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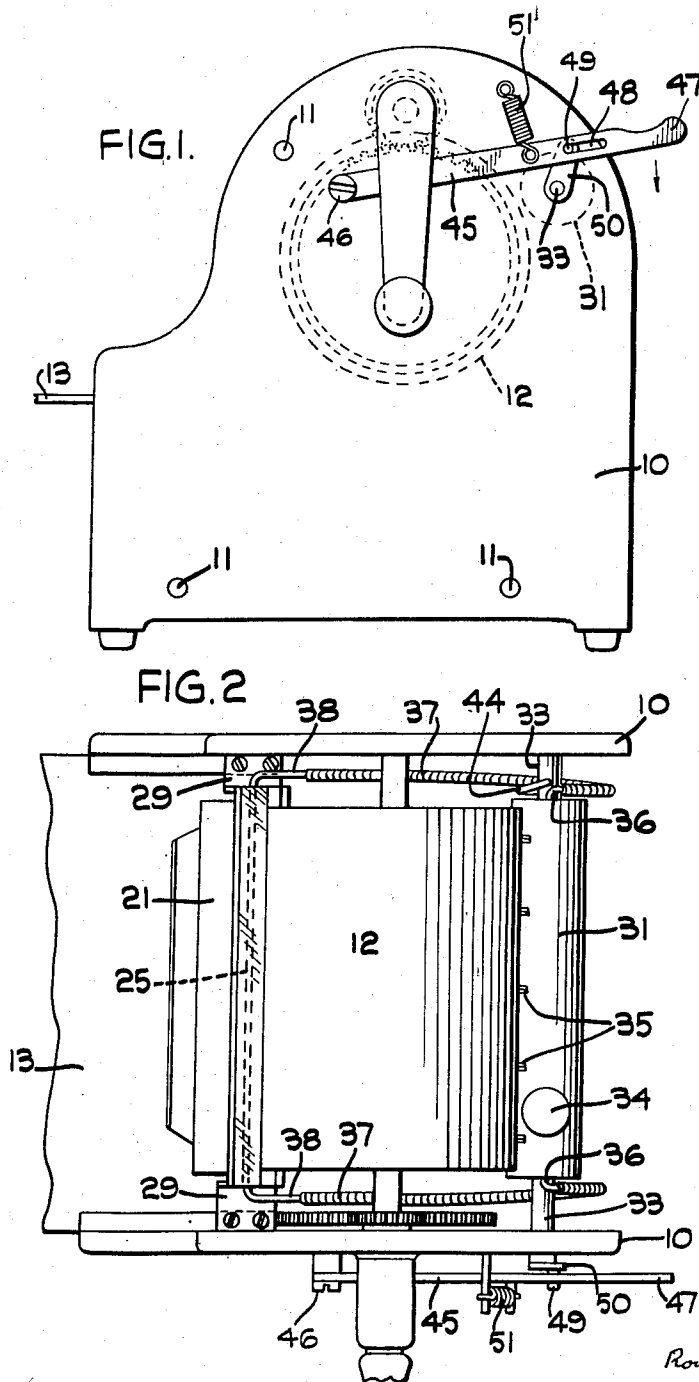
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2,666,412

