

Dec. 30, 1941.

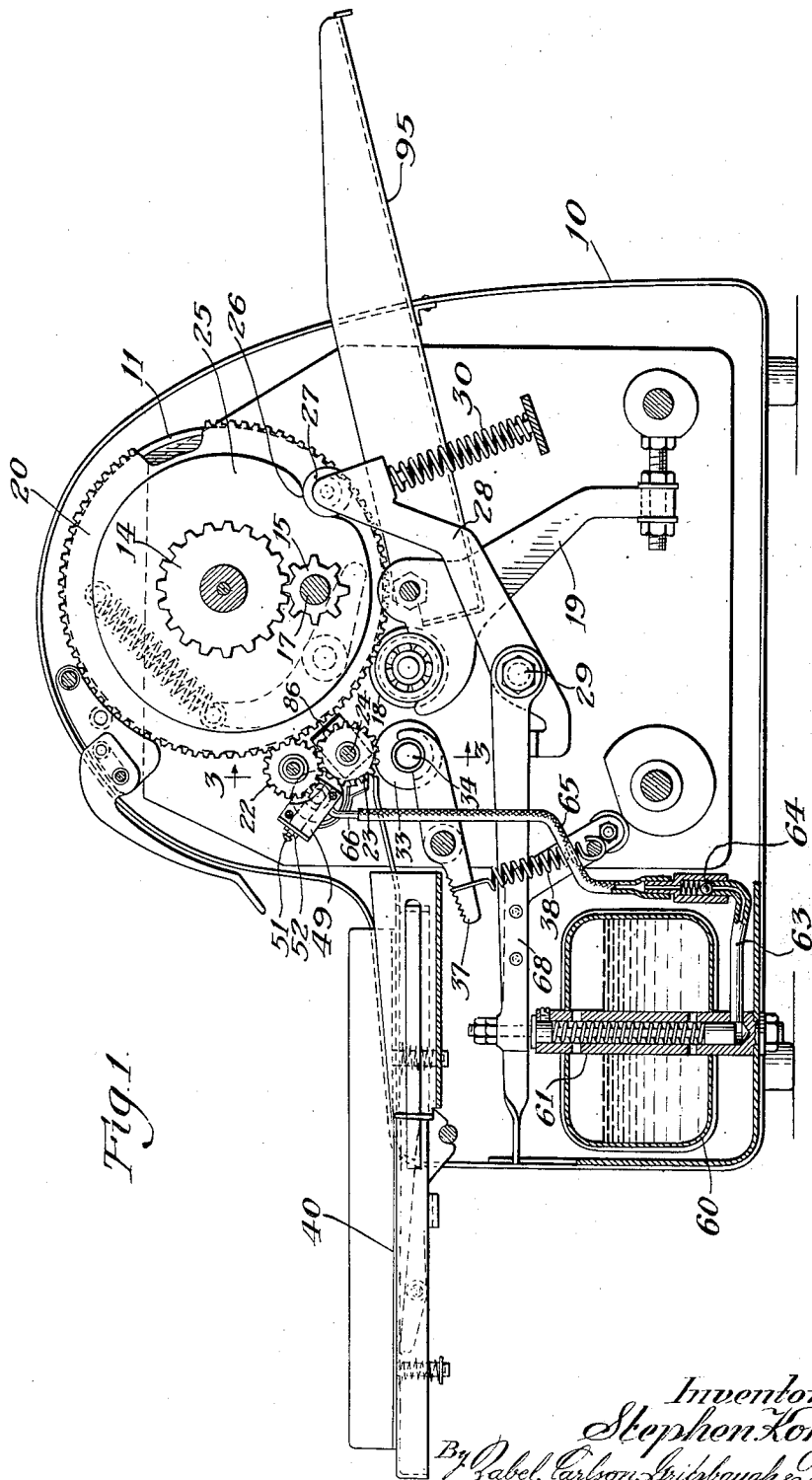
S. KOKAY

2,267,982

MOISTENING MEANS

Filed April 12, 1939

3 Sheets-Sheet 1



Inventor:
Stephen Kokay.
By Gabel, Carlson, Critchbaugh & Wells
Attorneys

Dec. 30, 1941.

