March 9, 1965 C. SISKIND ETAL 3,172,346

PHOTOGRAPH PROCESSING APPARATUS

Filed May 21, 1962 3 Sheets-Sheet 1

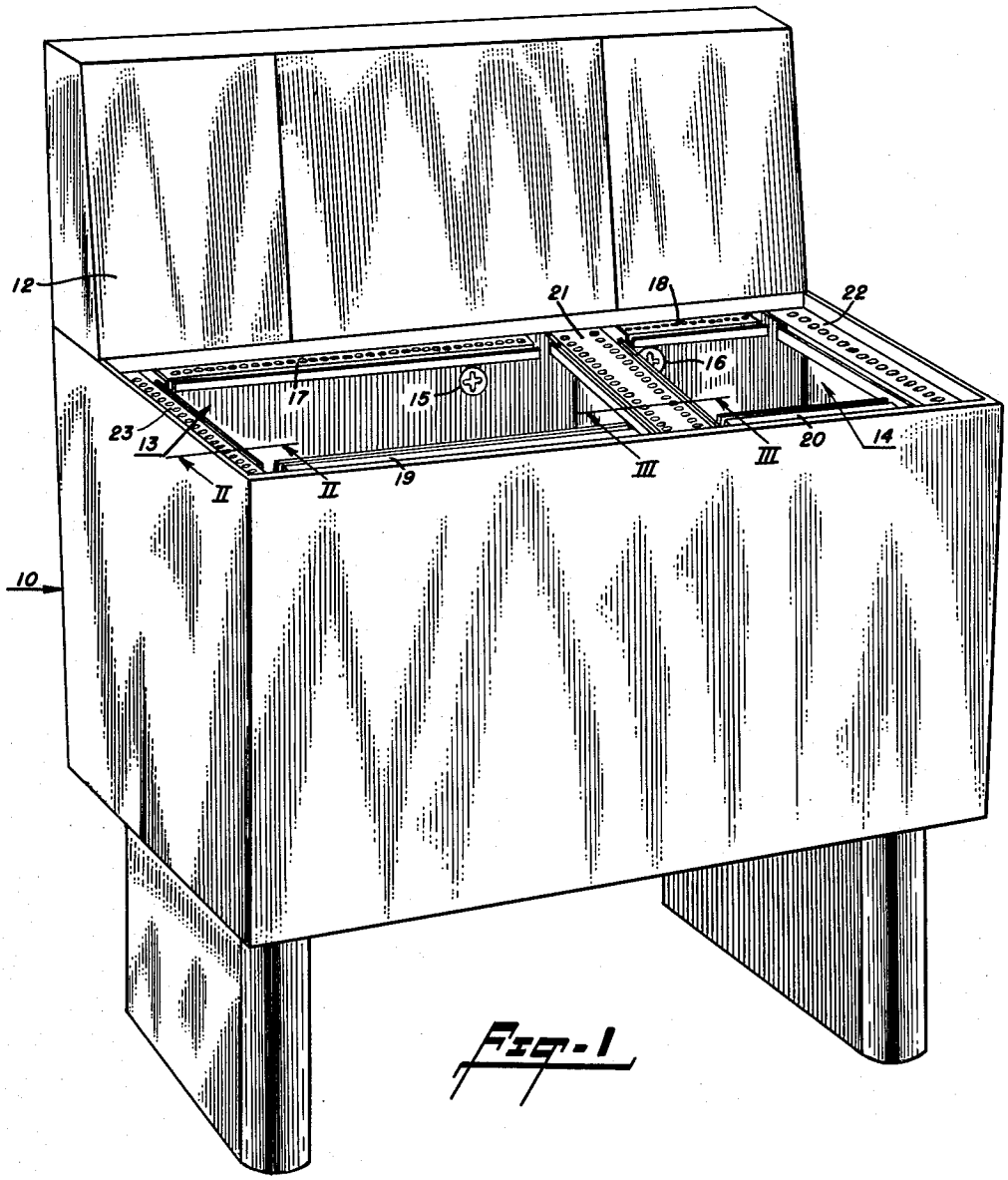


Fig-1

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PHOTOGRAPH PROCESSING APPARATUS