MOISTENING MEANS FOR DUPLICATING MACHINES

Filed March 18, 1952

3 Sheets-Sheet 1



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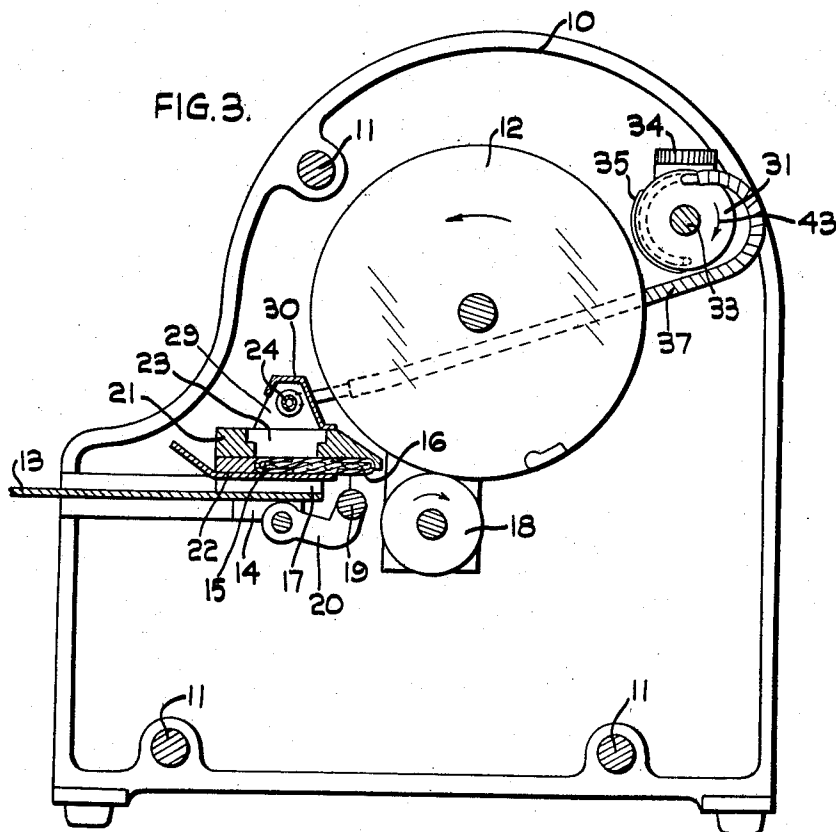
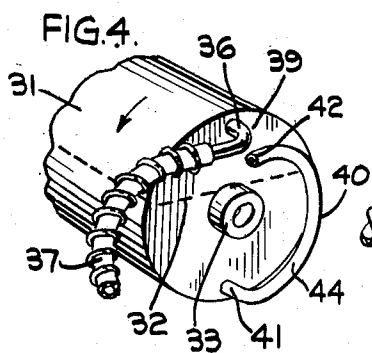
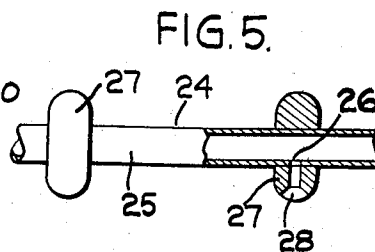
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MOISTENING MEANS FOR DUPLICATING MACHINES

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3 Sheets-Sheet 2



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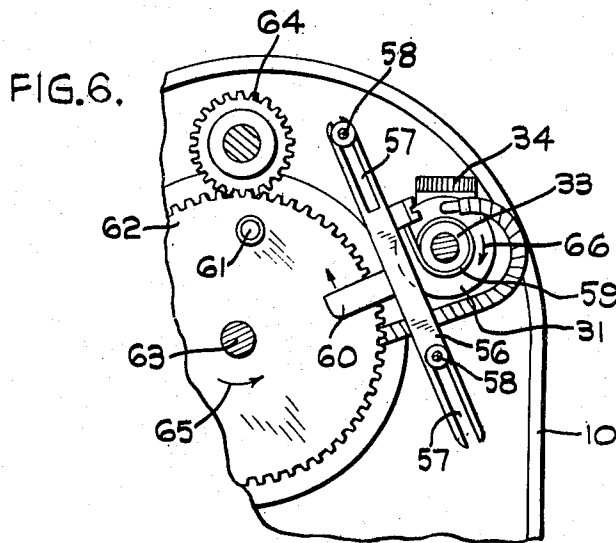
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MOISTENING MEANS FOR DUPLICATING MACHINES

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3 Sheets-Sheet 3



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MOISTENING MEANS FOR DUPLICATING MACHINES

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3 Claims. (Cl. 118-267)

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The present invention relates to duplicating machines hereinafter referred to as of the kind specified in which copy sheets fed into the machine are moistened therein by a liquid and are brought into pressure contact with a master sheet supported upon a master cylinder or equivalent, said master sheet having matter to be reproduced marked thereon in reverse.

