Sept. 25, 1956 C. A. BERGMAN 2,764,180

FLUID SUPPLY SYSTEM FOR DUPLICATING MACHINES

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Fig. 1.

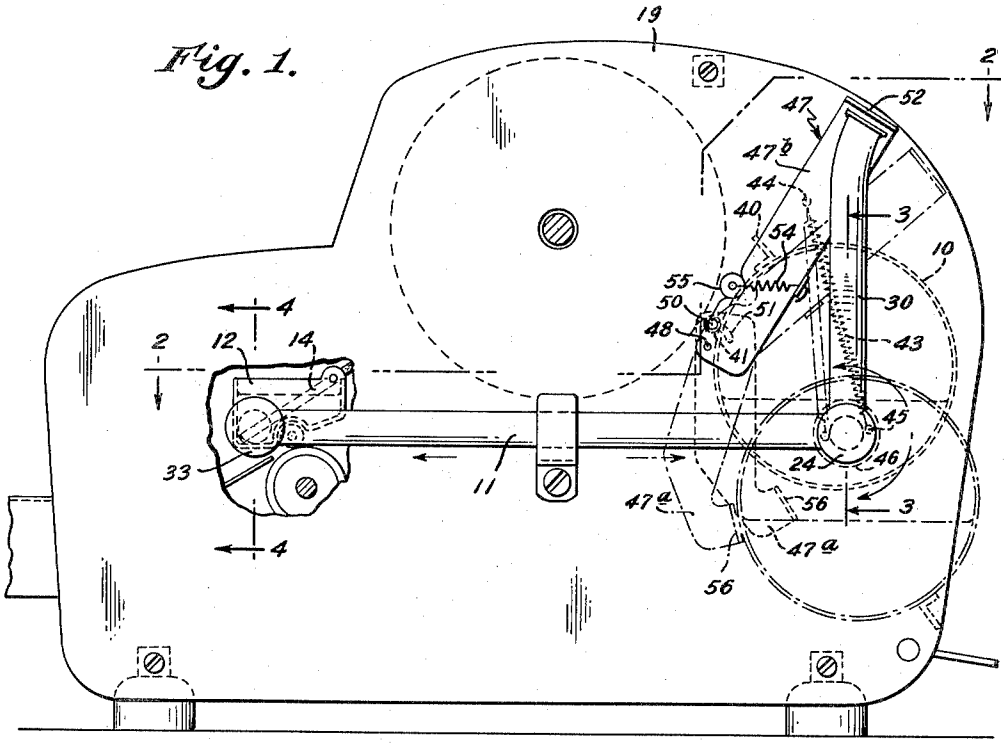
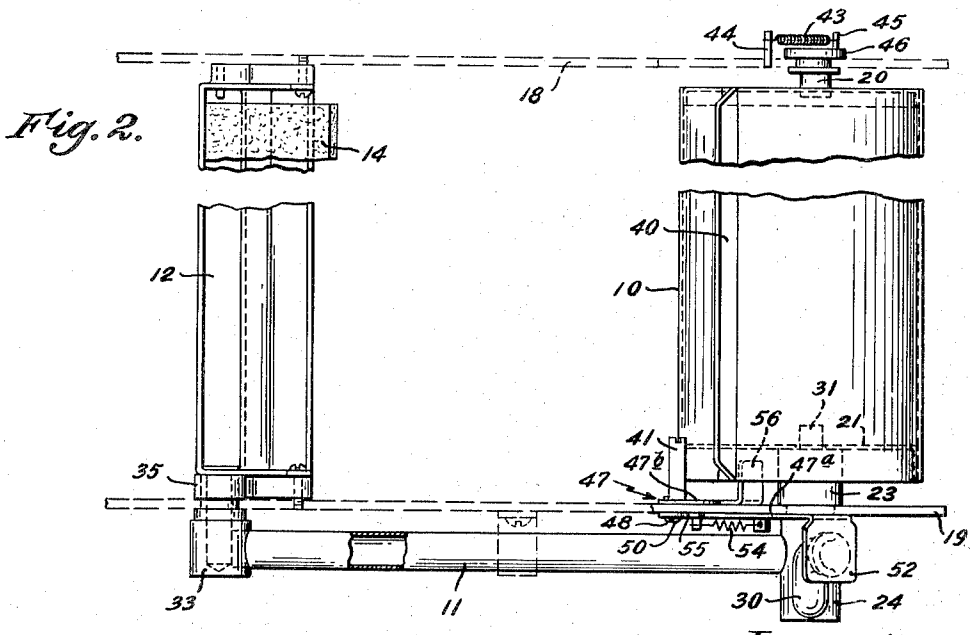


Fig. 2.



