United States Patent [19]

Ramsdale

[11] **3,765,576**

[45] **Oct. 16, 1973**

[54] **APPARATUS FOR DISPENSING PHOTOGRAPHIC CHEMICALS**

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[22] Filed: **Apr. 10, 1972**

[21] Appl. No.: **242,358**

[52] **U.S. Cl.** ..... **222/132,** 222/146 R, 222/148

[51] **Int. Cl.** **B67d 5/62**

[58] **Field of Search** ..... 222/129.4, 132, 144, 222/145, 146 R, 146 C, 148; 165/61, 64

[56] **References Cited**

UNITED STATES PATENTS

2,653,733	9/1953	Rudd	222/145
3,460,717	8/1969	Thomas	222/132
19,824	4/1858	Bigelow	222/144
3,143,167	8/1964	Vieth	165/44
1,205,494	11/1916	Watts	222/145
3,133,675	5/1964	Broadhurst	222/129.4
3,385,569	5/1968	Bookat	222/129.4

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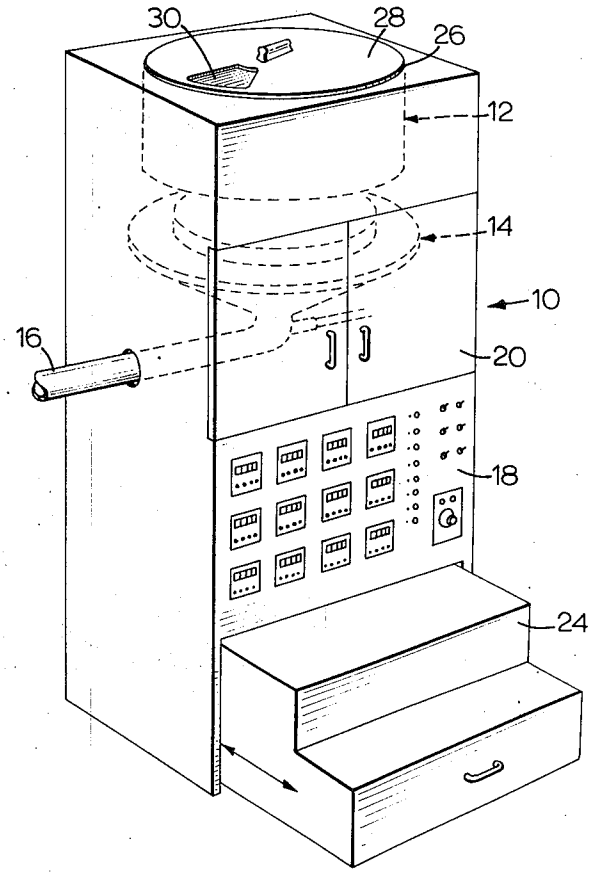
[57] **ABSTRACT**

A device for dispensing liquid photographic chemicals, in which a plurality of containers are disposed in a circle, each container having an outlet leading downwardly into a covered frustro-conical bowl disposed below the containers, the bowl having a central outlet conduit. Valve means control the flow individually from each container into the bowl. Valve controlled ducts also lead into the bowl for connection with a source of pressurized liquid such as rinse water.

