Aug. 25, 1964 F. K. LAKE 3,145,653

LIQUID SUPPLY SYSTEM

Filed March 14, 1963

FIG. 1

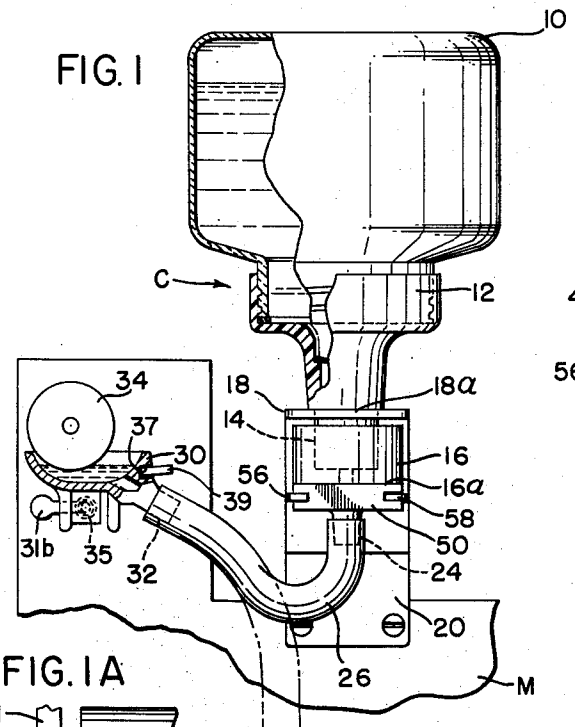


FIG. 2

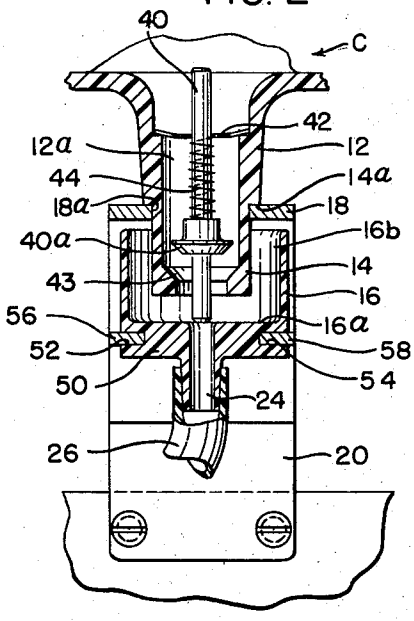


FIG. 1A

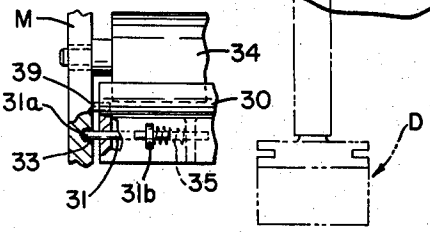


FIG. 3

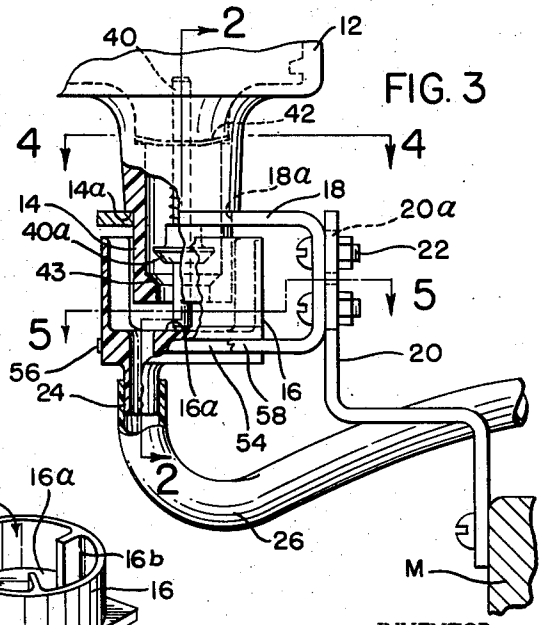


FIG. 4

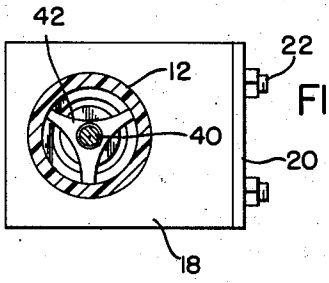
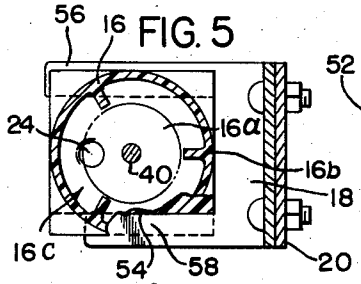


FIG. 5



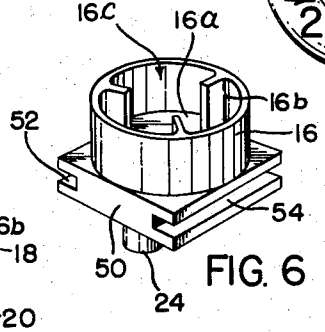


FIG. 6

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LIQUID SUPPLY SYSTEM

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This invention relates to a liquid supply system, and more particularly to a liquid supply system which may be quickly assembled for use and as readily disengaged to permit instant draining off of the liquid. Such a system is particularly advantageous for cleaning of a liquid reservoir, changing from one liquid material to another, and the like.

While such liquid supply systems have many different applications, it is believed the present invention can be more briefly explained and more clearly described in relation to the lithographic printing art wherein a plurality of such liquid supply systems are utilized in a single operation.

In one form of lithography wherein printing is accomplished by the planographic method, a master or plate bearing a water-repellent, ink-receptive image is employed. Ink and an aqueous ink repellent liquid are applied either simultaneously or alternately to the master, the ink adhering to the image areas and the repellent to the unimaged areas.

The inked image is then transferred to a copy sheet, either directly or through the offices of a resilient blanket.

In the order of sequence, the plate or master is treated with a pre-conditioning solution, known in the art as a plate etch solution; ink and repellent solutions are then applied to the plate or master; and finally copy sheets are run through the printing machine.

Prior to running a subsequent master, the blanket must be cleaned in order to remove the unwanted inked image from the previous master. For this purpose, a cleaning solution is applied to the blanket.

