March 29, 1960 H. GOODMAN 2,930,306

PHOTOGRAPHIC DEVELOPING TANK

Filed Sept. 30, 1957

FIG. 1.

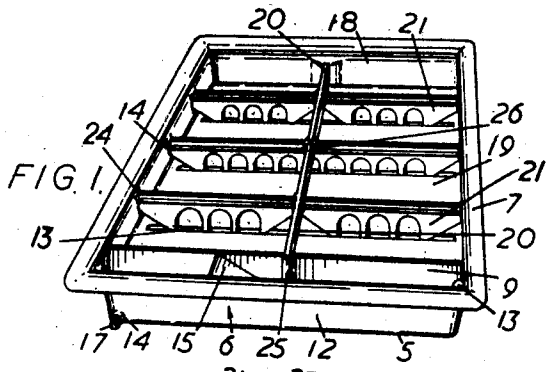


FIG. 2.

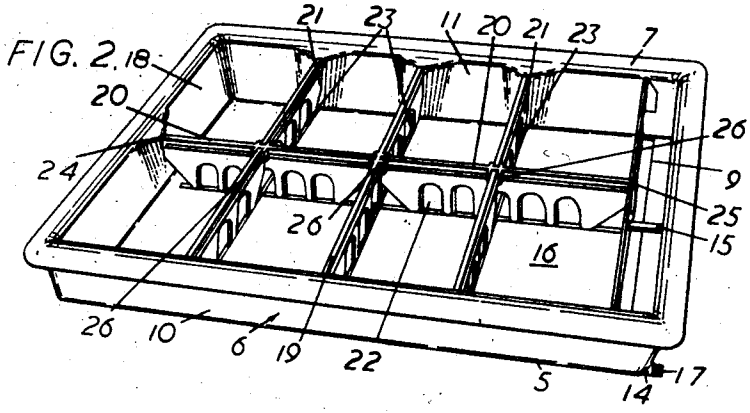
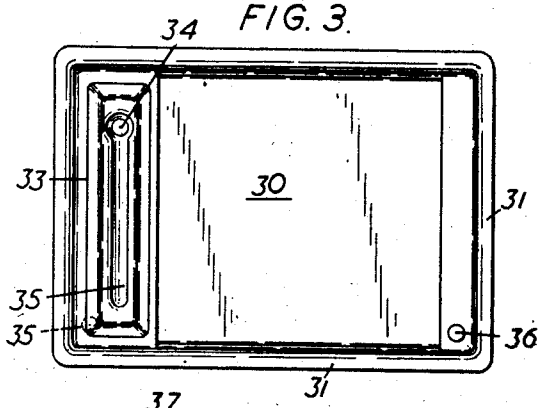


FIG. 3.



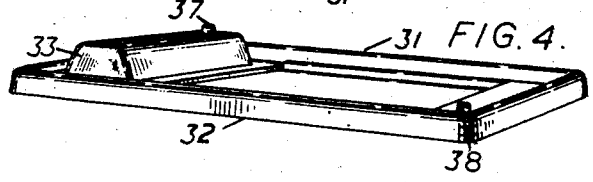


FIG. 4.

Inventor

HARRY GOODMAN

By Irwin S. Thompson

Attorney

United States Patent Office 2,930,306
Patented Mar. 29, 1960

2,930,306

PHOTOGRAPHIC DEVELOPING TANK

Harry Goodman, Glasgow, Scotland

Application September 30, 1957, Serial No. 687,162

Claims priority, application Great Britain January 31, 1957

5 Claims. (Cl. 95—96)

This invention relates to photographic developing tanks especially for use in the development and fixing of color prints.

In the development of photographic prints it is necessary during the developing process to immerse the exposed print in turn in developing and fixing solutions and to wash the print with running water between and after each immersion. Where color prints are concerned, a plurality of different developing and fixing solutions are required, usually necessitating the availability of a dark-room with a supply of running water.

The primary object of the present invention is to provide for the developing of color prints without the necessity for the availability of a dark-room with a supply of running water.

A further object of the invention is to provide for economy in the quantity of developing and fixing solutions required during the developing process.

Another object of the invention is to provide a photographic developing tank which can simultaneously handle a number of prints of different sizes, or of the same size as required.

A further object of the invention is to provide a photographic developing tank readily adaptable for handling a number of different sizes of prints at one time.

