Nov. 15, 1955 M. MORRISON 2,723,610

FILM DEVELOPING MACHINE

Filed June 30, 1951 3 Sheets-Sheet 1

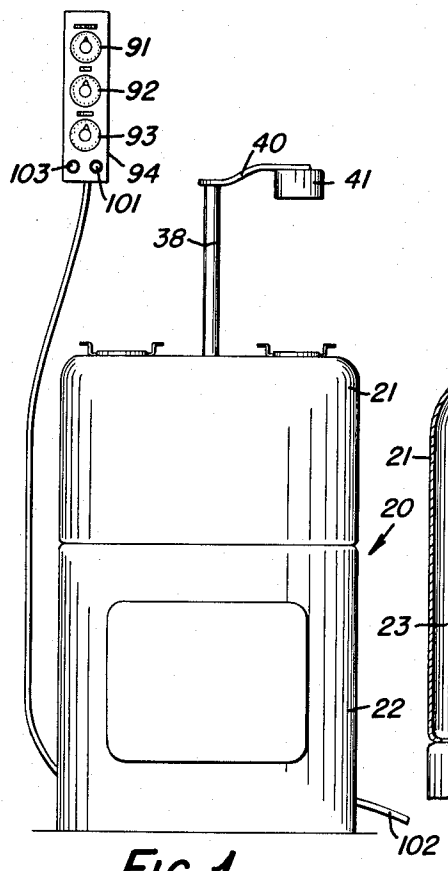


FIG. 1.

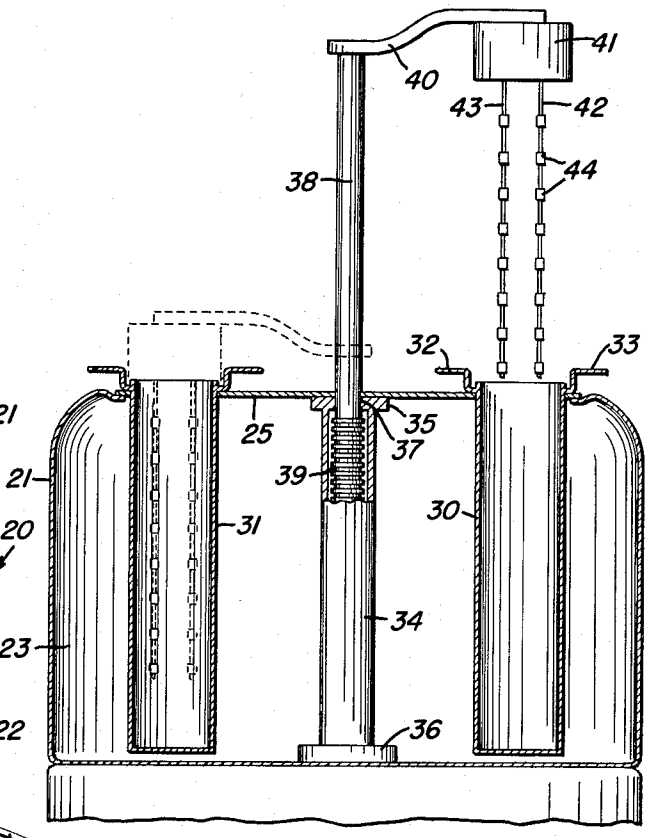


FIG. 2.

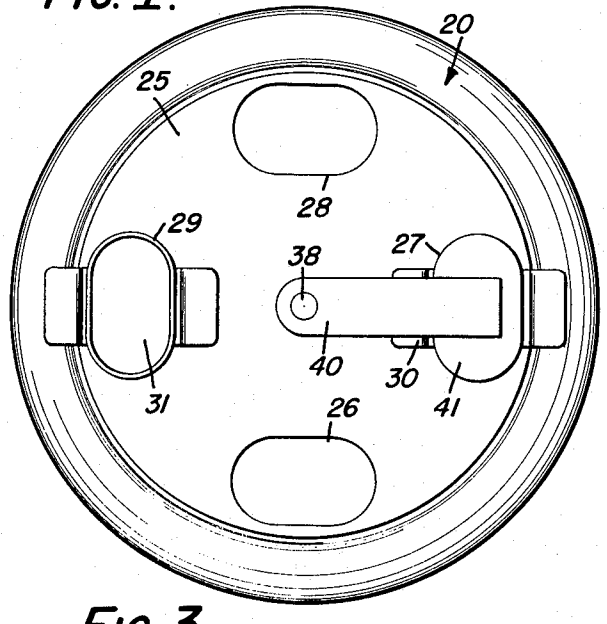


FIG. 3.

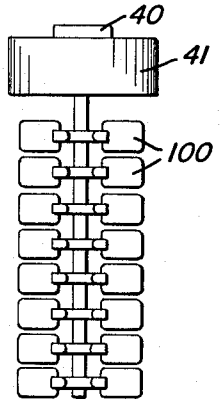


FIG. 4.