Filed May 21, 1962 3 Sheets-Sheet 2

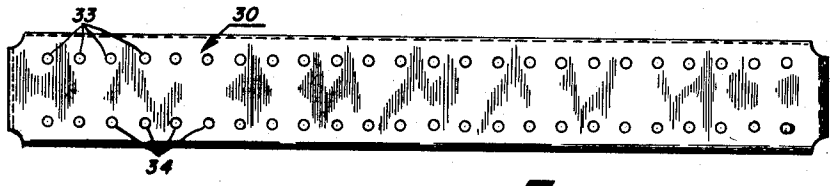


Fig-4

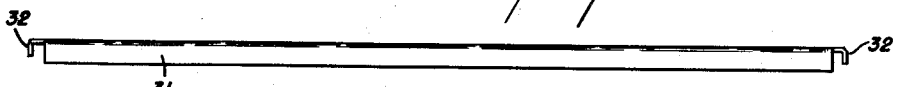


Fig-5

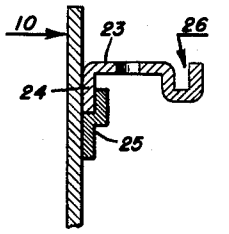


Fig-2

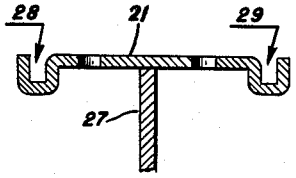


Fig-3

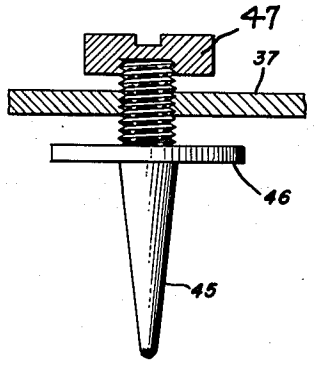


Fig-9

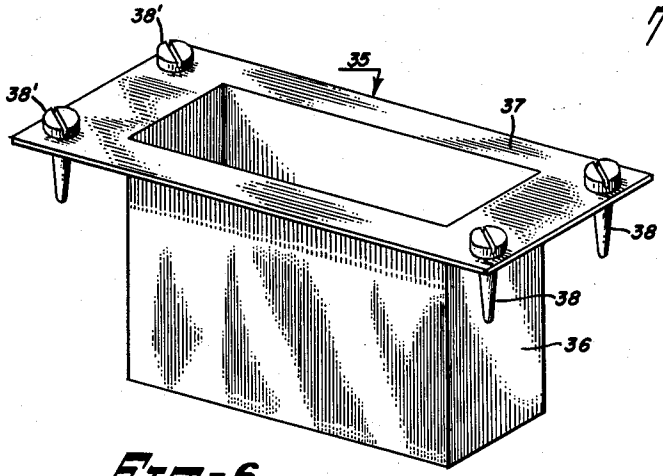


Fig-6

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March 9, 1965 C. SISKIND ETAL 3,172,346

