

# United States Patent

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[54] **PHOTOGRAPHIC PROCESSING APPARATUS**  
 16 Claims, 2 Drawing Figs.

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**ABSTRACT:** A photographic processor formed by an outer chamber with an inner chamber supported therein having walls which are spaced from the walls of the outer chamber. A cap seals both the inner and outer chambers and contains an opening through which liquid may be introduced into the inner chamber when the processor is upright. Openings are provided in the inner chamber adjacent the cap so that processing liquid may flow therethrough into the outer chamber when the processor is held horizontally and a liquid may subsequently flow therethrough and out through the opening in the cap when the processor is inverted.

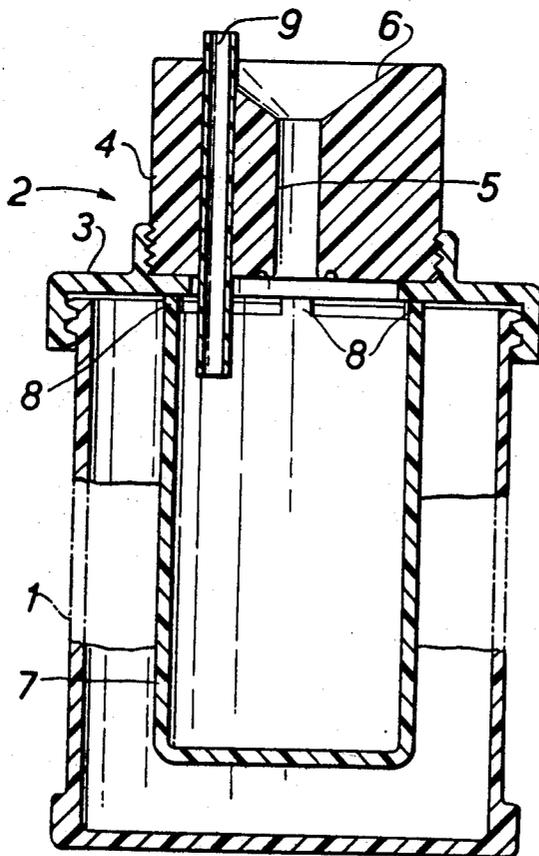


FIG. 1.

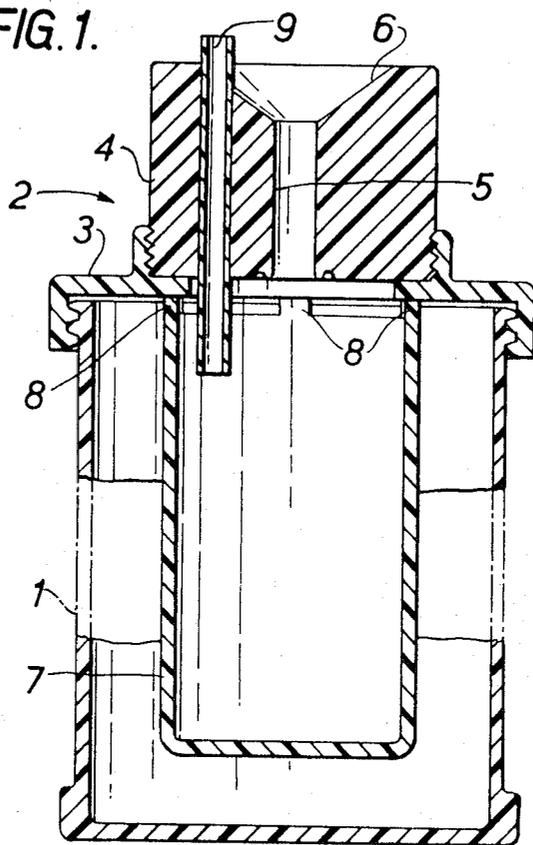
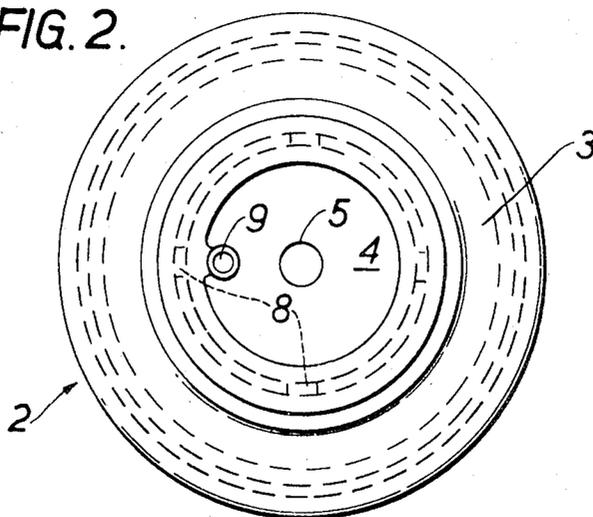


FIG. 2.



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**PHOTOGRAPHIC PROCESSING APPARATUS**

This invention relates to photographic processing apparatus.