8 Claims, 5 Drawing Figures



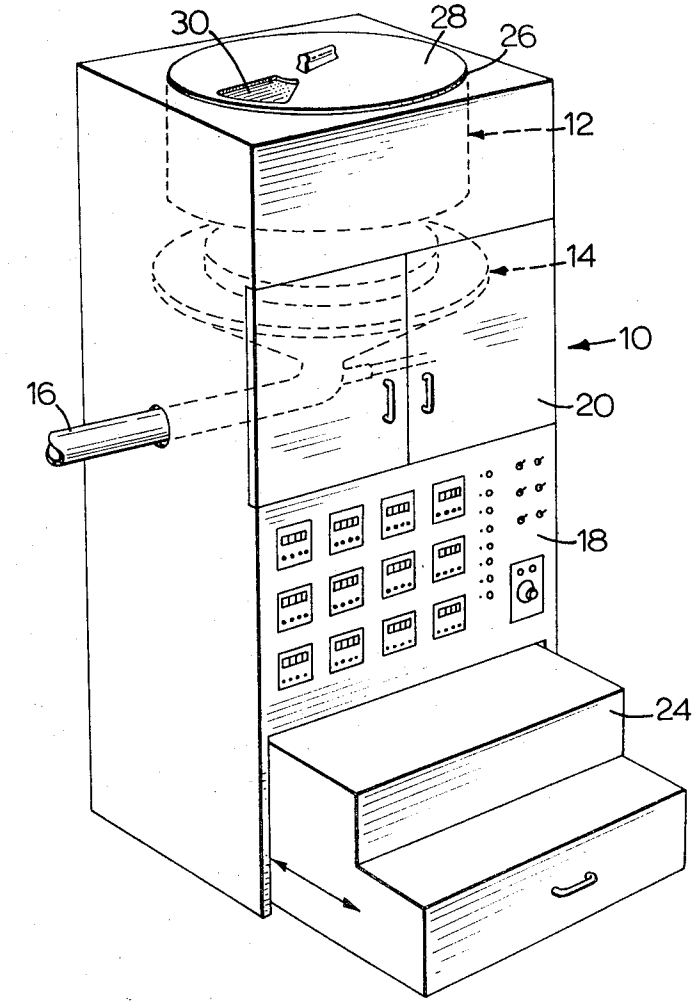


FIG. 1

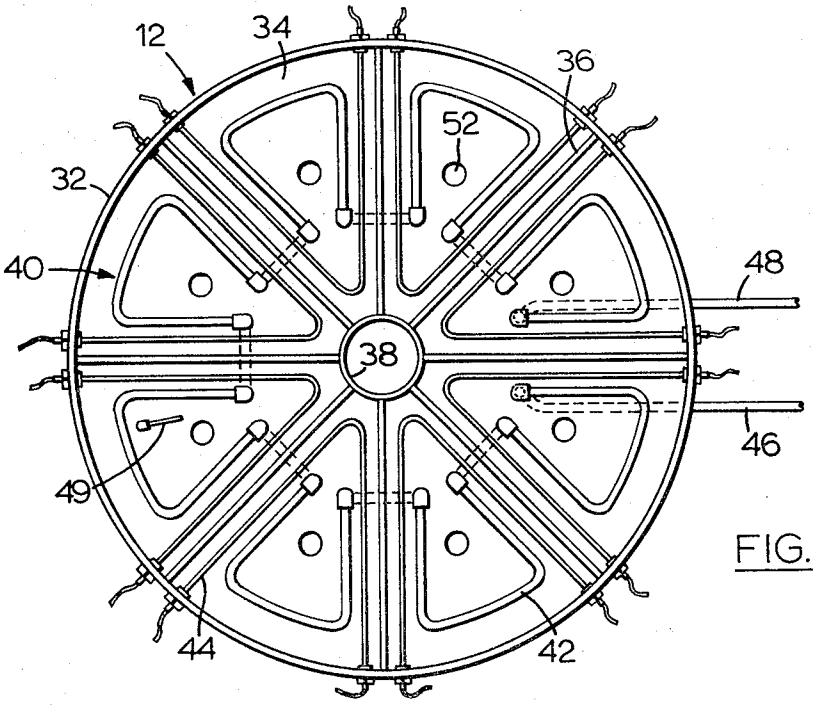


