Nov. 24, 1942. E. WILDERSON 2,303,185

MOISTENING DEVICE

Filed May 10, 1939 4 Sheets-Sheet 1

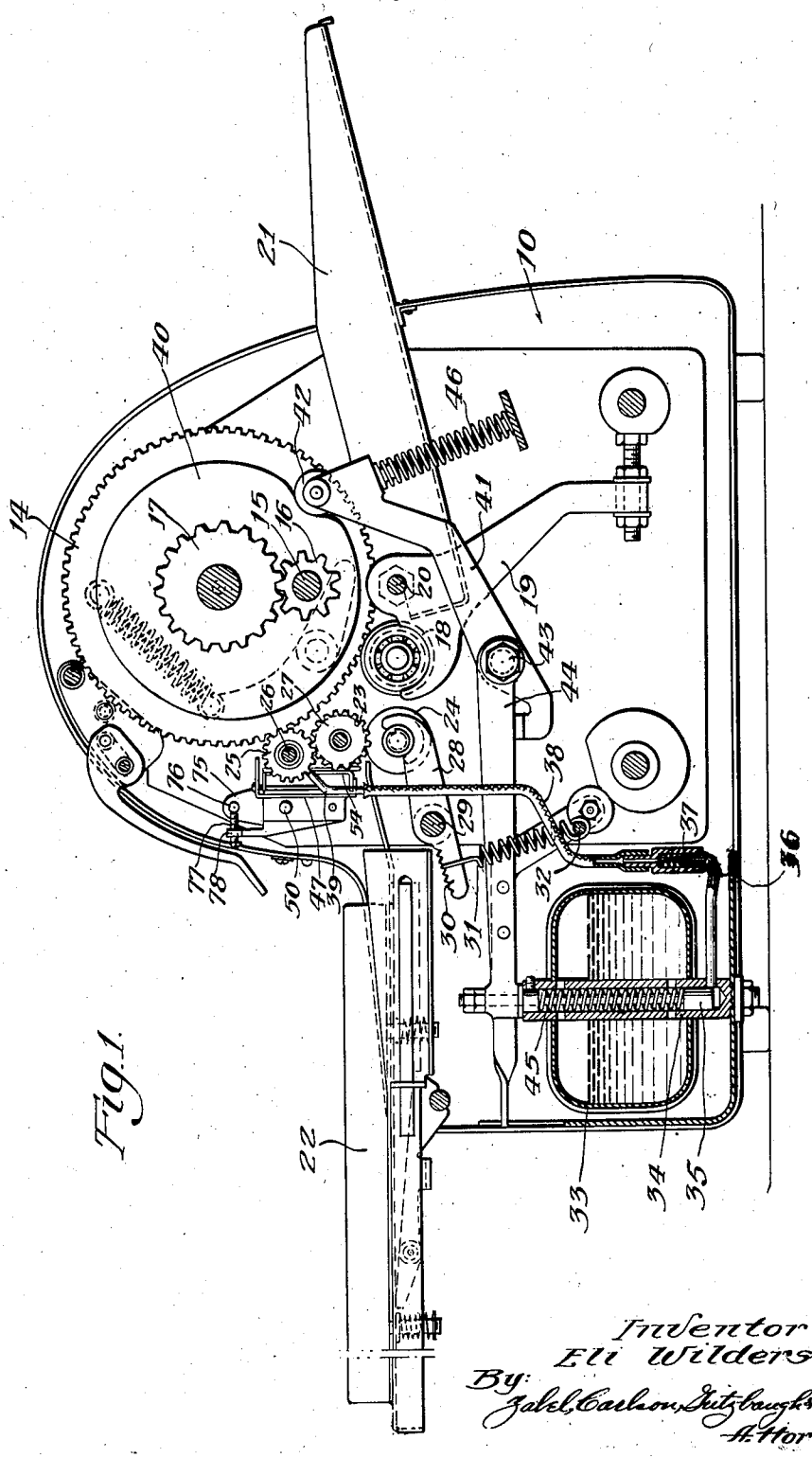


Fig. 1.

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Fig. 2.

