

DEVELOPING TANK.

3 SHEETS—SHEET 1.

3 SHEETS—SHEET 1.



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958,993.

Patented May 24, 1910.

3 SHEETS—SHEET 2.

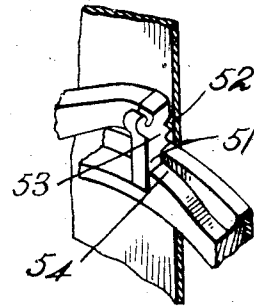
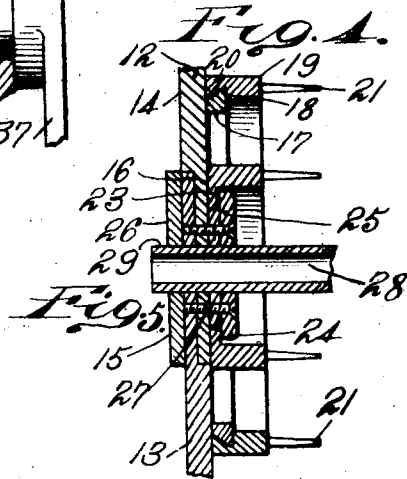
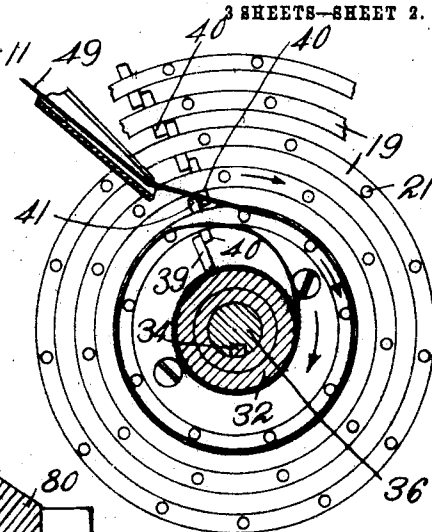
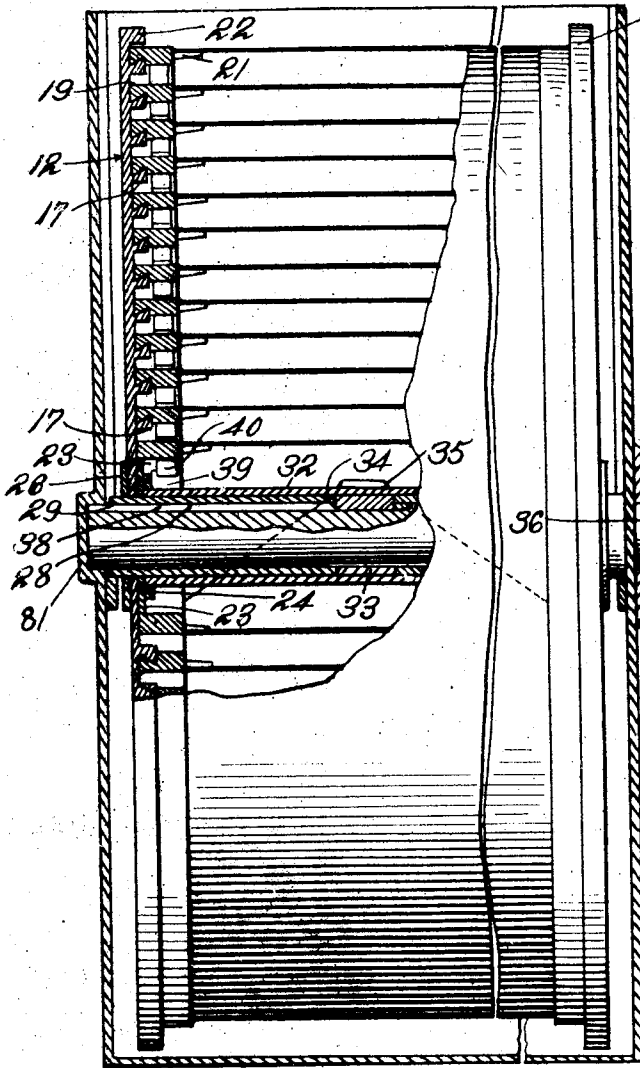


Fig. 3.