FIG. 3

FIG. 2

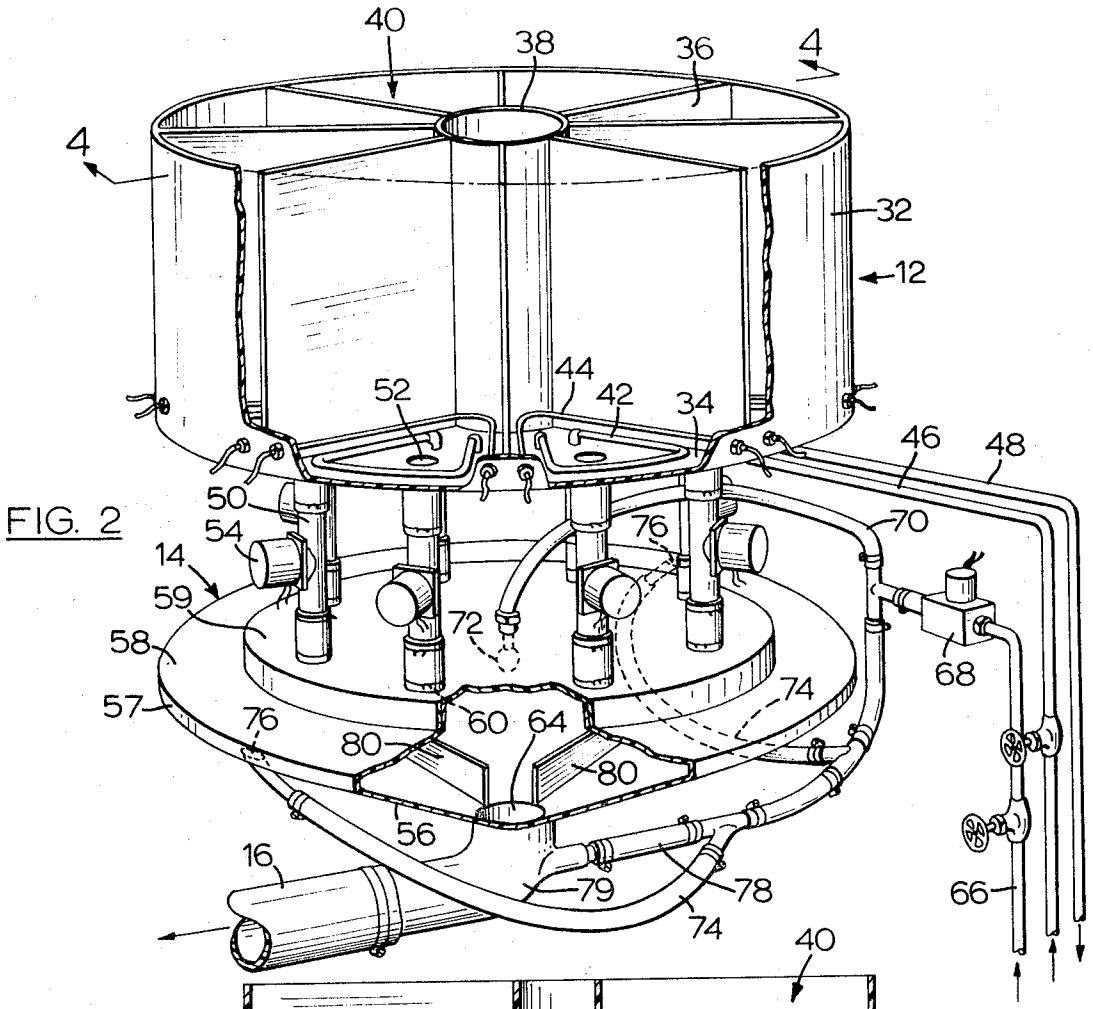

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