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FILM DEVELOPING MACHINE

Filed June 30, 1951 3 Sheets-Sheet 2

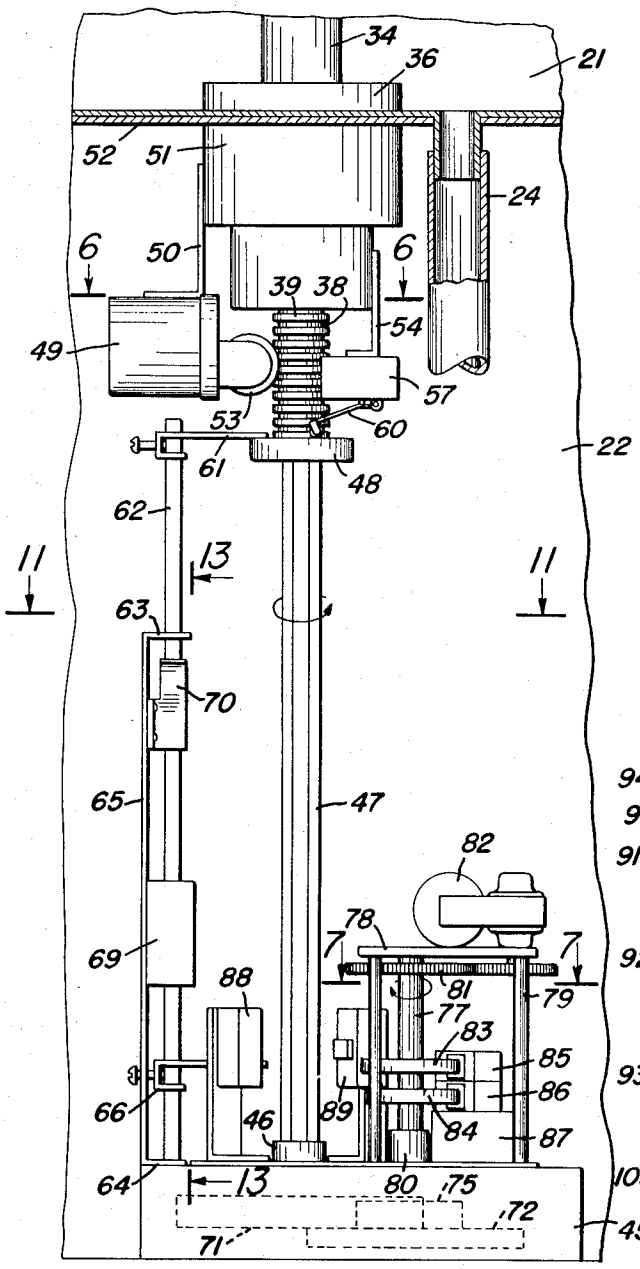


FIG. 5.

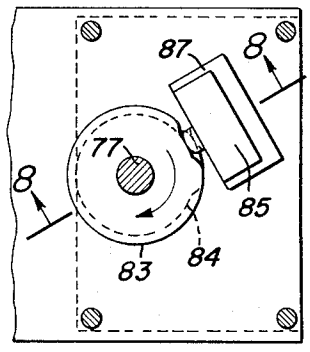


FIG. 7.

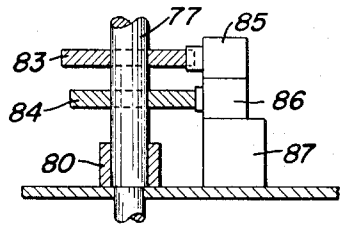


FIG. 8.

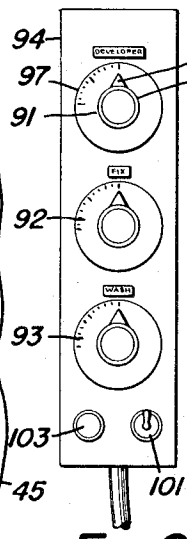


FIG. 9.

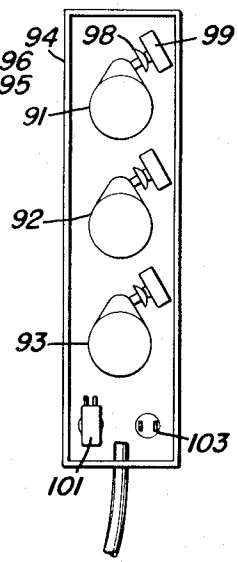


FIG. 10.

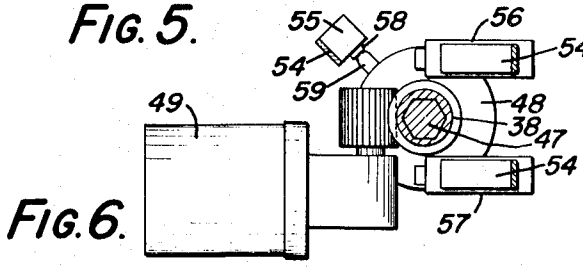


FIG. 6.

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Nov. 15, 1955 M. MORRISON 2,723,610

FILM DEVELOPING MACHINE

Filed June 30, 1951 3 Sheets-Sheet 3

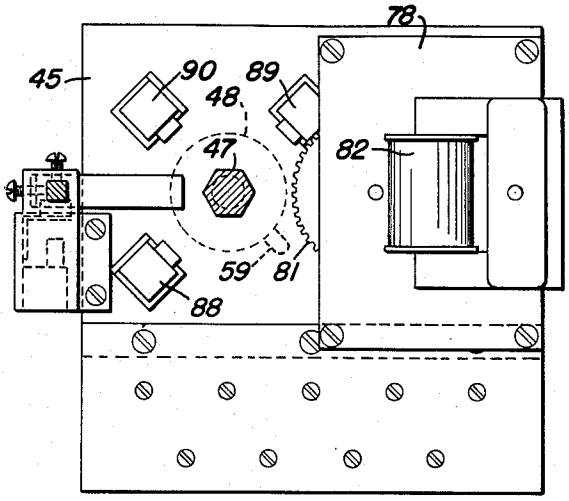


FIG. 11.