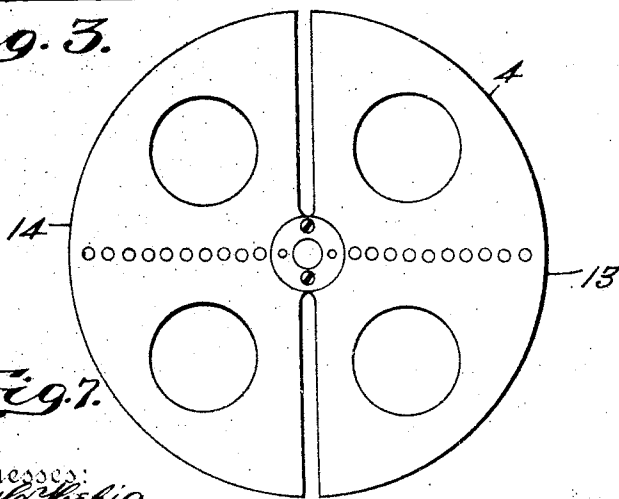


Fig. 7.

Fig. 6.

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DEVELOPING TANK.

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3 SHEETS—SHEET 3.

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Fig. 8.

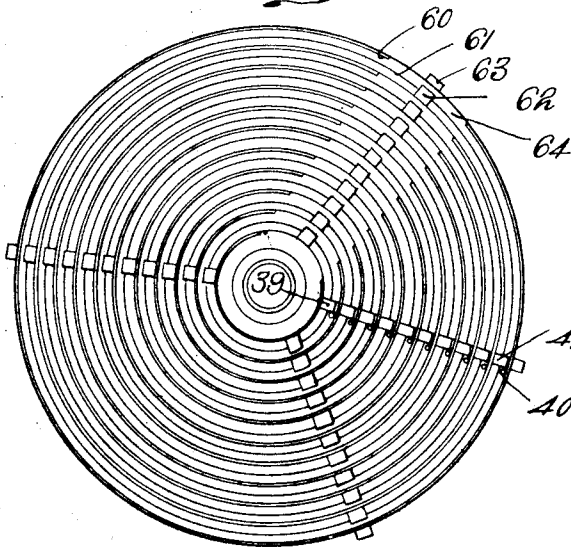


Fig. 9.

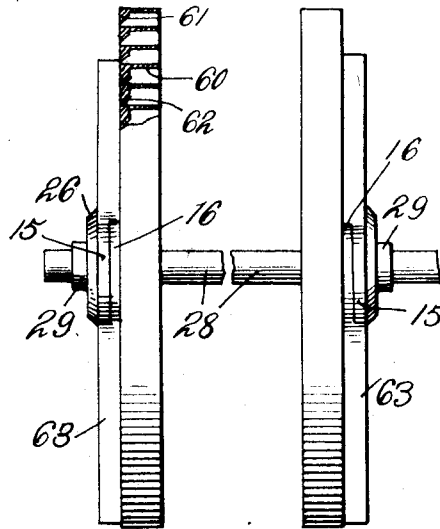


Fig. 10.

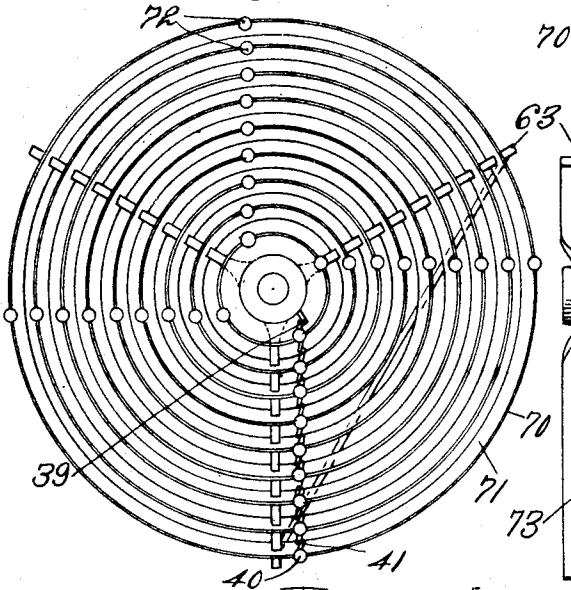


Fig. 11.

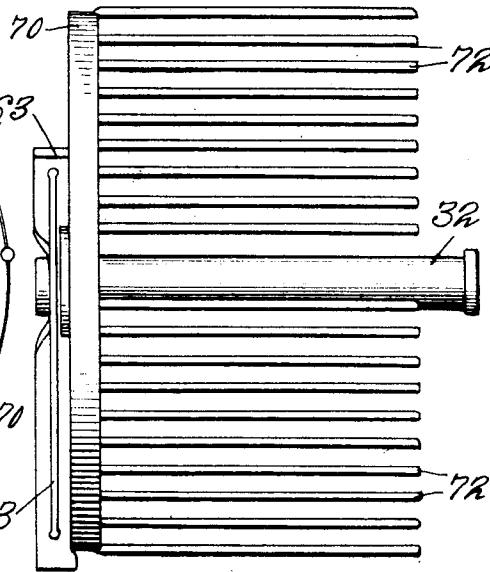


Fig. 12.