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Fig. 4.

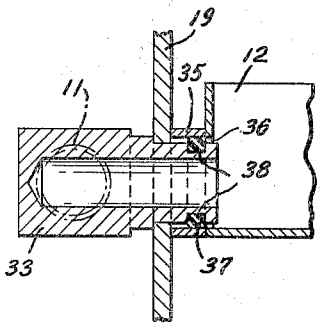
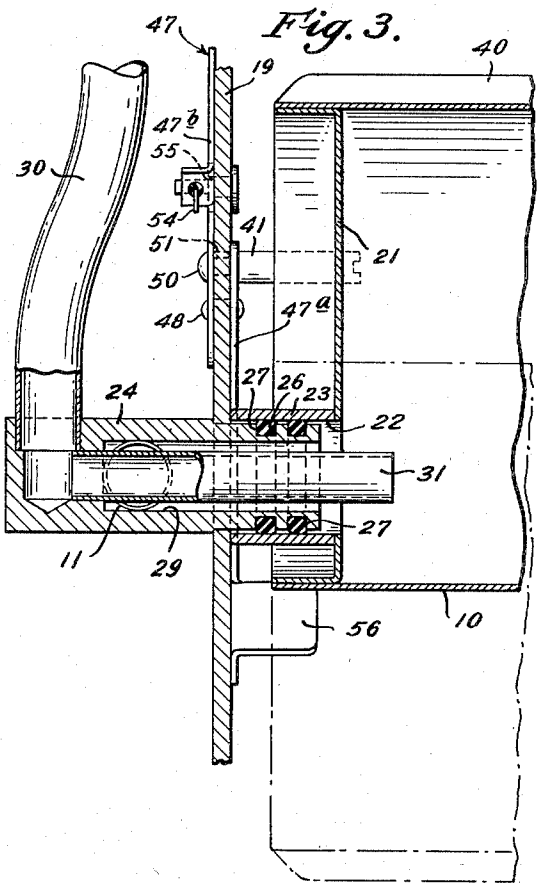


Fig. 3.



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FLUID SUPPLY SYSTEM FOR DUPLICATING MACHINES

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5 Claims. (Cl. 137—453)

The present invention relates to a fluid supply system for a fluid duplicating machine and the like. In a fluid duplicating machine a clear sheet to be printed is moistened with a fluid solvent and pressed into contact with a master copy on which is printed the material to be copied. When the clear sheet is pressed against the master copy the solvent on the clear sheet dissolves some of the ink of the printed material on the master copy and reproduces the printed material on the clear sheet.

The fluid system of the present invention is described herein in connection with a fluid duplicating machine in which the fluid is applied to the clear sheet by means of a wick resting in a pool of the fluid in a wick tank and bearing against a moistening roll, which the clear sheet comes in contact with as the sheet is moved to the master copy. In the described arrangement a supply tank of fluid supplies the fluid to the wick tank and maintains sufficient fluid in the tank to keep the wick wet with the fluid during the operation of the machine, but it will be understood however that the supply system of the present invention may be used under other conditions and with other arrangements.

In the operation of the fluid supply system of the present invention, fluid is supplied from the supply tank by the gravity feed to the wick tank and is maintained at constant level therein, replacing fluid which is used during the operation of the machine or lost by evaporation. The fluid is volatile and evaporates quickly from the wick tank and wick. When the machine is not in use, the surplus fluid is usually left in the wick tank and allowed to evaporate rather than being put back in the supply tank. The fluid is expensive and the losses from evaporation are substantial especially in offices where the duplicating machine is used for short printing runs and is left idle for several days between runs. The fluid supply system of the present invention reduces this loss of fluid due to evaporation from the second tank when the machine is idle.

In the fluid supply system of the present invention the supply tank is pivotally mounted and is movable into two positions. In one position the fluid in the supply tank is above the level of the fluid in the wick tank and feeds to the wick tank by gravity in the conventional manner, and in the other position the supply tank is below the level of fluid in the wick tank so that any surplus fluid therein may drain back to the supply tank.

The present invention also provides improved means for filling the supply tank quickly and conveniently with less danger from splashing, particularly from the surplus air which is displaced from the tank. Splashing is serious because it is likely to ruin the master copy as well as to contaminate the operator's hands and clothing.

