April 19, 1960 E. L. E. PARDEE 2,933,032

PHOTOGRAPHIC FILM AND PAPER PROCESSING MACHINE

Filed Feb. 25, 1957 2 Sheets-Sheet 1

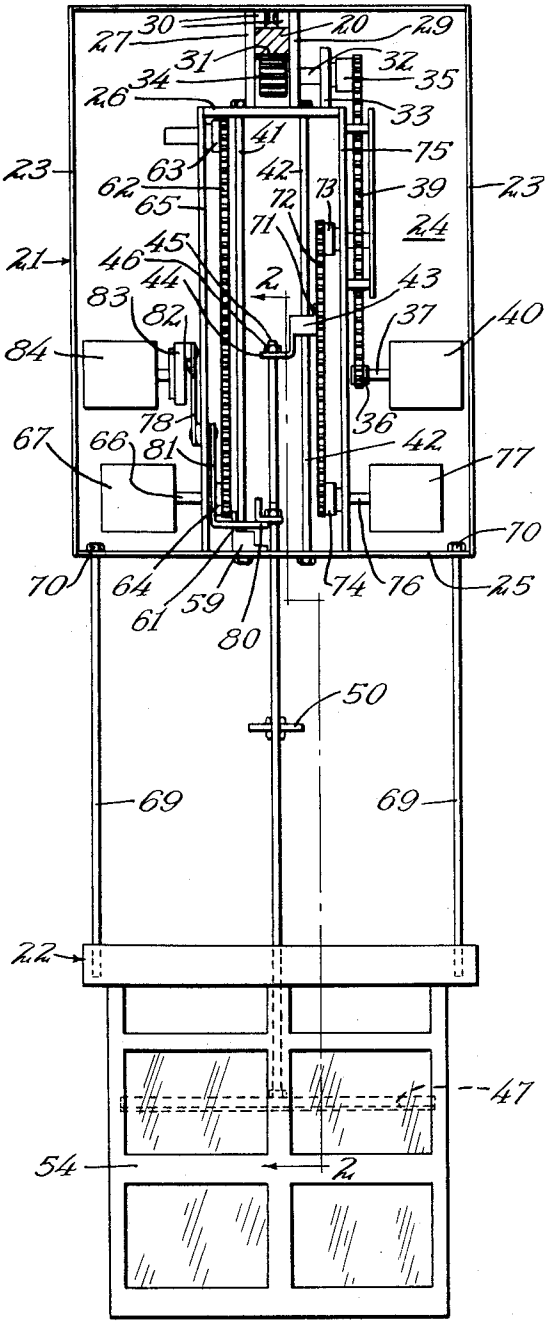


FIG. 1

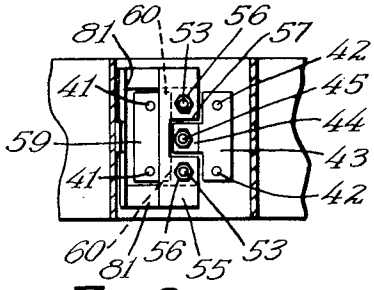


FIG. 3

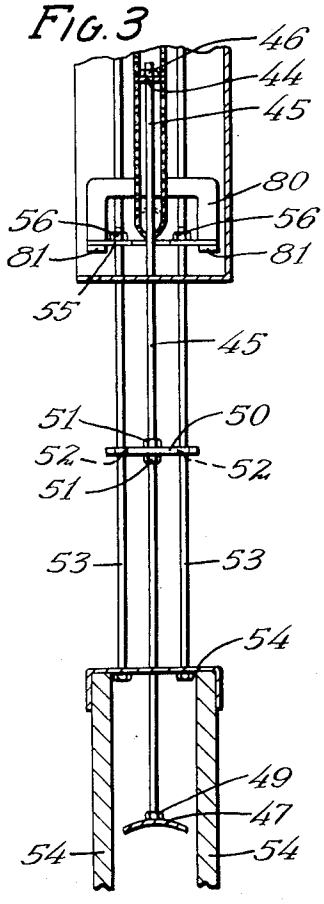


FIG. 2

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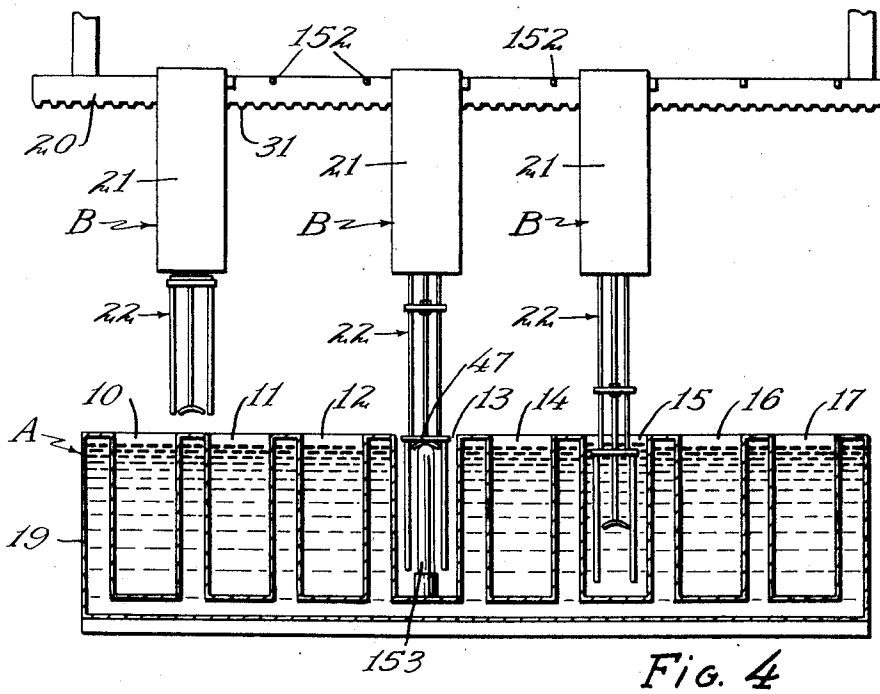


Fig. 4

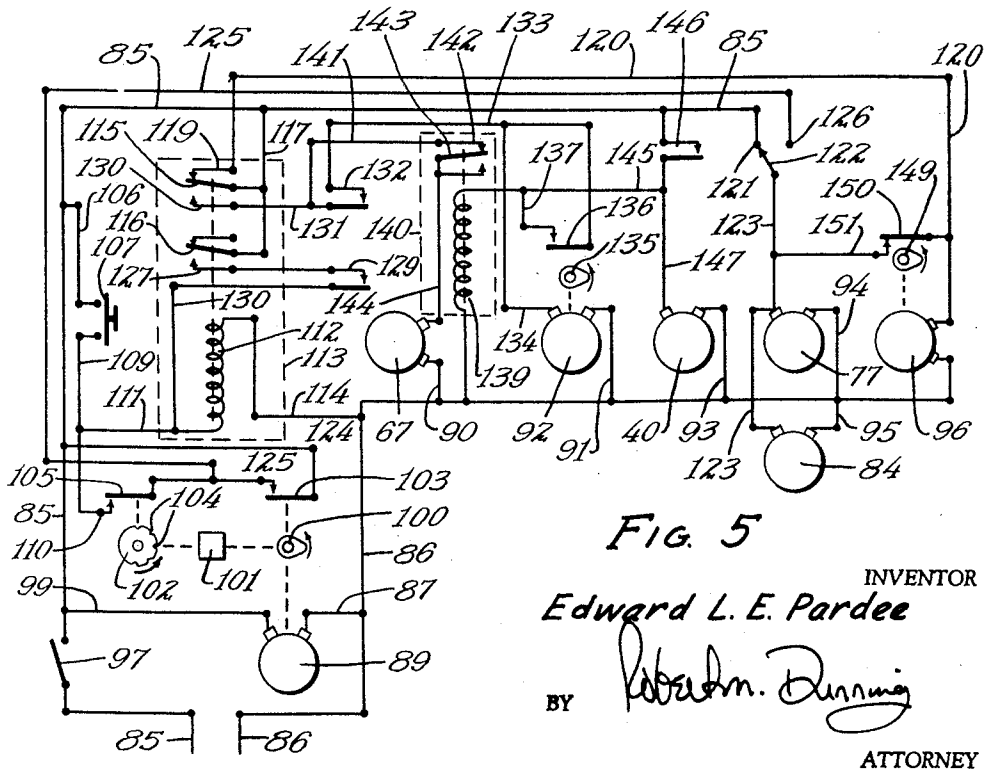


Fig. 5

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2,933,032

PHOTOGRAPHIC FILM AND PAPER PROCESSING MACHINE

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Application February 25, 1957, Serial No. 641,976

6 Claims. (Cl. 95—89)

This invention relates to an improvement in photographic film and paper processing machine and deals particularly with a machine of the type described which is completely automatic.

Silver halide types of photographic materials, whether designed for the reproduction of color or simply black and white, are processed by subjecting them to the action of a series of chemical solutions, under controlled conditions. In the processing of color positive or so called "reversal" materials, the sequence of operations includes a light exposure in which the whole image area is flooded with white light. Generally speaking, the variables which must be controlled are, chemical composition of the solutions, time of treatment in each solution, temperature of the solutions, agitation of each solution, and secondary light exposures.