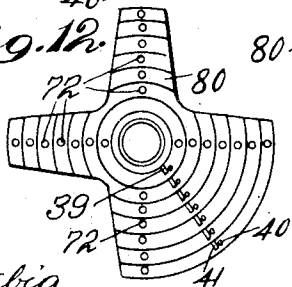
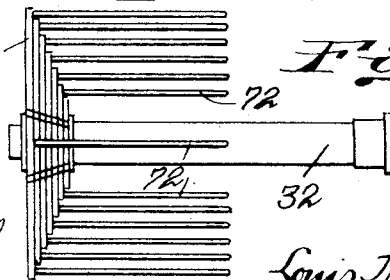


Fig. 13.



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DEVELOPING-TANK.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LOUIS N. CHAPIN, a citizen of the United States, residing in the city of New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Developing-Tanks, of which the following is a full, clear, and exact specification.

My invention relates to tanks for developing photographs and particularly to a developing tank wherein a roll of flexible films having a large number of latent images may be placed for developing, fixing, washing, etc., and my invention has for its object to produce a developing tank wherein such films may not only be developed, but also be fixed, washed, etc., and be prepared for printing without any danger of exposure to light and without fear of the film being touched by the backing.

Another object of my invention is to produce a developing tank wherein such film may be placed for developing without requiring any support outside of that furnished by the parts of the tank; to wit, without the supplemental, flexible, waterproof sheet frequently used for such purpose.

Another object of my invention is to provide a developing tank wherein two films may be developed, etc., simultaneously, and wherein they may be simultaneously inserted and withdrawn with but little more trouble than one film would cause.

These, and other objects which will appear as the description proceeds, I accomplish by the apparatus hereinafter described and illustrated in the accompanying drawings wherein—

Figure 1 is a plain view of my developing tank. Fig. 2 is a vertical, longitudinal section on the line 2—2 of Fig. 1. Fig. 3 is an enlarged end view, partly in section, with the front of the box removed and a film in place. Fig. 4 is a detail illustrating how the reels wind the film. Fig. 5 is a sectional detail of the inner reels, illustrating sundry details of construction. Fig. 6 is a perspective view of a lock employed in connection with the outer reel. Fig. 7 is a side view of the film-carrier, showing the fluid openings. Fig. 8 is an inner end view of one of the disks having a modified form of reel; Fig. 9 a side view of the same, partly broken

away. Fig. 10 is a view similar to Fig. 8, of another modified form; Fig. 11 is an end view thereof; and Figs. 12 and 13 are side and end views of another modified form.

The box 1 is equipped with a cover 2, which fits snugly so as to exclude light, and with a curved bottom 3, which extends from side to side of the box and has its concave side upward so as to lie in proximity to the film-carrier 4, in order that only the amount of the developing fluid necessary to cover the film may be employed. The side and front walls of the box are extended at 5 to receive the spool or film-holder 6, which is of usual construction and as commercially supplied has openings in each end of its spindle which receive a fixed post projecting from a shoulder 7 attached to one side wall of the box, and a yielding post attached to a flanged sleeve 8 and mounted upon a stud 9 projecting from shoulder 10 attached to the other and right-side wall. A spring 10^a coiled about stud 9 presses the yielding post outward.

The film-carrier 4, as illustrated in Figs. 1 to 7, comprises two disks 11 and 12, situated respectively adjacent to the right and left-hand side walls of the box. These have the same elements, but are not interchangeable by reason of the relative location of the stops and receiving pins, which are reversed in position as the two disks face each other. Taking disk 12 for purposes of explanation, it is, for purposes of assembling, made in two parts in the form of semi-circular plates 13, 14, each of which has centrally-disposed on its inner straight edge, ears 15, 16, which overlap, as seen in dotted lines in Fig. 7, and are each reduced in thickness one-half (Fig. 5). A space is left between these plates and they are perforated to permit free passage of the fluids employed.

Fixed to the inner face of the disk 12, is a series of circular concentric guides 17, which have peripheral beveled retaining faces 18. Upon such guides are mounted so as to turn freely thereon, the circular concentric reels 19, provided on their inner sides with grooves 20, adapted to receive the retaining faces 18, and thereby to hold the reels in place to permit them to turn thereon. Projecting sidewise from the reels are the film supports, in this case winding pins 21, which receive and hold the film. The pe-

riphery of the disk 4 terminates in a projecting flange 22 (Fig. 3), bent inwardly at right angles to the disk and extending over the outermost reel 19. The innermost reel 19 is not supported as are the others, but is equipped with an inwardly-extending radial flange 23, (Fig. 5), which engages under the shoulder 24 of a washer 25, and permits the said reel to turn freely.