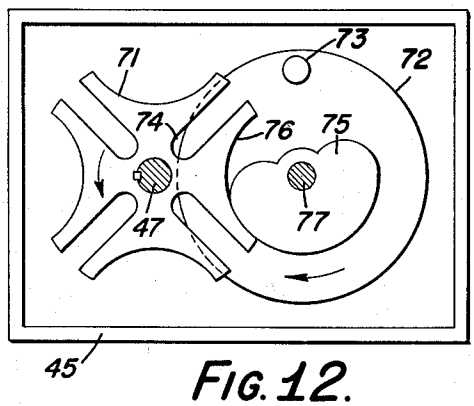


FIG. 12.

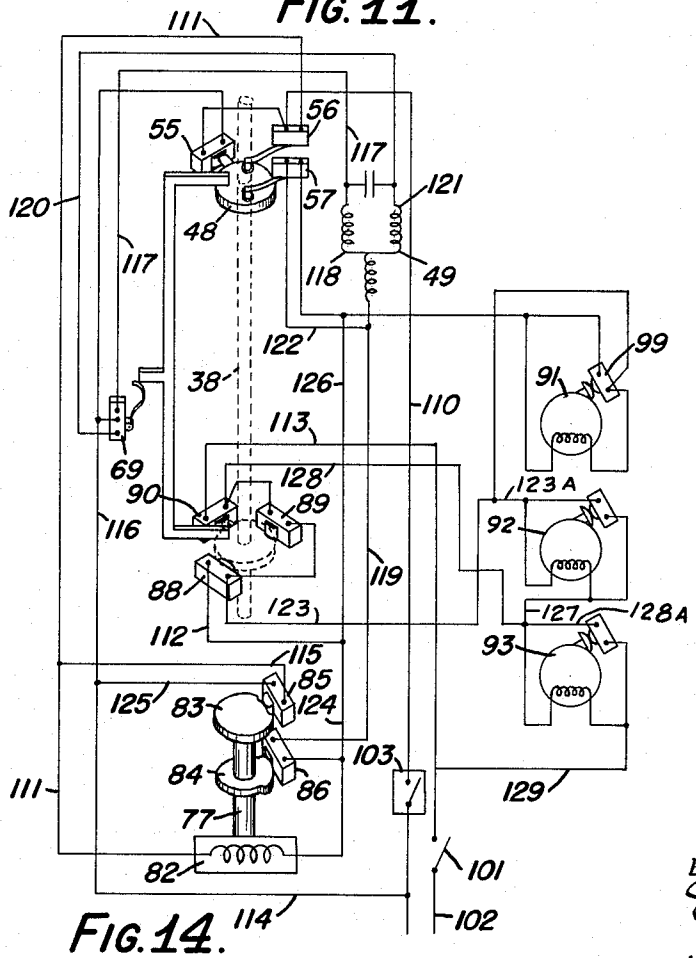


FIG. 14.

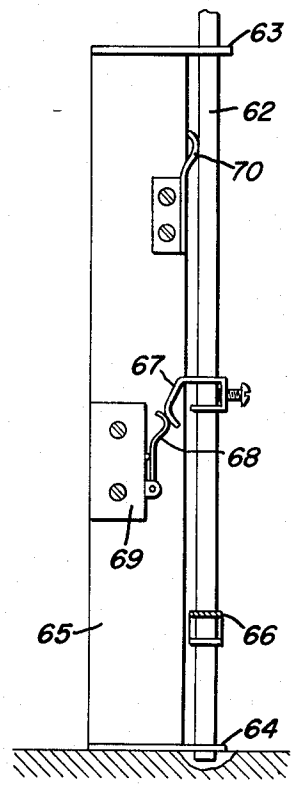


FIG. 13.

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2,723,610

FILM DEVELOPING MACHINE

Montford Morrison, Rochester, N. Y., assignor to Ritter Company, Inc., Rochester, N. Y., a corporation of Delaware

Application June 30, 1951, Serial No. 234,510

13 Claims. (Cl. 95—89)

This invention relates to automatic film developing machines and, more particularly, to the variety of such machines in which the films are held by means rotated intermittently to positions above a plurality of concentrically arranged treating baths in succession and alternately raised and lowered to immerse the films in each bath. One object of the invention is to provide an improved machine of this character which is more simple, efficient and reliable in construction and mode of operation.

Another object is to provide such a machine having film treating parts of minimum number and complexity.

Another object is the provision of such a machine actuated by an electric circuit system adapted to be set in operation by push button means and to thereafter continue automatically a complete cycle of operation.

A further object is to supply a machine of the character described including settable time switch means for automatically controlling the duration of the several steps of the treatment.