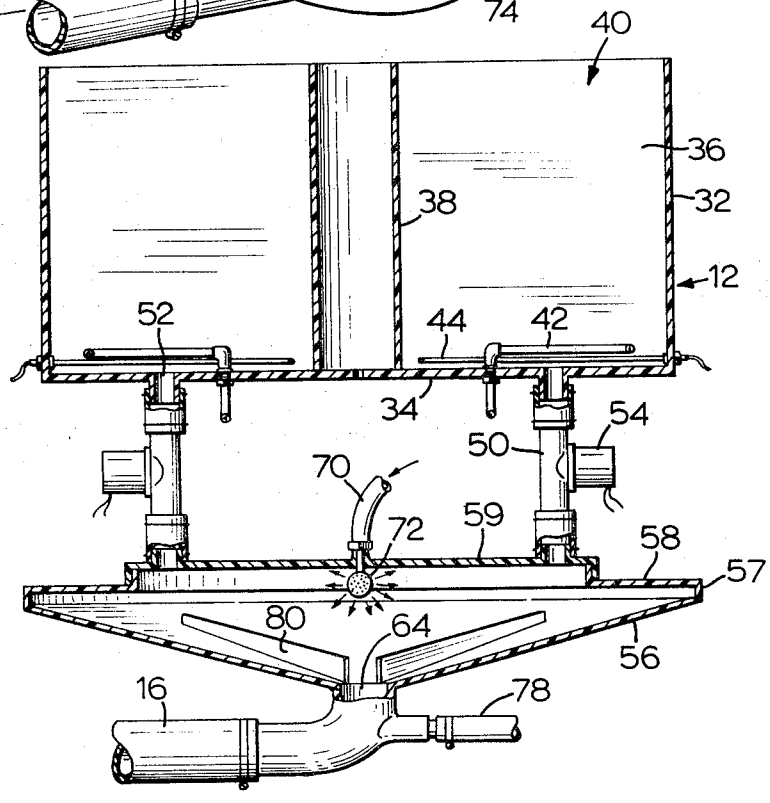
FIG. 4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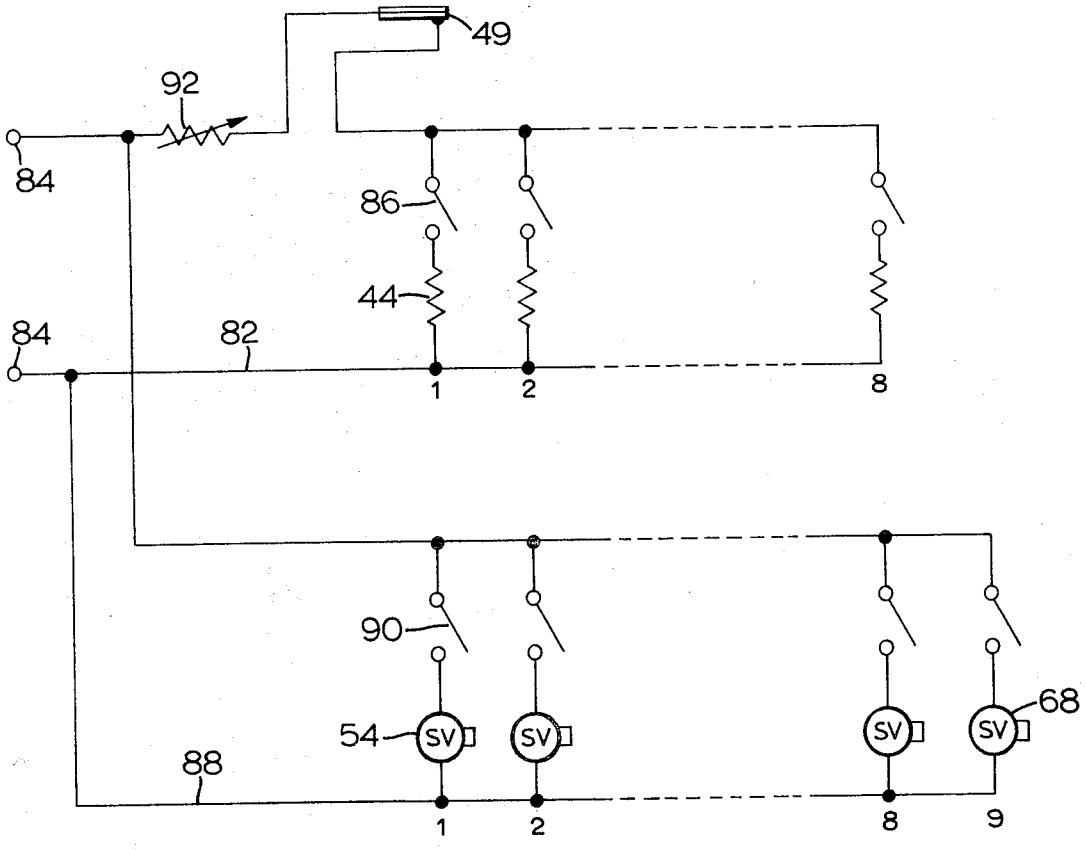