Various devices have been previously produced which comprise semi-automatic devices for use in such processes. For example, machines have been produced for agitating the solutions either mechanically or through the use of a gas bubble system. Timing devices have been produced which signal the dark room operator when the materials being processed should be transferred from one solution to another, such transfer being ordinarily a manual operation.

Automatic equipment has also been marketed in which rolls of motion picture film or shorter pieces of film which are joined in end to end relation pass through a series of solutions, the film moving like a long ribbon through the bath under controlled conditions. Other types of equipment have also been produced which hold strips of film or sheet film in hanger frames and these frames are lowered and raised and laterally transported from one open top tank of solution to another by means of an endless belt or chain passing over properly spaced pulleys or sprockets.

An object of the present invention lies in the provision of an apparatus which is unlike any of the previous equipment with which I am familiar in that it is an automatic batch processor as distinguished from a continuous processor and in that each batch of film is completely handled by a robot device which travels from one solution tank to another carrying with it not only the batch of film being processed but also the agitating mechanism used for stirring the various solutions during processing. A series of these robots can work side by side independently of each other, each moving from one tank to the next as required and each processing a batch of film or other photographic material so effectively and efficiently that their combined output might even be greater than that of a continuous machine. Furthermore, one such robot or carriage may follow another as long as they are spaced far enough apart so that there can be no interference between the successive robots or carriages during the treating operation.

A feature of the present invention lies in the provision of a photographic processing apparatus including a series of open topped tanks which are themselves preferably

immersed in one or more larger temperature controlled tanks. The open topped tanks are aligned in preferred form and a track is supported above the level of the tanks on which the robots or carriages are supported. During the travel of each carriage from one end of the track to the other, the film supported by the carriage passes through the various necessary stages to completely process the film.

A further feature of the present invention resides in the fact that each carriage supports pairs of standard film hangers or other suitable frames on which the film to be processed is supported. Each carriage also includes an agitator and a means of operating the agitator so that the solution in each tank is agitated at the time the film is supported therein. The carriage also includes means for lowering the film into each tank for a predetermined period of time as determined by a program timing device. Each carriage also includes means for moving itself from one stage to another into position above the treating tanks. The program timer may also be arranged so that the treating time in one tank may be substantially different from the treating time in another tank. Means are also provided whereby the treatment in certain of the tanks may be eliminated and so that the film passes through only the necessary steps to fully process it depending upon the type of film being processed. In other words, in the processing of black and white film, the apparatus may be arranged to treat the film in only selected tanks and to skip others required for the more complicated processing of color film.

A further feature of the present invention resides in the fact that the film being processed may in itself be moved in the tank independently of the agitating means and at a rate of speed which is entirely independent of the rate of movement of the agitator so as to break up any rhythm which might result from the regular movement of the agitator in the solution and thereby cause irregularity in the treating process.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification:

Figure 1 is a diagrammatic front elevational view of one of the robots or carriages showing the general arrangement of parts therein.

Figure 2 is a sectional view on the line 2—2 of Figure 1 showing a part of the operating mechanism.

Figure 3 is a plan view extending diagrammatically on a horizontal plane through a portion of the robot shown in Figures 1 and 2.

Figure 4 is a diagrammatic view showing in side elevation a series of treating tanks, the robot supporting track, and a series of robots mounted thereupon.

Figure 5 is a diagrammatic view of the wiring diagram showing a typical method of operation of the apparatus.

In view of the fact that the details of construction may vary considerably, the structure is shown diagrammatically in the drawings. However, the structure is believed sufficiently clear to be readily understood by anyone skilled in the art.

In Figure 4 of the drawings a tank structure A is illustrated which includes a series of open topped treating tanks 10, 11, 12, 13, 14, 15, 16 and 17. Eight tanks have been shown for the purpose of illustration, it being understood that additional tanks could also be employed or that this number may be increased or reduced to suit individual needs.

The tanks 10 through 17 are preferably enclosed in an outer tank 19 which preferably is filled with a liquid maintained at a desired treating temperature. In the simple arrangement illustrated, the fluid in all of the various tanks is constant and equal. It will be understood, how-

ever, that the tank 19 could be divided into a series of smaller tanks by suitable partition walls or the like and each section may be maintained at a different treating temperature if necessary. As such tanks and the control thereof are well known in the art, no details of the arrangement are illustrated.

A track 20 is supported above the level of the tanks to extend over the tanks and in a direction parallel thereto. The track D is designed to support a series of robots or carriages which are illustrated in general by the letter B. Each track 20 may support one or a series of such robots B, care being taken to maintain these carriages in sufficiently spaced relation so that the operation of one cannot interfere with the operation of the other. Each robot B includes a mechanism housing 21 and a film supporting structure 22 which is suspended from the mechanism housing 21, the construction of which will be described in detail.