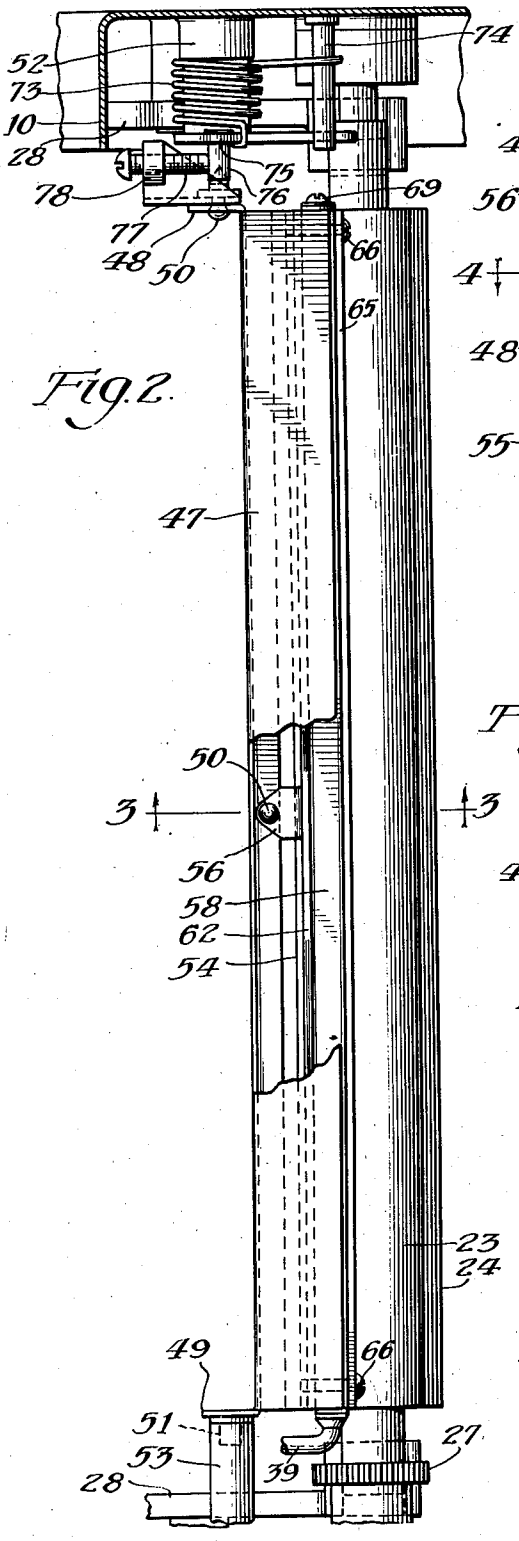


Fig. 3.

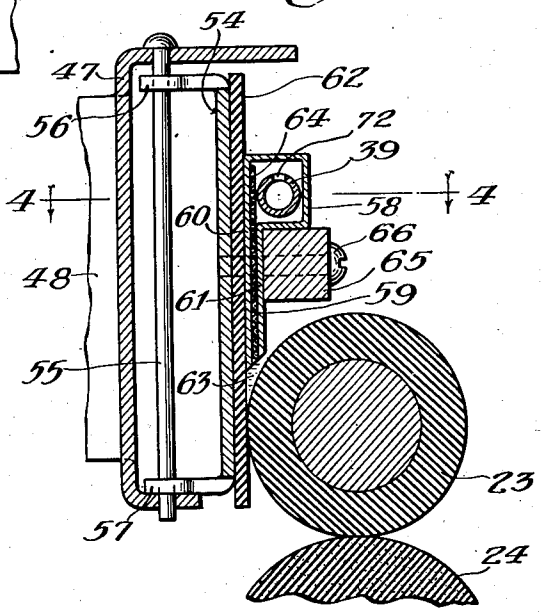
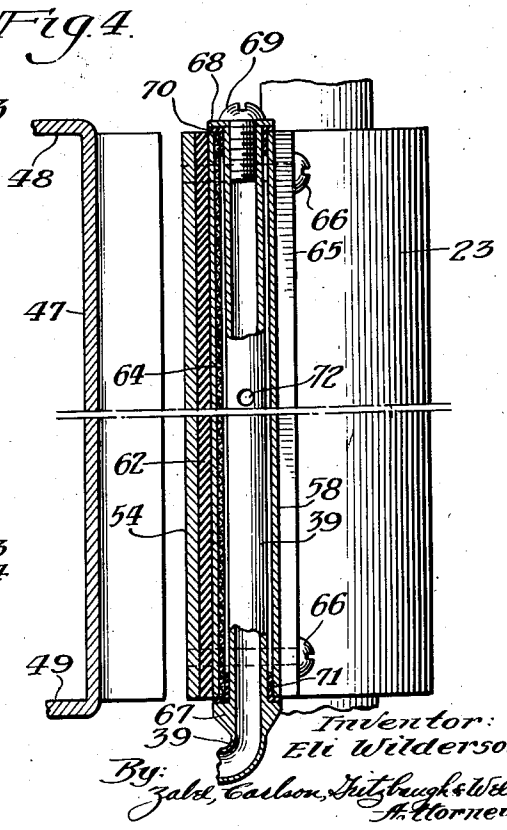


Fig. 4.