Further objects and advantages of the present invention will be apparent from the following descriptions and accompanying drawings in which:

Fig. 1 is a side elevation, partly in dot and dash lines, of the fluid supply system of the present invention shown with some of the elements of a fluid duplicating machine;

Fig. 2 is a view taken on the lines 2—2 of Fig. 1 looking in the direction of the arrows and showing the fluid supply system of the present invention in top plan;

Fig. 3 is a section on the lines 3—3 of Fig. 1 looking in the direction of the arrows and;

Fig. 4 is a section on the lines 4—4 of Fig. 1 looking in the direction of the arrows.

Referring now to the drawings and first to Fig. 1, the fluid supply system of the present invention includes a fluid supply tank 10 and a pipe 11 connecting the fluid supply tank to a wick tank 12. A wick 14 is located in the wick tank 12 in position to be partly immersed in the fluid therein. The wick extends out of the tank and rests against a moistening roll (not shown) so that by capillary action the wick transfers fluid from the wick tank 12 to the periphery of the moistening roll which moistens the sheet to be printed.

The fluid supply tank 10 is pivotally mounted and arranged to be movable into two positions, the upper of which is indicated in dotted lines and the lower of which is indicated in dot-and-dash lines. When the supply tank is in the upper position the fluid in the tank flows by gravity through the pipe 11 to the wick tank 12, until the partial vacuum in the top of the supply tank 10 prevents further flow of fluid to the wick tank 12. As the level of the fluid in the wick tank is lowered, whether by evaporation or use, additional fluid flows from the supply tank and a substantially constant level in the wick tank is thus maintained.

When the supply tank 10 is in its lower position the fluid level in the supply tank is considerably below the wick tank 12 and the fluid in the wick tank 12 drains back into the supply tank 10. By this construction, a substantially closed system is provided and the surplus fluid is restored to the main tank when the machine is no longer in use.

As best seen in Figs. 2 and 3 the supply tank 10 is pivotally mounted between frame members 18 and 19 of the duplicating machine and pivots about the center of a stub shaft 20 at one end of the tank, this center being eccentric to the center of volume of the tank. At the other end of the tank, the end wall 21 of the tank has an opening 22 (see Fig. 3) surrounded by a tubular outwardly extending flange 23. A tubular connecting member 24 connected at right angles at the end of the pipe 11 is secured to the frame member 19 and extends into the flange 23. Circular gaskets 26 seated in grooves 27 in the inner end of tubular connecting member 24 provide a fluid seal which permits the supply tank 10 to be rotated about the tubular member 24.

There is also a stationary tube 31 having a diameter less than that of the bore 29 of the tubular member 24 and connected inside the bore of the tubular connecting member 24 at its outer end and having its inner end extending into the interior of the supply tank 10. A filler pipe 30 for fluid is connected to the tubular connecting member and joins the outer end of tube 30.

This construction is such that fluid entering through filler pipe 30 will pass through stationary tube 31 into the supply tank 10, while fluid from the supply tank may pass, when required, from the supply tank through the bore 29 of the tubular connecting member 24, into pipe 11 and pass to wick tank 12 or pass in the reverse direction when the supply tank is in its lower position so that the wick tank is being drained. This construction also makes it possible to move the supply tank from upper to its lower position or vice versa without leakage.

As shown in Fig. 4 the connection of the pipe 11 to the wick tank 12 is similar in its connection to the supply tank 10. However, in contradistinction to the supply

tank, which is pivotally mounted, the wick tank is fixed in a stationary position between the frame members **18** and **19** of the duplicating machine. The pipe **11** connects into the bore of a tubular connecting member **33** which is secured through the frame member **19** and extends into an outwardly extending tubular flange **35** which is around a hole **36** in the bottom edge of the end wall of the wick tank **12**. A fluid seal is provided by a circular gasket **37** seated in the grooves **38** in the inner end of the tubular connecting member **33**.

A flange **40** on the exterior of the supply tank **10** provides a handle for moving the supply tank to its respective positions. When the supply tank **10** is moved to its upper position the body of the tank strikes a stop pin **41** which locates the supply tank in its upper position. The stop pin **41** is on a lever **47** formed with two arms **47***a* and **47***b* as will be explained hereafter. The supply tank **10** is counter-balanced by a spring **43** attached at one end to a peg **44** on the frame member **18** of the machine and at the other end to a peg **45** on a disk **46** on the stub-shaft **20**. The peg **45** is so located on the disk **46** that the spring **43** is on one side of the center of movement of the tank **10**, when the tank is in its upper position and when the tank is in its lower position it is on the other side of the center.