The invention may, for instance, be applied to duplicating machines of the kind having a pair of side frame members connected together in spaced relationship and supporting the spindle of a cylinder to which the master sheet is secured, the machine also having a pressure roller for pressing the moistened copy sheets into contact with the master when the cylinder is revolved.

The object of the present invention is to provide improved means for controlling the feed of liquid to the moistening member or appliance for the copy sheets. This moistening member or appliance may consist of a pad of absorbent material over which the copy sheets are drawn, or it may consist of a roller over which the copy sheets pass.

According to the present invention, a duplicating machine of the kind specified has the copy sheet moistening member supplied with liquid by means of a distribution device fed from a tank which is adapted to be moved periodically by automatic means or otherwise from an inoperative position in which liquid from the tank is prevented from being delivered to said distribution device to an operative position in which a gravity feed for the liquid is established between the tank and said device.

The tank may be mounted for oscillation about a horizontal or approximately horizontal axis and has one or more flexible or jointed pipe connections each leading from an outlet in the tank to said distribution device, said outlet or outlets being above the liquid level when the tank is in its inoperative position and below this level when the tank is in its operative position.

The gravity feed may be established or facilitated by the provision of an air inlet duct or opening on the tank so positioned as to admit air to the space in the tank above the liquid only when the tank is in the operative position.

A manually operable lever or other member may be provided for effecting periodic movement of the tank to its operative position.

Alternatively tank displacement mechanism driven from or in predetermined relationship to the master cylinder or other rotary element of

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the machine is provided for moving the tank automatically to its operative position when the machine is operated.

Referring to the drawings:

Figure 1 shows in side elevation a duplicating machine of the kind specified incorporating one form of moistening means according to the present invention.

Figure 2 is a plan view of the same construction.

Figure 3 is a cross-sectional view in side elevation of the same construction.

Figure 4 is a fragmentary perspective view on an enlarged scale showing one end of the liquid containing tank and also the connecting pipe and air duct at this end.

Figure 5 is a fragmentary view on an enlarged scale and partly in longitudinal cross-section showing the construction of the liquid distributing device.

Figure 6 is a fragmentary view in side elevation and in cross section showing one form of mechanism for operating the moistening means automatically, these moistening means being of the form illustrated in Figures 1 to 4, and

The duplicating machine illustrated in the drawings is of generally conventional construction apart from the moistening means forming the subject of the present invention and such machine thus comprises a pair of side frame members 10 supported in laterally spaced relationship by cross members 11, the whole forming the supporting framework or structure for the working parts of the machine. The machine further comprises a master cylinder 12 of known type which is adapted to support around its circumference a master sheet, the exterior face of which has marked thereon in hectographic carbon or some other suitable medium the matter to be reproduced on the copy sheets, this matter appearing in mirror image or reverse on the master sheet.

At the front of the machine a conventional form of table or tray 13 is provided above the inner end 14 of which is disposed a moistening member or appliance in the form of a pad 15 of which the forward lower portion 16 is exposed to the in-feed path 17 by which the copy sheets pass between the printing couple constituted by the master cylinder 12 and a pressure roller 18 disposed beneath it and engaging with it. A presser bar or member 19 extending laterally across the width of the copy sheet table 13 is supported beyond the inner extremities of this table upon a lever arm 20 or other suitable means and

is adapted in any suitable manner not illustrated to press the copy sheets against the portion 16 of the moistening pad when the machine is operated.

Thus far described the machine is of conventional construction and it will, of course, be understood that very widely differing forms of construction of the parts mentioned as well as differing relative positions for these parts may be adopted without departing in any way from the scope of the invention.

