

Oct. 27, 1942.

S. KOKAY

2,299,994

MOISTENING MECHANISM

Filed May 4, 1939

4 Sheets-Sheet 1

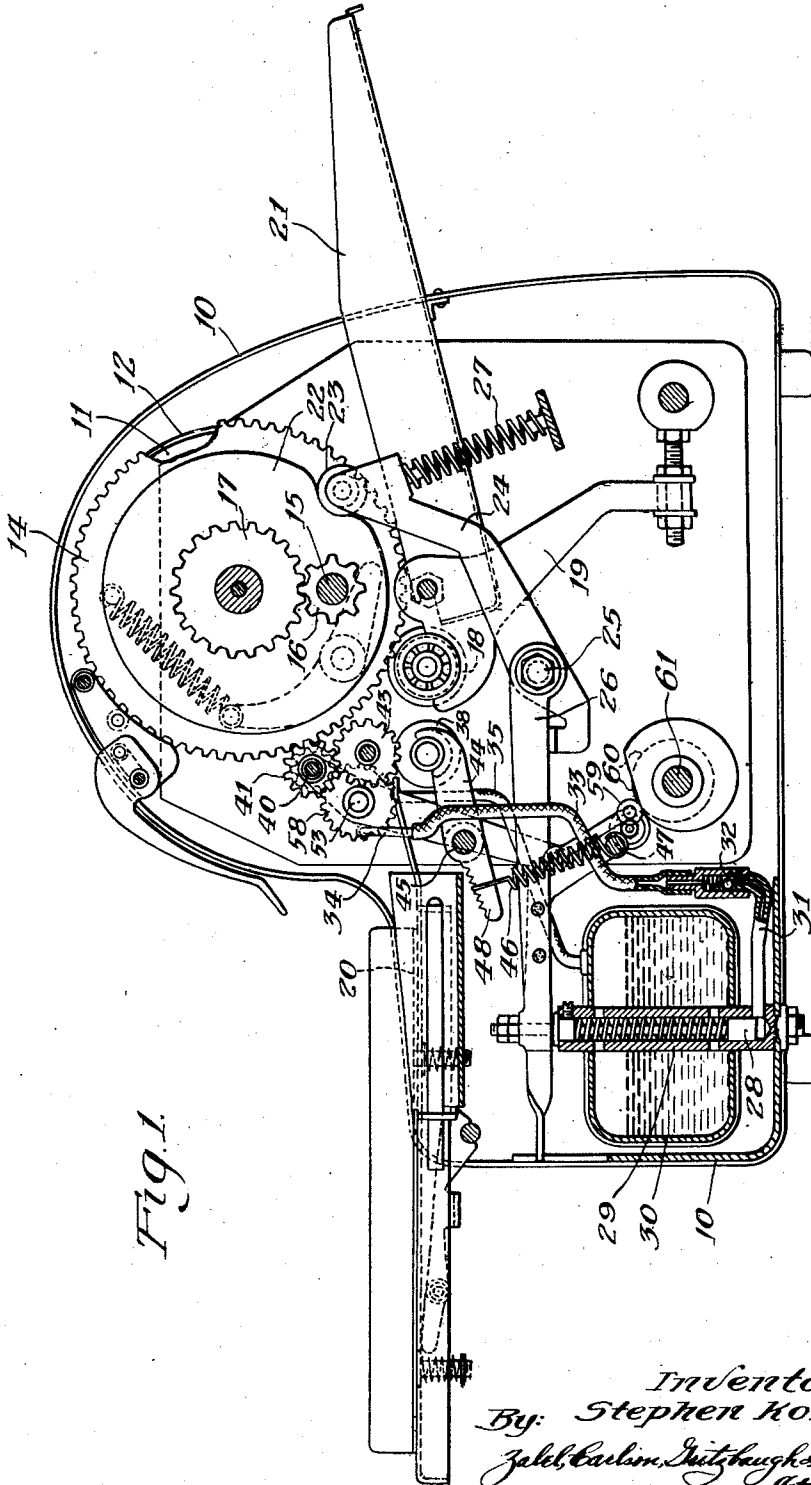


Fig. 1.

Inventor:
By: Stephen Kokay,
Jaleh, Carlin, Smith, Hughes & Wells
Attorneys

Oct. 27, 1942.

