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[21] Appl. No. 724,760
[22] Filed Apr. 29, 1968
[45] Patented Jan. 19, 1971

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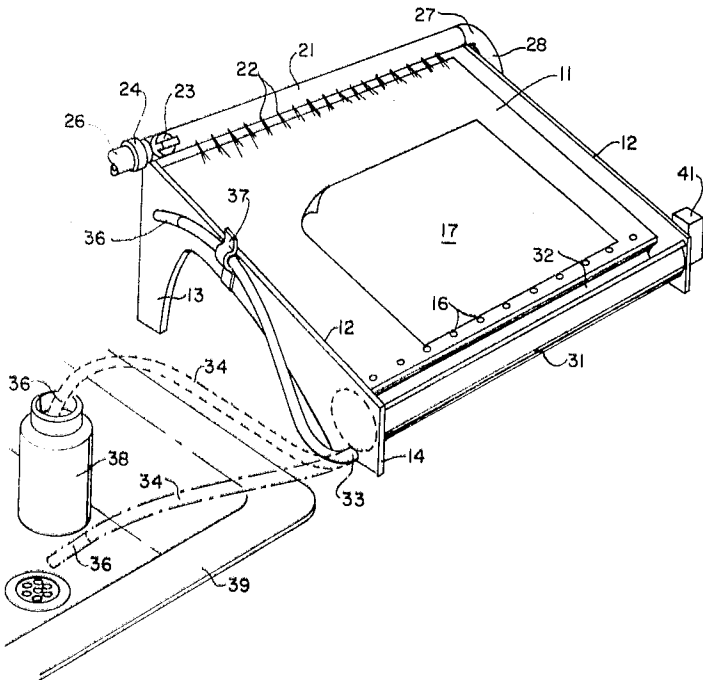
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[54] APPARATUS FOR PROCESSING PHOTOGRAPHIC
PRINTS
2 Claims, 3 Drawing Figs.
[52] U.S. Cl. 95/95
[51] Int. Cl. G03d 3/02
[50] Field of Search 95/89, 95,
96, 97, 98

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ABSTRACT: Apparatus for photographic development of either color or black-and-white prints using standard developing chemicals. An inclined platen receives the photographic paper. At the top of the platen is a transverse tube formed with spray holes, at the bottom a trough collecting liquid running off the lower end of the platen; sides of the platen retain the chemicals thereon. The trough has a discharge hose for draining chemicals into containers for reuse or rinse water into the sink. The tube has a valve and water connection to rinse water at one end and a connection to the pump at the other.