A washer 26 is provided, which is situated externally of the disk 12, and is secured to the ears 15, 16, and to washer 25 by screws 27, threaded into the said parts. This outer washer is fixed to an inwardly-extending tubular socket 28, which passes through same and also projects outside of disk 14, forming a trunnion 29, which guides the film-carrier 4 between ribs 30, 31 (Fig. 2), on the side wall to a seat where the said ribs are joined at their lower ends. A hollow film sleeve 32 receives the tubular sockets 28 attached to each disk and is provided with interior, centrally-disposed stops 33, 34, which limit the inward passage of said tubular sockets. This sleeve 32 is also provided with a hook 35, which is adapted to hook into the end of the film-carrying paper.

The stop 34 (Fig. 3), projects inwardly farther than the other stop and furnishes the medium by which motion is communicated from the shaft 36, of crank arm 37, to sleeve 32, by entering a groove 38 in said shaft, thereby providing a spline and groove connection between said parts. Shaft 36 passes through opening in bearing-block 80 and a corresponding opening in the right-hand side wall of the tank and is seated in a pocket 81 in the left-hand side wall of the tank. A rotary motion is communicated from the hooking sleeve 32, after it has made one revolution, to the first or innermost reel by means of a post 39 which projects radially outward from the end of said sleeve near disk 12 in the path of a counterpost or stop 40 projecting radially inward from said reel. In its starting position, or position of rest after the film has been hooked on the said reels, it should be in the position of Fig. 3, and after two revolutions have been made, in the position of Fig. 4. The succeeding reels are equipped with corresponding, outwardly, radially-projecting posts 41 and similar inwardly-projecting posts 40, and as each reel makes a complete revolution it will "pick up" its immediately-surrounding reel; that is, the outwardly-extending pin 41 upon the periphery of each reel will engage the inwardly-extending pin 40 upon the interior surface of the surrounding reel and carry said surrounding reel along. In Fig. 4 it will be observed that the second reel has just been picked up.

In Figs. 1 and 2 is illustrated a film-guiding shelf 42, which at its front is provided on each side with hooks 43, which engage

over posts 44, 45, projecting inwardly from the side walls in such manner as to permit the ready removal of the said shelf and to permit its front end to swing freely. The shelf is formed in somewhat rectangular shape in longitudinal section, as seen in Fig. 2, and its free end 46 provides the means by which the film is guided to the winding pins 21. The film is held to said shelf by the upwardly and inwardly-extending edges 47, 48, 75 of the shelf.

The winding pins on each reel, from the inner to the outer reels, are situated at slightly-increasing distances apart, and the pins in two radial lines at the front are at greater distances apart than the other pins, whereby, when in starting position as in Fig. 2, the pins lying under the free end of the shelf and those above it form a path for the shelf. This permits the said free end to pass between said pins and to guide the film, which is illustrated in Fig. 4, and there designated 49, until it is caught by the pins.

The swinging movement of the shelf at its free end 46, permits it to be lifted by the winding pins of each succeeding reel as said reel is picked up by the stops and caused to rotate, thereby delivering the film in proper position to be taken off and held by the pins of the outer rotating reel, and the path between the said two lines of pins is wide enough to permit the shelf freely to clear the pins as it swings. As each reel is picked up, its pin lying immediately under the shelf will lift it and it will be held lifted by the succeeding pins. The toe of the shelf will then move rearwardly a trifle, approaching more nearly a horizontal position and permitting a slight movement in the same direction of the adjoining anchored reels to accommodate the new position of the shelf until, when the shelf emerges from the last reel, it will be in nearly a horizontal position. The reels outside of the one last picked up by the stops will remain quiet save for the slight movement to accommodate the change in angle of the shelf, being held against accidental displacement by the shelf.

Mounted upon the posts 44, 45 (Fig. 1), so as to swing freely, are stop arms 50, which at their free ends terminate in stops 51, which fall into the space between plates 13, 14 (Fig. 7), and hold the disks 11, 12 against rotation in either direction. The said stop arms have a slight sidewise spring movement and are held in closed position by serrated lugs 52 fixed to the inner side walls of the tank (Fig. 6), which enter corresponding recesses 53 in the side of said arms and permit the said stop 51 to have a radial adjustment.