The mechanism housing 21 is shown as including side panels such as 23, front and rear wall panels such as 24, and a bottom panel such as 25. A horizontal supporting plate 26 is supported by the rear panel 24 and includes a pair of vertical spaced guide plates 27 and 29 which extend on opposite sides of the track 20. Rollers 30 or other suitable means are rotatably supported by the plates 27 and 29 and rest upon the upper surface of the track 27, these rollers acting as a support for the carriage or robot B. The track 20 extends through suitable openings in the front and rear panels 24 so that the carriage may move longitudinally of the track.

As is indicated in Figure 4 of the drawings, the track 20 is in the form of an inverted gear rack having gear teeth 31. A shaft 32 is supported by the guide plates 27 and 29 and by a parallel supporting plate 33 and a pinion 34 is mounted upon the shaft 32 in engagement with the rack teeth 31. A sprocket 35 rotates with the pinion 34 and is connected to a cooperable sprocket 36 on the motor shaft 37 by a suitable chain 39. The shaft 37 comprises the driven shaft of a motor 40 which preferably includes a gear reduction unit so as to slow the speed of operation of the driven shaft 37 to a speed practical for moving the carriage along the track. When the motor 40 is energized, its movement will be transmitted from the driven shaft 37 through the chain 39 to the shaft 32, rotating the sprocket 34 and moving the carriage B along the track. Suitable means are provided which will be later described to control the circuit to the motor 40 and to interrupt the circuit at predetermined positions along the length of the track 20.

A series of four rectangularly arranged spaced guide shafts extend from the supporting plate 26 to the bottom panel 25 of the enclosure 21. Two of these guide rods 41 are on one side of transverse center and the other pair of rods 42 are on the opposite side of center. A cross head 43 is slidably supported on the vertical shafts 42 and the cross head 43 includes a centrally projecting tongue 44 which is connected to the upper end of a central shaft 45.

As is indicated in Figures 1 and 2 of the drawings, the rod 45 extends through the offset projecting end 44 of the cross head 43 and is provided at its upper end with a bearing nut 46. A slightly bowed agitator blade 47 is centrally connected at 49 to the lower end of the rod 45 and moves vertically in unison therewith. A cross head 50 is secured to the rod 45 by any suitable means. Nuts 51 are shown clamping the cross head 50 in place to prevent it from rotation relative to the shaft 45. The cross head 50 is provided with a pair of apertures 52 extending therethrough for accommodation of vertically extending rods or shafts 53. The rods 53 are connected at their lower ends to a bracket member such as 54 which forms the top of the film supporting hanger or frame 22.

The details of the film hanger or film supporting frames are not illustrated in the drawings, each such frame being indicated in general by the numeral 54 and being designed to support strips of film or sheets of film. The shaft 45 which supports the agitator 47 extends through the bracket 54 and the individual film supporting hangers 54 are arranged on opposite sides of the agitator 47.

The rods 53 are connected at their upper ends by a connecting bracket 55 through which the upper ends of the rods 53 extend and nuts 56 on the rods 53 overlie the connecting member 55 to hold the upper ends of the rods in properly spaced relationship. The connecting member 55 is centrally notched as indicated at 57 to permit passage of the projecting end portion 44 of the cross head 43 which supports the agitator rod or shaft 45.

A cross head 59 is slidably supported upon the rods 41 and includes a pair of spaced projections 60 which extend beneath the connecting member 55. In place of spaced projections, an edge of the cross head 59 may extend beneath the connecting member 55 so that when the cross head 59 is raised, the connecting member 55 supporting the film hanger arms 53 will also be raised. As is diagrammatically illustrated in Figure 1 of the drawings, the cross head 59 is connected by a link 61 to an endless conveyor chain 62 supported by a pair of vertically spaced sprockets 63 and 64. The upper sprocket 63 is merely an idler sprocket supported by a partition member 65 projecting from the rear wall 24 of the carriage while the lower sprocket 64 is mounted upon the driven shaft 66 of a motor 67. The motor 67 normally is provided with an integral gear reduction unit so as to slow the speed of rotation of the driven shaft 66 to a speed which is practical for operation. When the motor 67 is energized, the driven shaft 66 moves the conveyor chain 62. Movement of the chain 62 acts through the link 61 to raise the cross head 59. This in turn acts through engagement with the connecting member 55 to elevate the hanger supporting arms 55 and the film hanger 22. This upward movement of the hanger 22 continues until the link 61 reaches the top of the conveyor chain flight. At this point of the operation a limit switch is actuated which stops the rotation of the transfer motor 67 and sets into motion the travel motor 40 in a manner which will be described more in detail in combination with the wiring diagram.