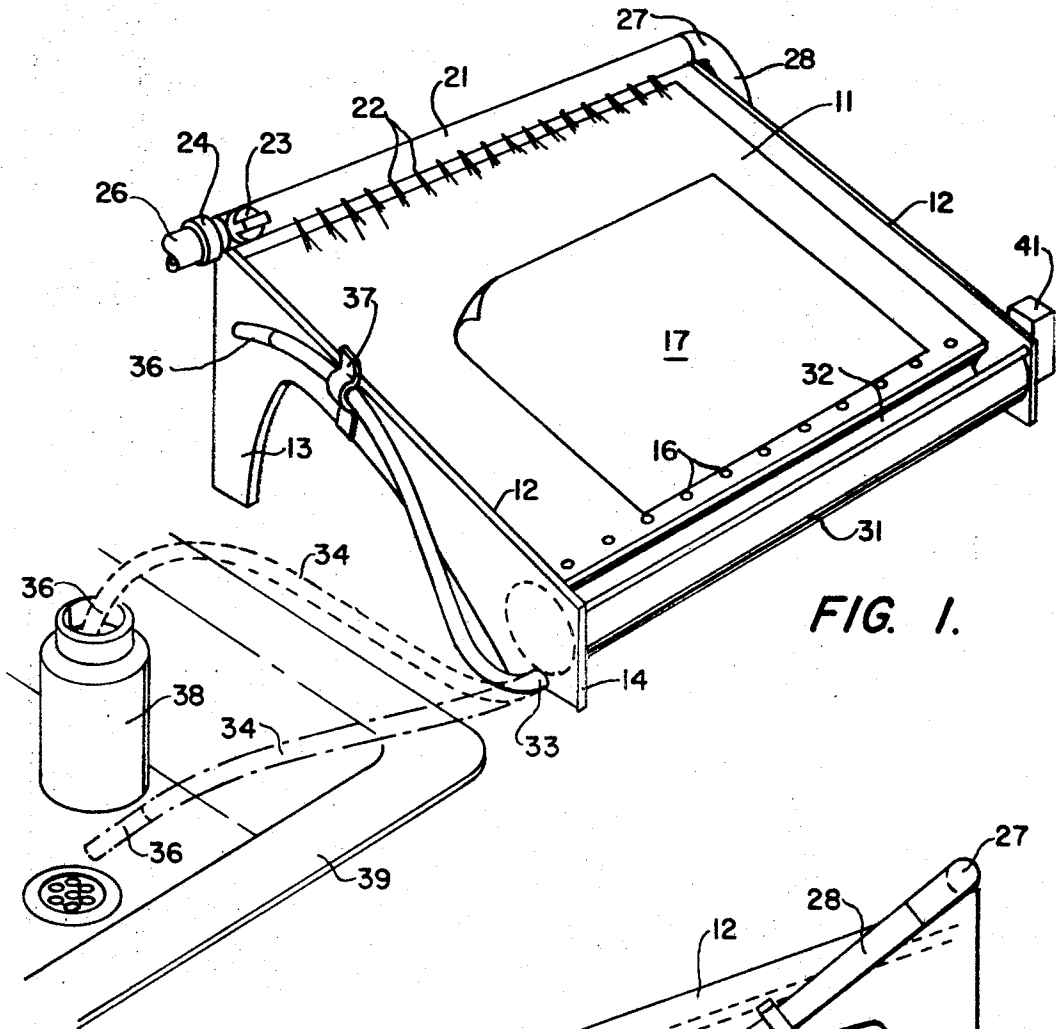


FIG. 1.

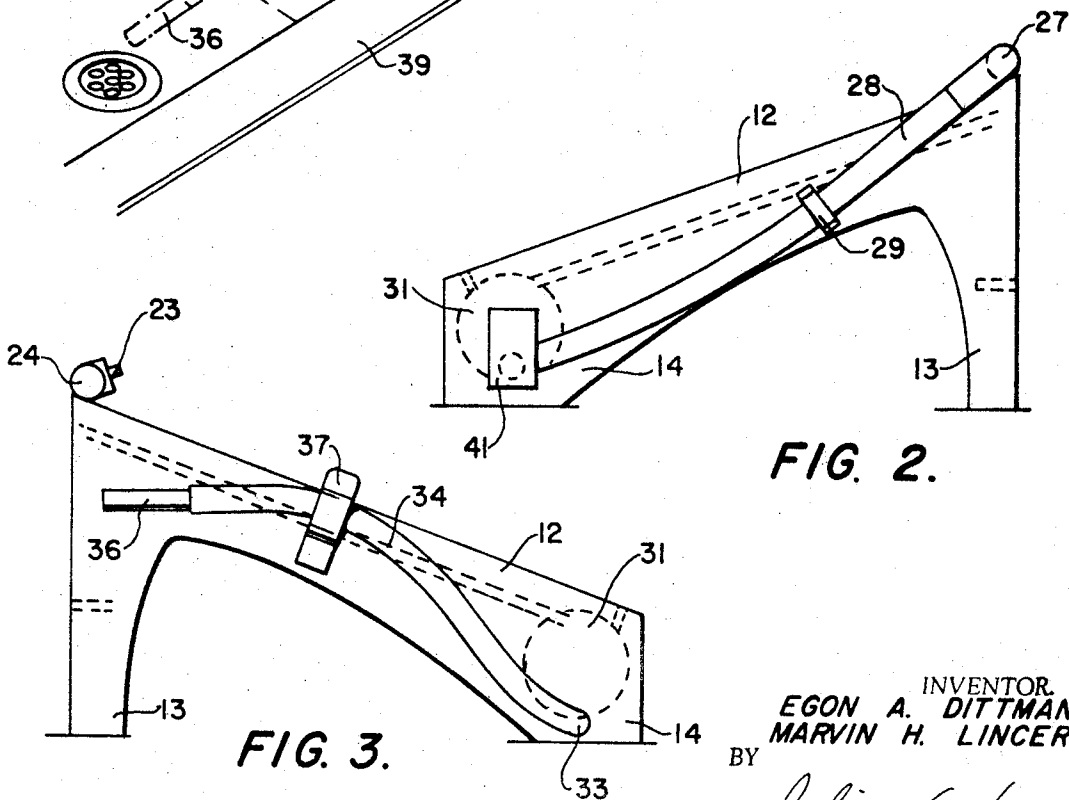


FIG. 2.

FIG. 3.

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APPARATUS FOR PROCESSING PHOTOGRAPHIC PRINTS

This invention relates to a new and improved apparatus and method for processing photographic prints. More particularly, the invention relates to sequential performance of development steps wherein the print remains in a single piece of developing equipment rather than being transferred from tray to tray. In accordance with the present invention, a photographic print is supported face down on a platen and the developing solutions and rinse water are circulated between the platen and the print in accordance with the sequence of conventional developing techniques. A principal object of the invention, therefore, is the provision of a single piece of developing equipment rather than a series of trays. The space requirements for a photographic darkroom are materially reduced.