Thus, it will be seen that liquids must be utilized in three different areas in the course of printing copy sheets from a lithographic plate or master:

(1) Preliminary moistening or dampening of the master.

(2) Application of moisture, or repellent, to the master during running of copy sheets.

(3) Cleaning of the blanket prior to printing from a subsequent master.

Since three fundamental moistening or dampening operations are thus performed in the course of printing or duplicating from a single master, it is important that at the end of the running of any master the reservoirs of all three liquid supply systems may be readily drained and cleaned if desired. Hence, the liquid supply system of this invention serves the purpose of supplying liquid as required, and permitting immediate drainage of the liquid reservoirs at will.

A primary objective of this invention, therefore, has to do with a liquid supply reservoir which can be readily drained.

Another object of the invention is to so construct a liquid supply system as to permit assembly and disassembly thereof without the use of tools.

Still another object of the invention is to provide a liquid supply system which is simple in construction and inexpensive to manufacture.

The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of a preferred embodiment of the invention as illustrated in the accompanying drawings, in which:

FIG. 1 is a front elevation of the liquid supply system of this invention, with certain parts broken away to permit a clearer understanding of the invention, and includes in broken lines a showing of a portion of the device in alternate positions;

FIG. 1A is a fragmentary side elevation of a section of FIG. 1 with parts broken away, showing the means for mounting and removing the reservoir;

FIG. 2 is an enlarged section taken substantially on line 2—2 of FIG. 3;

FIG. 3 is a fragmentary side elevation of the device of FIG. 1 with parts broken away;

FIG. 4 is a section taken on line 4—4 of FIG. 3;

FIG. 5 is a section taken on line 5—5 of FIG. 3;

FIG. 6 is a perspective of a removable receptacle forming the basis of quick assembly and draining off aspects of the invention.