Guide rods 69 are anchored at their lower ends to the hanger bracket 54 and these guide rods extend through the bottom panel 25 of the housing 21 and include headed upper ends 70 which may rest upon the bottom panel 25 and limit downward movement of the film hanger element 21. These guide rods 69 may slide upwardly with the hanger unit when this unit is moved upwardly.

The cross head 43 is connected by a link 71 to a conveyor chain 72 supported by a pair of vertically spaced sprockets 73 and 74. The sprocket 73 is merely an idler sprocket supported by the frame partition member 75 projecting forwardly from the rear panel 24. The bottom sprocket 74 is mounted upon a motor shaft 76 which is driven by an agitator motor 77. This motor 77, similarly to the previous motors described, includes a gear reduction to limit the speed of rotation of the driven shaft 76.

It will be noted that due to the fact that the connecting member 55 and the cross head 59 are so shaped not to interfere with the movement of the cross head 43, the cross head 43 may be moved upwardly and downwardly by the link 71 upon movement of the chain 72. Thus, during operation of the agitator motor 77, the agitator bar 47 is slowly raised and lowered a distance approximately equal to the height of the film supporting frames 54 so as to agitate the treating liquid between the two frames. It should also be noted, however, that while the agitator may function independently of the operation of the devices used for raising and lowering the hanger shaft 53, the agitator will be elevated at the same time the film supporting frames 54 are raised even though the agitator motor 77 may continue to operate. This is

accomplished by engagement of the bracket **54** with the cross head **50** or the nut **51** holding the cross head in place, this engagement preventing the agitator bar from moving to a position lower than the frames **54**. Engagement of the bracket **54** with the cross head **50** acts to raise the agitator supporting arm or shaft **45**, the upper end of this shaft merely sliding through the projecting end **44** of the cross head **43**.

A means is also provided for raising and lowering the film supporting frames in the various tanks of the tank assembly A. This raising and lowering action is not designed to withdraw the frames **54** from below the level of the treating liquid in the various tanks and the vertical reciprocation of the frame may be constant or intermittent. The mechanism for accomplishing this result includes an inverted generally U-shaped bracket **80** having horizontal fingers **81** which are spaced to straddle the cross head **59** but which engage beneath the connecting member **55** connecting the upper ends of the hanger supporting rods **53**. This bracket **80** is connected by a link **78** to a crank **82** or to a point eccentric from the center of a disc **83** driven at a slow rate of speed by a motor **84**. Upon rotation of the motor **84**, the disc **83** rotates slowly and acts through the link **81** to raise and lower the bracket **80**. The fingers **81** of this bracket engage beneath the connecting member **55** and raise and lower the frame elements **54** at a speed which is out of normal timed relation to the vertical movement of the agitator shaft **45**.

From the foregoing description, it should be clear that when the carriage or robot B is mounted upon the horizontal track **20**, a series of operations may take place in timed relation. For example, the carriage B, if not already positioned over the first tank **10** of the series, may be moved into the proper position by the travel motor **40** which when energized rotates the pinion **34** engaging the under side of the supporting rack. When the carriage is in proper position over the tank **10**, or any subsequent tank, the travel motor **40** may cease operation and the transfer motor may be energized, lowering the cross head **59** and permitting the connecting member **55** supporting the hanger supporting rods **53** to move to its lowermost position.

While in lowered position, the hanger may be slowly raised and lowered by operation of the frame agitator motor **84** which acts through the bracket **80** to raise and lower the connecting member **55** within fixed limits. Simultaneously, the agitator motor **77** may be energized to operate the endless chain **72** which raises and lowers the agitator shaft or arm **45** supporting the agitator bar **47**. The agitator motor **77** and frame agitator motor **84** may operate either continuously or intermittently as is preferred, as the operation thereof will not affect the raising or lowering of the film frames or the movement of the carriage.

The manner in which the various elements of the apparatus function for their intended purposes is shown diagrammatically in Figure 5 of the drawings. This view shows a circuit including a pair of line wires **85** and **86** connected to a suitable source of current, the line wire **86** connected by a conductor **87** to one terminal of a first timer motor **89**. This conductor is also connected by a conductor **90** to one terminal of the transfer motor **67**. A conductor **91** connects the line wire **86** to one terminal of a second time delay or timer motor **92**. The line wire **86** is also connected by a conductor **93** to one terminal of the travel motor **40**. The line wire **86** is also connected by a conductor **94** to one terminal of the agitator motor **77** and by a conductor **95** to one terminal of the frame agitating motor **84**. The line wire is also connected to one terminal of a third timer motor **96**.