Upon the periphery of the outer reel is a shoulder 54, the face of which is radial to the axis of rotation of the said reel and which coöperates with stop 51, which pro-

jects laterally across the face of said reel. The inclined backs of the said shoulders are presented to the stops when the film is being wound upon the reels, permitting the revolution of the said outer reel (Fig. 2). The said shoulder cooperates with the stop in holding the outer reel against rotation when the film-carrier is being rotated in the reverse direction to put it in position for receiving a fresh film, and thereby permits all the reels again to assume the position of Fig. 2.

The operation of this form of my device is as follows: Assuming the film-carrier to be in the position of Fig. 2, wherein the left-hand disk viewed from the front is illustrated, and the spool 6 to be loaded with a film. The free end of the film is brought through the shelf under the overhanging edges 47, 48, and hooked on the finger 35. The cover 2 is then placed on the box and the crank handle 31 turned clockwise (Fig. 1), thereby causing the sleeve 32 to move in the same direction through spline and groove 34, 38. The disks 11, 12, are held stationary by stops 51 entering the space between plates 13, 14, and by the shelf resting on the pins. The first revolution of the sleeve 32 winds a layer of the paper backing of the film thereon and then post 39 on said sleeve will pick up post 40 on the innermost reel, causing it to move in the same direction. The pins lying immediately under the toe of the shelf will push it upward and it will then deliver the film to be received on and carried by the pins of said innermost reel. Upon the second revolution the next set of pins 41, 40, will cause this operation to be repeated for the next adjoining reel, and so on until the film has been completely transferred to the pins, where it is so held that the succeeding layers of negatives do not touch each other. The developing solution may then be poured in the tank, for which purpose the cover may be raised and moved slightly lengthwise. After the negatives are developed, water to rinse them may be placed in the tank, followed by the fixing solution, when they may again be rinsed. The backing and film may then be removed from the film-carrier by sliding the shaft 36 entirely out and lifting the film-carrier bodily from the tank and standing it on end, then removing the upper disk by simply lifting it off, its attached socket 28 readily sliding out of sleeve 32; then lifting out sleeve 32, and the entire film will be supported upon the pins of the opposite disk. It may then be removed from the paper backing for drying as usual. It will be observed that during the entire operation the film has not been touched by the hand nor by anything which might injure it, and this I regard as an important advantage of my invention. The film-carrier and sleeve may then be

again assembled, placed in the tank, the shaft 36 reinserted in such position as to cause spline 34 to enter groove 38, and the film-carrier placed in proper position to receive a new film by engaging stops 51 in the space between disks 13, 14, in its innermost position, so that it is in the path of shoulder 54, thereby holding the outer reel against backward movement, when by turning the handle in the reverse way the reels, which will all then be in the position of the two inner reels, (Fig. 4), will be turned to the position indicated in Fig. 2.

It will be observed that the stops 51 have two positions—an outer one in which they hold only the disks, and an inner one in which they hold the disks and also engage shoulders 54. This adjustment is useful in setting the reels to position to receive a film. By simply lowering the stops and turning the handle the reverse way, the stops will automatically drop in between disks 13, 14, and then being pushed down, on a continuation of the turning, they will engage shoulders 54.

In the modified form of Figs. 8 and 9, the film is supported on flanges 60, carried by reels 61, having beveled inner faces which take behind lugs 62 having a counter bevel on their contacting faces. The lugs 62 project inwardly from spiders 63, to which they are attached. The reels are concentric and are held in position by the lugs on the spiders, which permit them to revolve freely. The flanges extend around a large part of the reels, but have a portion cut away at 64, forming a path for the shelf. The construction of the hubs of the flanges, the posts, the sockets, sleeve, shaft, shelf, stops, etc., is the same as in the previous form. The chief difference here is in the substitution of flanges for pins, which produces a construction probably cheaper and more efficient to hold the film.

In Figs. 10, 11, a spider 63 is employed having similar beveled-faced lugs 62, which hold and guide reels 70 having radial inwardly-extending continuous flanges 71. These flanges have their inner faces beveled to take behind the beveled faces of the lugs, but one spider is designed to be used, although two might be, and it has attached to it film-receiving and carrying pins 72, which have a length equal to the width of the film. The arms of the spider may be braced, if desired, as by stays 73.

In the form of Figs. 12, 13, a series of concentric plates 80 arranged side by side are employed to receive and hold the laterally-projecting film-receiving pins 72, and these plates are of progressively-diminishing diameter from the outer plate to the innermost one, thereby allowing the pins attached to each plate to clear the adjoining plate.

It is possible, in the preferred form of

my invention to develop, etc., two films simultaneously if desired. Space may be secured for additional spool carrier in numerous ways—as by increasing the height of the box or its length—and when two films are so developed they should be wound in back to back. I have employed with good results brass as the material from which to make said tank, and this I have found to answer very well in use, as it soon becomes silver-plated from the deposit of the silver in the fixing solution. Care should be taken entirely to wash out the hyposulfite of soda solution before developing fresh films.

