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[11] **3,709,138**

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[54] PHOTOGRAPHIC PRINT PROCESSING APPARATUS

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[52] **U.S. Cl.** ..... **95/93,** 95/89 R
[51] **Int. Cl.** **G03d 3/08**
[58] **Field of Search** 95/93, 89

[56] **References Cited**

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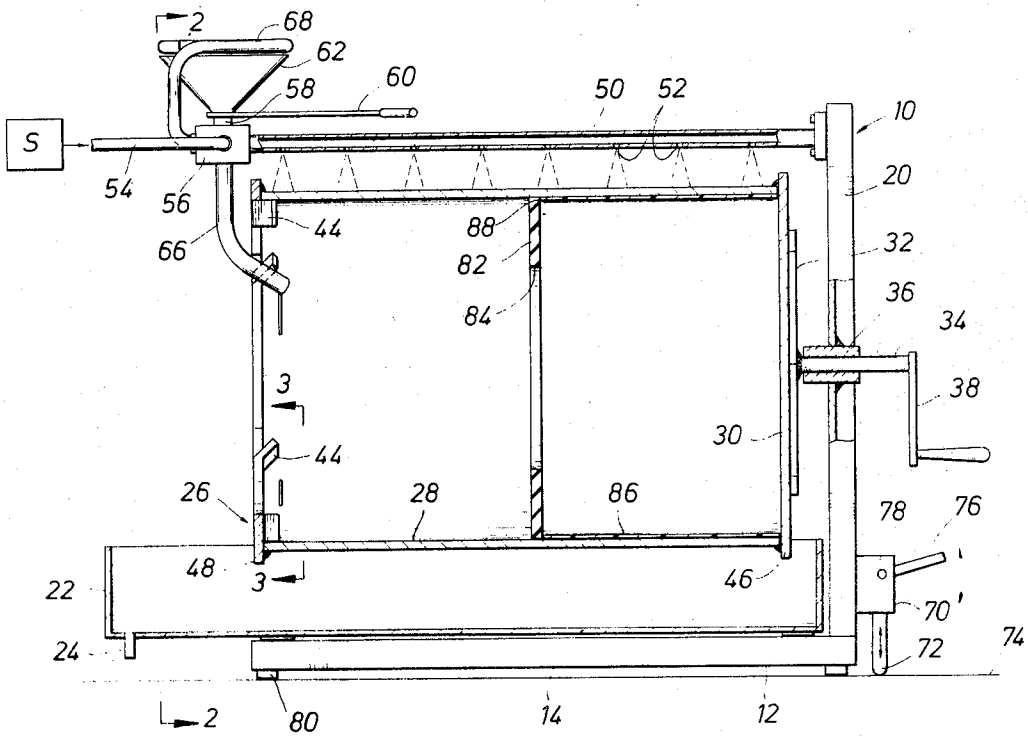
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[57] **ABSTRACT**

Photographic print processing apparatus according to the present invention may comprise a rotatable drum into which may be introduced a quantity of photographic print processing fluid. A device is provided for controllably introducing the processing fluid into the drum and for controllably introducing water or other appropriate fluid for the washing of photographic printing papers at appropriate stages during the development process. The apparatus may be powered manually or may be provided with a motor drive mechanism to achieve selective rotation of the drum during processing. The drum may be rotated in one direction for processing and may be rotated in the opposite direction for expelling the processing fluid from the drum into a reservoir provided to contain the expelled fluid. Selective directional rotation of the drum may be achieved by the reversible electric motor that may be actuated by mercury switches positioned on an actuating lever which switches are selectively actuated to energize the motor depending upon relative positioning of the lever as the lever is actuated for control purposes.