PHOTOGRAPH PROCESSING APPARATUS

Filed May 21, 1962 3 Sheets-Sheet 3

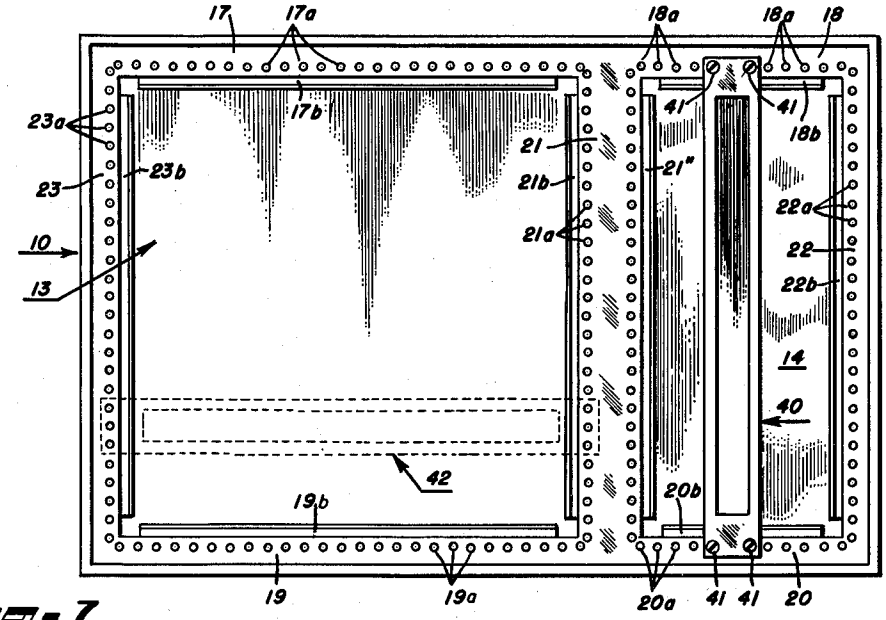


Fig-7

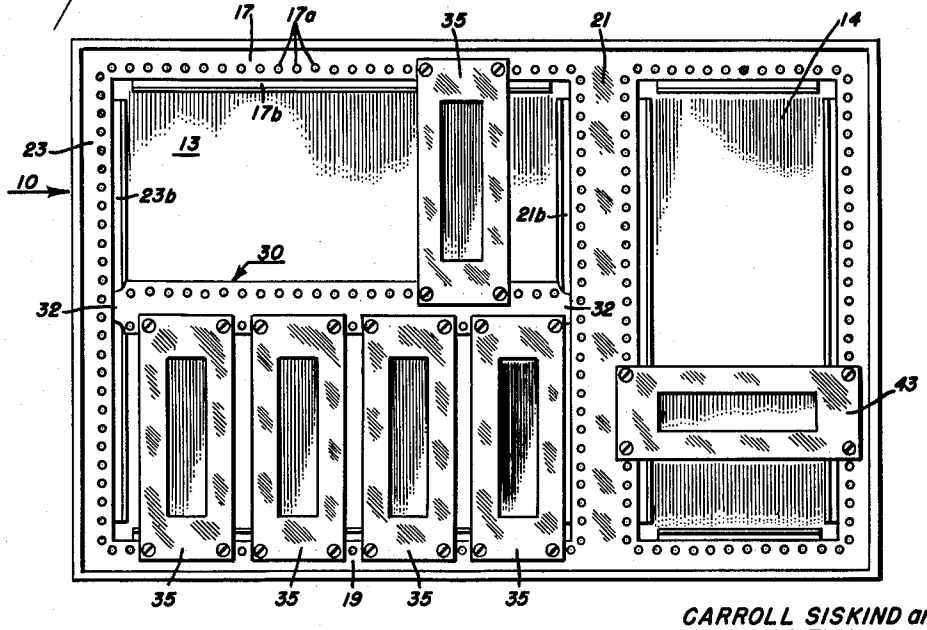


Fig-8

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Patented Mar. 9, 1965

3,172,346

PHOTOGRAPH PROCESSING APPARATUS

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Filed May 21, 1962, Ser. No. 196,369
7 Claims. (Cl. 95—98)

This invention relates to apparatus for use in the processing of color photographs and more particularly to such apparatus incorporating a modular arrangement whereby the apparatus readily is conditioned by the operator for use with any one of numerous processing procedures.

The development of color film and the making of color prints involve processes having numerous, distinct steps, the number and order of the steps depending upon the specific film or printing paper used and the desired photographic character of the finished product. The various chemical processing solutions are contained in individual stainless steel tanks, or vessels, and it generally is desirable to maintain the solutions at a relatively fixed temperature during the processing operation. The color negative, or exposed print, is immersed in the solutions in a prescribed order and in accordance with a predetermined timing sequence, with one or more washing steps interspersed through the particular processing procedure.