Another object of the invention is to provide equipment which will handle large size prints. Inasmuch as only a single piece of equipment is required, rather than a series of developing trays, it is economically feasible to make the apparatus larger than conventional trays of commercial type.

An important feature of the invention is the fact that touching of the print with hands or tongs between the beginning and end of the development is eliminated. Accordingly, the likelihood of damage to the print is materially reduced by practice of the present invention.

Another advantage of the invention is that there is a more thorough and uniform contact of chemicals with all of the print surface. The platen is prepared in such manner as to produce a uniform, even layer of liquid in contact with the print thereby accomplishing uniformity of development throughout the surface of the print.

A feature of the invention is the fact that the chemicals and rinse water run down the platen between the platen and the print and that the print is supported by the liquid above the platen surface. Accordingly, the print is not immersed in an excess of the developing solutions and lesser quantities of developing liquids may be employed.

A still further feature of the invention is the fact that the salvaging of the chemicals used in developing is simplified.

Another advantage of the invention is the fact that the equipment is kept clean at all times. The components of which the equipment is constructed are chemically resistant to developing solutions and the construction is such that the equipment is capable of being washed free of all contaminants between steps and also at the end of a processing run.

Another feature of the invention is the fact that the equipment may be used in developing either color film or black-and-white film and that the solution and processing steps are not materially different in sequence from those recommended by manufacturers for conventional developing techniques at the present time. The invention is particularly adaptable in processing of AGFACOLOR color prints and performs a remarkably good job in such development. The equipment is, however, suitable to other color processing techniques and is particularly suitable for black-and-white development.

Another feature of the invention is that with simple changes the equipment may be converted from left-hand to right-hand models, depending upon the location of the sink in the dark room with reference to the surface on which the equipment is supported.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

FIG. 1 is a perspective view showing the invention.

FIG. 2 is a side elevation as viewed from the right in FIG. 1.

FIG. 3 is a side elevation as viewed from the left in FIG. 1.

The apparatus as illustrated in a preferred embodiment shown in the accompanying drawings comprises a platen 11 disposed at an angle of about 20° to the horizontal. The sur-

face of the platen is finished with fine lines so as to promote uniform dispersion of water and chemical over its surface. Thus the platen 11 may be formed of a plastic material, such as LUCITE, lined by rubbing with steel wool. Along either side edge of platen 11 are upstanding sides 12 which confine the chemical to the surface of the platen. Legs 13, 14 rear and front support the platen in inclined position. Adjacent the bottom edge of the platen are stops 16, arranged in a horizontal row. Such said stops 16 support the lower edge of photographic print 17. It is a feature of the invention that the chemicals hereinafter described run down platen 11 between the platen and the bottom surface of print 17 and, in effect, support the print 17 floating on the chemicals. Accordingly, the print is turned face down on the platen 11 during the entire processing operation and is not removed until processing is completed. It is possible, however, from time to time to pull back the upper edges of the print, as is shown in FIG. 1, to insure that the chemicals are acting upon the whole print surface, but such touching of the print is not necessary and an advantage of the invention is the fact that handling of the print is very materially reduced over conventional techniques wherein a series of trays are employed.

Extending across the top of platen 11 is a tube 21, provided with small holes 22 along its length through which a spray of water or chemicals is emitted so that the spread of the chemicals is substantially uniform throughout the width of the platen. In a preferred form of the invention, holes 22 are spaced at ½-inch intervals and may be of a "41" drill size, approximately. At the left-hand end of the machine, as shown in FIG. 1, is a valve 23 which is interposed between tube 21 and a connection 24 for a water hose 26 connected to a water tap. When valve 23 is opened, rinse water flows through hose 26 into tube 21 and down the surface of platen 11. On the opposite end of tube 21 is an elbow 27 connected to a hose 28 and held against right side 12 by clip 29. It will be understood that the arrangement of the parts, shown in FIG. 1, accommodates a sink on the left side of the machine, but where space requirements are such that a right-hand setup is desirable, the parts 24 and 27 may be interchanged.

At the bottom of platen 11 is a trough 31, having an open top 32. Thus chemicals running down platen 11 flow through the opening 32 into the trough 31. Below the left-hand end of trough 31 is a fitting 33 to which is attached a flexible hose 34. The opposite end of hose 34 has a spout 36, which may be of a relatively stiff material. The hose 34 may be held in elevated position by clip 37 on the left-hand side 12 and when thus elevated no liquid is discharged from trough 31 through hose 34. However, when it is necessary to drain chemicals from trough 31, the hose 34 is unfastened from clip 37 and spout 36 is inserted through the neck of a container 38, so that the chemicals drain into the container. Where rinse water is being circulated through the apparatus, the discharge nozzle 36 may be placed in sink 39 to drain into the sewer.