17 Claims, 8 Drawing Figures



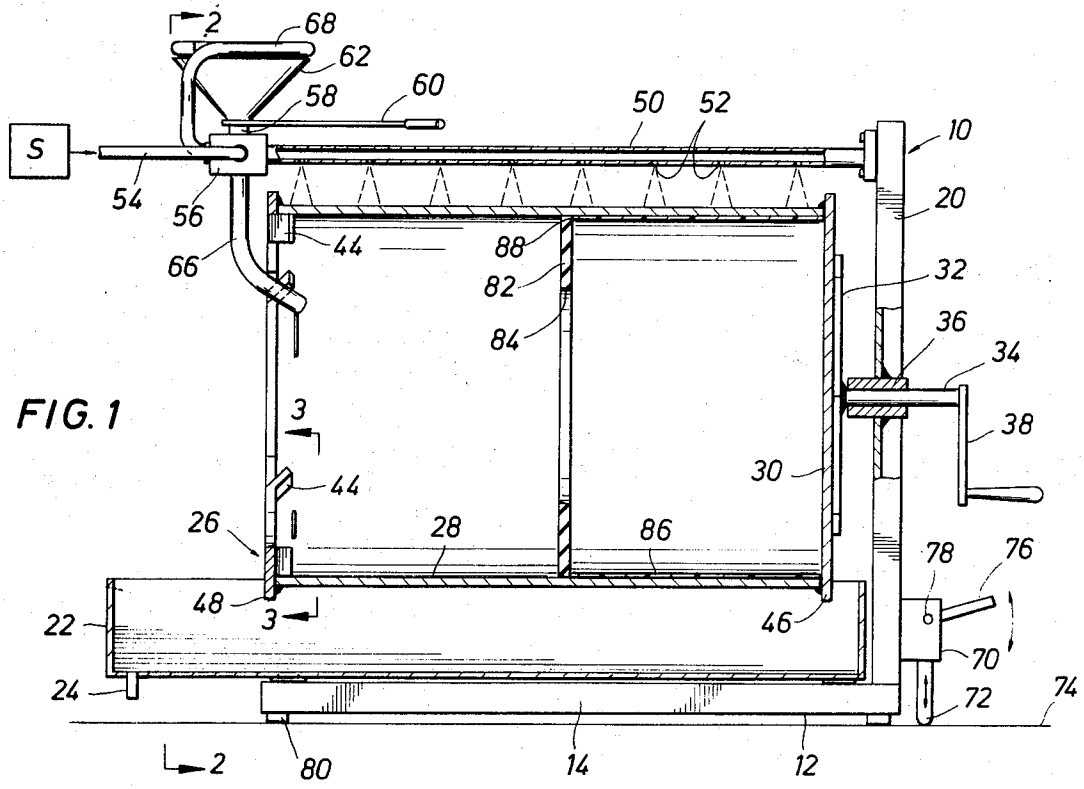


FIG. 1

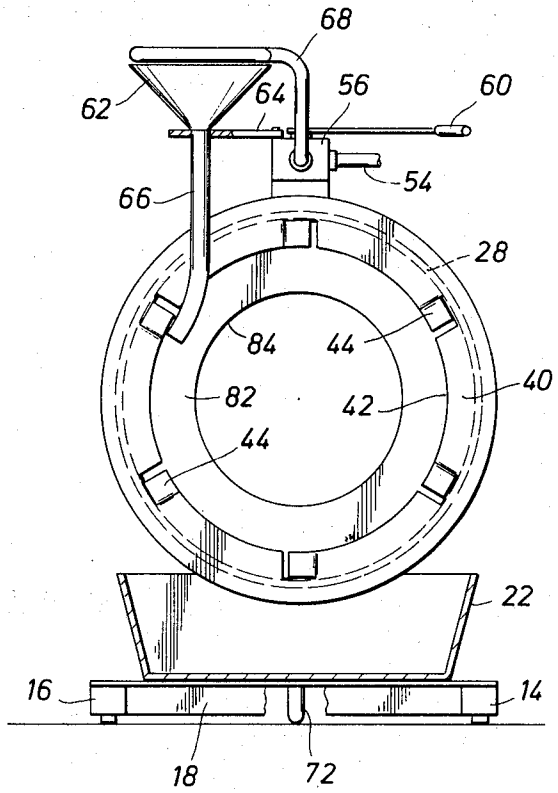


FIG. 2

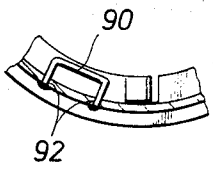


FIG. 3

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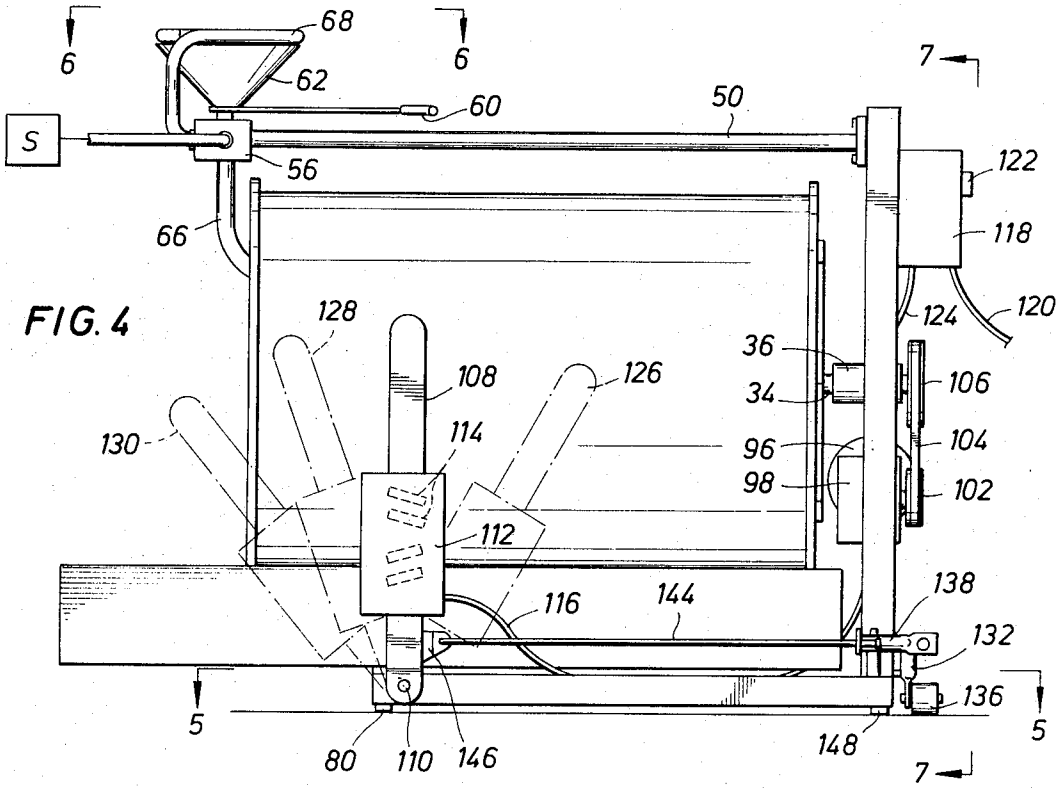