Many types of photographic films and papers, especially those used for color photography, require accurately controlled treatment in processing to achieve consistent results.

One of the difficulties is that some processing solutions have limited keeping properties and become quickly exhausted in use. To use fresh solution in conventional processing equipment every time a process is carried out would be uneconomical.

The object of the invention is to provide photographic processing apparatus enabling accurately controlled treatment in processing to be achieved without the uneconomic use of processing solutions.

According to the invention there is provided a photographic processing apparatus providing a lighttight processing chamber within which photographic sheet material to be processed may be introduced with the sheet material lying close to the sidewall of the chamber, an aperture provided at the top of the apparatus for the introduction of processing liquid into the chamber, a cup disposed within the apparatus so that when the apparatus is upright liquid introduced through the aperture will enter the cup, said cup and aperture being so arranged and disposed that as the apparatus is tilted from the vertical to the horizontal position liquid in the cup will be discharged into the processing chamber and not out of the aperture whereby upon rotation of the apparatus the liquid will in turn come into contact with all the sheet material, and discharge means disposed for discharge of liquid from the processing chamber and apparatus upon said apparatus being turned upside down.

With the apparatus according to the invention a measured quantity of processing liquid can first be introduced into the cup and then quickly and evenly be brought into contact with the material to be processed so as to achieve consistent results. Moreover it will be appreciated that considerably less liquid is required than with conventional apparatus which must be filled to a vertical level sufficient to cover the photographic sheet material to be processed and consequently fresh liquid can economically be used for each batch of material to be processed.

Preferably the aperture for introducing liquid also serves as the discharge means so that there is only one aperture. Preferably the apparatus consists of a container and a removable lid for allowing sheet material to be introduced into the container, the said one aperture being provided in the lid.

The cup and lid may be separate members, and the cup may be fitted into the apparatus before the lid is fitted, but the cup and lid are preferably interconnected so that the cup is detached from the apparatus when the lid is detached.

According to another aspect of the invention there is provided a lid for a photographic processing apparatus, said lid being adapted to be fitted to an open topped container to form therewith a lighttight processing chamber within which photographic sheet material to be processed may be introduced with the sheet material lying close to the sidewall of the chamber, said lid having a cup connected to the under side of the lid with the top of the cup nearest the under side of the lid, an aperture being provided in the lid through which liquid may be poured into the cup, said cup and aperture being so arranged and disposed that when the lid is fitted to an open-topped container and the apparatus is tilted from the vertical to a horizontal position liquid in the cup will be discharged into the processing chamber and not out of the aperture, and discharge means for discharge of liquid from the apparatus upon said apparatus being turned upside down.

The cup is preferably connected to the lid by a plurality of spacers disposed between the underside of the lid and the upper end of the cup. To facilitate pouring the liquid through the lid the aperture may be funnel-shaped at its outer end. To facilitate both pouring in and pouring out, the lid may be pro-

vided with an air vent for venting the interior of a container to which the lid is fitted. The air vent is preferably in the form of a narrow tube extending through the lid into the cup.

The lid may be adapted to make engagement with the container in any convenient way; for instance, it may be a push fit but preferably it screws on.

In order that the invention may be well understood a preferred embodiment will now be described in detail with reference to the accompanying drawing in which:

FIG. 1 shows a cross-sectional view of a processing apparatus,

FIG. 2 shows a plan view of the lid for the apparatus.

A photographic processing apparatus consists of a relatively long cylindrical tubular container 1 open at one end. A circular lid 2 screws onto the open end of the container 1. For ease of manufacture the lid is formed in two parts 3, 4 which are screwed together. The part 4 of the circular lid is thicker than the annular part 3 and projects outwardly from the lid 2. An aperture 5 passes centrally through the part 4 of the lid 2, and opens into a funnel-shaped portion 6 on the outer side of the lid 2.

A circular cup 7 is positioned on the under side of the lid 2 by means of four spacers 8 equispaced around the top of the cup 7. The cup 7 is coaxial with the lid 2 and is disposed so that the open end of the cup 7 is towards and below the aperture 5. The outer diameter of the cup 7 is less than the inner diameter of the container 1 so that passages communicate from the interior of the cup 7, between the spacers 8, to the interior of the processing chamber of the apparatus. An air tube 9 forming an air vent passes through the part 4 and projects a little way above the top of the lid 2 and a little way into the cup 7.

To use the processing apparatus, sheets of material to be processed are rolled into a tube and inserted into the processing chamber formed by the container 1. The lid 2 is then screwed onto the open end of the container 1. The apparatus is maintained vertical with the lid 2 uppermost and a measured quantity of processing liquid is poured through the funnel 6 and aperture 5 partly to fill the cup 7. The apparatus is then tilted until it is horizontal and the processing liquid then pours out of the cup 7 and into the container 1. The apparatus is then rotated until the process is complete. The apparatus is then turned upside down and the liquid pours out of the aperture 5. After discharging the processing liquid, the apparatus can be filled with water for washing, or with the next processing liquid as required by the process in question.