Still a further object is to provide a machine having the above advantages and adapted to be readily manufactured and assembled at relatively low cost.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a side elevation of a machine embodying the present invention;

Fig. 2 is an enlarged, central, vertical section of the upper portion of the machine;

Fig. 3 is a top plan view;

Fig. 4 is an elevation of film holding means detached, as seen from the right in Fig. 2;

Fig. 5 is an enlarged, fragmentary elevation, partly in section, of the lower portion of the machine showing the operating mechanism;

Fig. 6 is a sectional plan view on the line 6—6 in Fig. 5;

Fig. 7 is a sectional plan view of switch operating means on the line 7—7 in Fig. 5;

Fig. 8 is a sectional elevation on the line 8—8 in Fig. 7;

Fig. 9 is a front elevation of a time switch mechanism;

Fig. 10 is a rear elevation of parts shown in Fig. 9;

Fig. 11 is an enlarged, plan view on the line 11—11 in Fig. 5;

Fig. 12 is an enlarged, plan view of a star wheel mechanism also shown in broken lines at the bottom of Fig. 5;

Fig. 13 is an enlarged elevation of operating means for a reversing switch as viewed from the line 13—13 in Fig. 5, and

Fig. 14 is a diagram of an electric circuit system for automatically operating the machine.

The invention is embodied in the present instance, by way of illustration, in a machine comprising a generally cylindrical casing indicated generally at 20 and having an

upper container portion 21 and a lower compartment portion 22 for the operating mechanism. The upper portion 21 comprises a container or tank 23 for washing films through which water may be continuously circulated, as by means of suitable pipe connections, one of which is shown at 24 (Fig. 5). Tank 23 has a cover portion 25 formed with four oval-shaped openings, 26 to 29, inclusive. The openings 26 and 28 are merely to afford access to the wash water in the tank, while openings 27 and 29 receive containers, 30 and 31, respectively, for the developing and fixing fluids. The top of each of these containers 30 and 31 is provided with flanges, 32 and 33, serving as handles and for supporting the containers on the cover 25, these containers having open tops, as shown, through which the films may be immersed in their fluids.

A vertically extending sleeve 34 is fixed concentrically in tank 23, as by means of flanges 35 and 36 at its upper and lower ends, and these flanges are formed with bearings, as at 37, for a vertically extending shaft section 38, the lower end of which, within the sleeve 34, is enlarged and hollow and formed with circumferentially extending rack teeth 39, as shown, for a purpose hereafter described. Fixed on the upper end of shaft 38 is a radially extending arm 40, carrying at its outer end a cap 41, of suitable size and shape to fit down over and close the upper ends of the containers 30 and 31, to provide a light-lock, as shown in broken lines in Fig. 2. Cap 41 is equipped internally with known and suitable bracket or clamp means (not shown), for detachably suspending film holding strips, as 42 and 43, provided with clamps 44, of any known and suitable variety, for detachably clamping and holding dental X-ray films, for example, in position for immersion in the container fluids.

The lower portion of the casing for the operating mechanism has a hollow pedestal portion 45 (Fig. 5), the top of which carries a bearing 46 for the lower end of a vertically extending shaft section 47, of angular and preferably hexagonal, cross-sectional shape, and rotatable in the direction shown by the arrow. The upper end of this shaft is fitted telescopically in a similarly shaped bearing (not shown) in the lower end of shaft section 38, so that section 38 may slide longitudinally over section 47 to enable it to be raised and lowered to immerse the films in the containers. The lower end of shaft section 38 has fixed thereon a flange 48, for a purpose hereafter described. It will be seen from this construction that shaft 47 may be rotated in situ, while shaft 38 may rise and fall on shaft 47 and also be rotated thereby.

The means for raising and lowering shaft section 38 comprises an electric motor 49 (Fig. 5), supported by a bracket 50 on a housing and bearing portion 51 for the shaft fixed to the top 52 of the casing compartment. Motor 49 drives a pinion 53 meshing with the rack teeth 39 of the shaft. Housing 51 also supports by brackets, as 54, a plurality of electric switches 55, 56 and 57 (Figs. 5 and 6), arranged adjacent the flange 48 on the lower edn of shaft section 38 in the upper position thereof. Switch 55 is preferably of the known "Switchette" variety having a depressable element 58 normally spring actuated to switch closing position, but capable of being depressed to open the switch. This switch serves the function of stopping the operation of the machine at the end of each cycle, as hereafter described, being actuated by a finger 59 (Fig. 6) fixed in and projecting radially from the shaft flange 48.

Switches 56 and 57 are preferably of the known "Micro Switch" variety, having roller tipped arms 60 (Fig. 5), for operating plunge elements normally actuated by spring means, as well understood in the art. Switch 56 is normally spring actuated to open position and serves to control the indexing operation of the shaft sections from

container to container. Switch 57 is normally spring actuated to closed position and serves to limit the upward movement of shaft section 38, as hereafter described.

The means for reversing the direction of rotations of motor 49, to alternately raise and lower shaft section 38 comprises, preferably, a bracket 61 fixed on the upper end of a vertical rod 62 sliding in bearings in flanges 63 and 64 of a plate 65 fixed on the casing. Bracket 61 has its outer end extending into the path of the extreme upward movement of flange 48 and rod 62 carries at its lower end a bracket 66 having its outer end extending into the path of the extreme lower movement of flange 48, for sliding rod 62 vertically a short distance as the flange reaches the ends of its upward and downward movement. Rod 62 carries a finger 67 (Fig. 13) arranged to actuate the lever 68 of a "Micro Switch" 69, of known and suitable construction, as flange 48 strikes bracket 66 and moves rod 62 downwardly, the switch being wired in the circuit of motor 49 to reverse its direction of rotation for raising and lowering shaft section 38. Plate 65 carries a spring finger 70 bearing on rod 62 to frictionally resist its movement except when actuated as described above.