FIG. 4

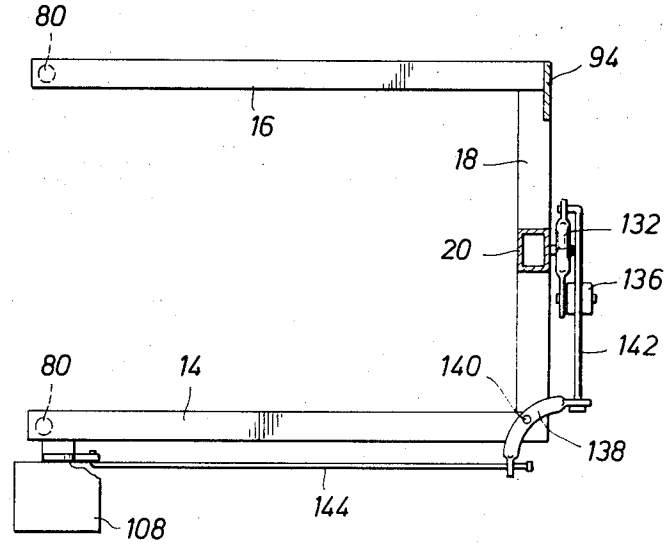


FIG. 5

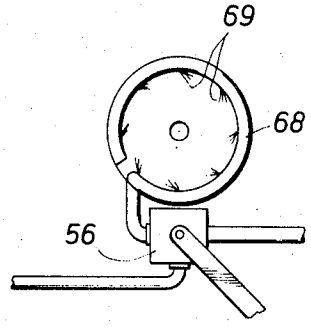


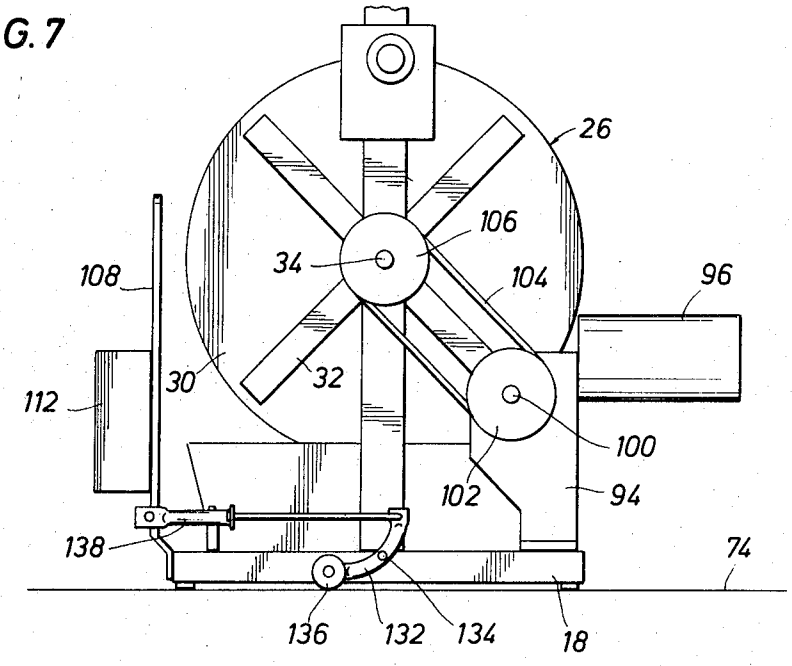
FIG. 6

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FIG. 7



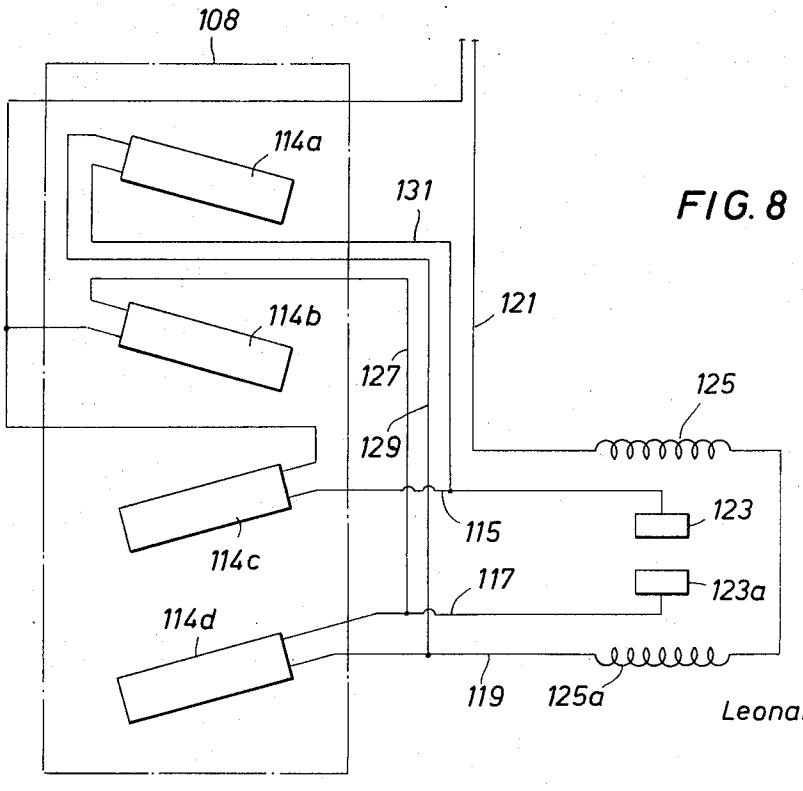


FIG. 8

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PHOTOGRAPHIC PRINT PROCESSING APPARATUS

FIELD OF THE INVENTION

This invention relates generally to apparatus for the development of photographic printing papers and more specifically to apparatus that is manually or automatically controlled as desired and is capable of the simultaneous development of one or more black and white or color photographic printing papers. The apparatus of this invention is effectively adapted for use by both professional and amateur photographers especially where the processing of a small number of photographs may be desired or where the size of prints being processed may be exceptionally large.

DESCRIPTION OF THE PRIOR ART

Historically, it has been the practice, especially of amateur photographers, to employ a plurality of flat pans for the processing of photographic printing papers. Photographic development fluid and washing fluids are generally placed within the pans and the photographic papers are processed in the various solutions and are transferred from pan to pan during the processing procedure.