Color film is supplied in various standard sizes up to 8 x 10 inches, whereas color prints may run as large as 16 x 20 inches. Consequently, the processing apparatus includes a plurality of tanks of two sizes, one to accommodate the largest size film and the other to accommodate the largest size paper.

Inasmuch as different types of films and printing papers require different specific processing sequences, it is desirable that the processing apparatus include a maximum flexibility with respect to the number and size of the tanks to be used and the positioning thereof relative to each other. The latter requirement is of importance as all, or at least a substantial portion, of the particular processing procedure must be carried out in a dark room.

Processing apparatus heretofore available has been designed primarily for use with a specific processing procedure, in which case the apparatus is limited for use with a specific grade, or type, of film or paper. Also, there has recently become available processing apparatus which includes provision for a limited degree of interchangeability of the solution-containing vessels, in which case the apparatus can be used with a few, but not all, of the available types of films and papers.

An object of this invention is the provision of apparatus for processing color photographs which apparatus includes convenient means whereby the operator can arrange the number, size and relative orientation of the solution-containing vessels thereby to adapt the apparatus for use in a processing sequence having the necessary number of steps.

An object of this invention is the provision of color photograph processing apparatus having adjustable means for removably supporting a plurality of solution-containing vessels in any one of numerous predetermined arrangements thereby to facilitate the particular processing procedure.

An object of this invention is the provision of color photograph processing apparatus comprising a tub for containing water, a plurality of vessels for containing the processing solutions, an adjustably-positionable arm for supporting the vessels in the water and cooperating means between the said arm and the tanks for retaining the tanks in predetermined, spaced, relation.

These and other objects and advantages will become apparent from the following description when taken with the accompanying drawings. It will be understood, however, that the drawings are for purposes of illustration and are not to be construed as defining the scope or limits of the invention, reference being had for the latter purpose to the claims appended hereto.

In the drawings wherein like reference characters denote like parts in the several views:

FIGURE 1 is an isometric view of apparatus made in accordance with this invention with the solution-containing vessels removed;

FIGURE 2 is a cross-sectional view taken along the line II—II of FIGURE 1 and drawn to an enlarged scale;

FIGURE 3 is a similar cross-sectional view taken along the line III—III of FIGURE 1;

FIGURE 4 is a plan view of the removable bracket arm;

FIGURE 5 is a side view thereof;

FIGURE 6 is an isometric view of a vessel adapted to contain a processing solution;

FIGURE 7 is a fragmentary plan view of the apparatus showing one arrangement of the larger-size solution-containing vessels;

FIGURE 8 is a similar view showing an arrangement of the smaller size vessels; and

FIGURE 9 is an enlarged, fragmentary view, in cross section, showing an arrangement for adjusting the locating pin relative to the vessel flange, thereby to effect a leveling of the vessel when suspended within the tub.

Referring, now, to FIGURE 1, the numeral **10** identifies a generally rectangular tank, preferably made of stainless steel and supported on suitable legs. Extending upwardly from the tank is a panel **12**, which normally carries the necessary accessories such as thermometers, control devices and manually-operable valves for controlling the flow of water into the separate tubs **13** and **14**, which tubs are provided with overflow outlets **15** and **16**, respectively. In accordance with conventional practice, the tub **14** is used for the washing step in the processing procedure and a continuous circulation of water is maintained therethrough. The larger tub **13**, into which the various solution-containing vessels are suspended, is filled with water to a desired level thereby to maintain the processing solutions at a uniform temperature.