The moistening pad 15 is supported in a frame constituted by an upper laterally slotted member 21 beneath which is secured a plate 22, the outer end of which is turned inwardly as illustrated to form a guide at the entrance to the in-feed path 17 for the copy sheets, the upper surface of this plate serving to support the end surface of the moistening pad.

The upper surface of the moistening pad is exposed through the laterally extending slot 23 provided in the member 21 and above this slot is disposed a distributing device 24 for the moistening liquid such as spirit.

This moistening device, a fragment of which is illustrated in detail in Figure 5, may consist of a tubular member 25, the lower side of which is provided with a series of longitudinally spaced outlets or orifices 26 which may have downwardly projecting nozzles 27 with flared or bell-shaped mouths 28.

This tubular member is supported at its ends in suitable plates or brackets 29 secured to or formed integrally with the lateral extremities of the frame member 21 and above the distributing device is provided a sheet metal guard 30.

At the rear of the machine and on the side of the master cylinder remote from the moistening pad and liquid distributing device is provided a tank 31 for containing spirit, a fragmentary view of one end of this tank being shown in detail in Figure 4, the normal maximum level of the liquid therein being indicated by the dotted line 32. This tank is of elongated cylindrical form and at each end is provided with cylindrical spigots such as that shown at 33 by means of which the tank is journaled rotatably in the side frame members 10 about a horizontal or approximately horizontal pivotal axis.

At its upper side the tank is provided at a suitable position along its length with a filler fitting enclosed by a cap 34 and exteriorly the surface of the tank adjacent to the master cylinder is provided with a plurality of spaced triangular section ribs 35 which avoids extensive contact between the master sheet of the surface of the tank such as might be inclined to deteriorate the quality of the matter appearing on the master sheet.

Above the normal liquid level 32 of the tank the latter is provided at each end with a liquid outlet fitting 36, these fittings being connected to the distributing device by a pipe system comprising a pair of flexible pipes 37, the lower ends of which are joined to cranked extensions 38 and the distributing device.

To prevent creation of a partial vacuum in the space 39 above the liquid level 32 which might occur if a large quantity of liquid were required to be delivered from the tank to the distributing device, the tank is provided at one end at least with an air inlet duct 40, one end of which 41 communicates with the interior of the tank below the normal level 32 and the other end 42 of which is open to the atmosphere.

Means are provided for rotating the tank through an appropriate angle, for example, in the range 60° to 180° in the direction indicated by the arrow 43 (Figures 3 and 4) so that the fitting 36 is brought below the liquid level 32 and a quantity of liquid is delivered from the tank through the pipe system to the distributing device under the influence of gravity and is projected from the nozzles 27 on to the exposed upper surface of the moistening pad 15.

Rotation of the tank from the inoperative position illustrated in Figure 4 to the operative position thus described serves to displace the end 41 of the air duct to a position above the liquid level 32 but since the intervening portion 44 of the air duct which is of curved form and lies adjacent to the periphery of the tank, always has a part remaining above the liquid level, any liquid contained in this duct automatically runs back into the tank during said rotation, and, when the tank arrives at the operative or discharging position, the air duct is clear of liquid and allows air to pass into the space 39 to relieve any partial vacuum which may have been set up.

For effecting rotation or oscillation of the tank as described, the arrangement shown in Figures 1 to 3 illustrates the provision of a lever 45, the inner end of which is pivotally secured as indicated at 46 to one of the side frame members and the outer end of which 47 has a finger piece which projects rearwardly of the machine. Intermediate its ends the lever is slotted as shown at 48 and in the slot engages the pin 49 of a crank arm 50 fixed to the end of the tank spigot 33.

A coiled tension spring 51 serves to bias or load the lever in the raised position illustrated in Figure 1 and thus serves to maintain the tank normally in the inoperative position. The lever may be depressed whenever a fresh supply of moistening liquid is required to be delivered to the moistening pad, the operator judging for him or herself when this is necessary.