The employment of flat pans for the development of photographic printing papers is subject to a number of disadvantages that make such development method undesirable even though the flat pan method of development is quite inexpensive. Considerable cabinet space is generally required for the placement of various pans thereby requiring that the development room be of substantial size. The pan method of processing generally requires the provision of substantial amounts of processing fluid which of course, adversely affects the cost of the development process. Moreover, it is generally difficult to maintain the temperature of the processing fluid within the particular temperature range necessary for optimum development of photographic printing papers. Where color prints are to be developed, the maintenance of optimum development temperature is quite critical and frequently makes the development of quality photographic prints difficult and expensive to achieve if the pan method of development is employed. Also the size of photographic prints that can be developed is limited by the physical size of the pans employed.

Rotatable drum type development apparatus has been in use for quite some time but such apparatus is generally of extremely expensive nature and is not therefore readily available for use by amateur photographers. Such apparatus is also cumbersome and cannot be efficiently used where low volume developing is desired. With commercial drum type photographic print processing apparatus in mind, a limited number of drum type processing devices have been developed for use by amateurs. For the most part, such devices are extremely expensive, thereby precluding use of such devices by all but a limited number of amateurs. One example of photographic print processing apparatus of the drum type and of less expensive nature is set forth in U.S. Pat. No. 2,947,236 to Siegel which discloses a tubular element having open ends which may be closed by stoppers after a sheet of photographic printing paper has been inserted therein. After development fluid has been introduced, the tubular member is placed on rotating rolls and rotated for a particular period of time necessary for development of the photographic printing paper disposed therein. Drum type photograph processing apparatus like the pan type, described above, are also subject to difficulty of maintaining optimum temperature for development of printing papers especially where color printing papers are developed. Color type printing papers generally require that temperature of the development fluid be precisely maintained within narrow limits at all times during the development process to produce optimum results. This feature is found wanting in most of the print processing devices available for use by amateurs.

To provide heating means to maintain developing fluid within pans at predetermined optimum temperature is not generally practical because of the expense required thereby. Moreover, to provide heating means in rotatable drum type development apparatus to maintain proper temperature of the development fluid is generally considered impractical except in the most expensive apparatus because of the difficulty of heating a rotatable drum. It is therefore a primary object of the present invention to provide novel photographic print development apparatus of the rotatable drum type that may be heated simply and inexpensively to provide for optimum temperature control of the development fluid.

It is a further object of the present invention to provide novel rotatable drum type photographic print development apparatus that is adapted for simple introduction of measured amounts of development fluid into the drum at appropriate times during the development procedure.

It is also an object of the present invention to provide novel photographic print development apparatus of the drum type that subjects all of the photographic paper to fluid contact substantially simultaneously and does not result in uneven development or spotting of the photographic paper during the development process.

Among the several objects of the present invention is noted the contemplation of novel photographic print development apparatus of the drum type that provides for complete and simple washing or flushing of development fluid from the apparatus at appropriate times during the development process without necessitating cumbersome manipulation of the apparatus.

Another important object of the invention concerns the provision of novel photographic print development apparatus of the drum type that achieves effective and rapid ejection of fluid from the rotatable drum simply by achieving counterrotation of the drum when fluid ejection is desired.

It is an even further object of the present invention to provide novel photographic print development apparatus that may be actuated manually or may be powered by a motor mechanism as desired.

Another feature of the present invention concerns the provision of novel photographic print development apparatus that may be provided with an electric motor drive that is actuated through manipulation of a single actuating lever thereby facilitating the apparatus for simple control by amateur photographers as well as by professional photographers.

It is another feature of the present invention to provide novel photographic print development apparatus of the rotatable drum type that achieves tilting of the drum relative to the horizontal in order to assist in rapid ejection of development or washing fluid thereby providing for precision control of development time.

Another feature of the present invention contemplates the provision of novel photographic print development apparatus that provides for simultaneous development of multiple photographic printing papers during a single development operation.

It is an even further feature of the present invention to provide novel photographic print development apparatus of the drum type that maintains positive separation of multiple photographic printing papers being developed during any particular development process.

It is an even further feature of the present invention to provide novel photographic print development apparatus that prevents contact between photographic papers and apparatus provided for achieving fluid ejection from the rotatable drum.

It is also an object of the present invention to provide novel photographic print development apparatus of the rotatable drum type that is simple in nature, reliable in use, and low in cost.

Other and further objects, advantages and features of the present invention will become apparent to one skilled in the art upon consideration of the written specification, the attached claims and the annexed drawings. The form of the invention, which will now be described in detail, illustrates the general principles of the invention, but it is to be understood that this detailed description is not to be taken as limiting the scope of the present invention.

SUMMARY OF THE INVENTION

A preferred embodiment of the present invention may comprise a framework capable of supporting a rotatable drum for rotation about a generally horizontal axis. Manual means may be provided for achieving selective rotation of the drum or, in the alternative, the drum may be provided with a motor, such as a reversible electric motor, capable of rotating the drum selectively in either direction about its horizontal axis. The drum may be of generally cylindrical configuration with one extremity thereof being closed while the other extremity remains open for insertion therein of one or more photographic printing papers to be developed.

For the purpose of introducing development fluid into the drum, a hopper of generally conical configuration may be disposed adjacent to the drum and may be provided with a conduit for conducting the development fluid to the drum to begin the development process. Development fluid adhering to the hopper may be flushed therefrom by water or other flushing fluid sprayed into the upper extremity of the hopper by a perforated tubing encompassing the upper extremity of the hopper structure. The flushing or washing fluid may be provided by a supply such as a mixture of hot and cold water from conventional faucets that are customarily employed to supply water to the sink of a darkroom or bathroom.