Referring now in detail to the accompanying drawings showing a preferred form of the invention, and referring first to FIG. 1, there is provided a liquid supply container indicated generally at C, and comprising a bottle 10 threadedly secured to one end of a bottle cap 12 forming within itself a valve chamber 12*a*. The lower portion or neck 14 of the cap 12 nestles within a receptacle 16, mounted within a U-shaped support member 18, in a manner to be described hereinafter. The upper arm of the support 18 is provided with an opening 18*a* which fits the neck 14 closely but in a loose manner for ready removal. The neck 14 includes a shoulder 14*a* for supporting the container C upon the upper arm of the support 18. A bracket 20 attached to duplicating machine M, FIG. 3, retains the U-shaped member 18 as, for example, by the screws 22. It should be noted the bracket 20 is provided with elongated slots 20*a*, thereby providing vertical adjustment of the container C.

The receptacle 16 is in the form of an open-topped cup substantially larger in diameter than the neck 14 of the cap 12. The receptacle is supported by member 18 and is arranged so as to have a free sliding engagement between the arms of the support. In the form shown the receptacle includes a base 50 with guide grooves 52, 54, and the lower arm of the support 18 includes rails 58, 56 which coact with the grooves 52, 54 to guide the receptacle in its sliding movement. Preferably one of the rails, e.g. rail 56, is made longer than the other so that they may be serially engaged with the grooves, thereby simplifying the manual operation of assembly of the receptacle 16 with the support 18. It will be noted that the length of neck 14 is sufficient to project into the receptacle when the parts are in place on support 18 so that the receptacle is locked against inadvertent removal until the neck 14 is withdrawn. The neck 14, therefore, constitutes a readily releasable retention means for the receptacle. The interior surface of the receptacle carries radial fins 16*b* which serve to definitely locate the receptacle with respect to neck 14 while still maintaining air passages 16*c* alongside the neck giving access to the surface of any fluid in the receptacle. The bottom of the receptacle has an off-center outlet nipple 24. It will be noted that the upper end of the receptacle 16 has a wide-mouthed configuration and is free of any obstructions which might restrict or delay outflow of liquid or tend to trap any remnants of liquid therein.

Elsewhere on the machine at the approximate level of the bottom of the container C, as viewed in FIG. 1, there is positioned a fountain or reservoir 30 adapted to receive liquid from the container C. To this end, a flexible hose 26 connects the outlet 24 of the receptacle 16 to the inlet 32 of the fountain or reservoir 30.

A roller 34 is rotatably mounted in association with the fountain 30 and is effective, usually through intermediate

rollers, to convey the liquid in the fountain to any desired surface such as a printing element.

A simple effective means is employed to maintain the level of the liquid in the fountain **30** and will be briefly described. As will best be seen in FIGS. 2, 3, and 4, there is provided a valve member including a valve stem **40** and a valve disk **40***a* carried thereby. The valve member **40**, **40***a* is positioned approximately in the center of valve chamber **12***a*. A valve stem guide **42** retains the uppermost portion of the valve stem **40** in its central location. The lower portion of the valve stem **40** is centrally located through seating of the valve disk **40***a* against a valve seat **43**, by means of a compression spring **44** surrounding the valve stem **40** between the disk **40***a* and stem guide **42**. Under normal machine operating conditions the valve member **40**, **40***a* is in the position shown in FIGS. 1, 2, and 3, wherein the lowermost end of the valve stem **40** abuts against the upper surface **16***a* of the base of receptacle **16** to lift the valve disk **40***a* against the force of spring **44**.