The apparatus which would have required 1,000cc. of liquid to fill it in the conventional way requires only 25cc. The method of using the apparatus ensures that the material to be processed is evenly treated.

I claim:

1. A method of processing an exposed photographic sheet of the type requiring treatment with a plurality of liquids comprising:

- placing said sheet in a lighttight generally circular cylindrical container substantially against the inner wall thereof;
- positioning said container generally vertically;
- introducing a quantity of a first treating liquid into the top of said container and maintaining said liquid adjacent the axis of said container and separate from said sheet;
- changing the orientation of said container to a generally horizontal position to cause said first liquid to contact said sheet; and
- rotating said container substantially about a horizontal axis to distribute said liquid over said sheet.

2. A photographic processing apparatus comprising outer container means having a top end and a bottom end, said outer container means having an opening at one such end to receive material to be processed, and also having closure means for closing the said opening inner container means mounted within said outer container means in spaced relation-

inner container means, said inner container means being operative to contain fluid introduced therein, an aperture provided in the top end of said outer container means and communicating with the interior of said inner container means for the introduction of processing liquid thereto when said processing apparatus is in an upright position, said aperture being positioned in said top end so as to fall within the confines of said inner container means, and fluid passage means formed at the top of said inner container means adjacent the top end of said outer container means and communicating with said processing chamber, said fluid passage means operating to permit processing fluid to flow into said processing chamber when said apparatus is tilted from an upright to a horizontal position and to permit fluid to flow from said processing chamber through said aperture when said apparatus is inverted.

3. An apparatus as claimed in claim 2 in which the closure means consists of a removable lid forming part of said outer container means, said aperture being provided in such lid.

4. A photographic processing apparatus as claimed in claim 3 in which the inner container means and lid are interconnected.

5. An apparatus as claimed in claim 4 in which the inner container means is formed by a cup connected to the lid by a plurality of spacers disposed between the underside of the lid and the upper end of the cup.

6. An apparatus as claimed in claim 5 in which said lid is provided with an air vent for venting the interior of the processing apparatus, said air vent being in the form of a narrow tube extending into the cup.

7. An apparatus as claimed in claim 6 in which the aperture is funnel shaped at its outer end.

8. In a photographic processing apparatus comprising a substantially cylindrical housing for receiving photographic material to be processed, which housing is adapted for movement between substantially vertical and horizontal orientations, and has at least one opening at one end for the admission of processing liquids into said housing, the improvement which comprises:

reservoir means mounted within said housing below said opening when said housing is in a vertical position and in communication with said opening for receiving such liquids admitted through said opening and storing the received liquids out of contact with the interior surface of said housing and said received material while said housing is disposed generally vertically, and for discharging such liquids into contact with the cylindrical interior surface of said housing and said received material when said housing is disposed generally horizontally.

9. Photographic processing apparatus as in claim 8, wherein said reservoir means is a liquid container supported substantially coaxially within said housing below said opening when

said housing is in a vertical orientation.

10. Photographic processing apparatus as in claim 9, wherein said container has at least a portion spaced from said opening and adapted to discharge such liquids upon tipping of said housing from said vertical orientation.

11. A photographic processing apparatus comprising an outer container having a top end and a bottom end, said outer container being openable at one end to receive sheet material to be processed, an inner container mounted within said outer container in spaced relationship thereto to provide a processing chamber externally of said inner container and within said outer container, said inner container being operative to contain fluid introduced therein, the top end of said outer container being provided with an aperture communicating with the interior of said inner container for permitting the introduction of processing liquid into said inner container through said aperture when said processing apparatus is in an upright position, and fluid passage means between said inner container and said processing chamber for permitting processing fluid contained in said inner chamber to flow into said processing chamber when said apparatus is tilted from an upright to a horizontal position.

12. Apparatus as in claim 11, wherein said inner container is positioned directly beneath the aperture of the top end of said outer container.

13. In a photographic processing apparatus comprising a substantially cylindrical container for receiving photographic material to be processed, said container having a top end and a bottom end when in a vertical orientation, said container being adapted for movement between substantially vertical and horizontal orientations, and having an opening in said top end for the admission of processing liquids into said container, the improvement which comprises reservoir means mounted within the container directly beneath and in fluid communication with said opening for receiving liquids admitted through said opening and retaining said received liquids out of contact with the interior surface of said container and said received material while said container is maintained generally vertically, said reservoir means having means for discharging such liquids into contact with the cylindrical interior surface of said container and said received material when said container is moved from a substantially vertical to a substantially horizontal orientation.

14. Apparatus as in claim 13, wherein said reservoir means is concentrically mounted in said container.

15. Apparatus as in claim 14, wherein said reservoir means is supported by reservoir support means connected to said container top end.

16. Apparatus as in claim 15, wherein said discharging means comprises at least one opening in said reservoir support means.

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