively moving said magazine, means operated by said motor for holding a plate during exposure, said means automatically releasing said plate at a predetermined time, means for automatically developing said plate after being released by said automatic releasing means, and means for controlling the motor.
8. In an automatic photo-machine, the combination with a lens and a shutter therefor, of a chute for the plate, a photographic-plate holder comprising a stationary plate having a delivery-opening, a movable photographic-plate magazine carried on said plate-holder and adapted to carry a plurality of photographic plates, and arranged to successively bring said plates to the opening aforesaid and positioned to at other times coact with the stationary plate aforesaid to cover the photographic plates, means for automatically operating said shutter, means for automatically discharging the plate after exposure, developing vessels, and means for automatically

conveying the photographic plates after exposure through said vessels.

9. In an automatic photo-machine, the combination with a lens, of a plate-holder, means for discharging plates from the plate-holder after exposure, a developing vessel, and a non-tiltable reciprocatory photographic-plate conveyer depending into said developing vessel and adapted for causing the plate to gravitate therefrom when said conveyer is lifted from the developing vessel.

10. In an automatic photo-machine, the combination with a lens, of a plate-holder, means for discharging plates from the plate-holder after exposure, a developing vessel, and a non-tiltable reciprocatory photographic-plate conveyer depending into said developing vessel and having an inclined bottom to cause the plate to gravitate from the conveyer when the said conveyer is lifted from the developing vessel.

11. In an automatic photo-machine, the combination with a lens, of a plate-holder, means for discharging plates from the plate-holder after exposure, a plurality of developing vessels, a separate non-tiltable reciprocatory conveyer adapted to be introduced into and removed from each vessel, said conveyers each having an inclined bottom to cause the plate to gravitate from one conveyer to the conveyer of a succeeding developing vessel when the given conveyer is lifted from the developing vessel, and means for raising the conveyers successively to cause the plate to pass successively from one conveyer to another by gravitation after submersion in the developing fluid.

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Witnesses:

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