The line wire **85** is connected to a control switch **97** and a conductor **99** leads from the line wire **85** to the other terminal of the timer motor **89** causing constant rotation thereof when the apparatus is in operation. A timer motor **89** rotates a cam **100** at a rate of perhaps one rotation per minute. The motor **89** also acts through a suitable gear reduction **101** to rotate a program timer disc **102** at a rate of perhaps one revolution in 80 minutes.

The cam **100** is engageable with a normally open switch **103** and acts to close this switch for a time of perhaps five seconds of each minute. The program timer disc **102** is provided with notches such as **104** in suitably spaced relation about its periphery, the disc **102** actuating a switch **105** for a short period of time each time one of the notches **104** reaches a predetermined position of the cycle. Obviously, in actual practice, a different type of structure may be provided, it being the purpose of the arrangement to close a normally open switch at predetermined timed intervals.

A conductor **106** is connected to the line wire **85** and extends to one terminal of a push button switch **107**, the other terminal of which is connected by a conductor **109** to a terminal **110** of the switch **105**. A conductor **111** branches from the conductor **109** and extends to one terminal of the relay coil **112** of a relay **113**, the other terminal of which is connected to the line wire **86** by the conductor **114**. Thus, when the push button **107** is depressed, a circuit is closed to the relay coil **112** moving to switch blades **115** and **116** from one extreme position to the other.

The switch blades **115** and **116** are connected by a conductor **117** to the line wire **85**. The switch blade **115** in unenergized position of the relay **113** engages a contact **119** connected by a conductor **120** to a terminal of the timer motor **96**, the other terminal of which is connected to the line wire **86** to complete the circuit. Thus, when the relay **113** is unenergized, a circuit is completed to the timer motor **96**. The line wire **85** is connected to one fixed terminal **121** of a selector switch **122**, the blade of which is connected by a conductor **123** to one terminal of the agitator motor **77**, the other terminal of which is connected to the line wire **86** to complete the circuit. The conductor **123** also connects the frame agitator motor **84** in parallel with the motor **77** so that when the switch blade **122** is in the position illustrated in Figure 5, the agitator motor **77** and frame agitator motor **84** operate continuously.

One terminal of the switch **103** which is controlled by the cam **100** is connected by a conductor **124** to the line wire **85** and the other terminal of this switch **103** is connected by a conductor **125** leading to the second terminal **126** of the selector switch **122**. Thus, when the selector switch **122** is in contact with the switch terminal **126**, a circuit is closed during a dwell period of perhaps five seconds during each minute from the line wire **85** through conductor **124** and switch **103** to the conductor **125** leading through the switch **122** and conductor **123** to the agitator motor **77** and frame agitator motor **84**. Thus, when the switch **122** is in contact with the terminal **126**, the motors **77** and **84** are intermittently operated for a selected period of each minute.

When the relay coil **112** is energized, a circuit is closed from the line wire **85** through the conductor **117** and relay switch blade **116** to the normally open terminal **127** leading to a low limit switch **129** and conductor **130** to the relay coil **112**. Thus, when the low limit switch **129** is closed, a holding circuit is provided for the relay coil **112** to keep the relay **113** energized.

The switch blade **115** engages the switch terminal **130** when the relay **113** is energized closing a circuit from the line wire **85** through conductor **117**, switch blade **115**, terminal **130**, conductor **131**, the upper limit switch **132**, and conductors **133** and **134** to the timer motor **92**, the other terminal of which is connected to the line wire **86**. The time delay motor **92** actuates a cam **135** which ac-

tuates a switch blade 136. The cam 135 acts after a period of perhaps two seconds to open the switch 136 thus opening the circuit through the conductor 137 to the relay coil 139 of the relay 140. The other terminal of the coil 139 is connected to the line wire 86.

A conductor 141 leads from the relay terminal 130 and its conductor 131 to the normally closed terminal 142 of the relay switch 143. A conductor 144 leads from the switch blade 143 to the second terminal of the transfer motor 67, the other terminal of which is connected to the line wire 86. Thus, it will be seen that when the relay coil 112 is energized, a circuit is closed through the normally closed relay switch 143 to the transfer motor 67 to actuate the same.

A circuit is also provided to the relay coil 139 through a conductor 145 and travel limit switch 146 to the line wire 85. The travel limit switch 146 also controls the circuit through conductor 147 to the second terminal of the travel motor 40. Thus, when the switch 146 is closed, the travel motor 40 is energized.

The timer motor 96 controls the operation of a cam 149 which in turn controls a switch 150. The switch 150 is connected between conductor 120 and a conductor 151 leading to the second terminals of the agitator motor 77 and the frame agitator motor 84. The circuit through the cam actuated switch 150 is designed to provide a closed circuit to the two agitator motors 77 and 84 for a period of perhaps one to 60 seconds each time the plate holders are first lowered into a tank of solution.

Having now described the circuit, the operation will be described.