The means for rotating shaft section 47 and with it the upper shaft section 38 comprises, preferably, a "star wheel" device, of known and suitable construction, such as the star wheel 71 shown in broken lines in Fig. 5 and in full lines in Fig. 12, this wheel being keyed to the lower end of shaft section 47 which projects through its lower bearing 46 into the casing pedestal portion 45. Wheel 71 is actuated by disk means 72 carrying a pin 73 for engagement in the slots 74 of the wheel and a cam portion 75 for locking engagement with the circular edge recesses 76 of the wheel to hold the same stationary, as well understood in the art. Disk 72 is fixed on the lower end of a shaft 77 journalled at its ends in a top plate 78 of a supporting frame 79 (Fig. 5) and in a bearing 80 on the pedestal 45. Shaft 77 is rotated in the direction indicated by the arrow by a geared connection 81 with an electric motor 82 mounted on top plate 78, as shown. Shaft 77 has fixed thereon also a pair of cams, 83 and 84, for actuating a pair of "Switchettes," 85 and 86, respectively, the switches being mounted on a supporting block 87 on the pedestal, as shown. Switch 85 is normally spring actuated to open position and serves to control the indexing rotation of the shaft sections, while switch 86 is normally spring actuated to open position and serves to control the excitation of the motor 49 for raising and lowering he upper shaft section 38, as hereafter described. Indexing motor 82 is controlled, as hereafter described, to effect a complete rotation of shaft 77 for each indexing movement of shaft sections 38 and 47.

The variable timing of the immersion of the films in the several treating fluids is controlled by a series of "Switchettes," 88, 89 and 90 (Figs. 5 and 11), supported on brackets on casing pedestal 45 adjacent the lower end of the travel of flange 48 of the upper shaft section 38 in position to be selectively engaged and opened by finger 59 on flange 48, as hereafter set forth. Switch 88 is connected in circuit with time switch means for controlling the duration of immersion of the films in the container 30 for the developing fluid. Switch 89 is connected in circuit with the time switch means for the fixing container 31 and switch 90 with the time switch for the final immersion in the washing water through opening 26 in the top of the casing.

The time switch mechanism preferably comprises three settable time switches, 91, 92 and 93, of known and suitable construction, arranged in vertically spaced relation in a single housing 94 (Figs. 1, 9 and 10). Each switch has an operating knob, as 95, carrying a pointer 96 adapted to be rotated counterclockwise to a selected position over a dial 97 graduated in minutes of time. Such setting of the indicating pointer tensions a spring actuated mechanism, including gearing for rotating a switch actuating finger as 98 (Fig. 10), for actuating a switch 99 of a "Switchette" connected in the controlling circuit, as hereafter described. Each of these time switches is constructed as described and the setting of the pointer moves the switch actuating finger 98 in a counterclockwise direction (Fig. 10) to a set position more or less distant from its switch, so that on release of the spring mechanism, finger 98 travels for a variably selected period before actuating its circuit switch 99, as well understood in the art.

In starting position, the shaft section 38 is in raised position with its arm 40 and film holding means above opening 26 in the tank cover as at the completion of the previous cycle. The films to be treated, such as the dental X-ray films 100, are fastened in the clamps 44 of the immersing strips 42 and a main switch 101 is closed to connect the operating circuit to the power line 102 (Fig. 14). The machine cycle is then initiated by closing a manually operable switch 103, preferably of the push button type, thereby establishing a circuit from one side of the power line through conductor 110 and through index switch 56 which is initially closed by engagement by shaft flange 48 in its uppermost position. The circuit then passes through conductor 111 through the indexing motor 82 and through conductor 112 to switches, 88, 89 and 90. The circuit passes in succession through these three switches, which are all normally closed, to a conductor 113 and thence through the main switch 101 to the other side of the power line. This energizes the motor 82 to actuate the star wheel and rotatably index the shaft arm 40 to a position above opening 27 in the top of the casing and the container 30 for the developing fluid, as shown in Figs. 2 and 3. Such rotation of the index motor 82, shaft 77 and its cam 83 serves to close switch 85, with the result that current passes through another circuit comprising conductor 114 outside the push button, through switch 85, conductors 115 and 111, the index motor 82 and switches 88, 89 and 90, to conductor 113 and thence to the other side of the power line, energizing the motor and indexing the film holder to a position substantially above opening 27 in the top of the casing and above container 30 for the developing fluid, as shown in Figs. 1 and 2. This provides current to the indexing motor after push button 103 has been released and allows the machine to complete its cycle of operation, as hereafter described.