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Fig. 5.

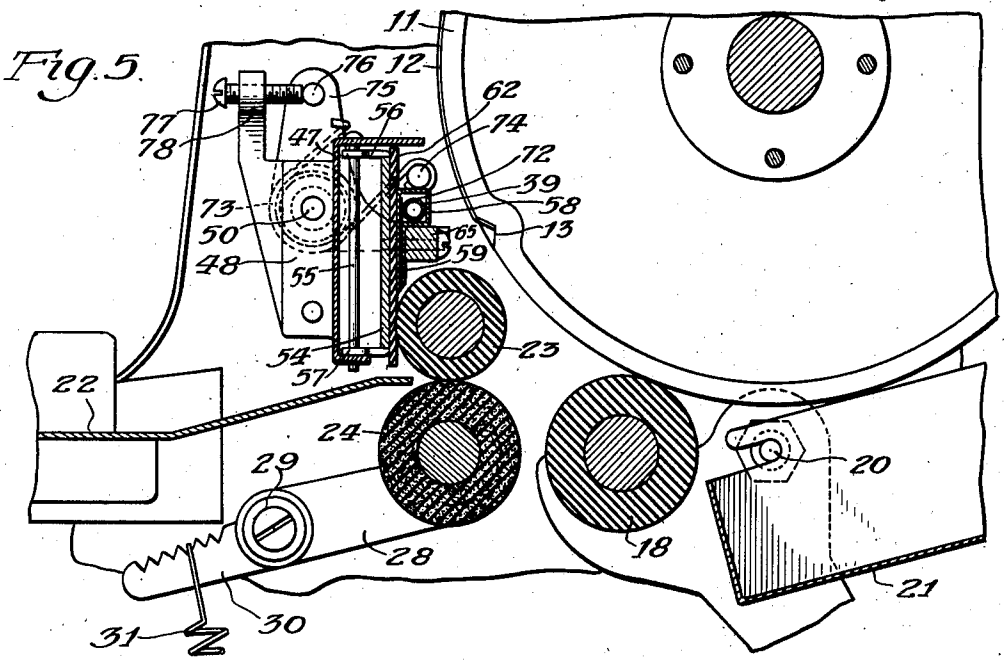


Fig. 6.

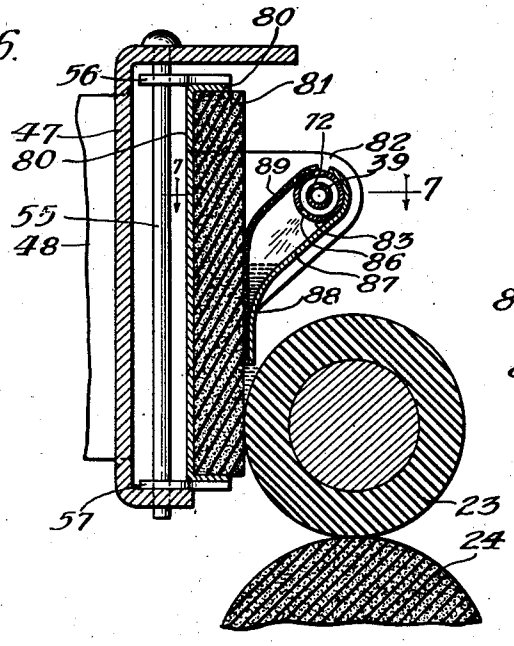
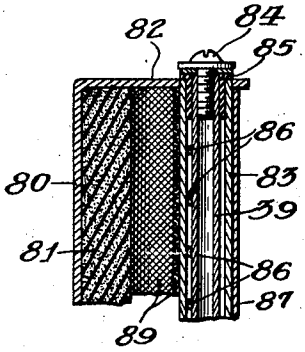


Fig. 7.



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Fig. 8.