S. KOKAY

2,267,982

MOISTENING MEANS

Filed April 12, 1939

3 Sheets-Sheet 2

Fig. 2.

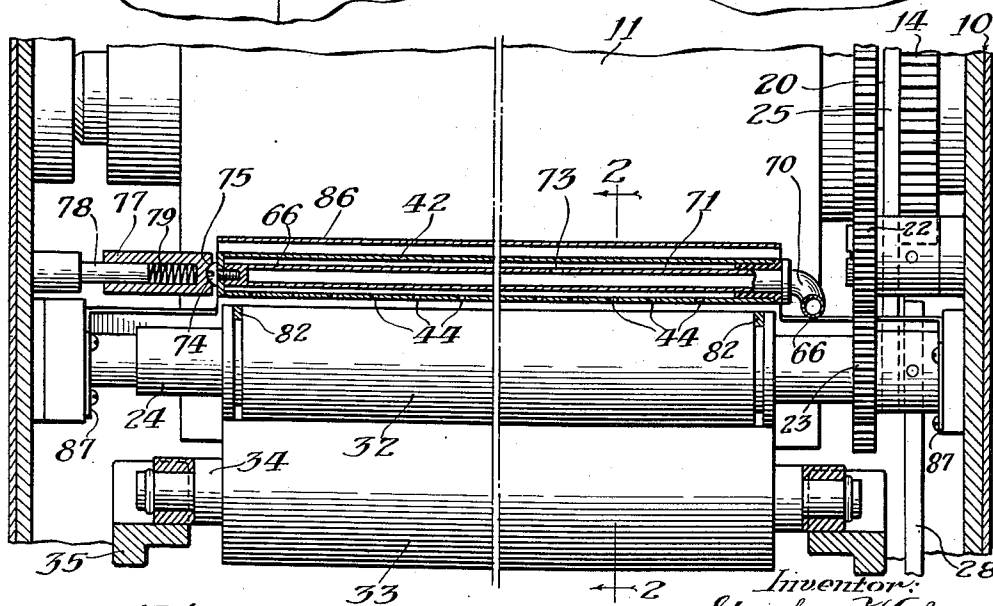
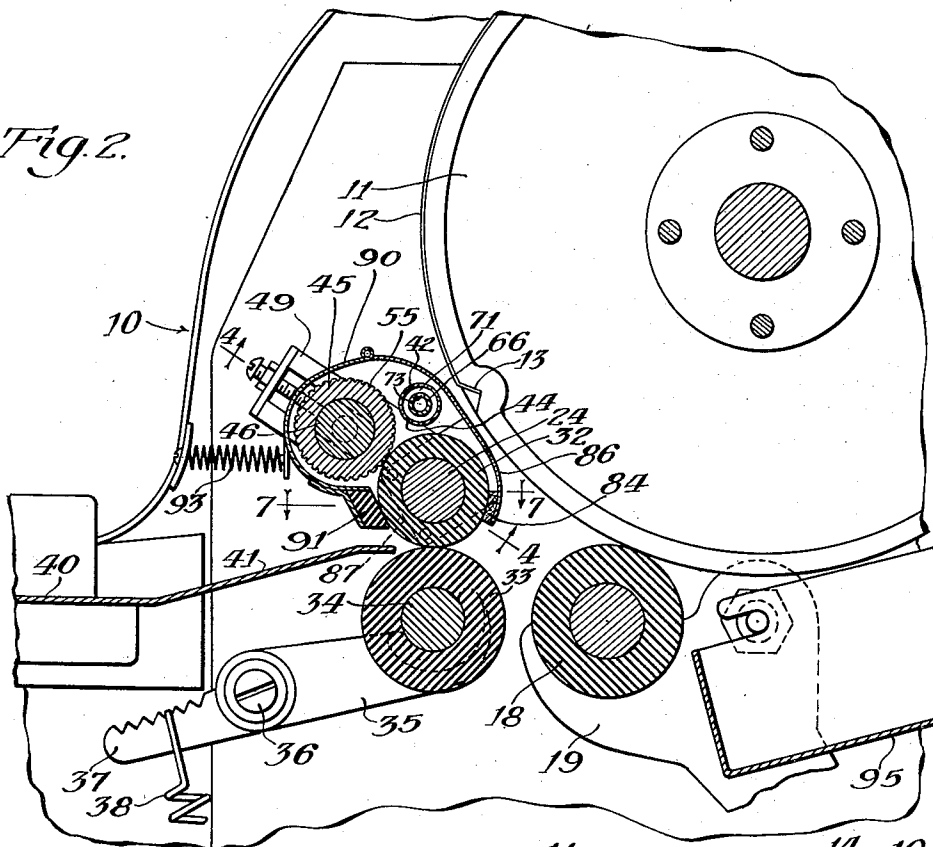