Other objects and features of the invention will become apparent as this description proceeds with reference to the accompanying drawing, in which:

Fig. 1 is a perspective view of a photographic developing tank with the lid or cover removed as seen from one end and above;

Fig. 2 is a perspective view of the tank as seen from one side and above;

Fig. 3 is a plan view of a lid or cover for the tank; and

Fig. 4 is a perspective view of the lid as seen from one corner and above.

Referring now to the drawing, the photographic developing tank comprises a tray 5 rectangular in plan view and having a continuous peripheral upstanding wall 6 of constant height provided at its upper edge with an outwardly-directed rounded bead 7.

A fixed vertical partition 9 extends transversely of the tray between the side walls 10 and 11 thereof close to but spaced in parallel relationship from an end wall 12 thereof. An orifice 13 is provided at the bottom of the partition 9 adjacent the side wall 11. A second orifice, referred to hereinafter as the draining orifice, is provided at the base of the end wall 12 diagonally opposite the orifice 13, the latter being built outwardly at 14 about the draining orifice and tapped to enable the latter to be closed by a screw-threaded stopper 17. A shield plate 15 bridges the space between the partition 9 and wall 12 rather nearer the draining orifice than the orifice 13. The shield plate 15 is oblique to the vertical, sloping downwardly in the direction of the orifice 13, and extends from the top of the partition but stops short of the floor 16 of the tray to provide a through passage for liquid from the orifice 13 to the draining orifice while preventing access to the tray interior on the other side of partition 9 of light entering through the latter orifice.

The tray 5 between the other end wall 18 and the partition 9 can be divided into compartments by means of readily insertable and removable combs 19, 20 and 21, all shown in position in Figs. 1 and 2 and dividing the tray as aforesaid into eight compartments. Thus the tray can readily be adapted to suit varying sizes of prints by selective insertion of combs.

For the purpose of positioning the combs the floor 16 of the tray has a central longitudinal groove 22, and three transverse grooves 23 which quarter the tray between the end wall 18 and the partition 9. Likewise the walls of the tray have vertical grooves 24 which register with the grooves on the floor of the tray and the partition 9 is formed with a central vertical kink 25 thus to provide a groove registering with the groove 22.

The comb arrangement is such that the tray developing space between the end wall 18 and the partition 9 can be divided into halves by insertion of the central transverse comb 19, then into quarters by insertion of the two longitudinal combs 20, and then into eighths by insertion of the short, transverse combs 21. Manifestly various comb arrangements are thus possible to suit print sizes. The combs 19 and 20 are formed centrally on each face at their upper parts with a pair of spaced guide ribs 26 defining therebetween slots for guidance and positioning of combs, those on the comb 19 serving the combs 20 and those on the combs 20 serving the combs 21.

The lid or cover 30 (see Figs. 3 and 4) is a flush fit on the tray and is formed with a peripheral upwardly-arching channel-defining marginal portion 31 merging into a downwardly-directed peripheral flange 32. When the lid is fitted on to the tray the bead 7 on the peripheral wall of the latter fits snugly into the channel and is overhung by the flange 32 thus positively to prevent ingress of light to the tray interior where the lid and the tray fit together. The flange is formed with slight inwardly-directed depressions (not seen in the drawing) at spaced locations around its periphery which positively prevent accidental displacement of the lid once in position.

The lid is formed on its upper surface at the end to be disposed adjacent the end wall with a hollow chamber 33 disposed transversely thereof. A filling orifice 34 is provided adjacent one end of the chamber 33 and the roof of the latter is formed with a channel 35 extending along the length thereof and about the filling orifice to catch any liquid which may splash on being poured through the orifice 34.

An outlet orifice 35 is provided in the bottom of the chamber, i.e. in the lid below the chamber, and the orifice 35 is provided at the opposite end of the chamber from the filling orifice 34 so that no light entering through the latter orifice can accede to the tray interior when the lid is fitted to the tray. The chamber 33 in effect is a light trap.

An orifice 36 is provided in the lid at the opposite end thereof from the chamber 33 and is positioned to be disposed above the draining orifice and between the partition 9 and the end wall 12 of the tray when the lid is in position on the tray. Thus the partition 9 and shield plate 15 together form a light trap positively preventing any light entering through orifice 36 from entering the print-receiving section of the tray, i.e. the section thereof between partition 9 and end wall 18. The orifice 36 enables the insertion of the bulb of a thermometer into liquid in the tray to measure the temperature of such liquid without allowing access of light to prints being developed. As shown in Fig. 4 the orifices 34 and 36 can be closed by screw stoppers 37 and 38 respectively when desirable.