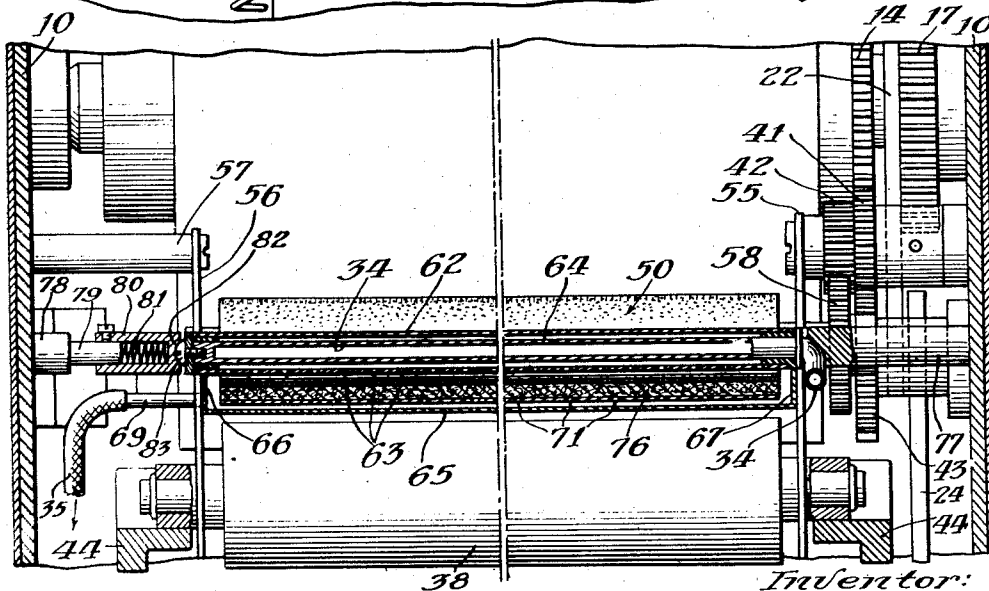
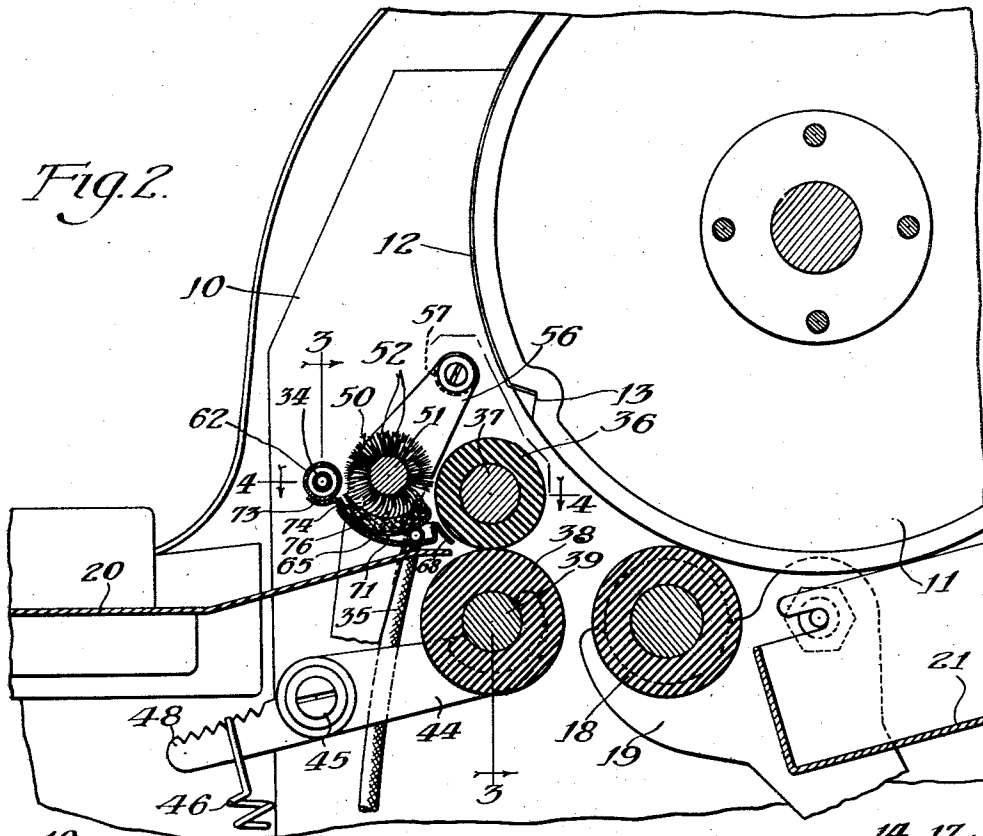
S. KOKAY