Numerous changes and modifications in the structure illustrated will readily suggest themselves within the range of my invention, some of which I have illustrated, and I do not desire to be understood as limiting myself to the precise structure or structures described.

What I claim is:

1. In a developing tank, a series of annular, rotatable film supports of progressively increasing diameters, independent bearings for each film support, means for revolving the smallest support and means for picking up an adjoining support at each revolution of such revolving support or supports.

2. In a developing tank, a series of concentric, rotatable film supports, separate bearings for each film support, the said bearings being concentric, means for revolving the inner support and means for picking up the immediately surrounding support at each revolution of such revolving support or supports.

3. In a developing tank, a plurality of concentric, rotatable annular film supports of the same width, independent bearings for each support, means for revolving the inner support and means for successively revolving additional supports.

4. In a developing tank, a series of concentric, rotatable film supports, means for revolving the inner support and for successively revolving surrounding supports, and means for holding the non-revolving supports against movement, and out of contact with the film.

5. In a developing tank, a series of concentric, rotatable film supports, separate bearings for each film support, the said bearings being concentric and means for revolving each film support a limited distance free of its surrounding support, and means for picking up the surrounding support after such free movement.

6. In a developing tank, a series of concentric, rotatable film supports, each film support having spaces aligned with each other forming a film path, independent, concentric bearings for each film support, and posts on each support adapted to engage its adjoining supports.

7. In a developing tank, a series of concentric, rotatable film supports, each film support having spaces aligned with each other forming a film path, independent, concentric bearings for each film support, and inwardly and outwardly-extending radial posts on each support in position to engage similar posts on adjoining supports.

8. In a developing tank, a film-carrier comprising a series of concentric, rotatable film supports, separate bearings for each support and means for revolving each film support a limited distance free of its surrounding support, means for picking up the surrounding support after such free movement, and means for permitting the film carrier and film to be together removed from the tank.

9. In a developing tank, a film-carrier having means for attaching a film thereto, and a series of concentric reels, film supports on each reel spaces in each film support forming a film path, and connections between adjacent reels for revolving each reel a limited distance free of its surrounding reel, and means for picking up the surrounding reel after such free movement, substantially as described.

10. In a developing tank, a film carrier having means for attaching a film thereto, and a series of concentric annular reels, separate bearings for each of said reels, film supports on each reel, each of said supports having a space therein forming a film path, and connections between said reels whereby each reel, after completing a revolution, picks up and carries its surrounding reel, substantially as described.

11. In a developing tank, a film-carrier comprising a series of rotatable film supports, each film support having spaces forming a film path, stops on each support, the stops on adjacent sides of adjoining supports being adapted to engage each other, and means permitting the film carrier and film to be together removed from the tank.

12. In a developing tank, a separable film-carrier comprising a series of concentric, rotatable film supports and means for revolving each film support a limited distance free of its surrounding support, means for picking up the surrounding support after such free movement, and means permitting the film carrier and film to be together removed from the tank.

13. In a developing tank, a separable film carrier comprising a series of rotatable film supports, each film support having a space forming a film path and stops on each support adapted to engage the stops on adjoining supports, and means for permitting the film-carrier and film to be together removed from the tank.

14. In a developing tank, a film-carrier carrying a central revoluble film-attaching

sleeve, a series of concentric, rotatable film supports, separate, concentric bearings for each film support, and means for revolving each of said supports a limited distance free of its surrounding support, and means for picking up the surrounding support after such free movement.

15. In a developing tank, a separable film-carrier comprising a central, revoluble film-attaching sleeve, a series of concentric, rotatable film supports, means for revolving each of said supports a limited distance free of its surrounding support, and means for picking up said surrounding support after such free movement, and means permitting the film carrier and film to be together removed from the tank.

16. In a developing tank, a film-carrier comprising a central, revoluble film-attaching sleeve, a series of concentric, rotatable film-supports of the same width, separate bearings for each support and means for revolving said sleeve free of the innermost support and for revolving each of said supports free of its surrounding support.

17. In a developing tank, a removable and separable film-carrier comprising a film-attaching sleeve, revoluble side reel supports, reels supported thereon to revolve independently thereof, film supports on said reels each support having a space to form a film path, and posts adapted to engage each other attached to said sleeve and to the outer and inner surfaces of said reels.

18. In a developing tank, a removable and separable film-carrier, comprising a film-attaching sleeve, revoluble side reel supports, reels held thereon and adapted to revolve independently thereof, film supports fixed to said reels and each support having a space to form a film path, and cooperating engaging posts on said sleeve and said reels, and a stop adapted to engage said reel supports.