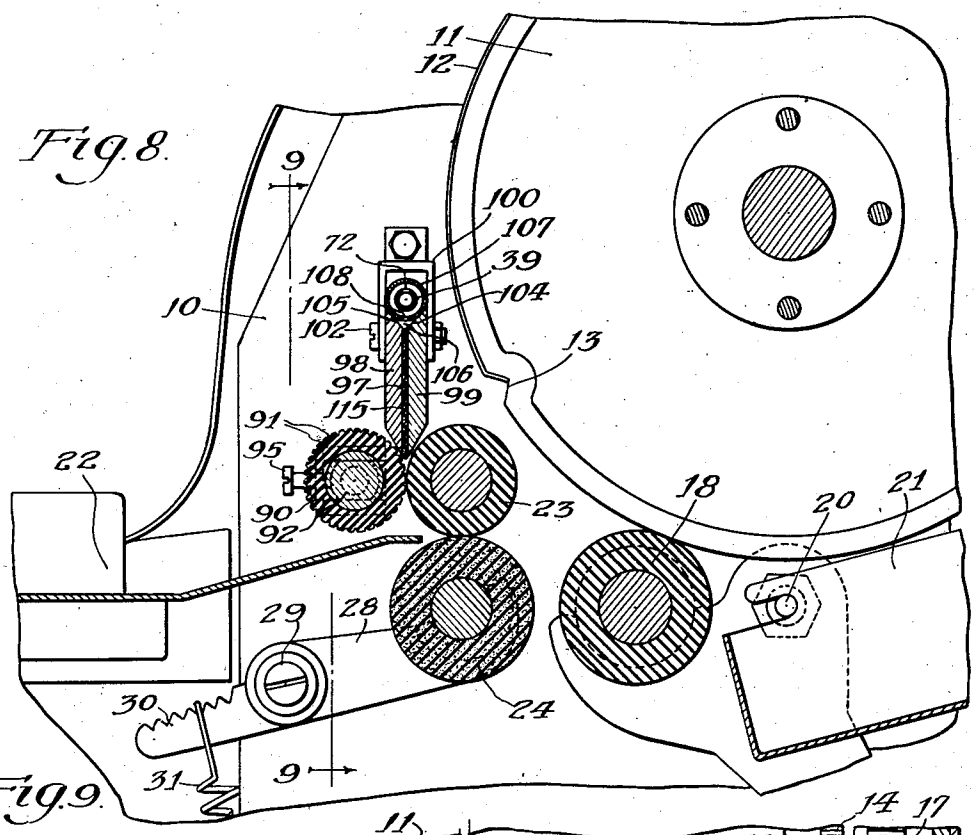
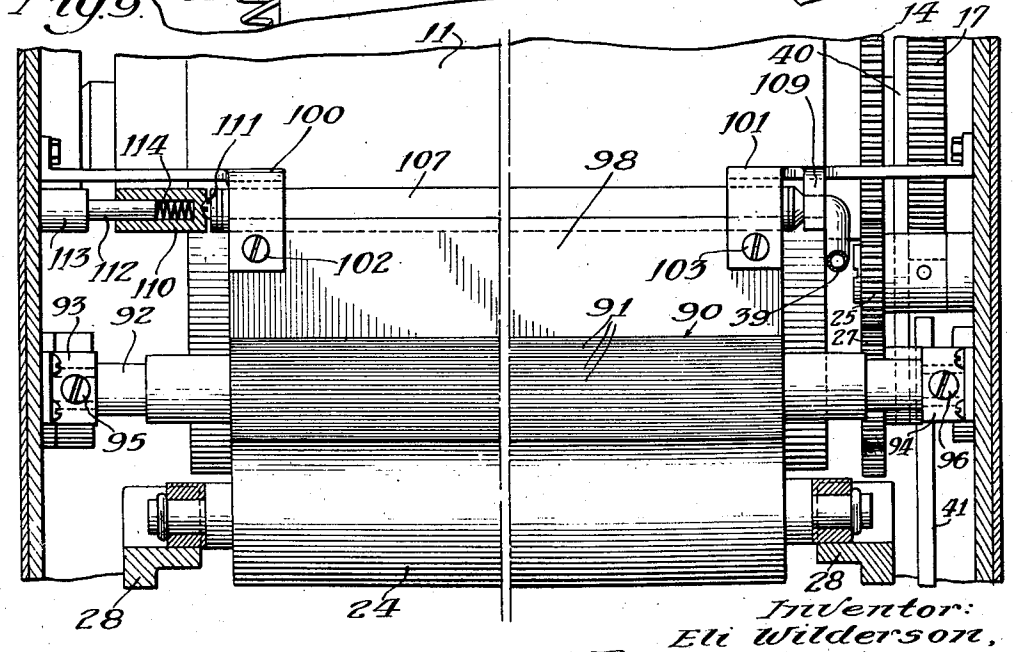


Fig. 9.