2,299,994

MOISTENING MECHANISM

Filed May 4, 1939

4 Sheets-Sheet 2



Inventor:
By: Stephen Kokay,
Zabel, Carlson, Fitzbaugh & Wells
Attorneys

Oct. 27, 1942.

S. KOKAY

2,299,994

MOISTENING MECHANISM

Filed May 4, 1939

4 Sheets-Sheet 3

Fig. 4.

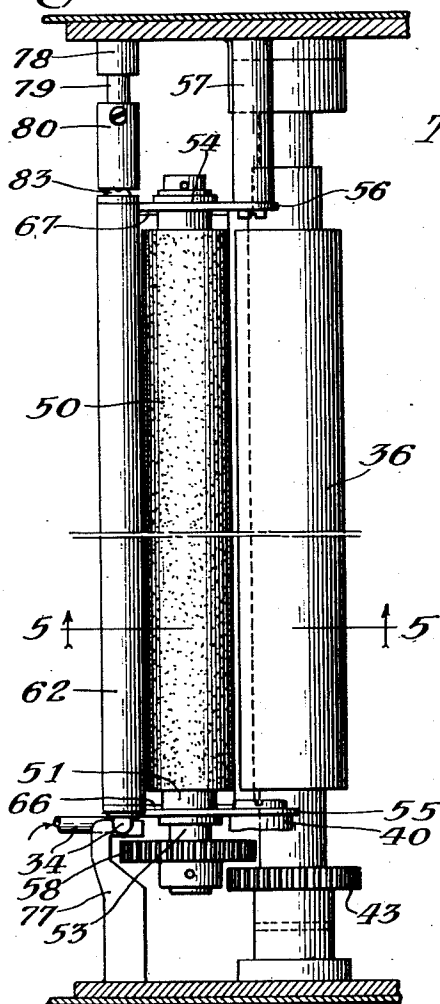


Fig. 6.

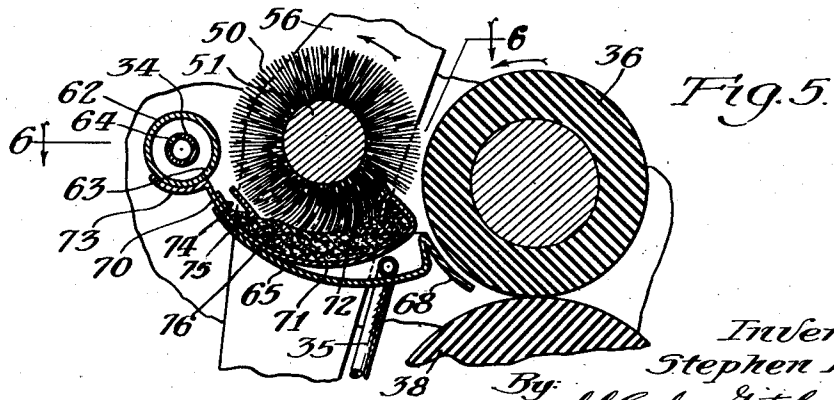
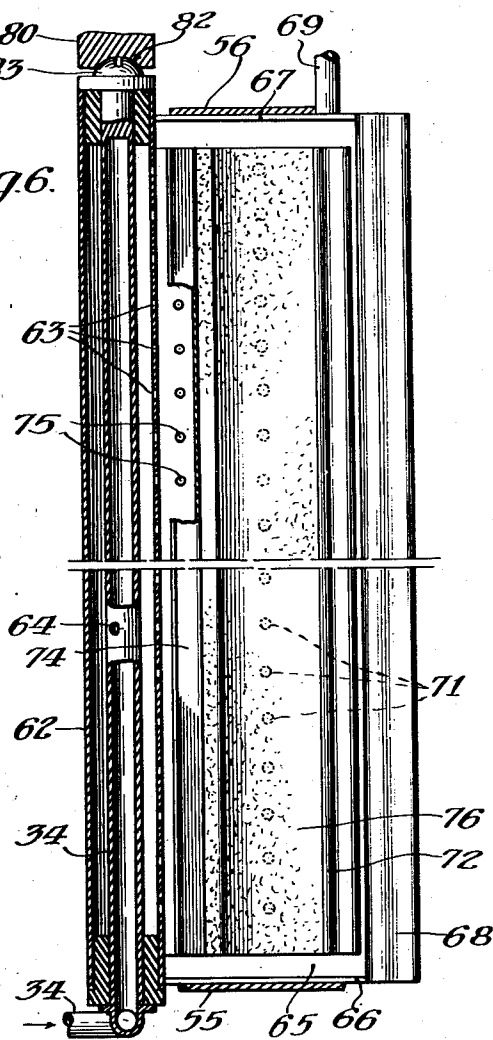