19. In a developing tank, a removable and separable film-carrier comprising a film-attaching sleeve, revoluble side reel supports, reels supported thereon and adapted to revolve independently thereof, film supports on said reels each support having a space to form a film path, and posts attached to said sleeve and to the outer and inner surfaces of said reels, and a stop adapted when adjusted to position to engage said reel supports, and adjustable also to engage the outermost reel to stop rotation thereof in one direction.

20. In a developing tank, a series of concentric, rotatable film supports, means for revolving each film support a limited distance free of its surrounding support, and means for picking up said surrounding support after such free movement, and a movable guide adapted successively to deliver film to each moving support.

21. In a developing tank, a series of con-

centric rotatable film supports each support having a space to form a film path, posts on each support adapted to engage its adjoining supports, and a movable guide entering said path and adapted successively to deliver film to each moving support.

22. In a developing tank, a series of annular rotatable film supports each support having a space to form a film path, means for rotating the inner support, and means for successively rotating the adjoining supports, and a movable guide adapted successively to deliver film to each moving support.

23. In a developing tank, a removable and separable film-carrier, comprising a series of rotatable film supports each support having a space to form a film path, posts on each support adapted to engage the adjoining support, and a movable shelf adapted to enter said film path and successively to deliver film to the outer rotating film support.

24. In a developing tank, a removable and separable film-carrier comprising a series of concentric rotatable film supports each support having a space to form a film path, a film-receiving sleeve, means for revolving said sleeve and innermost support and for revolving an additional support at each revolution, a movable film-guide adapted to enter said film path and to deliver film to each support at its first revolution.

25. In a developing tank, a film-carrier having means for attaching a film thereto, and a series of concentric film supports each support having a space to form a film path, cooperating posts attached to adjoining film supports revolving each support a limited distance free of its surrounding support, and a movable shelf entering said path and successively delivering film to adjoining supports, substantially as described.

26. In a developing tank, a series of concentric, rotatable film supports each support having a space to form a film path, means for revolving each film support a limited distance free of its surrounding supports after such free movement, means for picking up the surrounding supports after each free movement, and a removable guide pivotally supported on the tank adapted to enter said path and successively to deliver film to the supports, and movable outwardly as the supports are loaded, substantially as described.

27. In a developing tank, a film-carrier having means for attaching a film thereto, and a series of concentric annular reels, bearings therefor, film supports on each reel each support having a space to form a film path through said supports, connections between said reels whereby each reel, after completing a revolution, picks and carries its immediately-surrounding reel, a

movable guide entering said film path and adapted successively to deliver film to each reel.

28. In a developing tank, a series of concentric rotatable film supports each support having a space to form a film path, means for revolving the inner support and means for successively picking up the surrounding supports, a movable guide adapted to enter said film path successively to deliver film to each support, substantially as described.

29. In a developing tank, a series of concentric rotatable film supports each of said supports having a space to form a film path, each support having a limited movement free of its outer supports, means for revolving the inner support and for successively revolving surrounding supports, and a movable film guide adapted to enter said film path successively to deliver film to each support, substantially as described.

30. In a developing tank, a removable and separable film-carrier, a film-attaching sleeve, revoluble side reel supports, reels held thereon to revolve independently thereof, film supports fixed to said reels each of said supports having a space and the said spaces being alined, thereby forming a film path, cooperating engaging posts on said sleeve and said reels, and a movable film guide detachably mounted in said tank and adapted successively to deliver film to said film supports, substantially as described.

31. In a developing tank, a plurality of concentric rotatable film supports each support having a space to form a film path, means for revolving the inner support and for successively revolving additional supports, and a film-guide adapted successively to deliver film to each support.

32. In a developing tank, a plurality of rotatable concentric film supports each support having a space to form a film path, a central film-receiving sleeve, means for revolving said sleeve and for successively revolving the film supports, a movable and detachable film-guide adapted to enter said path and successively to deliver film to said sleeve and to said supports.

33. In a developing tank, a plurality of rotatable concentric reels, horizontal film supports projecting sidewise from said reels each support having a space to form a film path, radial posts upon the peripheral and interior faces of said reels in the same path, and a film-guide adapted to enter said path and deliver film to each of said film supports.

34. In a developing tank, a pair of revoluble disks, a plurality of rotatable concentric reels held upon said disks and rotating independently thereof, supporting pins projecting sidewise from said reels, a pin upon each reel being located so that when

the reels are in starting position, said pins shall lie in substantially a radial line forming a film path, and posts upon the peripheral and interior faces of said reels in line with each other.