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UNITED STATES PATENT OFFICE

2,303,185

MOISTENING DEVICE

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Application May 10, 1939, Serial No. 272,829

14 Claims. (Cl. 91—48)

The present invention relates to moistening means and is particularly adapted to be embodied in liquid-process duplicating machines to moisten copy sheets with a solvent for copying ink.

It is the principal object of the invention to provide an improved means for applying a thin film of solvent to copy sheets as they are advanced to contact a master sheet in a duplicating machine of the type wherein the data to be duplicated is typed or written in reverse with copying ink on a master sheet, and the copy sheets after being moistened with solvent for the copying ink, are brought into contact one by one with the master sheet. It is also a purpose of this invention to provide an improved means for distributing moistening liquid to a roller which, in turn, transfers the liquid to a copy sheet.

It is a further and more particular object of the present invention to provide improved moistening means for applying a solvent to copy sheets, which moistening means comprises a moistening roller adapted to engage the copy sheets and a novel distributing means for distributing liquid to the moistening roller, which novel distributing means includes a narrow channel extending from a liquid supply container downwardly toward the roller and a screen in said channel held between the walls thereof, said screen being of relatively fine mesh so as to distribute the liquid throughout the channel and control the flow thereof to the roller.

It is a further object of this invention to provide an improved means for applying a thin film of solvent to copy sheets, which improved means comprises a roller adapted to engage the copy sheets, a wiper engaging the roller and adapted to limit the liquid on the roller to a thin film, and a distributing channel for distributing liquid to the roller, which channel includes a screen held between the opposed walls of the channel.

The objects and advantages of the present invention will appear more fully as the description proceeds, reference being had to the accompanying drawings wherein a preferred form of the invention is shown.

In the drawings:

Fig. 1 is a longitudinal sectional view taken through a duplicating machine of the type described, which machine embodies the present invention;

Fig. 2 is an enlarged plan view of the moistening means embodying the present invention;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a plan sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a smaller sectional view showing the relation of the moistening means to the duplicating apparatus, this sectional view being also taken on the line 3—3 of Fig. 2;

Fig. 6 is a fragmentary, sectional view similar to Fig. 3 but showing a modified form of the invention;

Fig. 7 is a fragmentary, sectional view taken on the line 7—7 of Fig. 6;

Fig. 8 is a sectional view similar to Fig. 5 illustrating a further modification of the invention; and

Fig. 9 is a sectional view taken substantially on the line 9—9 of Fig. 8.

Referring now to Figs. 1 to 5, inclusive, wherein a machine embodying a preferred form of the invention is illustrated, reference character 10 designates the frame of a duplicating machine in which a duplicating drum 11 is journalled for rotation. The drum 11 is adapted to carry a master sheet 12 upon which the data to be duplicated is printed, written or typewritten in reverse. One edge of the master sheet 12 is secured in a groove 13 provided in the periphery of the drum 11. As is customary in machines of this type, suitable gripping means (not shown) are adapted to releasably hold the master sheet 12 in the groove 13.

As shown best in Fig. 1, a gear 14 is fixed to the drum 11 so as to rotate therewith. The gear 14 is driven from a drive shaft 15 through a pinion 16 on the shaft 15 and a gear 17 which is secured to the gear 14. The shaft 15 is journalled in the frame 10 and is adapted to be rotated by suitable drive means (not shown).

A platen roller 18 is adapted to ride upon the surface of the drum 11 and to press copy sheets against the master sheet 12 when the copy sheets are advanced to the platen roller. The platen roller 18 is journalled in suitable levers 19, one of which is shown in Fig. 1; the other, of course, being directly behind the one shown in Fig. 1 and at the opposite side of the frame 10. The levers 19 are mounted upon a shaft 20 and are adjustable about the shaft 20 as a pivot to vary the pressure of the platen roller against the drum. The platen roller is driven by frictional engagement with the drum 11 or with the sheets thereon. A sheet receiving tray 21 is mounted in the frame 10, one end of the tray being supported by the shaft 20. A copy sheet feed tray 22 is sup-

ported in the frame 10. Sheets may be supplied from the tray 22 to combined moistening and feed rollers 23 and 24. Feed roller 23 is adapted to be driven from the gear 14 by a pinion 25 which is journaled on a stub shaft 26 carried by the frame 10. The pinion 25 meshes with another pinion 27 which is fixed to the roller 23. The feed roller 23 is also a moistening roller. It is preferably formed from elastic material such as solid neoprene or rubber which is relatively hard. A cooperating roller 24 is preferably formed of a sponge type of neoprene or rubber so that it is somewhat porous. The roller 24 is journaled in two arms 28. The arms 28 are fixed to a rotatable shaft 29. One of the arms 28 has an extension 30 to which a spring 31 is adjustably attached. The spring 31 is secured to the frame 10 by means of a pin 32 and is under tension so that it tends to press the roller 24 upwardly against the roller 23.