The top of the tank **10** is a mono-planar structure made up of the rear plates **17**, **18**, corresponding front plates **19**, **20**, a divider plate **21** and the side plates **22**, **23**. These plates, made of strainless steel, are secured together to form a rigid structure which, in turn, is secured to the tub, thereby defining the openings for the tubs **13** and **14**. For purposes which will be described in detail hereinbelow, the plates are provided with spaced, aligned holes at the forward edges thereof. Further, the forward edge of each plate is reversely bent to form channels which are substantially co-extensive with the length of the plates.

FIGURE 2, which is an enlarged cross-sectional view taken along the line II—II of FIGURE 1, shows the side plate **23** having a downwardly-depending portion **24** disposed within a clip **25** that is welded, or otherwise secured, to a side wall of the tub **10** and the reverse bend at the forward edge forming the channel **26**. Similarly, FIGURE 3 shows the divider plate **21** supported by the tank partition wall **27** and having both edge portions reversely bent to form the channels **28** and **29**. It will now be apparent that the tank top is a unitary structure affixed to the tub to lie in a plane somewhat lower than the top of the tub walls.

In order to provide for a maximum degree of flexibility whereby the operator can position a required number of

solution-containing vessels in a preferred positional orientation within the tub 13, there is provided a removable bracket arm as shown in FIGURES 4 and 5. This bracket arm 30, made of stainless steel, has notched corners to permit bending the side edges downwardly to form the side walls 31 (which provide structural rigidity) and the lips 32 adapted to fit within the channels formed in the top of the tank, such as the facing channels 26 and 28 shown in FIGURES 2 and 3. Attention also is directed to the two rows of spaced holes 33 and 34 formed in the bracket 30, the longitudinal spacing of the holes corresponding to that of the holes formed in plates 17, 19, 21 and 23, as shown in FIGURE 1.

Referring back to FIGURE 1, the opening in the tub 13 is square and the length of the bracket 30 (FIGURE 4) is such that the bracket spans the tub opening, in either direction, when the lips of the bracket are positioned in the channels formed in opposite plates 17, 19, or 21, 23. Inasmuch as these channels extend substantially the full length of the plates, the bracket 30 is slidably positionable to divide the tub opening into two sections of desired proportions.

The various chemicals utilized in the processing operation are contained in individual stainless steel tanks or vessels with the exception of the bleaching solution which preferably is contained in a vessel made of brass to resist the corrosive action. These vessels are made in two standard sizes, one for film and one for printing paper. Appropriate baskets are provided for retaining a quantity of either films or papers in spaced-apart position within the appropriate vessel, and suitable light-tight covers are provided for each vessel. Such baskets and covers are standard equipment and form no part of the present invention.

FIGURE 6 shows one of the small vessels for containing a processing solution and which is adapted to accommodate a plurality of color films. A plurality of such vessels are provided each having a capacity of approximately one gallon. It will be noted that the vessel, identified by the numeral 35, comprises a rectangular body portion 36, having a flat skirt, or flange 37, secured thereto at the open end and which carries four locating pins 38 and 38′ having tapered ends. The spacing between the adjacent pins 38 is equal to that of the adjacent pins 38′ and is a multiple of the spacing between adjacent holes in the plates forming the top cover of the tank 10 (see FIGURE 1) and the holes 33 and 34 formed in the bracket arm (see FIGURE 4). Specifically, in the actual apparatus, the spacing between adjacent holes 33, in the bracket arm, is one inch, and the spacing between the locating pins 38 of the vessel is three inches. The length of the flange 37, of the vessel 35, is somewhat less than the width of the small tub 14 (see FIGURE 1) and somewhat less than one half that of the larger, square tub 13, for purposes which will become apparent as the description proceeds.

A set of larger vessels is also provided, these vessels having a capacity of approximately 3½ gallons and designed to accommodate a plurality of prints having a maximum size of, say, 16 x 20 inches. Each of the larger vessels is provided with a flange and four locating pins such as the flange 37 and the pins 38, 38′ shown in FIGURE 6. Further, the larger vessels are somewhat narrower than the smaller vessels and the length of the flange (on the larger vessels) is such that it will span the opening in the larger tub 13.