The supply of flushing or washing fluid may also serve as a supply of fluid at appropriate temperature for the purpose of maintaining the temperature of the rotatable drum within the precise limits required for ultimum photographic print development. A perforated conduit may extend the length of the drum and may spray water at optimum temperature onto the outer surface of the drum. The spray of temperature controlling fluid and flushing fluid may be controlled by a single valve if desired. The rotatable drum may also be provided with a plurality of vanes disposed at the open extremity thereof that are operative to retain development fluid within the drum upon rotation of the drum in a forward direction and being operative to eject the photographic development fluid from the drum upon rotation of the drum in the opposite or reverse direction. To assist in rapid ejection of photographic fluid from the drum, the drum may also be provided with means for raising the closed extremity thereof relative to the horizontal thereby tilting the drum and draining any fluid therein rapidly toward the open extremity of the drum.

Where the photographic print development apparatus is to be provided with power actuation, it may be appropriate to provide a reversible electric motor that may be drivingly connected to a shaft for rotating the drum by conventional pulley and belt drive connection means. For the purpose of selectively energizing the reversible electric motor, a single control lever may be provided that may be manually manipulated in order to achieve desired directional control of drum rotation. A switch housing may be fixed to the operating lever and may contain a plurality of mercury switches that are selective energized depending upon the position of the control lever. The control lever also may be provided with mechanical structure to achieve lifting of one extremity of the development apparatus to tilt the drum and cause rapid draining of fluid from the drum when such is desired. A reservoir may be provided below the drum to receive fluid ejected from the drum and may include a drain to conduct ejected fluid to appropriate disposal apparatus such as a dark room sink.

BRIEF DESCRIPTION OF THE DRAWINGS

So that the manner in which the above recited features, advantages and objects of the invention, as well as others which will become apparent are attained and can be understood in detail, more particular description of the invention, briefly summarized above, may be had by reference to the embodiments thereof which are illustrated in the appended drawings, which drawings form a part of this specification.

It is to be noted however that the appended drawings illustrate only typical embodiments of the invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective embodiments. In the drawings:

FIG. 1 is a sectional view in elevation of rotatable drum type photographic print developing apparatus constructed in accordance with the present invention.

FIG. 2 is an end view in elevation of the photographic print development apparatus of FIG. 1.

FIG. 3 is a fragmentary sectional view taken along line 3—3 in FIG. 1 and illustrating clips for preventing contact between photographic printing papers and the fluid ejection vanes of the apparatus.

FIG. 4 is a side elevational view of the photographic printing paper development apparatus of FIG. 1.

FIG. 5 is a sectional view of the photographic printing paper development apparatus herein taken along lines 5—5 in FIG. 4.

FIG. 6 is a fragmentary view in plan taken along lines 6—6 in FIG. 4 and illustrating the hopper and control valve structure of the apparatus of this invention in detail.

FIG. 7 is an end elevational view of the photographic printing paper development apparatus of FIG. 4 illustrating the motor drive mechanism and showing the elevating mechanism in detail.

FIG. 8 is a schematic illustration of electrical circuitry for controllable energization of the electric motor drive mechanism of FIGS. 4 and 7.

DESCRIPTION OF PREFERRED EMBODIMENTS

Now referring to the drawings and first to FIG. 1 there is illustrated photographic printing paper development apparatus of the rotatable drum type which, according to the present invention, may conveniently take the form illustrated generally at **10** having a support framework **12** defined by a pair of generally parallel support elements **14** and **16** each being connected at one extremity thereof to a transverse support element **18**. A vertical post **20** may be connected by welding or by any other appropriate means of connection to the transverse support element **18**. A reservoir **22** may be supported by the framework **12** to retain development, washing or fixing fluid drained from the development drum and may be provided with a drain **24** to conduct used photographic fluid to a disposal facility such as a dark room sink.

The development apparatus may include a rotatable drum disposed above reservoir **22** and illustrated generally at **26**, which may include a generally cylindrical wall **28** having one extremity thereof closed by a transverse wall **30**. A drum support brace **32** of generally "X-like" configuration may be secured to the transverse wall **30** by welding or by any other appropriate means of connection as desired. A drive shaft **34** may be welded or otherwise connected to the drum support brace **32** and may be appropriately journalled journaled rotation within a bearing **36** fixed to the vertical support post **20**. An operating handle or crank **38** may be connected to shaft **34** and may be manually manipulated to achieve rotation of the drum **26** about its horizontal axis.

The rotatable drum is provided with a transverse end wall **40** having an access opening **42** formed therein and being of sufficient dimension to allow insertion of photographic printing papers into the drum.

For the purpose of providing for quick ejection of development fluid from the drum, the end wall **40** is cut away in such manner as to define a plurality of vanes **44** that are offset inwardly of the drum relative to the transverse end wall. The radially outer portion of each of the vanes **44** is substantially coextensive with the inner peripheral surface defined by the generally cylindrical wall **28**. Upon rotation of the drum in counterclockwise manner, as illustrated in FIG. 2, the vanes **44** will prevent development fluid from being ejected through outlet openings provided by the cutouts defining the vanes. Upon rotation of the drum in clockwise manner, however, the vanes will engage and eject the development fluid in an efficient manner without necessitating cumbersome activity that would otherwise be necessary to achieve ejection of fluid from the drum.

For the purpose of maintaining the drum **26** at optimum temperature during the development procedure, it should be noted that end walls **30** and **40** extend radially beyond the outer surface defined by cylindrical wall **28** thereby defining flanges **46** and **48** respectively, that cooperate with the cylindrical wall **28** to provide a channel within which the temperature which the fluid may be circulated. A tubular conduit **50** may be secured to the vertical support post **20** in any desirable manner and may be provided with a plurality of perforations **52** through which temperature controlling fluid is sprayed into the channel about the outer surface of cylindrical wall **28**. Temperature controlling fluid may flow from a source "S" through a supply conduit **54** to the perforated tubular conduit **50** under control of a three-way valve **56** that is connected to the free extremity of conduit **50**. The valve **56** may be of rotatable plug type having a plug trunnion **58** extending outwardly of the valve and being connected to a valve handle **60** that may be manipulated manually for controlling fluid communication between the supply conduit **54** and the tubular perforated conduit **50**. The source "S" of temperature controlling fluid may be any suitable means for conveniently mixing hot and cold water from conventional water supply faucets such as a mixing valve or the like that is capable of achieving efficient mixture of the water to achieve a continuous supply of water at a particular desired temperature.