Fig. 3.

Inventor:
Stephen Kokay.
By Jabel, Carlson, Luitpbaugh, Wells
Attorneys

Dec. 30, 1941.

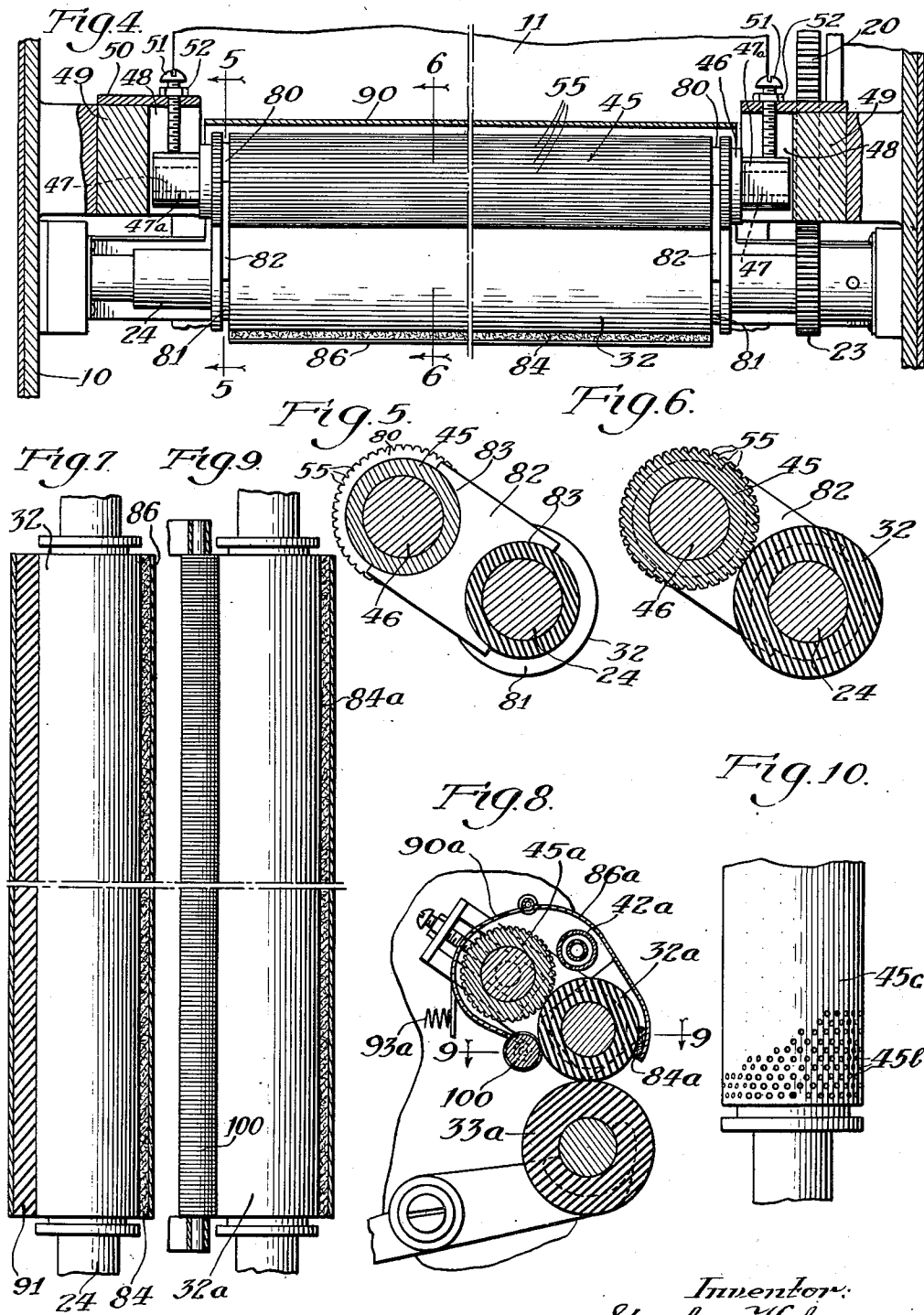
S. KOKAY

2,267,982

MOISTENING MEANS

Filed April 12, 1939

3 Sheets-Sheet 3



Inventor:
Stephen Kokay
By Pabel, Carlson, Gutzbaugh & Wells
Attorneys

UNITED STATES PATENT OFFICE

2,267,982

MOISTENING MEANS

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

Application April 12, 1939, Serial No. 267,516

13 Claims. (Cl. 91-49)

The 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.

A primary object of the invention is to provide 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.

Another object of the invention is to provide improved means for distributing solvent upon a roller so that the roller will apply solvent to copy sheets in a thin even film as the copy sheets are advanced to engage a master sheet in a duplicating machine of the type described.

Other objects and advantages will become apparent as the following description progresses, reference being had to the accompanying drawings.

Fig. 1 is a longitudinal, vertical section taken through a duplicating machine which embodies one form of the invention;

Fig. 2 is a fragmentary, enlarged section taken through improved moistening apparatus which forms part of the apparatus shown in Fig. 1, Fig. 2 being taken on line 2-2 of Fig. 3;

Fig. 3 is a fragmentary, transverse section taken on line 3-3 of Fig. 1;