When the push button 107 is closed, a circuit is momentarily closed to the relay coil 112 thus energizing this coil. The cycle normally starts when the frame hangers are in lowered position and in this position the lower limit switch 129 is in circuit breaking position. However, when the relay coil 112 is actuated, a circuit is closed from the line wire 85 through the conductor 117, switch blade 115, terminal 130, conductor 131, conductor 141, relay switch 143 and conductor 144 to the transfer motor 67, the other terminal of which is permanently connected to the other side of the line. As a result, the transfer motor 67 starts into operation and moves the conveyor chain 62. This conveyor chain 62 acts through the link 61 to raise the cross head 59 upwardly. Upward movement of the cross head 59 causes this cross head to engage the connecting member 55 connecting the upper ends of the film hanger rods 53 moving these rods and the film hanger upwardly. The cross head 59 does not always immediately engage and lift the hanger rods 53 as these hanger rods may be slightly elevated at the time upward movement of the cross head 59 is initiated by the reciprocating bracket 80. However, the cross head 59 may move directly through the bracket 80 and pick up the connecting member 55 regardless of its position at the time upward movement of the cross head 59 is started.

Incidentally, upward movement of the hanger arms 53 causes the hanger bracket 54 to engage the guide or cross head 50 on the agitator shaft 45 also withdrawing the agitator 47 from the tank in unison with the film hangers.

As the cross head 59 starts its upward movement, the lower limit switch 129 is closed, closing a holding switch circuit from line wire 85 through conductor 117, switch blade 116, terminal 127, lower limit switch 129 and conductor 130 to the relay coil 112, the other terminal of which is connected to the other side of the line. Thus, in starting the cycle, the push button 107 is held depressed until the cross head moves out of engagement with the lower limit switch 129.

The movement of the transfer motor 67 continues until the cross head 59 engages the upper limit switch 132 acting to close this switch. When the upper limit switch 132 is closed, a circuit is closed from the line wire 85 through conductor 117, switch blade 115, terminal 130, conductor 131, upper limit switch 132, conductor 133, time delay switch 136, conductor 137 to the relay coil 139, the other terminal of which is connected to the other line wire. Energization of the coil 139 acts to break the only circuit to the transfer motor and simultaneously closes a circuit through conductors 145 and 147 to the travel motor 40 which is actually connected in parallel to the relay coil 139. At this point of the operation, the travel limit switch 146 is opened by some means spaced longitudinally of the track 20 such as by one of the projections 152 on the track. However, the time delay switch 136 closes the circuit to the travel motor 40 for a time sufficient for the carriage to move past the projection 152 at which time the travel limit switch 146 closes, maintaining the circuit to the relay coil 139 and to the travel motor 40. This operation continues until the travel limit switch 146 is against broken or opened by the next projection 152. When open, the travel motor 40 will stop operation and the relay coil 139 will be deenergized thus reclosing the circuit through the switch arm 143 to the transfer motor.

Movement of the transfer motor 67 will start movement of the conveyor chain 62 in a direction to lower the cross head 59. As the cross head starts downwardly, the circuit through the upper limit switch 132 is opened and the cross head continues downwardly until the lower limit switch 129 is opened. This action will de-energize the relay coil 112 and reestablish the original circuits.

During this time, the timer disc 102 continues its operation until the switch 105 is closed. When the switch 105 closes and when the switch 103 simultaneously closes (which will occur each minute due to the fact that the switch 105 remains closed for at least this period of time) a circuit is closed from line wire 85 through conductor 124, switch 103, switch 105 and conductor 111 to the relay coil 112 thus starting the next cycle of operation. This action will operate sequentially to raise the film hangers, move the carriage to its next position, and lower the film hangers to complete the cycle.

It will be noted that the agitator motors either operate continuously or intermittently. This is permissible as the movement of the reciprocating bracket 80 and of the vertically reciprocating cross head 43 do not affect the operation of the remainder of the structure. When the agitator rod is raised with the hangers, the rod merely slides through the projection 44 of the cross head 43. It will also be noted that each time the relay 112 is deenergized, a circuit is closed from the line wire 85 through conductor 117, switch arm 115, terminal 119, conductor 120 to the timer motor 96 which acts to maintain a circuit to the agitator motors for a timed period which may be adjusted by the cam 149. Thus, each time the film hangers become immersed in a tank, the agitator motors operate continuously for a timed period even though the selector switch 122 is in position for intermittent operation as controlled by the cam 100.

It will be seen that by changing the position of the projections 152, or removing certain of these projections, the carriages may be made to skip certain individual steps. It will also be noted that in the particular arrangement illustrated, one of the tanks, such as 13, is provided with a source of white light indicated in general by the numeral 153 which is located between the film hangers in lowered position thereof. Such a light is used to provide a secondary exposure to the film at a particular part of the sequence of operations. The agitator 47 will not affect the operation of this light as the agitator is merely prevented from lowering due to engagement with the light or a part of the support thereof.