A hopper **62** may be disposed above the rotatable drum **26** and may be connected to a support arm **64** that is in turn connected to the valve structure **56**. A conduit **66** may extend downwardly from the hopper **62** and may terminate with an outlet disposed within the access opening **42** thereby conducting development fluid from the hopper into the drum. For the purpose of flushing or washing photographic development chemicals that might adhere to the hopper **62**, a conduit **68** may extend from a discharge outlet of valve **56** and may encompass the upper extremity of the hopper **62** in the manner illustrated in FIGS. **1**, **2** and **6**. The flushing conduit **68** may be provided with a plurality of perforations **69** as illustrated in FIG. **6**, each being oriented to spray the flushing fluid in angular relation relative to the conduit **68** thereby accumulating to provide a swirling or circulating effect within the hopper to effectively achieve washing of any contaminants therefrom.

To assist in ejection of development fluid or washing fluid from the rotatable drum **26** an elevator block **70** may be secured in any desirable manner to the vertical post support **20** and may include an elevator member **72** disposed for engagement with the surface **74** upon which the development apparatus rests. An elevator lever **76** may be connected by a pivot **78** to connector block **70** and may also be connected to the elevator member **72**. As the lever **76** may be rotated about pivot **78**, as shown by an arrow, the elevator member **72** will be moved in such manner as to raise or lower one extremity of the development apparatus while foot members **80**, disposed at the other extremity of support frame elements **14** and **16**, remain in contact with the surface **74**. This feature causes the drum to be inclined

relative to the horizontal thereby causing development fluid or washing fluid, contained therein, to flow more rapidly toward the exit openings defined by the cutouts defining vanes **44**.

It is desirable to alter the interior dimension or volume of the drum to limit the size thereof only to that extent necessary for the development of a photographic print of a particular size and thereby limit the amount of development fluid necessary for the development process. Means for limiting the internal physical dimension of the drum may conveniently take the form illustrated in FIG. **1** comprising a movable partition **82**, having an opening **84** formed centrally thereof, may be disposed within the drum. The partition may be positively oriented within the drum by a spacer member **86** that may, if desired, be a sheet of flexible material such as rubber providing an abutment edge **88** that may be engaged by the partition **82** thereby disposing the partition in substantially parallel relation with transverse end walls **30** and **40**. Obviously, partition orienting sheets of different dimension may be employed to provide for proper location of the partition **82** in the event compartments of different size are desired for the development of photographs of any particular dimension.

As illustrated in FIG. **1**, and in detail in FIG. **3**, a plurality of clip members **90** may be secured to the generally cylindrical wall **28** and may extend inwardly of the drum surface to orient photographic papers within the drum and to prevent the papers from coming into contact with the vanes **44** at any time during the photographic print development process. Clip **90** may be affixed to the wall structure **28** in any desirable manner. As illustrated in FIG. **3**, the clip may extend through apertures **92** formed in the wall **28** and may be welded externally of the cylindrical wall structure. Clip members **90** achieve proper location and protection of the photographic printing papers during the development process and do not in any way interfere with introduction, circulation or ejection of the development fluid.

With reference now to FIGS. **4**, **5** and **7**, a modified embodiment of the present invention is illustrated, that differs from the structure illustrated in FIGS. **1**, **2** and **3** only in the provision of an electric motor drive mechanism and an alternative mechanism for achieving tilting of the drum to assist in ejection or dumping of development fluid therefrom. Structure of the electrically driven photographic print processing apparatus of FIGS. **4** and **5** corresponding to similar structure illustrated in FIGS. **1** and **2** is indicated by corresponding reference numerals.

A motor bracket **94** may be secured to the transverse support member **18** in any desirable manner. A reversible electric motor **96** may be connected to a reduction gear box **98** that may, in turn, be secured to motor bracket **94**. Gear box **98** may be provided with an output shaft **100** to which may be connected a pulley **102** adapted to receive a drive belt **104** establishing driving relation with a pulley **106** secured in nonrotative relation with drum shaft **34**.

For the purpose of achieving controlled actuation of the motor **96**, a control lever **108** may be connected to support element **14** by a pivot **110** and may support a control housing **112** thereon. A plurality of mercury switches **114** may be disposed within the control housing **112** and may be electrically connected to control circuitry **116** for achieving selective directional rotational control of the motor **96**. Electrical power for energizing the circuitry of motor **96** may be supplied to a junction box **118** electrically connected by power supply conductor **120** to any appropriate source of electrical energy, such as a conventional **115** volt electrical outlet, not shown. A conventional "on-off" switch **122** may be provided for the junction box **118** to control energization of a motor supply circuit **124** connected between the junction box and motor **96**.

As illustrated in broken lines in FIG. **4**, the control lever **108** may be selectively moved forwardly to the position illustrated at **126** causing closure of the lower pair of mercury switches **114** thereby energizing the forward conductors of the motor control circuitry to achieve forward rotation of motor **96** which turns the rotatable drum in a forward direction causing vanes **44** to retain the development fluid within the drum.

With the control lever **108** illustrated in the central position thereof, as shown in full line, both the upper and lower pairs of mercury switches will be open thereby de-energizing both the forward and reverse motor control circuits to stop rotation of the drum.

Upon movement of the control lever **108** to the reverse position, as illustrated in broken line at **128**, the lower pair of mercury switches will remain de-energized and the upper pair of switches will be closed thereby energizing the reverse conductors of the motor control circuit **116** causing motor **96** to counterrotate the drum **26** which causes the vanes **44** to eject development fluid from the drum.