Just prior to shaft 77 completing a full revolution and before the film holder has reached a position of 90° from its initial position, cam 84 momentarily closes switch 86 allowing current to pass through conductors 114 and 116 to reversing switch 69, which is in the position for rotating motor 49 to lower the shaft section 38. From this switch 69 the circuit passes through conductor 117 to motor 49 and through its winding, indicated at 118, for rotating the motor in the direction to lower the films into the developing fluid, the circuit continuing through conductor 119 and through switch 86 to switches 88, 89 and 90 to the other side of the power line. As shaft 77 rotates through the few remaining degrees to complete a full revolution thereof, shaft 38 starts downwardly as a result of the closing of the above circuit and opens index switch 56 and closes limit switch 57 which is in parallel with switch 86 and which closes a second circuit to motor 49. When shaft 77 completes its rotation, cam 83 opens switch 85 while cam 84, having passed beyond switch 86, allows the same to open, thereby putting the circuit to motor 49 under the control of switch 57. As push button 103 has been released, switch 85 now opened by cam 83, and switch 56 now opened by the downward movement of shaft 38, as described above, all three circuits to indexing motor 82 are open and will remain open until the end of the developing period when the shaft will rise again and close switch 56 to initiate the next indexing operation.

As shaft section 38 reaches its lowered, film-immersing position, its flange 48 strikes bracket 66, lowering rod 62 and moving switch 69 to a reversed position for raising the films after a selected delay interposed by the time

switch mechanism. Finger 59 on shaft disk 48 engages and opens switch 88 thereby opening one circuit to the raising motor and placing the control of the raising motor under a second circuit which is in parallel with switches 57 and 88 and comprises switch 56 and time switch 91, as hereafter set forth. Reversal of switch 69 establishes a circuit through conductor 114, switch 69, conductor 120, and winding 121 of motor 49 to drive it in a direction to raise the shaft section 38. From the motor the circuit passes through conductor 122 to the switch 57 which is closed while the shaft disk 48 is lowered out of contact with it. As the current passes from switch 57 to time switch 91 it releases switch 91 for operation through the period for which it is set. On completion of such period, the time switch closes and completes a circuit through conductor 123 and through switches 89 and 90 which are closed while the finger 59 of the shaft disk 48 is indexed out of contact therewith. From switches 89 and 90 the circuit passes through conductor 113 to the other side of the service line. The shaft then rises to withdraw the films from the developing fluid.

As the shaft section 38 reaches its upper position over the developer container, its flange 48 engages bracket 61 to slide rod 62 upwardly and reverse switch 69. The flange also engages and opens the limit switch 57 to stop the rise of the shaft and break the circuit through the timing device. It also closes the indexing switch 56 to establish a circuit through conductors 114 and 116, the normally closed stopswitch 55, the closed index switch 56, conductor 111, index motor 82, conductor 124, switches 88, 89 and 90 and conductor 113 to the other side of the power line. This starts the indexing motor, so that cam 83 closes index switch 85 after which the circuit is completed through conductors 114 and 125, switch 85, conductor 111, index motor 82 and back to the other side of the line through switches 88, 89 and 90. This allows excess fluid to drain back from the films into the developer tank for a period of fifteen seconds while the star wheel disk 72 is making a major portion of its revolution from the position shown in Fig. 12 to the position for reengaging the star wheel. When the parts reach that position the films are indexed around over "rinse" opening 28 in the tank cover above the washing water in the tank. The circuit connections are then the same as described above for stopping the indexing movement and for lowering of the films into the developer container except that as shaft flange 48 reaches its lowermost position, its switch actuating finger 59 lies between switches 88 and 89, so that switches 88, 89, and 90 are left closed. The descent of the shaft reverses switch 69, as described above, and the shaft immediately rises, without dwell, to its uppermost position.

The connections are then the same as those established by the rise of the shaft from the developer container, as described above, the wash water being allowed to drain back into the tank for about fifteen seconds while the star wheel device is starting an operation which finally indexes the film around over opening 29 and the container for the fixing fluid. The connections are then the same as during the lowering of the film into the container for the developing fluid, as described above, and the shaft is lowered to immerse the films in the fixing fluid. As the shaft reaches its lowermost position relative to this container, a circuit is established through conductor 114, the reversing switch 69, conductor 120 and winding 121 of motor 49, thence through conductor 122 and switch 57. From the switch the current passes through conductors 126 and 112 to switch 88, and as switch 89 has been opened by finger 59 engaging the same as the shaft reaches its lowermost position, the current thence passes through a second or parallel circuit to the raising winding 121 of motor 49 comprising conductors 123 and 123A and the time mechanism 92 for the fixing bath. As this mechanism has been set to its desired period of delay, the circuit is kept open,

to produce a dwell in the bath, until the time mechanism closes its circuit switch 92, after which the circuit is completed through conductors 127 and 128 to switch 90 and conductor 113 back to the other side of the line. This energizes motor 49 in a direction to raise the shaft to its uppermost position in which the connections are the same as described above for the dwell over the rinse opening 28 in the tank cover, followed by indexing of the film holder to a position above the next opening 26.

As the star wheel mechanism completes its operation, the films are indexed around over opening 26 in the tank cover above the washing water, at which point the shaft is lowered to wash the films. As the shaft reaches its lowermost position in this washing opening, it establishes a circuit through conductor 114, reversing switch 69, conductor 120 and the winding 121 of motor 49 which rotates the motor in a direction to raise the shaft. This time finger 59 engages and opens switch 90 and causes the current to pass through a second or parallel circuit, hereafter described, to the raising winding 121 of motor 49. That is, from the motor the circuit continues through conductor 122, switch 57 and conductors 126 and 112 to switch 88. From this switch the circuit continues through switch 89 and conductors 128 and 128A to the time switch mechanism 93 for the washing period, switch mechanism 93 being in parallel with switch 90, as shown in Fig. 14. Since this mechanism has been set to a desired period of dwell, the film holding mechanism remains stationary until, at the end of such period, the time switch closes to establish a connection through conductor 129 with the other side of the line. The shaft section 38 then rises to its uppermost position and opens switch 57 for stopping the upward movement of the shaft. That is, as shaft 38 reaches its uppermost position, its flange finger 59 engages and opens stop switch 55, with the result that the parts come to rest over opening 26, ready for replacement of the films for another cycle of operation.