A moistening liquid supply tank 33 is mounted in the frame 10 and is adapted to hold a supply of moistening liquid for the copy sheets. A pump comprising a cylinder 34 and a piston 35 acts to pump the liquid from the tank 33 upwardly to a position where it can be utilized to moisten the roller 23. An outlet 36 from the cylinder 34 leads through a check valve 37 and a flexible conduit 38 to a distributor pipe 39. The pump piston 35 is operated from a cam 40 which rotates with the drum 11. A cam lever 41 has a roller 42 in engagement with the cam 40. The lever 41 is pivoted on a shaft 43 which also is the pivot for the lever 44 that is connected directly to the piston 35. A spring 45 in the cylinder 34 presses the piston 35 downwardly and the lever 44 is adapted to raise the piston once for each rotation of the drum. A spring 46 engages the lever 41 so as to maintain the roller 42 against the cam 40.

Referring now more particularly to Figs. 2 to 5, inclusive, the moistening means by which the liquid from the pipe 39 is distributed to the roller 23 will be described. The moistener frame comprises a chanel shaped supporting bracket 47 which is pivotally mounted on the frame 10 by two flanges 48 and 49 having pins 50 and 51 that are journaled in posts 52 and 53 mounted on the opposite side walls of the frame 10. Within the bracket 47 a channel shaped plate 54 is pivoted by means of a pivot pin 55 mounted in the bracket 47 midway between its ends and two ears 56 and 57 which are formed on the plate 54.

A rectangular container 58 is mounted around the pipe 39 and has a channel 59 extending downwardly therefrom. The channel 59 is formed by two extended walls 60 and 61 of the container 58. A sheet 62 of rubber is interposed between the wall 60 and the plate 54. This rubber sheet 62 projects downwardly below the wall 60 where it engages the surface of the roller 23. The walls 60 and 61 terminate slightly above the adjacent surface of the roller 23 so that liquid passed downwardly between these walls will fall into a trough 63 that is formed by the roller 23 and the sheet 62.

In order to adequately distribute and limit the flow of moistening liquid through the channel 59 a screen 64 extends from the container 58 downwardly through the channel 59. The screen 64 is preferably a relatively fine mesh material screen that will not corrode in the solvent liquid employed. As an example of the size of mesh found suitable, a screen of 60 to 100 mesh is entirely satisfactory. The screen 64 is clamped between the walls 60 and 61 by a block 65 which extends lengthwise beneath the container 58 and is secured to the plate 54 by suitable screws 66.

The plate 54 and the rubber sheet 62 being pivoted on the pin 55 will follow the line of the roller 23 when they are pressed against the roller. The pipe 39 is held in the container 58 in the manner illustrated in Fig. 4 by a shoulder 67 at one end, a flange 68 at its other end, and a screw 69 closing the end of the pipe 39. Sealing members 70 and 71 seal the ends of the container 58 around the pipe 39. The pipe 39 is, of course, provided with one or more apertures 72 for delivering liquid into the container 58.

In order to press the rubber sheet 62 yieldingly against the roller 23 the bracket 47 is mounted to swing around its pivots 50 and 51 and spring means are provided for urging the bracket 47 in the proper direction to press the sheet 62 against the roller 23. The spring means comprises a spring 73, one end of which is secured to a pin 74 on the frame 10. The spring 73 is wound around the post 52 and its other end is hooked around a plate 75 which is pivoted about the pivot 50 for the bracket 47. The plate 75 carries a pin 76 which engages an adjustable screw 77 that is fixed to an arm 78 extending upwardly and rearwardly from the bracket 47.

The weight of the moistening mechanism comprising the bracket 47 and plate 54 together with the various parts mounted on the plate 54, will tend to swing the rubber sheet 62 away from the roller 23. However, the force of the spring 73 is exerted through the plate 75, the pin 76 and the screw 77 to overcome this tendency. By adjusting the screw 77 the relative positions of the bracket 47 and the plate 75 may be changed to increase or decrease the pressure of the rubber sheet 62 against the roller 23.