The system illustrated in Figures 1 to 3 is capable of automatic operation, as shown in Figure 6.

The actuating mechanism may take the form of a reciprocating member 56 having slots 57 at its ends through which pass headed studs 58 secured to one of the side frame members and this reciprocating member 56 is connected drivingly to the tank in any suitable manner, for example, by means of a cord 59 lapped round one of the tank spigots 33.

The reciprocating member 56 has a projection 60 disposed in the path of a peg 61 which projects laterally from the gear 62 on the master cylinder shaft 63 by means of which the latter is driven from a pinion 64.

The gear 62 rotates in the direction of the arrow 65 and the peg 61 thus periodically effects a reciprocation of the member 56 driving same in an upward direction to oscillate the tank in the direction indicated by the arrow 66. Return movement is accomplished by any suitable biasing means such as a coiled torsion spring on one of the tank spigots.

What I claim then is:

1. In a duplicating machine of the kind specified, means for moistening copy sheets, comprising a moistening member disposed adjacent to the in-feed path of the copy sheets, a liquid distribution device arranged in operative relation with said moistening member, a tank for containing moistening liquid, said tank being pivotally mounted in the machine about an ap-

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proximately horizontal axis above the level of said distribution device, an outlet in said tank disposed above the normal liquid level thereof, a pipe system connecting said outlet to said device, means operatively connected with said tank for moving same from an inoperative position in which said outlet is disposed above said level to an operative position on which said outlet is disposed below said level, and, an air inlet duct on said tank having one end communicating with the interior of the tank below said liquid level in the inoperative position of the tank and above said liquid level in the operative position of the tank said duct being open to the atmosphere at its other end and having an intermediate portion of which part at least is always disposed above said liquid level, so as to drain any liquid back into the tank when moving from its inoperative to its operative positions.

2. In a duplicating machine of the kind specified, means for moistening copy sheets, comprising a moistening member disposed adjacent to the infeed path of the copy sheets, a liquid distribution device arranged in operative relation with said moistening member, a tank for containing moistening liquid, said tank being movably mounted in the machine in mountings permitting the orientation of the tank to be varied, an outlet in said tank disposal above the normal liquid level thereof, a pipe system operatively connecting said outlet to said distributing device; means operatively connected with said tank for varying its orientation from an inoperative position in which gravitational feed of liquid from said tank through said pipe system is prevented to an operative position on which such feed is established and said tank having an air inlet duct communicating at one end with the interior of the tank below said liquid level in the inoperative position of the tank while having an outlet to atmosphere at a level above said liquid level and an intermediate portion of a longitudinal configuration to afford a gravitational drainage path back into the tank for liquid in said duct while the tank is in transit from its inoperative to operative positions in the latter of which the

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duct establishes communication between the atmosphere and the interior of the tank above the liquid.

3. In a duplicating machine of the kind specified, means for moistening copy sheets, comprising a moistening member disposed adjacent to the infeed path of the copy sheets, a liquid distribution device arranged in operative relation with said moistening member, a tank for containing moistening liquid, said tank being pivotally supported in the machine about a substantially horizontal axis within the immediate zone occupied by the tank, an outlet in said tank disposal above the normal liquid level thereof, a pipe system operatively connecting said outlet to said distributing device; means operatively connected with said tank for varying its orientation by rotation about said axis from an inoperative position in which gravitational feed of liquid from said tank through said pipe system is prevented to an operative position in which such feed is established and said tank having an air inlet duct of substantially C-shape arranged at least approximately concentrically with the axis of rotation of the tank and communicating at one end with the interior of the tank below said liquid level in the inoperative position of the tank, while its other end is open to atmosphere at a level about said liquid level, the intermediate portion of the C-shaped duct affording a gravitational drainage path back into the tank while the tank is in transit from its inoperative to operative positions, in the latter of which the duct establishes communication between the atmosphere and the interior of the tank above the liquid.

RONALD MAX FORD.

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