Reference now is made to FIGURE 7 which is a fragmentary plan view of the tank 10 showing the plates 17–23 (which form the tank cover), each plate being provided with a row of uniformly-spaced holes (here identified by the related reference numerals 17*a*–23*a*) and upturned free edges forming the channels (here identified by the related numerals 17*b*–23*b*).

As stated hereinabove, the small tub 14 contains the circulating water for the washing step of the processing procedure. In the case of prints, a number of said prints is carried by a suitable basket which is disposed within one of the larger vessels, such as the vessel 40 in FIGURE 7. The vessel is suspended on the opposed plates 18, 20 with the locating pins 41 passing through the correspondingly-spaced holes of the series 18*a* and 20*a*. As is well known in this art, the vessel 40 has perforations in the side walls affording the flow of water through the vessel and into contact with the contained prints. The described arrangements provide a firm support for the vessel while permitting easy removal and re-positioning thereof. Further, in the event two such wash vessels are required, they can be positioned in side-by-side relation.

A plurality of similar vessels can be suspended in the large tub 13 in a similar manner, with the vessels positioned in side-by-side relation and extending lengthwise or crosswise of the tub as shown, for example, by the dotted outline of the vessel identified by the numeral 42. In actual practice, the large tub 13 will accommodate seven of the larger size vessels, which, together with the wash vessel 40, provides a capacity suitable for the processing of colored prints in a seven-step procedure, exclusive of the washing steps.

To convert the apparatus for use in developing colored films, the larger vessels are replaced by the smaller vessels which can be arranged quickly and easily by the operator in accordance with the specific processing method to be used with the particular film. One such arrangement is shown in FIGURE 8. Here the bracket arm 30 (see also FIGURE 5) is positioned to span the tub 13, with the lips 32 of the bracket arm resting in and slidable along the channels 21*b* and 23*b* formed in the opposed plates 21 and 23, respectively. The individual vessels 35 are retained in the desired position by the associated locating pins passing through appropriate holes formed in the bracket arm 30 and one or the other of the opposed plates 17 and 19. One or more wash vessels 43 similarly can be suspended in the tub 14, as shown. It will be apparent that the bracket arm 30 can be positioned at a right angle to the position illustrated in FIGURE 8 whereby the vessels 35 are positioned by the locating pins passing through the aligned holes in the bracket arm and one or the other of the opposed plates 21 and 23. It will further be apparent that the geometry of the described arrangement is such that a plurality of the small vessels can be suspended in, say, the rear portion of the tub 13 and a plurality of the larger vessels suspended in the front portion of the tub, all for the purpose of adapting the apparatus for use with a particular processing procedure or procedures.

In certain steps of the processing procedure, it is advantageous to have the vessel suspended within the tank in a very nearly vertical plane irrespective of the level of the apparatus. Toward this end, some, or all, of the locating pins can be adjustably mounted on the associated vessel flange. One such arrangement is illustrated in FIGURE 9 which is an enlarged view, in cross section, showing a portion of the vessel flange 37. In this case, the locating pin has its tapered end 45 terminating in a circular shoulder 46 from which the threaded shank extends through a threaded hole formed in the flange. Firmly secured to the end of the shank is a knurled, finger-operable knob 47. The maximum diameter of the pin end 45 is less than the diameter of the locating holes formed in the top surface of the tank. Consequently, when the vessel is suspended within the tank, it is supported by the circular shoulders of the locating pins. It will be apparent, then, that suitable rotation of one or more of the vessel locating pins will effect a leveling of the vessel, as desired.

Although the vessels hereinabove described have rectangular bodies for containing the processing solution, it will be apparent the invention is not restricted to vessels of such specific form. Circular, or other body shapes, may be utilized, each such vessel having an outwardly-extending flange which carries the locating pins for the purposes hereinabove set forth.