In the event it is desired to rapidly eject development or washing fluid from the drum, the control lever may be moved to a further rearward position as illustrated in broken line at **130** and referred to as the "dump position" thereby actuating a mechanical linkage to cause elevation of the closed end portion of the drum which causes fluid contained therein to flow rapidly toward the outlet end of the drum for ejection. For purposes of the present invention, a linkage for elevating one end of the photographic print development apparatus of this invention may take the form illustrated in FIGS. **4**, **5** and **7** where a pivot arm **132** is secured to transverse support element **18** by a generally horizontal pivot **134** and includes a roller **136** disposed for contact with the surface **74** upon which the apparatus rests. A second pivot arm **138** may be connected to support element **14** by a generally vertically disposed pivot **140** and may be connected to pivot arm **132** by a connecting link **142**. A connecting link **144** may be provided for securing the pivot arm **138** in operative relation with a connector tab **146** fixed to the control lever **108**. As the control lever **108** is moved toward its rearward positions about pivot **110**, the connector tab **146** will impart linear movement to connector link **144** thereby pivoting arm **138** clockwise about its pivot **140**. Simultaneously, the connector link **142** will be moved linearly by pivot arm **138** thereby inducing counterclockwise rotation of pivot arm **132** about its pivot **134**, as illustrated in FIG. **7**. This feature causes the roller **138** to be moved counterclockwise in arcuate manner thereby raising one extremity of the photographic print development apparatus from its support feet **148** and

inclining the drum **26** with respect to the horizontal to cause any fluid disposed therein to flow rapidly toward the outlet openings defined by the cutouts in wall **40** from which tabs **44** were formed.

It will be appropriate to provide the reversible electric motor **96** with a means of control, which, according to the present invention, may take the form illustrated schematically in FIG. **8** where an upper pair of mercury switches **144A** and **144B** are disposed to be closed when the control lever **108** is moved to the reverse and dump positions thereof as illustrated in broken line at **128** and **130** in FIG. **4**. A lower pair of memory switches **144C** and **144D** are adapted to be closed when control lever **108** is moved to the position illustrated at **126** in FIG. **4**. With the control lever **108** in its neutral or substantially vertical position, as shown in full line, both the upper and lower pairs of mercury switches will be de-energized and both the forward and reverse conductors of the motor control circuitry therefore will also be de-energized.

In the event it is desired to impart forward rotation to the drum **26** the control lever will be moved to its forward position, as illustrated at **126** in FIG. **4**, thereby causing the lower pair of mercury switches **144C** and **144D** to be closed, energizing motor brush conductors **115** and **117** and field coil conductors **119** and **121** and simultaneously energizing the motor brushes **123** and **123A** and motor field coils **125** and **125A** causing inducing motor **96** to rotate in the forward direction to drive the drum **26** counterclockwise as illustrated in FIG. **7**.

When it is desirable to induce reverse rotation to motor **96** to cause clockwise rotation of drum **26** for the purpose of ejecting fluid from the drum, the control lever **108** will be moved counterclockwise about its pivot **110** to the reverse position thereof, illustrated at **128** or **130**. When this has occured, upper mercury switches **114A** and **114B** will become closed thereby energizing conductors **127**, **129** and **131** to achieve energization of the brush and field coil circuits and inducing the rotary motor **96** to counterrotate and impart clockwise rotation to drum **26**, as shown in FIG. **7**.

It is evident, therefore, that the reversible electric motor **96** may be controlled simply by manual movement of control arm **108** to the various selective operative positions thereof. While particular structure has been set forth herein for selectively controlling the direction of motor rotation it is apparent that other motor control mechanisms may be employed with equal effectiveness. It is therefore not intended to limit this invention to the particular motor control apparatus disclosed herein.

In view of the foregoing it is apparent that I have provided unique apparatus for the development of photographic printing papers that is the rotatable drum type and yet is of such low cost and simple operation that is uniquely suitable for use by amateur photographers as well as by professional photographers. The drum of my invention may be simply and economically heated or cooled to maintain optimum temperature control during the development process through the use of a mixture of hot and cold water obtained from conventional water taps so that optimum development results may be effectively achieved even where color photographic printing papers are to be developed which require critical temperature maintenance.

The rotatable drum of my invention is effectively adapted for simple introduction of measured amounts of development fluid, washing fluid and fixing fluid at appropriate times during the development procedure. The apparatus of my invention is also effectively designed to provide for even wetting of photographic papers within the drum to achieve even development results and to prevent spotting of the photographic printing paper during the development process.

My invention is also readily adapted for quick and efficient flushing of the development fluid from the apparatus without necessitating cumbersome movement of the apparatus to achieve the cleaning process. The rotatable drum of my invention is also effectively designed to achieve effective and rapid ejection of development and washing fluid from the rotatable drum simply by achieving counterrotation of the drum either manually or by motor control as desired. Where the apparatus is to be powered by an electric motor, the motor may be simply and effectively controlled through manipulation of a single actuating lever thereby facilitating the apparatus for simple and easy control under dark room conditions. The drum of my invention is also constructed to provide for simultaneous development of multiple photographic printing papers during a single developing operation and effectively maintains positive separation of multiple photographic papers during any particular development process. Moreover, the above advantages and features of my invention are achieved by an extremely simple and reliable construction that may be provided at relatively low cost as compared to other commercially available drum type photographic print processing devices. It is therefore seen that this invention is one well adapted to attain all of the objects and advantages hereinabove set forth together with other advantages which will become obvious and inherent from a description of the apparatus itself. It will be understood that certain combination and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the present invention.