Fig. 4 is a fragmentary, transverse section taken on line 4-4 of Fig. 2;

Fig. 5 is a fragmentary section taken on line 5-5 of Fig. 4;

Fig. 6 is a fragmentary section taken on line 6-6 of Fig. 4;

Fig. 7 is a fragmentary section taken on line 7-7 of Fig. 2;

Fig. 8 is a fragmentary, vertical section taken through moistening apparatus which embodies another form of the invention;

Fig. 9 is a section taken on line 9-9 of Fig. 8; and

Fig. 10 is a partial plan view of a roller which embodies another form of the invention.

Referring for the present to Figs. 1 to 7, 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 rotatably mounted and is adapted to carry a master sheet 12 upon which the data to be dup-

licated is printed, written or typewritten in reverse with copying ink (Figs. 1 and 2). The forward edge of the master sheet 12 is secured in a groove 13 provided in the periphery of the drum 11. Constrained to rotate with the drum 11 is a gear 14 which meshes with a pinion 15 fixed to a stub shaft 17 rotatably journaled in the frame 10 and adapted to be rotated by a crank (not shown). A pressure or platen roller 18 is rotatably journaled in levers 19 and is adapted to press copy sheets (not shown) against the master sheet 12 when the copy sheets are advanced to the right between the drum 11 and the platen roller 18, the platen roller 18 being driven by reason of frictional engagement with the drum 11.