Referring now to Figs. 6 and 7, in this form of the invention a modified moistening means embodying the same principle is shown. The bracket 47 in this case carries a pivot pin 55 which supports a channel shaped member 80. The channel shaped member 80 carries a sponge rubber sheet 81 that is adapted to directly engage the roller 23. The member 80 has flanges 82 which extend toward the roller 23 at each end of the moistener and which are adapted to support a distributing tube 83. The distributing tube 83 is fitted over the pipe 39 which is mounted therein by a screw 84 and suitable packing 85 similar to that used to mount the pipe 39 in the container 58. The distributing tube 83 has a plurality of apertures 86 along the length thereof, which apertures are directed toward the sponge rubber sheet 81. A curved plate 87 is curved to engage the tube 83 and is welded to the end flanges 82. The plate 87 extends downwardly from the tube 83 alongside the sponge rubber sheet 81 to provide a channel 88 between the plate 87 and the sponge rubber sheet 81. A fine mesh wire screen 89 similar to that shown in the preferred form of the invention has its upper end mounted on the tube 83 and extends downwardly into the channel 88. This screen, being held between the sponge rubber sheet 81 and the plate 87, acts to limit the passage of liquid through the channel 88 and to distribute the liquid throughout the length of the channel in a uniform manner. The liquid in the channel 88 feeds down along the surface of the sheet 81 into contact with the roller 23. It will be understood, of course, that the pressure of the sheet 81 against the roller 23 may be

varied in this modification the same as in the preferred form of the invention.

Referring now to Figs. 8 and 9, in these figures a further modification of the invention is shown. The roller 23 is engaged by a wiping roller 90 which has longitudinally extending, spaced, fine grooves 91 in the periphery thereof. The roller 90 is desirably made of materials like that of the roller 23. A shaft 92 for the roller 90 is mounted in two bearing blocks 93 and 94 on the frame 10. Adjusting screws 95 and 96 are provided in the bearing blocks 93 and 94 for adjusting the roller 90 with respect to the roller 23 so as to vary the pressure between the rollers. A moistening channel 97 is provided between two plates 98 and 99 which are bevelled at their lower edges and extend down close to the meeting line of the rollers 90 and 23. The plates 98 and 99 are suspended by two brackets 100 and 101 which extend in from the side walls of the frame 10 upon which they are mounted. Each of the brackets 100 and 101 has a U-shaped portion fitting over the outside of the plates 98 and 99. Screw bolts 102 and 103 pass through the brackets and the plates to hold the plates in position. The plates 98 and 99 have their upper edges 104 and 105 bevelled to provide a trough 106 directly over the channel 97. A distributing tube 107 is provided around the pipe 39 and has a multiplicity of apertures 108 in the bottom thereof so as to discharge liquid downwardly into the trough 106 throughout the length of the tube 107. The pipe 39 and the tube 107 are carried between an arm 109 on the bracket 101 and a spring pressed cap 110 which engages a screw 111 closing the end of the tube 39. The cap 110 is hollowed out on its end to provide a seat for the screw 111. The cap 110 is slidable on a reduced portion 112 of a pin 113 mounted in the adjacent side of the frame 10. A spring 114 in the cap 110 keeps it in engagement with the screw 111.

The operation of the modification shown in Figs. 8 and 9 is believed to be apparent from the foregoing description. It will be understood that liquid is fed to the pipe 39 from a tank such as the tank 33 in measured quantities. The liquid is sprayed in the channel 97 and limited in its downward flow by a screen 115. This screen, like the screens in the other two forms of the invention, is desirably composed of a suitable material which is non-corrosive in the solvent used and which is of suitable mesh to limit the liquid flow in the channel 97 to the desired degree.

While there have been shown and described certain embodiments of the invention, it is to be understood that it is capable of many modifications. Changes, therefore, may be made without departing from the scope of the invention as described in the appended claims, in which it is the intention to claim all novelty inherent in the invention as broadly as possible, in view of the prior art.

I claim:

1. In a duplicating machine, means for moistening copy sheets comprising a roller adapted to engage the copy sheets, an elongated container adjacent to said roller, means providing a channel leading downwardly from said container toward the roller, and a fine mesh screen held flat between the walls of said channel for controlling the movement of water downwardly between said walls.

2. In a duplicating machine, means for moistening copy sheets comprising a roller adapted to engage the copy sheets, a source of liquid, a channel receiving liquid from said source and adapted to condut the liquid to said roller, and a fine mesh screen held flat in said channel and extending in the direction in which the liquid passes through the channel.

3. In a duplicating machine, means for moistening copy sheets comprising a roller adapted to engage the copy sheets, a source of liquid, a channel receiving liquid from said source and adapted to conduct the liquid to said roller, and a fine mesh screen in said channel, said screen being held flat by the opposed walls of said channel.