The lower arm **47***a* of lever **47** is formed with a projection **56** which is in the path of the tank **10** as it approaches the lower limit of movement. Therefore, just before the tank reaches its lowest point it strikes the projection **56** of the arm **47***a* and swings the lever. The upper arm **47***b* of lever **47** carries a cover **52** which in one position of the arm closes the top of the filler pipe **30** and in another position opens it to receive fluid. Arm **47***b* when in closed position is shown in full line in Fig. 1, and when in open position in dot and dash lines. The two arms **47***a* and **47***b* are on opposite sides of the frame member **19** and are secured together by a screw **50** which carries the stop pin **41** already referred to. The lever **47** composed of the two arms **47***a* and **47***b* is pivoted on a pivot pin **48**. A slot **51** in the frame member **19** surrounds the screw **50** and permits the lever **47** to move about its pivot. Therefore as the tank **10** is swung down to its lower position it moves the lower arm **47***a* to left as shown in Fig. 1 and, consequently, the upper arm **47***b* is moved to right and the end of the filler pipe **30** is uncovered.

When the supply tank **10** is in its upper position a spring **54** holds the arm **47***b* against a stop **55** which is secured to the frame.

This arrangement is such that the supply tank **10** can be filled only when it is swung to its lower position in which the filler tube **30** is uncovered and therefore prevents filling when the tank is in its upper position which would result in overflowing the wick tank **12**. When in the lower position the greater part of the volume of the supply tank **10** is below the lowest point of the bore **29** through which the fluid passes to the pipe **11**. Thus when the fluid is poured into the filler tube **30** the fluid passes through the pipe **31** into the supply tank **10**, and air displaced by the fluid escapes through the bore **29** to the pipe **11** and out through the wick tank **12** which is then empty. Thus the fluid flowing in splashes harmlessly inside the tank and the displaced air, having a clear escape passage through the pipe **11**, does not bubble up in the filler tube **30**. Consequently there is no spattering of the fluid out of the filler tube **30** as the tank is being filled as long as the level of fluid does not rise above the top of the bore **29**. This is not a serious limitation on the capacity of the supply tank because with the tank moved to the lower position the level of fluid in the tank is just below the top of the bore **29** which is near the top of the tank and consequently the tank is substantially full.

As previously mentioned when the duplicating machine is not in use, supply tank **10** is swung to its lower position indicated at **10***b* so that the fluid drains back from the wick tank **12** into the supply tank **10** and thereby saves the loss of fluid due to evaporation from the wick tank **12** and from the wick **14**. Even though pipe **11** is open to atmosphere at the wick tank **12** when the supply tank **10** is in its low position, the evaporation is so slight that, in effect, the system is a closed system.

When the duplicating machine is to be used the supply tank **10** is swung to its upper position in which fluid from the supply tank again fills the wick tank **12** and saturates the wick **14** therein.

It will be understood that the above description is of a preferred embodiment of the fluid supply system of the present invention and that certain modifications may be made without departing from the spirit or scope of the invention defined in the appended claims.

I claim:

1. In a fluid supply system for fluid duplicating machines and in combination, a wick tank, a supply tank, an axial mounting on which the supply tank can be moved into two positions in one of which the fluid therein is above the intended level of fluid in the wick tank and in the other of which it is below, and connections for the passage from one tank to the other, and a filler pipe, said fluid connections and filler pipe entering the supply tank at its axis of rotation.

2. In a fluid supply system for fluid duplicating machines, a closed fluid supply tank pivotally mounted eccentric to the center of its volume, a pipe connected to and opening into the tank at its pivot point, said pipe having an outlet opening, the tank being mounted to pivot to two positions in one of which the greater part of the volume of the tank is above and in the other of which the greater part of the volume is below the outlet opening of the pipe, and a filler pipe entering the supply tank through the said pivot point separate from the said first mentioned pipe.

3. In a fluid supply system for fluid duplicating machines, a closed fluid supply tank pivotally mounted eccentric to the center of its volume, a pipe connected to and opening into the tank at its pivot point, said pipe having an outlet opening, the tank being mounted to pivot to two positions in one of which the greater part of the volume of the tank is above and in the other of which the greater part of the volume is below the outlet opening of the pipe, and a filler pipe extending into the said pipe and through the interior of the said pipe to the interior of the supply tank.

4. In a fluid supply system for fluid duplicating machines, a relatively stationary receiving tank, a closed fluid supply tank pivotally mounted eccentric to the center of its volume, a pipe connected to and opening into the tank at its pivot point and having an outlet opening into the receiving tank, and a filler pipe entering the supply tank through the said pivot point separate from said first mentioned pipe, said supply tank being mounted to pivot to two positions in one of which the greater part of the volume is below the said outlet of the pipe.

5. A fluid supply system according to claim 4, wherein said filler pipe extends into said first mentioned pipe and through its interior to the interior of the supply tank.

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