In use of a developing tank according to the invention,

the combs 19, 20 and 21 are inserted into position in the tray 5 as required in accordance with the size or sizes of the prints to be treated and after exposure the prints are placed in the tray compartments with the sensitive faces up. The cover or lid 30 is then fitted on to the tray 5 with the filling orifice 34 in the lid or the opposite end of the tank from the draining orifice. Until this stage has been reached, of course, all operations have been carried out with the exclusion of light rays which would have a deleterious effect on the sensitive coatings on the prints. All subsequent operations can be carried out in normal room lighting with the lid or cover retained in position.

In carrying out the developing process solutions to be used and also if necessary the tank are brought to the correct temperature and during the process this temperature is maintained within very close limits and manifestly it will depend upon the prevailing room temperature whether the tank when charged with a developing or fixing solution or with a rinsing water requires to be warmed or cooled. The temperature fluid in the tank can readily be measured by a thermometer through the orifice 36. After the preliminary temperature precautions have been taken the draining orifice is closed by the stopper 17 and developing solution is introduced into the tank through the filling orifice. The tank is gently rocked to ensure that the developing solution flows evenly and constantly over the prints. When development is complete, the stopper 17 is removed and the solution drained off, if desired into a bottle for further use. The stopper 17 is left out and water is run through the tank to wash the prints. The tank is drained and the stopper 17 replaced, whereafter fixing solution is poured into the tank through the filling orifice. Again the tank is gently rocked to ensure that the fixing solution flows evenly and constantly over the prints. The fixing solution is drained off and the prints are again washed.

Mainfestly the process of developing and fixing is carried out as described several times for color prints. The light traps ensure that no light reaches the prints when the filling and draining orifices are open.

The entire lid or cover 30 and the tray 5 with the fixed portion 9 therein are necessarily of opaque or light-impermeable material and the entire tank must be of a material or materials inert to the chemicals used in the developing process.

Various modifications may be effected in the developing tank shown and described by way of example, without thereby departing from the scope of the invention. For example, the light trap in the tray, effective of course only when the lid or cover is in position could take many forms, for instance the form of a maze. It could also be of a permanent nature, i.e. quite independent of the lid or cover, being permanently closed on top save for a closable orifice for insertion of a thermometer, in which event the lid or cover would be suitably modified. The tank shown and described is suitable only for a single layer of prints at a time but one or more extra layers could be cared for by the interpositioning of horizontal grills and appropriate modification of the combs. The inner surface of the lid or cover may be other than flat, for example have small inverted pyramids fashioned thereon, in order to obviate possible adhesion of prints thereto. Means may be provided for positively clamping the lid or cover in position on the tray, e.g. clips or screws may serve this purpose, in which event the inwardly-directed depressions in the flange would be superfluous.

Many plastics fulfil the material requirements of developing tanks according to the invention and thus the tanks are eminently suited to production by a moulding process.

The basic developing tank according to the invention may have many refinements incorporated therein. For example a thermometer could be built in, a thermostatically-controlled heater could be provided, a rocker base could be provided for the tray, and a time indicator fitted.

It will be manifest that developing tanks according to the invention may be used also for developing plates.

I claim:

1. A photographic developing tank comprising a light-impermeable tray having a flat bottom internal surface for receiving flat on and supporting plates and prints, an upstanding constant-height, relatively low light-impermeable peripheral wall on said tray, a light-impermeable cover fitted on said tray and openable therefrom, means at the interfitting edges of said cover and said wall inhibiting ingress of light to the tray interior, an upstanding light-impermeable partition extending across the tray and dividing a minor portion of the latter from a major portion thereof, said partition having an opening adjacent one end thereof and at the base thereof affording through flow of liquid, said wall where skirting said minor portion of the tray having at the base thereof and remote from said opening an orifice for draining liquid from the tray, a removable plug closing said draining orifice, light-trapping means within said minor portion of the tray between said opening and said orifice, said light-trapping means masking said opening against infiltration thereto of light passing through said draining orifice to the interior of said minor portion of the tray thereby to prevent access through said opening of such light to said major portion of the tray interior, said cover having therein at its end remote from said minor portion of the tray an orifice for filling liquid into the tray, and means masking said filling orifice from within against infiltration of light to the tray interior.