A gear 20 constrained to rotate with the drum 11 meshes with an idler pinion 22 which, in turn, meshes with a pinion 23. The pinion 23 is fixed to a shaft 24 which has its ends rotatably journaled in the frame 10. Obviously when the shaft 17 is rotated by means of the crank (not shown) the drum 11 and the shaft 24 will rotate in unison. A cam 25 constrained to rotate with the drum 11 is provided with a notch 26 engageable by a roller 27 carried by a lever 28 which is pivoted upon a pin 29 projecting from the frame 10. A compression spring 30 yieldingly urges the lever 28 in a counterclockwise direction (Fig. 1) so that the roller 27 will fall into the notch 26 when the notch 26 comes into the proper position. The purpose of this construction will presently appear.

Fixed to the shaft 24 is a combined feeding and moistening roller 32 which is preferably formed from elastic material of such composition that it is slightly yielding. In practice solid Neoprene or rubber, preferably the former, is employed in the preferred forms of the invention. Cooperating with the roller 32 is a feed roller 33 which is preferably formed with sponge Neoprene or rubber so that it is somewhat porous. The roller 33 is mounted on a shaft 34 which has its ends rotatably journaled in levers 35 pivoted on pins 36 projecting from the frame 10. The levers 35 have notched extensions 37 to which tension springs 38 are adjustably secured to urge the levers 35 in a counterclockwise direction (Fig. 2) so that the roller 33 is urged yieldingly against the roller 32. When copy sheets are advanced to the right between the rollers 32 and 33 and the shaft 17 is rotated by means of the crank (not shown) the rollers 32 and 33 advance the copy sheets to the right between the drum 11 and the pressure or platen roller 18 in such manner that each copy sheet comes into registry

with the master sheet and the data to be duplicated is copied from the master sheet onto the copy sheet. Of course, the copy sheets are first moistened with a solvent for the copying ink.

As best shown in Figs. 1 and 2, the improved machine is provided with a feed table 40 adapted to hold a stack of copy sheets. Adjacent the rollers 32 and 33 the feed table 40 has an upwardly inclined extension 41 which guides the advancing copy sheets to the bight between the rollers 32 and 33.

Improved means is provided for supplying the solvent to roller 32. It may be mentioned that the solvent is preferably of volatile liquid such as alcohol. The improved means for supplying the solvent preferably comprises a tube 42 provided with a row of perforations 44 in its bottom wall, the tube 42 extending horizontally just above the roller 32 and the perforations 44 being adapted to spray the solvent directly on the roller 32 or into the bight between the roller 32 and a metallic roller 45. As indicated, the roller 45 is preferably made from metal but it is also contemplated that it may be made from other materials such as vulcanized rubber, porcelain, glass and various plastic compounds. The roller 45 is fixed to a shaft 46 which has its ends 47 journaled in collars 47a slidably journaled in grooves 48 formed in bearing blocks 49 mounted on the frame 10 (Figs. 2 and 4). Screw-threaded through plates 50 fixed to the bearing blocks 49 are screws 51 which engage the collars 47a to hold the roller 45 against the roller 32. Lock nuts 52 on the screws 51 are provided for securing the screws 51 in their adjusted positions. The cylindrical surface of the roller 45 is provided with a plurality of longitudinally extending grooves 55. In practice good results have been obtained by providing V-shaped grooves opening onto the surface of the roller, the grooves being from 0.002 to 0.003 of an inch deep and from 0.003 to 0.005 of an inch wide. The grooves are spaced about one-sixteenth of an inch apart center to center. The roller 45 rotates when the roller 32 rotates because of its frictional engagement therewith.

Any suitable means may be provided for supplying solvent to the tube 42. In a preferred embodiment of the invention a tank 60 is provided for holding a supply of the solvent (Fig. 1). Extending through the tank 60 is a pump mechanism 61 by means of which solvent may be forced through a tube 63, thence through a check valve 64 to a flexible tube 65, which flexible tube 65 communicates with a metallic tube 66 (Figs. 1 and 3). The means for operating the pump mechanism 61 comprises a lever 68 pivoted upon the pin 29 and adapted to be oscillated by the lever 28 which carries the roller 27. The construction of the pump mechanism, the check valve 64 and the operation of the levers 28 and 68 is shown and described in United States Letters Patent No. 2,135,824 granted November 8, 1938 to Alfred Marchev and as details thereof do not form a part of this invention they will not be described in this instance. It will be readily understood that other pump mechanisms could be substituted for the pump mechanism shown at 61.