FIG. 5

APPARATUS FOR DISPENSING PHOTOGRAPHIC CHEMICALS

The present invention relates to the dispensing of liquid chemicals for the processing of photographic materials.

In the commerical processing of photographic material larger amounts of chemicals are used to handle the material in batches. Usually tanks are used for this purpose and the chemicals are introduced into the tank in measured quantities and in sequence. To have the chemicals at hand they may be retained in a row of containers and released into the processing tank as required. A problem arises from this arrangement because the timing of delivery of the chemicals is critical and delivery from a row varies with respect to the location of the containers in relation to the processing tank. If a common delivery trough is used there is also the problem of cleansing after delivery of each chemical to prevent contamination.

It is an object of the present invention to provide an improved apparatus for delivering chemicals to a photographic processing tank.

An example embodiment of the invention is shown in the accompanying drawings in which:

FIG. 1 is a perspective view of a device for dispensing photographic chemicals;

FIG. 2 is a perspective view, partly broken away, showing the container nest and collector outlet of the device of FIG. 1;

FIG. 3 is a plan view of the container well of FIG. 2;

FIG. 4 is a cross-section taken along line 4—4 of FIG. 2; and

FIG. 5 is a schematic diagram of a circuit for the device shown in FIGS. 1 to 4.

The example device shown in FIG. 1 of the drawings consists of a housing **10** containing in its upper portion a well **12** of containers for liquid chemicals, a collector **14** located below the well of containers, an outlet conduit **16** leading from the housing, and a control panel **18** located below the containers and the collector. The front face of housing **10** has a pair of doors **20** giving access to collector **14** and the lower portion of well **12**, and retractable steps **24** giving assistance to each the top of the housing which has an opening **26** providing access to well **12**. Opening **26** is closed by a removable lid **28** which has an opening **30** and is rotatable to locate the opening over any single container.

As seen in FIGS. **2, 3** and **4** of the drawings, container well **12** comprises a circular wall **32** and a bottom **34** forming a liquid retaining well which is segmented by dividers **36** radiating from an axial pillar **38** to form a plurality of numbered containers **40**. Adjacent bottom **34**, each container **40** has a looped cooling pipe **42** and a looped heating element **44**. Pipes **42** are interconnected in series with a common inlet **46** from a pressurized water source (not shown), and a common outlet **48** leading to a drain (not shown). Heating elements **44** are connected with an electrical power source through a control circuit to be described with reference to FIG. **5**. A temperature probe **49** is located in one of containers **40** and is also connected with the control circuit. A vertical pipe **50** leads downwardly from each container **40** through an outlet opening **52** in the bottom of well **32**. A solenoid valve **54** is located in each pipe **50**.

The bottom end of each pipe **50** opens into collector **18** which comprises a shallow frsutro-conical bowl **56**

having an outer rim **57** and a flat, stepped cover **58** removable in its central portion **59** which has openings **60** from pipes **50** located in a circle about the vertical axis of the bowl. An opening **64** in the centre of bowl **56** is connected with outlet conduit **16**. An inlet pipe **66** from a pressurized water source is connected to a solenoid valve **68** and then branches to connect (a) by a pipe **70** with a spray nozzle **72** mounted centrally on the inside of cover **58** of bowl **56**, (b) by pipes **74** with a pair of inlets **76** in bowl **56** adjacent rim **57**, and (c) by a pipe **78** with a elbow **79** outlet conduit **16** adjacent opening **64** of bowl **56**. A plurality of fixed, shallow baffles **80** are located on the inner surface of bowl **56** and radiate from opening **64**.