2. A photographic developing tank comprising a light-impermeable tray having a flat bottom internal surface for receiving flat on and supporting plates and prints, an upstanding constant-height, relatively low light-impermeable peripheral wall on said tray, a light-impermeable cover fitted on said tray and openable therefrom, means at the interfitting edges of said cover and said wall inhibiting ingress of light to the tray interior, comb means adapted removably to be fitted across said tray to subdivide same into compartments while permitting inter-compartmental through flow of liquid, means on the inside surface of said wall adapted to support said comb means in position, an upstanding light-impermeable partition, extending across the tray and dividing a minor portion of the latter from a major portion thereof, said partition having an opening adjacent one end thereof and at the base thereof affording through flow of liquid, said wall where skirting said minor portion of the tray having at the base thereof and remote from said opening an orifice for draining liquid from the tray, a removable plug closing said draining orifice, a light-impermeable shield plate bridging said minor portion of the tray between said partition and said peripheral wall, said shield plate extending downwardly from the level of the top of said partition towards the bottom internal surface of the tray and leaving thereat a space for through flow of fluid flowing along said bottom internal surface, said shield plate masking said opening against infiltration thereto of light passing through said draining orifice to the interior of said minor portion of the tray thereby to prevent access through said opening of such light to said major portion of the tray interior, said cover having therein at its end remote from said minor portion of the tray an orifice for filling liquid into the tray, and means masking said filling orifice from within against infiltration of light to the tray interior.

3. A photographic developing tank comprising a light-impermeable tray having a flat bottom internal surface for receiving flat on and supporting plates and prints, an upstanding constant-height relatively low, light-impermeable peripheral wall on said tray, a light-impermeable cover fitted on said tray and openable therefrom, means at the interfitting edges of said cover and said

wall inhibiting ingress of light to the tray interior, an upstanding light-impermeable partition extending across the tray and dividing a minor portion of the latter from a major portion thereof, said partition having an opening adjacent one end thereof and at the base thereof affording through flow of liquid, said wall where skirting said minor portion of the tray having at the base thereof and remote from said opening an orifice for draining liquid from the tray, a removable plug closing said draining orifice, light-trapping means within said minor portion of the tray between said opening and said orifice, said light-trapping means masking said opening against infiltration thereto of light passing through said draining orifice to the interior of said minor portion of the tray thereby to prevent access through said opening of such light to said major portion of the tray interior, a light-impermeable box on said cover positioned across said cover remote from said draining orifice and having a filling orifice at one end of its upper surface, said cover having an opening therein providing intercommunication between the tray and box interiors and located at the end of the box remote from said filling orifice, whereby light entering said box through said filling orifice is wholly dissipated therewithin before reaching said opening and the tray interior is protected against infiltration of light thereinto.

4. A photographic developing tank comprising a light-impermeable tray having a flat bottom internal surface for receiving flat on and supporting plates and prints, an upstanding constant-height relatively low, light-impermeable peripheral wall on said tray, a light-impermeable cover fitted on said tray and openable therefrom, means at the interfitting edges of said cover and said wall inhibiting ingress of light to the tray interior, comb means adapted removably to be fitted across said tray to subdivide same into compartments while permitting intercompartmental through flow of liquid, means on the inside surface of said wall adapted to support said comb means in position, an upstanding light-impermeable partition extending across the tray and dividing a minor portion of the latter from a major portion thereof, said partition having an opening adjacent one end thereof and at the base thereof affording through flow of liquid, said wall where skirting said minor portion of the tray having at the base thereof and remote from said opening an orifice for draining liquid from the tray, a removable plug closing said draining orifice, a light-impermeable shield plate bridging said minor portion of the tray between said partition and said peripheral wall, said shield plate extending downwardly from the level of the top of said partition towards the bottom internal surface of the tray and leaving thereat a space for through flow of fluid flowing along said bottom internal surface, said shield plate masking said opening against infiltration thereto of light passing through said draining orifice to the interior of said minor portion of the tray thereby to prevent access of such light to said major portion of the tray interior, a light-impermeable box on said cover positioned across said cover remote from said draining office and having a filling orifice at one end of its upper surface, said cover having an opening therein providing intercommunication between the tray and box interiors and located at the end of the box remote from said filling orifice, whereby light entering said box through said filling orifice is wholly dissipated therewithin before reaching said opening and the tray interior is protected against infiltration of light thereinto.

5. A photographic developing tank according to claim 4, said shield plate is situated nearer to said draining orifice than to said opening, is disposed oblique to the vertical and slopes downwardly in the direction of the said opening.

References Cited in the file of this patent

UNITED STATES PATENTS

1,001,422	McCandless	Aug. 22, 1911

FOREIGN PATENTS

206,936	Great Britain	Nov. 19, 1923