The liquid supply system of the invention operates in the following manner. To place the liquid supply system in operating position it is necessary only to slide the receptacle **16**, with hose **26** attached to outlet **24**, along the rails **56**, **58** to the position shown in FIG. 5. The bottle **10** is then placed in position with neck **14** of the cap **12** being inserted through the generally circular opening **18***a* in bracket **18** and into the receptacle **16**, as shown in FIGS. 1, 2, and 3. As the bottle neck **14** approaches full operating position, valve stem **40** abuts against the upper surface **16***a* of the base of the receptacle **16** and valve disk **40***a* is moved upwardly against the compression of spring **44**, thus permitting immediate flow of the liquid. The liquid in container **10** then flows into the receptacle to a level determined by the bottom of neck **14**, and through the conduit or hose **26** to a corresponding level in fountain **30**. If an adjustment of the level in fountain **30** is required, this can be effected by resetting the level of the support **18** by means of screws **22** and slots **20***a*.

As explained in detail hereinabove, disconnecting and draining the reservoir of a liquid supply system usually is a time-consuming and painstaking chore. However, by means of this invention it is now possible to accomplish this operation quickly and simply. For example, with the liquid supply system in the position shown in FIGS. 1, 2, and 3, i.e. operating position, to drain the reservoir the container C is lifted from the support **18**. In the course of such movement, the valve **40**, through the action of spring **44**, is urged toward a closed position, i.e., until the valve face **40***a* abuts against the valve seat **43**, thus sealing the liquid source and preventing spilling or dripping of the liquid. The receptacle **16** is then slid along the rails or tracks **56**, **58** of the U-shaped member **18** until it is entirely free of the bracket and can be lowered to the drain position, indicated at D in FIG. 1. In this manner the fountain **30**, the hose **26** and the receptacle **16** are emptied into a container, not shown. Thus it will be readily evident the fountain **30** may be completely drained without removing it from the duplicating machine and without opening any hose connections. This permits preparing the machine for shut-down or changing of the nature of the liquid without removal of the fountain or reservoir.

To facilitate cleaning of the fountain or reservoir **30**, there is provided an arrangement whereby the reservoir, instead of being affixed to the duplicating machine, is attached in such a manner as to be independent of the mounting for the fountain roller **34**, and in such manner that it may be removed without the use of tools and with but slight manipulation by the operator.

Referring to FIGS. 1 and 1A, there is shown a representative attaching and detaching means, for the reservoir **30**. For convenience and brevity, the means for only one end of the fountain or reservoir **30** is shown, it being understood the same or a similar arrangement may be employed at the other end of the reservoir **30**.

As will be readily seen, the base of the rservoir or fountain **30** slidably carries adjacent each end a pin or rod **31** having a normally projected locking tip **31***a*. In the attached or locked position, the tip **31***a* assumes the position shown in FIG. 1A wherein it is snugly seated in a mating opening **33** in the frame of the machine M. The rod **31** is normally held in this position by a compression spring **35**. Each rod is also provided with a knob or fingerpiece **31***b* for ready manipulation by the operator. To complete the support of the reservoir **30** on the machine frame, the fountain is provided with open-ended slots **37**, arranged to cooperate with lugs **39** which are suitably affixed to the frame.

Removal of the fountain is readily accomplished by urging knobs **31***b* against springs **35**, thus freeing rod tips **31***a* from their respective openings **33**. The reservoir can then be withdrawn from lugs **39** by movement downward and towards the left as seen in FIG. 1. The knobs **31***b* may be arranged one near each end of the reservoir **30** for two-handed actuation, or they may be positioned in close proximity, substantially centrally of the guideway **31**, thus permitting actuation of the knobs **31***b* with but one hand.