On the right-hand end of trough 31 is a pump 41, the discharge of which is connected through tube 28. In a preferred form, pump 41 has a capacity of about 175 gallons per hour delivered against the head which has heretofore been described. Preferably the pump is resistant to common photographic developing chemicals and, in order to eliminate shaft packing which may be a source of contamination, is of a magnetic drive type.

METHOD

The present invention is useful in developing AGFACOLOR prints and also black-and-white prints. The chemicals used in practice of the method are the standard chemicals recommended by the manufacturer of the print paper, except that because of the recirculation of the chemicals in accordance of the invention, the quantity of liquid required is reduced over normal tray development requirements.

The equipment is installed on a table to the right-hand side of a sink 39, it being understood that by reversal of parts the

equipment may be installed on the opposite side of the sink. Hose 26 is connected to a source of rinse water. After print 17 is exposed, it is placed face downward on platen 11, its lower edge being supported by stops 16. Where smaller prints are used, a plurality of prints may be held on platen 11 by appropriate holding means (not shown).

As a preliminary step it is desirable to wet the print 17. Accordingly, discharge nozzle 36 is hung in sink 39 and valve 23 is opened, allowing rinse water to be discharged through holes 22, running uniformly down the surface of platen 11 under the print 17, into the trough 31, and out through hose 34, into sink 39. After the print 17 is wet, valve 23 is turned off and hose 34 elevated by clip 37 to the position shown in solid lines as FIG. 1.

The first of the developing chemicals is then poured from its container 38 into the trough 31. In processing AGFACOLOR, the first chemical is a developer solution. The pump 41 is turned on and this causes circulation of the liquid from trough 31 up hose 28 to the right-hand end of tube 21 and thence through holes 22 onto the platen 11, where it runs down between platen 11 and the print 17 into trough 31 and is recirculated by pump 41 continuously for the period of time required in accordance with the print paper manufacturer's instructions. When the print has been processed for the required time of the first chemical, pump 41 is turned off and container 38 is placed below the level of trough 31 either in sink 39 or some lower elevation, and spout 36 is inserted through the neck of the container. This drains the chemical back into the container 38 for subsequent use. Use may be continued until the chemical is exhausted.

The next step is to rinse print 17 and the equipment. Accordingly, the discharge nozzle 36 is inserted in the sink 39 and valve 23 is turned on. This causes water to flow through the holes 22, flushing the platen 11, trough 31 and pump 41. The water also runs down through pipe 28, so that in substance the entire equipment is rinsed by the rinse water, as is the print 17. After rinsing is completed, the valve 23 is turned off and after the equipment has drained the hose 34 is elevated to clip 37.

The next step is to treat with the next chemical, which may be a stop fix, in the same manner as the developer. A subsequent rinse, then a bleach fix, then another rinse, then a stabilizer, and then a final rinse are sequentially used. For processing a print of the dimensions of 20 inches $\times$ 24 inches,

only one-half gallon of each of the various solutions is required, thereby reducing the amount of chemicals needed as compared to standard.

The process has been described for the AGFACOLOR process, but it will be understood that other color processes and black-and-white processing may be conducted provided the required solutions and chemicals are used at the proper times and temperatures as recommended by the print manufacturer.

When the print 17 has been developed, it is allowed to drain and excess moisture may be removed by a squeegee and the print then dried in conventional manner.

Although the foregoing invention has been described in some detail, by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be practiced within the spirit of the invention and scope of the appended claims.

We claim:

1. Apparatus for photographic development comprising a tray having a platen, said platen comprising a substantially rectangular piece of plastic material roughened on its top surface to promote even distribution of liquid over the entire top surface of said platen, sides on said platen, and support means for supporting said platen in tilted position, means on said platen to support a photographic print resting on said platen, a pipe across the top of said platen perforated in a plurality of spray apertures to distribute liquid across said platen to run down said platen, a tank across the bottom of said platen positioned to collect liquid which has run down said platen, said tank comprising a cylindrical member extending between said sides having an opening across the whole width of said platen immediately below the lower end of said platen, a pump having its intake connected to said tank and its outlet connected to said pipe, a flexible discharge hose connected to said tank, said hose movable between elevated position stopping discharge through said discharge hose and lowered position for drainage of the contents of said tank through said hose, a clip on said tray for holding said hose in elevated position, a connection for rinse water connected to said pipe, and a valve controlling admission of rinse water through said connection.

2. Apparatus according to claim 1 in which said platen is supported by said support means at an angle of about 20° to the horizontal.

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