Fig. 5.

Inventor:
Stephen Kokay
By: J. C. Carlson, Fritz Laughton & W. L. W. Attorneys

Oct. 27, 1942.

S. KOKAY

2,299,994

MOISTENING MECHANISM

Filed May 4, 1939

4 Sheets-Sheet 4

Fig. 7.

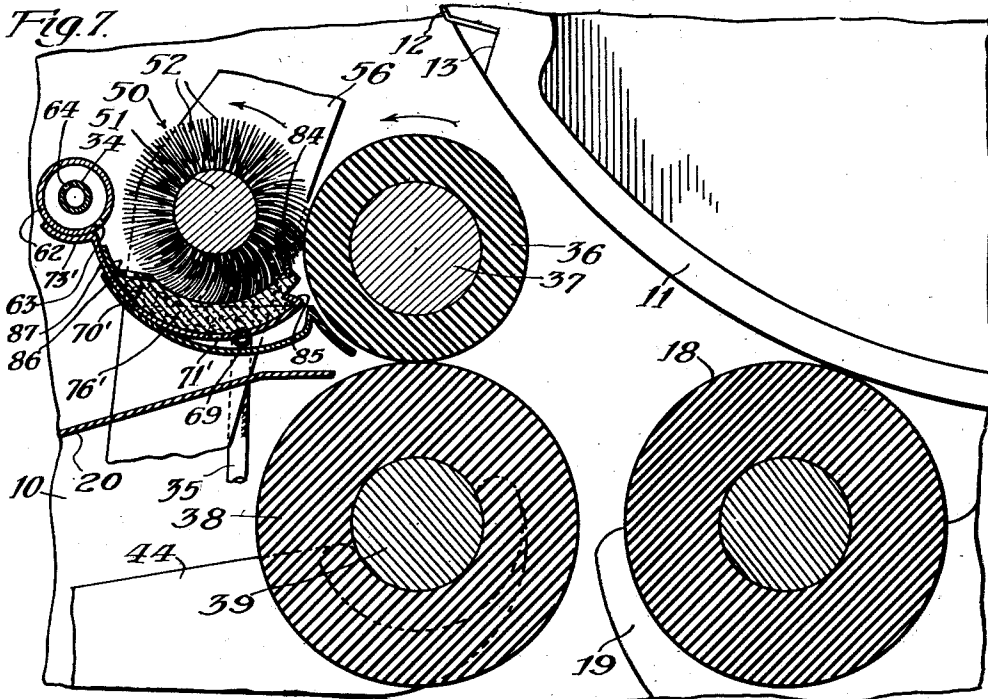
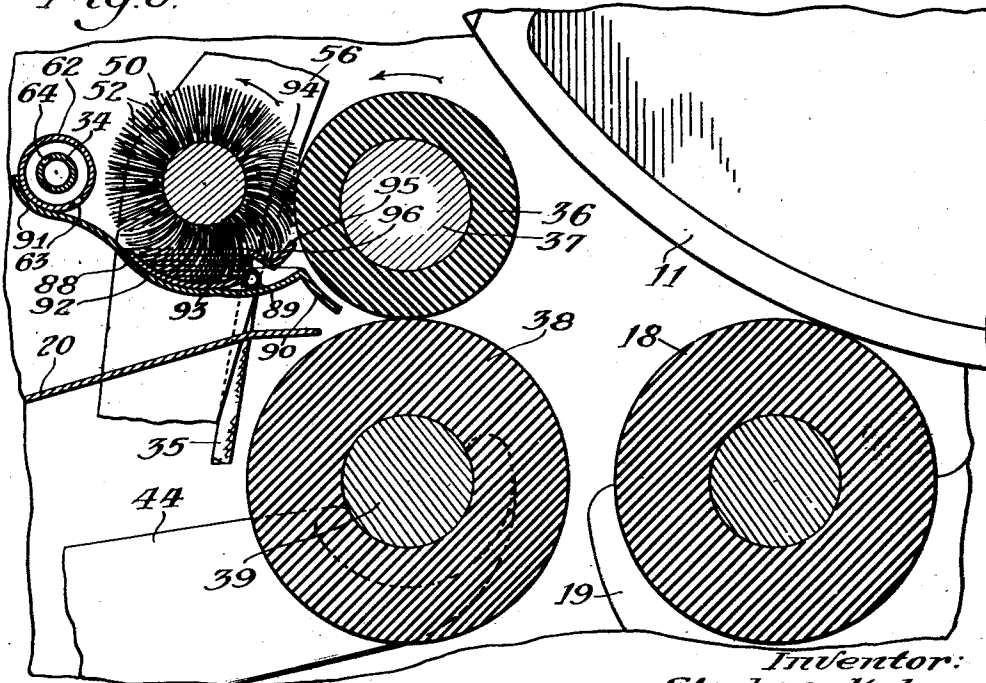