As many possible embodiments may be made of this invention without departing from the spirit or scope thereof, it is to be understood that all matters hereinabove set forth or shown in the accompanying drawings are to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. Photographic print development apparatus comprising:

a drum into which may be inserted one or more photographic printing papers to be developed;

support means supporting said drum in generally horizontal and rotatable relation;

hopper means carried by said support means;

conduit means being disposed in communication with said hopper means and being positioned for conducting development fluid from said hopper means into said drum;

means for selectively rotating said drum;

means for selectively expelling development fluid from said drum;

a supply of washing fluid at controlled temperature;

means for distributing washing fluid on the exterior surface of said drum for maintaining said drum at controlled temperature; and

means for selectively controlling communication between said hopper and said conduit means, between said supply of washing fluid and said washing fluid distributing means and between said supply of washing fluid and said conduit means.

2. Photographic print development apparatus as recited in claim 1:

wherein said means for rotating said drum comprises shaft means directly connected to said drum; and

crank means being secured to said shaft means.

3. Photographic print development apparatus as recited in claim 1:

said drum having one open extremity, said means for expelling development fluid from said drum comprising a plurality of vanes fixed to said drum adjacent said open extremity, upon rotation of said drum in one direction said vanes retaining said fluid within said drum and upon rotation of said drum in the opposite direction said vanes expelling said fluid from said drum.

4. Photographic print development apparatus as recited in 1:

said means for distributing washing fluid being spray means disposed adjacent said drum and adapted to spray said temperature control fluid onto the exterior surface of said drum; and

said means for selectively controlling communication being a three-way valve.

5. Photographic print development apparatus as recited in claim 1:

said means for expelling development fluid from said drum comprising a plurality of vanes fixed to said drum and coming into contact with fluid within the drum upon rotation of the same; and

said vanes retaining the development fluid within the drum upon rotation of the drum in one direction and expelling development fluid from the drum upon rotation of said drum in the opposite direction.

6. Photographic print development apparatus as recited in claim 1:

said means for rotating said drum comprising a reversible electric motor having an electric motor circuit;

means for connecting said motor in driving relation with said drum; and

motor control means for achieving selective energization of said motor circuit for selective rotation of said motor.

7. Photographic print development apparatus as recited in claim 6 comprising:

a control lever for controlling rotation of said drum;

said motor control means comprising a plurality of mercury switches mounted on said control lever with each being physically oriented in fixed position relative to said control lever, each of said mercury switches being selectively operated at various inclined positions of said control lever; and

the position of said control lever being selectively changed manually to achieve selectively energization of said motor.

8. Photographic print development apparatus as recited in claim 7:

means for selectively changing the inclination of the axis of rotation of said drum;

said last mentioned means comprising means for rotatably supporting said drum with the axis of rotation of said drum disposed generally horizontal manner;

elevating means being carried by said drum supporting means and being disposed for contact with a surface upon which said processing apparatus rests; and

said control lever controllably actuating said elevating means thereby causing said elevating means to selectively alter the inclination of the axis of rotation of said drum.

9. Photographic print development apparatus comprising:

a generally cylindrical drum having one closed and and an open end through which may be inserted photographic printing papers to be developed;

support means supporting said drum for rotation about a generally horizontal axis;

hopper means carried by said support means in fixed relation to said support means;

means for rotating said drum relative to said support means;

a supply of washing fluid at controlled temperature;

conduit means in communication with said hopper means and said supply of washing fluid for introducing a quantity of photographic development fluid from said hopper means into said drum and for introducing washing fluid into said drum;

means for spraying washing fluid at controlled temperature onto said drum for maintaining said drum and the contents therein at controlled temperature;

valve means for selectively controlling fluid communication between said supply of washing fluid and said conduit means, between said supply of washing fluid and said fluid spraying means and between said hopper means and said conduit means;

means for retaining development fluid within said drum upon rotation of said drum in one direction and for expelling development fluid from said drum upon rotation of said drum in the opposite direction; and

means for selectively controlling horizontal inclination of said drum.

10. Photographic print development apparatus as recited in claim 9:

said means for retaining and expelling photographic development fluid comprising a plurality of vanes disposed about the open extremity of said drum.

11. Photographic print development apparatus as recited in claim 9:

perforated conduit means disposed at the upper extremity of said hopper means, and adapted to spray washing fluid into said hopper for flushing of the hopper; and

said valve means selectively controlling fluid communication between said supply of washing fluid and said perforated conduit means.

12. Photographic print development apparatus as recited in claim 11:

said means for spraying washing fluid onto said drum comprising a second perforated conduit disposed adjacent said drum; and

said valve means being fixed to said second perforated conduit.

13. Photographic print development apparatus as recited in claim 9:

said means for rotating said drum comprising a reversible electric motor having an electric operating circuit;

means connecting said motor in driving relation with said drum; and

motor control means for achieving selective energization of said motor circuit for selective rotation of said motor.

14. Photographic print development apparatus as recited in claim 13:

a control lever for controlling rotation of said drum;

said motor control means comprising a plurality of mercury switches mounted on said control lever with each being physically oriented in fixed position relative to said control lever, each of said mercury switches being selectively operated at various inclined positions of said control lever; and

the position of said control lever being selectively changed manually to achieve selective energization of said motor.

15. Photographic print development apparatus as recited in claim 14:

means for selectively changing the inclination of the axis of rotation of said drum;

said last mentioned means comprising means for rotatably supporting said drum with the axis of rotation of said drum disposed in generally horizontal manner;

elevating means being carried by said drum supporting means and being disposed for contact with a surface upon which said processing apparatus rests; and

said control lever controllably actuating said elevating means thereby causing said elevating means to selectively alter the inclination of the axis of rotation of said drum.

16. Photographic print development apparatus as recited in claim 9:

partition means disposed within said drum for separation of said drum into compartments of variable size within said drum;

spacer means disposed within said drum to prevent shifting to multiple printing papers within said compartments.

17. Photographic print development apparatus as recited in claim 10:

means for preventing contact between photographic printing papers within said drum and said vanes during operation of said apparatus.

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