As seen schematically in FIG. **5** of the drawings, each heater element **44** is connected across a line **82** which is connected with a power source **84**. A normally open contact switch **86** is connected in series with each heater **44**. Temperature probe **49**, which may be a thermostatic relay as shown in FIG. **5**, is suitably connected in series in line **82** between switches **86** and power source **84**, and a variable resistor **92** is connected in series in line **82** between probe **49** and power source **84**. Each solenoid valve **54**, and solenoid valve **68**, is connected across a line **88** which is connected with power source **84**. A normally open contact switch **90** is connected in series with each solenoid valve **54, 69**. Contact switches **86** and **90** are suitably mounted on control panel **18** of housing **10**.

In the operation of the device a given number of different liquid chemicals in specific quantities, for use in a specific processing operation to be carried out in an adjacent tank (not shown), are charged into unit **10**, each chemical being charged into a different container **40** through opening **30** in lid **28** which is rotated to provide access to only one container at a time. The chemicals in containers **40** (some or all of which may have been charged) are then heated by elements **44** to a given temperature using thermostatic probe **49** and variable resistor **92** and the temperature is maintained substantially constant by means of the flow of water through cooling pipes **42**. Each container **40** may be heated separately by closing its associated contact switch **86**.

Each solenoid valve **54** is operated by its associated contact switch **90** to release the chemicals from containers **40** in a given sequence and at a predetermined time interval through outlets **52** and vertical pipes **50** into collector bowl **56**, where the chemical flows through outlet **64** and conduit **16** to the processing tank. After each chemical has passed through conduit **16** and that particular processing step has been carried out in the tank solenoid valve **68** is operated by its associated contact switch **90** to flow rinse water through bowl **56** and conduit **16** to the tank. Water spraying through nozzle **72** into bowl **56** and flowing tangentially into the bowl through openings **76** effectively decontaminates the bowl for the next chemical and also provides rinse water for the tank. Baffles **80** prevent the buildup of a vortex by the inflowing rinse water.

I claim:

1. Apparatus for dispensing liquid photographic chemicals, comprising:

a plurality of containers disposed in a circle, each container defining a well having (a) an outlet conduit opening from the bottom portion thereof, (b) a cooling conduit disposed in the bottom portion

thereof, and (c) heating means disposed in the bottom portion thereof;

a frusto-conical bowl disposed below the containers, said bowl having upstanding radial baffles therein and a cover, the outlet conduits extending downwardly from the containers and opening into the bowl through the cover thereof for the passage of the liquid photographic chemicals from the containers into the bowl;

valve means in each of the outlet conduits for controlling the flow of liquid from each of the containers into the bowl;

outlet means leading centrally from the bottom of the bowl; and

conduit means opening into the bowl for the passage of cleansing liquid into the bowl.

2. Apparatus as claimed in claim **1** in which a circular well is segmented to form the containers.

3. Apparatus as claimed in claim **2** in which the well carries a cover having an opening therethrough, the well cover being rotatable to provide access to only one

container at a time.

4. Apparatus as claimed in claim **1** in which each heating means comprises an electrical heating coil, and means to connect each coil individually with an electrical power source.

5. Apparatus as claimed in claim **1** including thermostatic probe means located in at least one of the containers and connected to regulate the heating means.

6. Apparatus as claimed in claim **1** in which the passage means opening into the bowl comprises at least one duct opening substantially tangentially into the peripheral portion of the bowl and spray means centrally located in the bowl adjacent the cover thereof.

7. Apparatus as claimed in claim **1** including means opening into the bowl outlet means for the passage of liquid thereinto.

8. Apparatus as claimed in claim **1** in which the cover is separable from the bowl and from the outlet conduits of the containers.

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