Having now described our invention, those skilled in this art will find no difficulty in making various changes and modifications in the illustrated construction. It is intended that such changes and modifications shall fall within the scope and spirit of the invention as recited in the following claims.

We claim:

1. Apparatus for processing photographs comprising,
(*a*) a tank having a cover with an opening formed therein,
(*b*) a removable member positionable to span the said opening,
(*c*) a plurality of vessels for the processing solutions, and
(*d*) cooperating means formed on the vessels, the cover and the said removable member for suspending the vessels in the tank in a selected one of several predetermined, non-slidable positions, including
(*e*) a plurality of spaced holes formed on the cover along the marginal edges defining the said opening,
(*f*) a plurality of aligned, spaced holes formed on the said removable member, and
(*g*) locating pins carried by the vessels and adapted for insertion in aligned holes of the removable member and cover.

2. Apparatus for processing photographs comprising,
(*a*) a tank having a cover with an opening formed therein,
(*b*) a removable member positionable to span the said opening,
(*c*) a plurality of vessels for the processing solutions, and
(*d*) cooperating means formed on the vessels, the cover and the said removable member for suspending the vessels in the tank in a selected one of several predetermined, non-slidable positions, including
(*e*) a plurality of spaced holes formed in the cover along the marginal edges defining the said opening,
(*f*) a plurality of aligned, spaced holes formed on the said removable member, and
(*g*) locating pins carried by the vessels and adapted for insertion in aligned holes of the removable member and cover, some of the said locating pins being adjustably secured to the vessels thereby to effect a leveling of the vessels when suspended in the tank.

3. Apparatus for processing photographs comprising,
(*a*) a tank having a cover with an opening formed therein,
(*b*) a plurality of similar vessels for containing processing solutions, each vessel having a body and an outwardly-extending flange at the open end,
(*c*) two sets of locating pins carried by the flange of each vessel, each set of locating pins being disposed at opposed ends of the vessel body,
(*d*) channels formed in the said cover along all of the marginal edges defining the said opening,
(*e*) aligned holes formed in the said cover and spaced from said channels,
(*f*) an elongated rigid bracket having depending lips at each end and having spaced holes formed along lines spaced from the bracket side edges, said bracket being positionable to span the said opening with the lips slidable to a selected position along channels at opposite sides of the opening, the arrangement being such that one or more vessels can be suspended between the bracket and the cover with the locating pins of the vessel passing through aligned holes of the bracket and cover.

4. The invention as recited in claim 3 wherein the tank and the cover opening are square, the cover is recessed from the open end of the tank, and the maximum length of each vessel flange is somewhat less than one half the tank length.

5. Apparatus for processing photographs comprising,
(*a*) a rectangular tank having a partition dividing the tank into a square tub and a rectangular tub having a width one half that of the square tub,
(*b*) a cover having a square opening over the square tub and a rectangular opening over the rectangular tub,
(*c*) spaced holes formed in the cover along the marginal edges defining the two openings,
(*d*) two sets of vessels for processing solutions, each vessel having an outwardly-extending flange at the open end,
(*e*) locating pins carried by the flange of each vessel at opposite ends thereof,
(*f*) the maximum spacing of the locating pins of one set of vessels being such that these vessels can be suspended by the cover with the locating pins passing through aligned holes disposed along opposite sides of the square opening, and
(*g*) the maximum spacing of the locating pins of the other set of vessels being such that these vessels can be suspended by the cover crosswise of the rectangular opening with the locating pins passing through aligned holes disposed along opposite sides of the rectangular opening.

6. The invention as recited in claim 5 including,
(*h*) an elongated rigid bracket having aligned holes formed therein and spaced from the side edges,
(*i*) means for slidably positioning the said bracket on the cover to span the said square opening, whereby the said other set of vessels can be suspended between the cover and the bracket with the locating pins passing through selected aligned holes in the cover and the bracket.

7. The invention as recited in claim 2, including means for axially adjusting the locating pins relative to the associated flange thereby to effect a leveling of the vessel when suspended.

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