35. In a developing tank, a pair of revoluble disks, inwardly-extending tubular sockets, a surrounding hooking sleeve, a shaft within said sockets and sleeve, a splined connection between said sleeve and shaft, a plurality of rotatable concentric reels mounted upon the inside of said disks so as to revolve freely thereon, film-supporting pins projecting sidewise from said reels, a pin upon each reel being located so that when the reels are in starting position, said pins shall lie in substantially a radial line forming a film path, posts upon the peripheral and interior faces of said reels in the same vertical plane, a film-guide adapted to enter said path and detachably mounted upon the walls, and supports for a spool in position to deliver film to said guide.

36. In a developing tank, two unconnected series of oppositely disposed rotatable concentric reels, film supports projecting from each reel toward its opposite reel a sufficient distance to receive the edge of the film, and means for successively connecting each reel with its surrounding reel.

37. In a developing tank, two unconnected series of oppositely disposed rotatable concentric reels, film supports projecting from each reel toward its opposite reel a sufficient distance to receive the edge of the film, means for successively connecting each reel with its surrounding reel, and means for holding oppositely-disposed reels against accidental rotation.

38. In a developing tank, two unconnected series of oppositely disposed rotatable concentric reels, film supports projecting from each reel toward its opposite reel a sufficient distance to receive the edge of the film, means for successively connecting each reel with its surrounding reel, said film supports provided with spaces alined to form a film path, and a film guide in said path adapted to deliver film to the outer revolving supports.

39. In a developing tank, two unconnected series of oppositely disposed rotatable concentric reels, film supports projecting from each reel toward its opposite reel a sufficient distance to receive the edge of the film, means for successively connecting each reel with its surrounding reel, said film supports provided with spaces alined to form a film path, and a film guide in said path adapted to deliver film to the outer revolving supports and means for holding idle supports against accidental rotation.

40. In a developing tank, two unconnected series of oppositely disposed rotatable con-

centric reels, film supports projecting from each reel toward its opposite reel a sufficient distance to receive the edge of the film, all of said film supports being of the same width, and means for successively connecting each reel with its surrounding reel.

41. In a developing tank, two unconnected series of rotatable concentric reels, both said series of reels being removable from the tank and being separable one from the other, film supports projecting from each reel a sufficient distance to receive the edge of the film, and means for successively connecting each reel with its surrounding reel.

42. In a developing tank, two unconnected series of rotatable concentric reels, both said series of reels being removable from the tank and being separable one from the other, film supports projecting from each reel a sufficient distance to receive the edge of the film, means for successively connecting each reel with its surrounding reel, and means for holding oppositely-disposed reels against accidental rotation.

43. In a developing tank, two unconnected series of rotatable concentric reels, both said series of reels being removable from the tank and being separable one from the other, film supports projecting from each reel a sufficient distance to receive the edge of the film, means for successively connecting each reel with its surrounding reel, said film supports provided with spaces alined to form a film path, and a film guide in said path adapted to deliver film to the outer pair of revolving supports.

44. In a developing tank, two unconnected series of oppositely disposed rotatable concentric reels, both said series of reels being removable from the tank and being separable one from the other, film supports projecting from each reel toward its opposite reel a sufficient distance to receive the edge of the film, means for successively connecting each reel with its surrounding reel, said film supports being provided with spaces alined to form a film path, and a film guide in said path adapted to deliver

film to the other pair of revolving supports and means to hold idle supports against accidental rotation.

45. In a developing tank, two unconnected series of rotatable concentric reels, both said series of reels being removable from the tank and being separable one from the other, film supports projecting from each reel a sufficient distance to receive the edge of the film, all of said film supports being of the same width, and means for successively connecting each reel with its surrounding reel.

46. In a developing tank, a series of concentric rotatable film supports of progressively-increasing diameter, means for revolving the smallest support and for successively connecting surrounding supports, and an adjustable stop for holding the outer support against rotation when the supports are revolved in the reverse direction.

47. In a developing tank, a plurality of concentric rotatable film supports arranged to form a film path, means for revolving the inner support and for successively revolving additional supports, and an adjustable stop adapted to engage said supports and hold the same against movement and to successively release the supports for loading.

48. In a developing tank, a plurality of concentric rotatable film supports arranged to form a film path, means for revolving the inner support and for successively revolving additional supports, and an adjustable stop adapted to engage said supports and hold the same against movement and successively release the supports for loading, and an adjustable stop adapted to engage the outer support when the supports are being revolved in the reverse direction and hold the same against revolution.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LOUIS N. CHAPIN.

Witnesses:

ADOLPH F. DIUSE,
HENRIETTA E. WORKMAN.