Fig. 8.



Inventor:
By: Stephen Kokay,
Zabel, Carlson, Ditzlaugh & Wells
Attorneys

UNITED STATES PATENT OFFICE

2,299,994

MOISTENING MECHANISM

Stephen Kokay, Chicago, Ill., assignor to Ditto, Incorporated, Chicago, Ill., a corporation of West Virginia

Application May 4, 1939, Serial No. 271,671

10 Claims. (Cl. 91—48)

The present invention relates to moistening means and is particularly adapted to be embodied in 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, in a duplicating machine of the type described, a novel moistening means comprising a moistening roller adapted to engage a copy sheet, a brush rotatably journaled alongside the moistening roller and having bristles which are adapted to transfer liquid to the roller, together with means for controlling the amount of moisture on the bristles of the brush.

The objects and advantages of the present invention will appear more fully as the description proceeds, reference being had to the accompanying drawings.

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 fragmentary sectional view taken centrally through the machine on a line parallel to the section line of Fig. 1;

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. 2;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5 with the moistening brush and roller removed;

Fig. 7 is a sectional view similar to Fig. 5 but upon an enlarged scale, illustrating a modified form of the invention, and

Fig. 8 is a fragmentary sectional view like Fig. 7, illustrating a further modification.

Referring now to Figs. 1-6 inclusive, wherein a machine embodying a preferred form of the invention is illustrated, the reference character 10 designates generally the frame of the machine in which a duplicating drum 11 is adapted to carry a master sheet 12 upon which the data to be duplicated is printed, written or typewritten, in reverse. The forward edge of the master sheet

12 is secured in a groove 13 provided in the periphery of the drum. 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 Figs. 1 and 3, a gear 14 is fixed to the drum 11 so as to rotate therewith. The drum and the gear are driven from a suitable 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 journaled in the frame 10 and is adapted to be rotated by a suitable hand crank, not shown. A platen roller 18 is rotatably journaled in levers 19 and is adapted to press copy sheets against the master sheet 12 when the copy sheets are advanced to the bite between the platen roller and the drum 11. The platen roller is driven entirely by frictional engagement with the drum 11 or with the sheets thereon. A copy sheet tray 20 is mounted at one end of the frame 10 and a receiving tray 21 is mounted at the other end of the frame. The drum 11 also has connected therewith a cam 22 which is adapted to engage a roller 23 on a lever 24. The lever 24 is pivoted on a stub shaft 25 which also carries a pump operating lever 26. A spring 27 presses the lever 24 upwardly so as to hold the roller 23 in engagement with the cam 22. The lever 26 is connected to a pump piston 28 operating in a cylinder 29 in a moistening fluid tank 30. The tank 30 is supported in the frame 10 in a suitable manner, not shown. The pump cylinder 29 has an outlet 31 through a check valve 32 and a flexible conduit 33 to a distributing tube 34 which forms part of the copy sheet moistening device. A return drain conduit 35 is adapted to drain excess moistening liquid back into the tank 30.