It will thus be seen that the invention accomplishes its objects and while it has been herein disclosed by reference to the details of a preferred embodiment, it is to be understood that such disclosure is intended in an illustrative, rather than a limiting sense, as it is contemplated that various modifications in the construction and arrangement of the parts will readily occur to those skilled in the art, within the spirit of the invention and the scope of the appended claims.

I claim:

1. In a film developing machine, a casing, an upwardly extending shaft, bearing means in said casing supporting said shaft for rotary and for longitudinal raising and lowering movements, a plurality of fluid containers in said casing spaced concentrically about said shaft, film holding means arranged on said shaft for lowering films into said containers, means for intermittently rotating said shaft for positioning said film holding means above successive containers, means for raising and lowering said shaft to immerse said films in the container fluids, electric motor means for actuating said shaft raising and lowering means and said shaft rotating means, an electrical network connectable to a source of electrical energy for actuating said motor means, said electrical network comprising a first switch means actuated by said shaft when in its uppermost position for initiating rotation of said shaft, a second switch means momentarily closed and reopened by said rotating means adjacent the end of the indexing operation for closing a first circuit to said raising and lowering means for initiating lowering of said shaft, the downward movement of said shaft from its uppermost position opening said first switch means and closing a third switch means for closing a second circuit to said raising and lowering means, and a fourth switch means actuated by said shaft in its lowermost position for reversing said raising and lowering means for raising said shaft, said shaft when

in its uppermost position opening said third switch means for stopping the upward movement of said shaft, said shaft also when in its uppermost position reversing said fourth switch means for reversing said raising and lowering means and completing a portion of a timed cycle of operation of said shaft.

2. A film developing machine as specified in claim 1 in which said first and second circuits to said raising and lowering means include switch means actuated by said shaft when in its lowermost position for opening said second circuit to said raising and lowering means for stopping the movement of said shaft, and settable time switch means for holding open said second circuit for a predetermined length of time for holding said shaft in said lowermost position and the films in immersed position, said time switch means thereafter closing said second circuit for raising said shaft.

3. In a film developing machine, a casing, an upwardly extending shaft, bearing means in said casing supporting said shaft for rotary and for longitudinal raising and lowering movement, a plurality of fluid containers in said casing spaced concentrically about said shaft, film holding means arranged on said shaft for lowering films into said containers, an indexing device for intermittently rotating and stopping said shaft for positioning said film holding means above successive containers, driving means comprising an electric motor for actuating said indexing means, an elevating device for raising and lowering said shaft to immerse said films in said container fluids, a second driving means comprising a second electric motor for actuating said elevating means, an electrical network connectable to a source of electrical energy for actuating said driving means, said electrical network comprising a first switch means actuated by said shaft when in its uppermost position for closing the circuit to said first driving means for initiating rotation of said shaft, a second switch means momentarily closed and reopened by said indexing means adjacent the end of the indexing operation for closing a first circuit to said second driving means for initiating lowering of said shaft, the downward movement of said shaft from its uppermost position opening said first switch means and closing a third switch means for closing a second circuit to said second driving means, a fourth switch means actuated by said shaft in its lowermost position for reversing said second driving means for raising said shaft, said shaft when in its uppermost position opening said third switch means for stopping the upward movement of said shaft, said shaft also when in its uppermost position reversing said fourth switch means for reversing said second driving means and completing a portion of a timed cycle of operation of said shaft.

4. A film developing machine as specified in claim 3 in which said first and second circuits to said second driving means include switch means actuated by said shaft when in its lowermost position for opening said second circuit to said second driving means for stopping the movement of said shaft, and settable time switch means holding open said second circuit to said second driving means for a predetermined length of time for holding said shaft in said lowermost position and the films in immersed position, said time switch means thereafter closing said second circuit for raising said shaft.

5. A film developing machine as specified in claim 4 in which said elevating device comprises a rack and pinion for raising and lowering said shaft to immerse said film in the container fluids.

6. A film developing machine as specified in claim 4 in which said indexing device comprises a star wheel device for intermittently rotating and stopping said shaft to position said film holding means above successive containers.

7. A film developing machine as specified in claim 4 in which said indexing device comprises a star wheel device for intermittently rotating and stopping said shaft for positioning said film holding means above successive containers, and said elevating device comprises a rack and pinion for raising and lowering said shaft to immerse said films in the container fluids.