4. In a duplicating machine, means for moistening copy sheets comprising a roller adapted to engage the copy sheets, a source of liquid, a channel receiving liquid from said source and adapted to conduct the liquid to said roller, a wiper engaging said roller below the channel, and a fine mesh screen held flat in said channel and extending in the direction in which the liquid passes through the channel.

5. In a moistening device for copy sheets, liquid distributing means comprising an elongated narrow channel, means to supply liquid to said channel, and a fine mesh wire screen gripped flat between the walls of said channel and adapted to distribute the liquid uniformly throughout the channel as it moves downwardly therethrough.

6. In a moistening device for copy sheets, liquid distributing means comprising an elongated narrow channel, means to supply liquid to said channel, and a fine mesh wire screen held between the walls of said channel and adapted to distribute the liquid uniformly throughout the channel, one wall of said channel being composed of a yielding material.

7. A moistening device for copy sheets comprising a moistening roller, a bracket alongside said roller, a plate pivoted intermediate its ends to said bracket and lying between the bracket and the roller, a wiper sheet carried by said plate, and engaging said roller, and a liquid distributing device feeding liquid to said roller in advance of said wiper sheet, said liquid supply device comprising a wire mesh screen, side walls confining said screen between them, and means to feed liquid between said side walls.

8. A moistening device for copy sheets comprising a moistening roller, a bracket alongside said roller, a plate pivoted intermediate its ends to said bracket and lying between the bracket and the roller, and a liquid distributing device feeding liquid to said roller, said liquid supply device comprising a wire mesh screen, side walls supported from said pivoted plate and confining said screen between them with one of said side walls in the form of a wiper sheet engaging said roller, and means to feed liquid between said side walls.

9. A moistening device for copy sheets comprising a moistening roller, a bracket alongside said roller, a plate pivoted intermediate its ends to said bracket and lying between the bracket and the roller, a wiper sheet carried by said plate, and engaging said roller, and a liquid distributing device feeding liquid to said roller in advance of said wiper sheet, said liquid supply device comprising a wire mesh screen, side walls confining said screen between them, and means to feed liquid between said side walls, said last named means comprising a liquid container from which said side walls depend.

10. A moistening device for copy sheets com-

prising a moistening roller, a wiper engaging the roller, and a liquid supply device adapted to deliver liquid to said roller in advance of its engagement with the sheet, said device including a screen, side walls engaging the opposite sides of said screen and providing therewith a channel, and means to feed liquid into said channel, said wiper comprising a roller having fine longitudinal grooves therein.

11. A moistening device for copy sheets comprising a moistening roller, and a liquid supply device adapted to deliver liquid to said roller in advance of its engagement with the sheet, said device including a screen, side walls engaging the opposite sides of said screen and providing therewith a channel with one of said side walls in the form of a rubber sheet wiper engaging said roller, and means to feed liquid into said channel.

12. A moistening device for copy sheets comprising a moistening roller, a wiper engaging the roller, and a liquid supply device adapted to deliver liquid to said roller in advance of its engagement with the sheet, said device including a screen, side walls engaging the opposite sides of said screen and providing therewith a channel, and means to feed liquid into said channel, said wiper comprising a rubber sheet, and said channel comprising two plates, the upper edges of which are sloped inwardly to provide a liquid trough.

13. In a copy sheet moistening means for a liquid-process duplicating machine, the combination of a roller rotatably mounted on a horizontal axis, means cooperating with said roller for forwarding a sheet in contact with the roller, a plate extending normally along the rear face portion of said roller in backwardly spaced relation thereto and pivotally mounted on a transverse axis so as to be movable angularly with respect to the roller, a wiper having a facing portion of non-absorbent material mounted on the front face of said plate in position for engaging said roller so as to form a trough with the roller, yielding means normally holding said wiper pressed yieldingly against the roller in position for maintaining a pool of liquid in the trough, and means for feeding a supply of liquid into said trough.

14. In a copy sheet moistening means for a liquid-process duplicating machine, the combination of a roller, means for forwarding a copy sheet in contact with the roller, means adapted by engagement with the downwardly moving face portion of said roller to hold a pool of liquid in the trough between the holding means and the roller, channel means extending along above the roller and having an elongated narrow opening into said trough, and fine mesh wire screen held flat in substantially vertical position in said elongated narrow opening adapted to permit liquid to pass downwardly through said opening and adapted to limit the flow of the liquid through the opening.

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