The construction heretofore described constitutes a duplicating machine of the type to which the present improvements in moistening devices may be applied. The moistening device comprises a combined feeding and moistening roller 36 which is fixed to a shaft 37 and a cooperating roller 38, which is fixed to a shaft 39. The rollers 36 and 38 are preferably formed from elastic material of such composition that it is slightly yielding. Solid neoprene or rubber which is relatively hard is preferably employed for the roller 36. The roller 38 is preferably formed from a sponge type of neoprene or rubber so that it is somewhat porous.

The rollers 36 and 38 are adapted to be driven by means of the gear 14. A stub shaft 40 is mounted in the frame 10 and carries two gears 41 and 42. The gears 41 and 42 are fixed together so as to rotate as a unit. The gear 41 meshes with the main gear 14 on the drum 11 and with a gear 43 which is fixed on the shaft 37. When the drum 14 is rotated in a counterclockwise direction, as shown in Fig. 1, the gears 41 and 43 cause the roller 36 to rotate in the

same direction. The shaft 39 of the roller 38 is journaled in two supporting arms 44 which are pivoted on suitable studs 45 mounted in the side frame 10. A spring 46 yieldingly presses the roller 38 against the roller 36. This spring is connected at one end to a pin 47 on the frame 10 and at the other end to an extension 48 of one of the supporting arms 44.

The roller 36 is adapted to be moistened by a brush 50. The brush 50 may be of any suitable construction. Preferably, the brush consists of a cylindrical hub 51 having radially extending bristles 52. The bristles 52 may be of any suitable material. They should, however, be relatively fine and resilient. They should also be capable of withstanding repeated wetting in the solvent for the copying ink. The hub 51 is extended beyond the bristles 52 (see Fig. 4) and has reduced portions 53 and 54 which are journaled in two supporting arms 55 and 56. The arm 55 is pivoted to the end of the stub shaft 40. The arm 56 is pivoted on the end of a stud 57 which is mounted on the frame 10 directly opposite the stub shaft 40. The reduced extension 53 on the hub 51 has a gear 58 fixed thereon. This gear 58 meshes with the gear 42 so that the brush is rotated in the same direction as the drum 11 and the roller 36. The arms 55 and 56 extend downwardly inside the frame 10 and are provided at their lower ends with rollers 59 which are adapted to engage an eccentric 60 that is carried by a shaft 61 adjustably mounted in the frame 10. Suitable means, not shown, is provided on the frame 10 for turning the shaft 61 and adjusting the eccentric 60 so as to move the arms 55 and 56 to adjust the brush 50 toward and away from the roller 36.

The moistening tube 34 extends into a distributing tube 62 (see Figs. 3, 5 and 6). The tube 62 has a plurality of apertures 63 therein and the tube 34 is apertured at 64 so as to discharge the liquid pumped from the tank 30 into the distributing tube 62. A pan 65 extends between the arms 55 and 56 and is attached to the arms by means of its end portions 66 and 67. The pan 65 has a lip 68 which is curved to the contour of the roller 36 and spaced therefrom, as illustrated best in Figs. 2 and 5. The drain conduit 35 is connected to an outlet 69 from the pan 65. Within the pan 65 there is provided an absorbent pad holder 70 which comprises a trough-shaped seat having apertures 71 in the bottom thereof. The ends of the pad holder terminate short of the end walls 66 and 67 of the pan 65. At one edge, the pad holder is bent inward to provide a wiper 72 which is adapted to engage the bristles 52 of the brush 50 so as to bend the bristles and to wipe off any excess liquid that may be clinging to the bristles. At its other side edge, the holder 70 is extended to provide a curved flange 73 that fits beneath the tube 62. The apertures 63 are so positioned as to direct liquid discharged from the tube 62 inside the holder 70.