From the foregoing description, it will be readily apparent that the assembly consisting of the receptacle **16**, the reservoir **30** and the connecting flexible tube **26**, can be quickly removed from the machine as a unit and handled in any way desired for ready cleaning. For example the whole assembly may be immersed in a cleaning bath or may be positioned in any desired relationship to a suitable flushing liquid stream for quickly cleaning the interior portions of any of the parts, including the tube **26**.

While the forms of the invention shown and described herein are admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the forms disclosed herein, for the invention is susceptible of embodiment in other forms and variations. It will be understood, therefore, that the invention is claimed in any of its forms or modifications falling within the spirit and scope of the language employed in the appended claims.

What is claimed is:

1. A liquid supply system comprising a reservoir; a support mounted at substantially the same level as said reservoir; an open-topped primary liquid reception and liquid level determining receptacle having its top opening free of outflow-impairing configurations, said receptacle being carried by said support in a normal, erect, liquid reception position and readily engageable with and disengageable from said support; a flexible conduit connecting said reservoir and said receptacle; means for supplying liquid to said receptacle and for maintaining a predetermined liquid level therein; and readily releasable retention means for retaining said receptacle engaged with said support in said normal position, whereby the receptacle may be conveniently withdrawn from the support and inverted and lowered to drain said reservoir.

2. A liquid supply system comprising a reservoir; a support mounted at substantially the same level as said reservoir; and open-topped receptacle carried by said support in a normal liquid reception position and readily engageable with and disengageable from said support; a flexible conduit connecting said reservoir and said receptacle; a liquid supply container carried by said support in a normal dispensing position and readily engageable with and disengageable from said support, said container and said receptacle, when disposed in said normal positions, occupying a relationship with one another such that said container inhibits disengagement of said receptacle from said support until said container is displaced from said normal position on the support.

3. A liquid supply system comprising a reservoir; a support mounted at substantially the same level as said reservoir; an open-topped receptacle carried by said support in an erect liquid reception position and readily en-

gageable with and disengageable from said support by movement in a substantially horizontal path; a flexible conduit connecting said reservoir and said receptacle; a liquid supply container carried by said support in an inverted dispensing position and readily engageable with and disengageable from said support, said container when disposed in said dispensing position projecting into the open top of said receptacle to prevent disengagement thereof from said support until said container is withdrawn from said dispensing position on the support.

4. A liquid supply system as set forth in claim 1 in which said liquid supply means maintains a constant liquid level relative to said receptacle, and wherein means is provided for mounting said support for vertical adjustment to adjust the liquid level in said reservoir.

5. In a printing machine; means for applying liquid to a printing member comprising a fountain; a support mounted at substantially the same level as said fountain; an open-topped primary liquid reception and liquid level determining receptacle having its top opening free of outflow-impairing configurations, said receptacle being carried by said support in a normal, erect, liquid reception position and readily engageable with and disengageable from said support; a flexible conduit connecting said fountain and said receptacle; means for supplying liquid to said receptacle and for maintaining a predetermined liquid level therein; and readily releasable retention means for retaining said receptacle engaged with said support in said normal position, whereby the receptacle may be conveniently withdrawn from the support and inverted and lowered to drain said fountain.

6. A printing machine according to claim 5 in which said fountain is readily manually removably mounted on said machine.

7. In a printing machine, means for applying liquid to a printing member comprising a fountain including a reservoir mounted on the machine for ready manual release therefrom and a fountain roller dipping into said reservoir; means for mounting said fountain roller on the machine independently of said reservoir; a support mounted at substantially the same level as said fountain; an open-topped primary liquid reception and liquid level determining receptacle carried by said support in a normal, erect, liquid reception position and readily engageable with and disengageable from said support; a flexible conduit connecting said fountain and said receptacle; means for supplying liquid to said receptacle and for maintaining a predetermined liquid level therein; and readily releasable retention means retaining said receptacle engaged with said support in said normal position, whereby the reservoir, receptacle and flexible conduit may be readily removed from the machine as a unit for convenient cleaning.

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