8. In a film developing machine, a casing, an upwardly extending shaft, bearing means in said casing supporting said shaft for rotary and for longitudinal raising and lowering movements, a plurality of fluid containers in said casing spaced concentrically about said shaft, film holding means arranged on said shaft for lowering films into said containers, an indexing device for intermittently rotating and stopping said shaft for positioning said film holding means above successive containers, driving means comprising an electrical motor for actuating said indexing means, an elevating device for raising and lowering said shaft to immerse said films in the container fluids, a second driving means comprising a second electric motor for actuating said elevating means, an electrical network connectable to a source of electrical energy for actuating said driving means, said electrical network comprising a manually operable switch for closing the circuit to said first driving means for initiating rotation of said shaft, a second switch means momentarily closed and reopened by said indexing means adjacent the end of the indexing operation for closing a first circuit to said second driving means for initiating lowering of said shaft, the downward movement of said shaft from its uppermost position closing a third switch means for closing a second circuit to said second driving means, a fourth switch means actuated by said shaft in its lowermost position for reversing said second driving means for raising said shaft, said shaft when in its uppermost position opening said third switch means for stopping the upward movement of said shaft, said shaft also when in its uppermost position reversing said fourth switch means for reversing said second driving means and completing a portion of a timed cycle of operation of said shaft.

9. A film developing machine as specified in claim 8 in which said first and second circuits to said second driving means include switch means actuated by said shaft when in its lowermost position for opening said second circuit to said second driving means for stopping the movement of said shaft, and settable time switch means for holding open said second circuit to said second driving means for a predetermined length of time for holding said shaft in said lowermost position and the films in immersed position, said time switch means thereafter closing said second circuit for raising said shaft.

10. In a film developing machine, a casting, an upwardly extending shaft, bearing means in said casing supporting said shaft for rotary and for longitudinal raising and lowering movements, a plurality of fluid containers in said casing spaced concentrically about said shaft, film holding means arranged on said shaft for lowering films into said containers, an indexing device for intermittently rotating and stopping said shaft for positioning said film holding means above successive containers, driving means comprising an electrical motor for actuating said indexing means, an elevating device for raising and lowering said shaft to immerse said films in the container fluids, a second driving means comprising a second electric motor for actuating said elevating means, an electrical network connectable to a source of electrical energy for actuating said driving means, said electrical network comprising a manually operable switch for closing a first circuit to said first driving means for initiating rotation of said shaft, a second switch means actuated by said first driving means for closing a second circuit to said first driving means for continuing the rotation of said shaft into position over the next successive container, said indexing means opening said second switch means adjacent the end of each indexing operation for stopping said shaft in position above the desired one of said containers, a third switch means momentarily closed and reopened by said indexing means adjacent the end of the indexing operation for closing a first circuit

to said second driving means for initiating lowering of said shaft, the downward movement of said shaft from its uppermost position closing a fourth switch means for closing a second circuit to said second driving means, a fifth switch means actuated by said shaft when in its lowermost position for reversing said second driving means for raising said shaft, said shaft when in its uppermost position opening said fourth switch means for stopping the upward movement of said shaft, said shaft also when in its uppermost position reversing said fifth switch means for reversing said second driving means, and completing a portion of a timed cycle of operation of said shaft.

11. A film developing machine as specified in claim 10 in which said first and second circuits to said second driving means include switch means actuated by said shaft when in its lowermost position for opening said second circuit to said second driving means for stopping the movement of said shaft, and settable time switch means for holding open said second circuit for a predetermined length of time for holding said shaft in said lowermost position and the films in immersed position, said time switch means thereafter closing said second circuit for raising said shaft.

12. A film developing machine as specified in claim 11 in which said shaft also when in its uppermost position closes a further switch means for closing a third circuit to said first driving means for initiating a second indexing of said shaft for completing a portion of a timed cycle of operation of said shaft, said further switch means being opened by the next downward movement of said shaft.

13. In a film developing machine, a casing having an upper tank portion for washing fluid and a lower compartment portion for housing operating mechanism, a shaft extending upwardly and concentrically through said casing portions, bearing means in said casing supporting said shaft for rotary and longitudinal sliding movements, a plurality of containers for developing and fixing fluids spaced concentrically about said shaft in said tank portion and having open tops, a laterally extending arm on said shaft provided with a cap arranged to fit over said container for developing fluid and providing a light-lock therefor, film holding means depending from said cap for lowering films into said fluid, an indexing device for intermittently rotating and stopping said shaft to position said film holding means above successive containers, driving means comprising an electric motor for actuating said indexing means, an elevating device for raising and lowering said shaft to immerse said films in said container

fluids, a second driving means comprising a second electric motor for actuating said elevating means, an electrical network connectable to a source of electrical energy for actuating said driving means, said electrical network comprising a first switch means actuated by said shaft when in its uppermost position for closing the circuit to said first driving means for initiating rotation of said shaft, a second switch means momentarily closed and reopened by said indexing means adjacent the end of the indexing operation for closing a first circuit to said second driving means for initiating lowering of said shaft, the downward movement of said shaft from its uppermost position opening said first switch means and closing a third switch means for closing a second circuit to said second driving means, a fourth switch means forming part of said first and second circuits to said second driving means, said fourth switch means being actuated by said shaft when in its lowermost position for opening said second circuit to said second driving means for stopping the movement of said shaft, settable time switch means actuated by the opening of said fourth switch means for holding open said second circuit to said second driving means for a predetermined length of time for holding said shaft in said lowermost position and the films in immersed position, said time switch means thereafter closing said second circuit, and a sixth switch means actuated by said shaft in its lowermost position for reversing said second driving means for raising said shaft upon the closing of the settable time switch means, said shaft when in its uppermost position opening said third switch means for stopping the upward movement of said shaft, said shaft also when in its uppermost position reversing said sixth switch means for reversing said second driving means and completing a portion of a timed cycle of operation of said shaft.

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