A trough 74 is mounted on the pad holder 70 just below the apertures 63 so as to receive the liquid discharged from these apertures. The trough has apertures 75 therein. The bottom of the trough 74 directly overlies a felt pad 76 that is seated in the holder 70. This felt pad also extends under the wiper 72, as shown most clearly in Fig. 5.

The tube 62 and the pipe 34 are preferably removably mounted. A stud 77 mounted at one side of the frame 10 is formed to receive the

pipe 34. A second stud 78 is mounted at the other side of the frame 10. The stud 78 has a reduced portion 79 which extends into a cap 80 which has a spring 81 therein. The cap 80 has a socket 82 adapted to receive the head of a screw 83 which connects the pipe 34 and the tube 62 together. By sliding the cap 80 to the left, as shown in Fig. 3, the head of the screw 83 may be lifted out of the socket 82 and the tube 62 can then be lifted up away from the pan 65 and the pad holder 70.

In the operation of the moistening device to moisten copy sheets, liquid is pumped through the pipe 34 from the tank 30 and discharged into the tube 62. This liquid spreads through the length of the tube 62 and flows through the apertures 63 down into the trough 74. The apertures 75 in the trough 74 distribute the liquid throughout the length of the pad 76. The brush 50, in rotating over the surface of the pad 76, when the pad is saturated with liquid, picks up a limited amount of the liquid on the bristles of the brush. These bristles are wiped by the wiper 72 and also bent backward so that when they pass over the wiper the natural resiliency of the bristles will cause them to spring forward in the direction of rotation of the brush. This causes the bristles to throw liquid against the surface of the roller 36. The bristles and the surface of the roller 36, which are directly opposite each other, move in opposite directions. The liquid thus becomes uniformly distributed over the entire surface of the roller 36 and is carried by this roller into contact with a copy sheet fed between it and the roller 38. The excess liquid delivered to the pad 76 to keep it saturated drains out through the aperture 71 into the pan 65 and is delivered by this pan through the outlet 69 to the return conduit 35.

Referring now to Fig. 7, in this form of the invention the construction of the brush 50 and the pan 65 is the same as in the preferred form of the invention. In this form of the invention, also, a pad holder 70' has a flange 73' like that in the preferred form of the invention. The pad holder 70' also has apertures 71' for draining out excess liquid. In this form of the invention, however, the bristles 52 of the brush 50 directly engage the roller 36. Furthermore, an absorbent pad 76' is provided, which pad has an extension 84 that projects beyond the holder 70'. The holder 70' has a flange 85 which engages an undercut portion of the pad 76' to maintain it in place. Instead of the trough 74, a flat apertured plate 86 is fastened to the holder 70' by a flange 87 and acts to distribute liquid fed from the tube 62. The plate 86 projects out far enough from the holder 70' to engage the bristles of the brush 50.

In the form of the invention just described, the extended portion 84 of the absorbent pad acts to remove excess liquid from the bristles of the brush. In this form of the invention, the bristles of the brush wipe the surface of the roller 36 and spread the liquid thereon by direct contact. There is also, in this form of the invention, a certain amount of the throwing action which occurs in the preferred form owing to the fact that the bristles are bent back somewhat by their engagement with the plate 86 and the pad 76'.

Referring now to Fig. 8, in this form of the invention a further modification is illustrated. A pan 88 is mounted between the arms 55 and 56. This pan has an outlet 89 and has a lip por-

tion 90 extending along the edge thereof adjacent to the roller 36. The pan 88 is extended upwardly around the back side of the tube 62 and has a curved portion 91 adapted to fit the tube 62. A trough 92 closed at its ends is seated in the pan 88. Liquid is discharged from the apertures 63 down into the pan 88 and fills the trough 92 up to the level of a series of apertures 93 provided along one wall of the trough 92. Above the apertures 93 the trough 92 has a downwardly and outwardly directed flange 94 which terminates in an up-turned edge 95. The flange 94 is provided with apertures 96 for draining any liquid that is thrown off by the brush against the edge 95. The brush 50 extends down into the trough 92 so that the bristles are actually submerged in the liquid in the trough. The flange 94 acts as a wiper to remove the excess liquid, and any liquid that is thrown off by the bristles as they flip over the top of the flange 94 is directed either against the edge 95 or against the surface of the roller 36. As in the form shown in Fig. 7, the bristles of the brush in this form of the invention engage the surface of the roller 36. The drain outlet 89 is adapted to be connected to the discharge conduit 35, as will be readily understood. The operation of this modification of the invention, except as hereinbefore described, is substantially the same as that of the preferred form.