In accordance with the patent statutes, I have described the principles of construction and operation of my improvement in photographic film and paper processing machine, and while I have endeavored to set forth the best embodiment thereof, I desire to have it

understood that changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A film processing unit for use in combination with a series of spaced tanks and including a track, a carriage movably supported on said track and suspended therefrom, a film support vertically movably supported by said carriage, means on said carriage for raising and lowering said film support, agitating means mounted on said carriage and movable independently of said film support in lowered position of said film support, and means on said carriage for moving said carriage along said track, and means on said carriage and including cooperable means spaced longitudinally of said track for sequentially moving said carriage into position over one of said tanks of said series, lowering said film support into said one tank, holding said film support immersed in said tank for a predeteremined time period, raising said film support, and moving said carriage over another tank of said series to initiate a similar cycle of operation, and means for reciprocating said film support independently of said agitating means while immersed in any said tank.

2. A film processing unit for use in combination with a series of spaced tanks and including a track, a carriage movably supported on said track and suspended therefrom, a film support vertically movably supported by said carriage, means on said carriage for raising and lowering said film support, agitating means mounted on said carriage and movable independently of said film support in lowered position of said film support, and means on said carriage for moving said carriage along said track, and means on said carriage and including cooperable means spaced longitudinally of said track for sequentially moving said carriage into position over one of said tanks of said series, lowering said film support into said one tank, holding said film support immersed in said tank for a predetermined time period, raising said film support, and moving said carriage over another tank of said series to initiate a similar cycle of operation, and means for reciprocating said film support while immersed in any said tank in independently timed relation to said agitating means.

3. A film processing unit for use in combination with a series of spaced tanks and including a track, a carriage movably supported on said track and suspended therefrom, a film support vertically movably supported by said carriage, means on said carriage for raising and lowering said film support, agitating means mounted on said carriage and movable independently of said film support in lowered position of said film support, and means on said carriage for moving said carriage along said track, means spaced longitudinally of said track and means on said carriage cooperable therewith for simultaneously stopping operation of said means for moving said carriage along said track and initiating operation of said means for raising and lowering said film support for lowering said film support into said tank, means on said carriage interrupting the operation of said means for raising and lowering said film support when said film support is in lowered position, means on said carriage operable after a predetermined time interval to activate said means for raising and lowering said film support to raise said film support, and means on said carriage for simultaneously interrupting movement of said means for raising and lowering said film support when said film support is in raised position and actuating said means for moving said carriage to initiate a new cycle of operation, and means for periodically operating said agitating means independently of said film support when said film support is in lowered position.

4. A film processing unit for use in combination with a series of spaced tanks and including a track, a carriage movably supported on said track and suspended therefrom, a film support vertically movably supported by said carriage, means on said carriage for raising and lowering said film support, agitating means mounted on said carriage and movable independently of said film support in lowered position of said film support, and means on said carriage for moving said carriage along said track, means spaced longitudinally of said track and means on said carriage cooperable therewith for simultaneously stopping operation of said means for moving said carriage along said track and initiating operation of said means for raising and lowering said film support for lowering said film support into said tank, means on said carriage interrupting the operation of said means for raising and lowering said film support when said film support is in lowered position, means on said carriage operable after a predetermined time interval to activate said means for raising and lowering said film support to raise said film support, and means on said carriage for simultaneously interrupting movement of said means for raising and lowering said film support when said film support is in raised position and actuating said means for moving said carriage to initiate a new cycle of operation, said film support including a pair of spaced parallel film supporting means, and in which said agitator means is positioned between said spaced film supporting means.

5. A film processing unit including a series of film treating tanks, a track supported parallel to said tanks, and a self-contained film handling device removably mounted on said tracks, said device comprising a carriage, a film carrier slidably supported by said carriage for movement into and out of said tanks, means on said carriage for moving said carriage along said track, means on said carriage for raising and lowering said film carrier, means on said carriage arresting movement of said carrier along said track and initiating the lowering movement of said carrier, means on said carrier operable for arresting lowering movement of said carrier into said tanks for a predetermined period of time, means on said carrier for initiating the raising of said carrier from said tanks, means on said carrier for arresting the raising of said carrier and initiating further movement of said carriage along said track, said film carrier and all of said means forming a part of said self contained film handling device, and including a vertically movable agitator and means on said carriage for vertically reciprocating the same in lowered position of said film carrier.

6. The structure of claim 5 and including means on said film carrier engaging said agitator upon upward movement of said film carrier, elevating said agitator out of said tanks.

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