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. Apparatus for moistening a copy sheet or the like, comprising a roller for engaging the copy sheet, and means to supply liquid to said roller, said means comprising a brush journaled for rotation alongside said roller, and means to wet said brush with a liquid, said last named means including a wiper adapted to remove excess liquid from the brush before the brush transfers liquid to the roller.

2. Apparatus for moistening a copy sheet or the like, comprising a roller for engaging the copy sheet, means to supply liquid to said roller, said means comprising a brush journaled for rotation alongside said roller, means to wet said brush with a liquid, said last named means including an absorbent pad engaging said brush, and means to moisten said pad.

3. Apparatus for moistening a copy sheet or the like, comprising a roller for engaging the copy sheet, means to supply liquid to said roller, said means comprising a brush journaled for rotation alongside said roller, means to wet said brush with a liquid, said last named means including an absorbent pad engaging said brush, means to supply an excess of liquid to said pad, and means to remove the excess of liquid whereby to maintain the pad in a saturated condition.

4. Apparatus for moistening a copy sheet comprising a feed roller, a brush alongside of but spaced from said roller, means to wet said brush, and means to cause said brush to throw the liquid with which it is wetted against the roller, said wetting means comprising a pad of absorbent material engaging said brush and liquid supply means for said pad.

5. In a machine of the character described, copy sheet moistening means comprising a roller adapted to engage the sheets, a rotatable brush having bristles adapted to spread liquid upon the surface of the roller, and means to wet the brush, said means including an absorbent pad.

6. In a machine of the character described, copy sheet moistening means comprising a roller adapted to engage the sheets, a rotatable brush having bristles adapted to spread liquid upon the surface of the roller, and means to wet the brush, said means including an absorbent pad, a pad holder, a distributor in said holder having apertures to distribute liquid to said pad, and a pan to receive excess liquid from said pad.

7. In a machine of the character described, copy sheet moistening means comprising a roller adapted to engage the sheets, a rotatable brush having bristles adapted to spread liquid upon the surface of the roller, and means to wet the brush, said means including an absorbent pad, a pad holder, and a wiper on said holder to engage and wipe excess liquid from the bristles of said brush as they leave the pad.

8. An apparatus for moistening a copy sheet, comprising in combination a roller, means co-operating with said roller for forwarding a copy sheet in engagement with the roller, a brush rotatably mounted alongside of said roller, an absorbent pad, means for supporting said pad lengthwise of the brush in contact with its bottom face portion and adapted to permit surplus liquid to escape downwardly from the pad, means for feeding solvent to said pad at spaced points therealong, and a drain pan below said pad in position to catch and carry away surplus solvent.

9. An apparatus for moistening a copy sheet, comprising in combination a roller, means co-operating with said roller for forwarding a copy sheet in engagement with the roller, a brush rotatably mounted alongside of said roller, an absorbent pad, a holder of sheet material supporting said pad alongside of the brush in contact with the bottom face portion of the brush and having a series of openings below the pad for the escape of liquid downwardly from the pad, a plate extending along above the pad having openings therethrough at separated points therealong, means for delivering solvent in position above said plate so as to be fed through said openings to said pad, and a drain pan below said pad in position to catch and carry away any solvent escaping downwardly through said pad.

10. An apparatus for moistening a copy sheet, comprising in combination a roller, means co-operating with said roller for forwarding a copy sheet in engagement with the roller, a brush rotatably mounted alongside of said roller, an absorbent pad, a holder of sheet material supporting said pad alongside of the brush in contact with the bottom face portion of the brush and having a series of openings below the pad for the escape of liquid downwardly from the pad, a trough extending along above the pad having openings through its bottom wall portion at separated points therealong, a pipe extending across above the trough having openings through its wall for delivering solvent at spaced intervals into said trough so as to be fed through the spaced openings in the trough to said pad, and a drain pan below said pad in position to catch and carry away any solvent escaping downwardly from said pad.

STEPHEN KOKAY.