The metallic tube 66 is bent to provide a downwardly extending portion 70 to which one end of the flexible tube 65 is secured. The main portion of the tube 66 extends horizontally (Fig. 3) throughout the entire length of the tube 42. The outside diameter of the tube 66 is smaller

than the inside diameter of the tube 42 so that an annular space 71 is provided between the tubes. The tube 66 is provided with an aperture 73 whereby solvent may flow from the interior of the tube 66 to the annular space 71. It is obvious that when the pump 61 is operating the solvent will be pumped through the tube 63, the check valve 64, the flexible tube 65 into the tube 66 and thence through the aperture 73 into the annular space 71 to be sprayed upon the roller 32 through the apertures 44. With this construction there is a substantially continuous flow of solvent through the apertures 44 even though the pump mechanism 61 forces the solvent into the tube 66 intermittently. Another feature of this improved construction is that the solvent flows in substantially equal quantities through the several apertures 44 and does not tend to flow in excessive amounts through the apertures at one end or the other end of the tube 42.

It will be noted that the left hand ends (Fig. 3) of the tubes 66 and 42 are closed and that a round-headed screw 74 projects from the closed end of the tube 42 and rests in a notch 75 provided at one end of a plunger 77 slidably journaled on a pin 78 which projects from the frame 10. A spring 79 disposed within the plunger 77 yieldingly urges the plunger to the right (Fig. 3) to hold the notch 75 in engagement with the screw head 74. At the same time the spring 79 yieldingly urges the tubes 42 and 66 to the right (Fig. 3) and the bent portion 70 of the tube 66 is urged into a notch (not shown) in one of the bearing blocks 49 so that the tubes 66 and 42 are secured detachably in the frame 10.

It will be noted that the two apertures 44 closest to the ends of the tube 66 are spaced inwardly from the adjacent ends of the roller 45. This construction is employed as it is preferable to prevent the solvent from flowing over the ends of the roller 45. As a further means of preventing the flow of solvent over the ends of the roller 45 as well as over the ends of the roller 32 annular grooves 80 are provided adjacent the ends of the roller 45 and aligned annular grooves 81 are provided adjacent the ends of the roller 32 (Figs. 4 and 5). In each pair of aligned grooves 80 and 81 there is provided a plate 82 having notched ends 83 fitting snugly in the grooves 80 and 81. The plates 82 tend to prevent the solvent which gathers at the bight between the rollers from flowing to the ends of the rollers. The plates 82 may be made of any suitable material. Brass has been used with good results.

It is understood, of course, that the roller 32 rotates in a counterclockwise direction (Fig. 2) and it will be readily understood that the roller 32 tends to pick up lint from the copy sheets as it rotates. To remove the lint from the roller 32 a felt strip 84 is provided and it engages the roller 32 to remove the lint therefrom. The felt strip 84 is secured by adhesive or any other suitable means to the lower end of a housing plate 86 which has bent ends 87 as shown in dotted lines in Fig. 2. The ends 87 are apertured to accommodate the shaft 24 and are fixed to the frame 10. The housing member 86 is preferably formed from sheet metal and at its upper end has a second housing member 90 of sheet metal pivoted to it. The housing member 90 carries a strip 91 of sponge Neoprene or rubber at its lower end, which strip 91 is yieldingly urged against the roller 32 by springs 93 which are

interposed between the frame 10 and the housing member 90. The strip 91 tends to distribute the solvent evenly upon the surface of the roller 32.

The operation of the apparatus shown in Figs. 1 to 7, inclusive, is substantially as follows: the operator drives the machine by means of a crank (not shown) and pauses each time the roller 27 engage the notch 26 to feed the copy sheets from the copy sheet table 40 to the bight between the rollers 32 and 33. The operator then continues rotation by means of the crank (not shown) and the rollers 32 and 33 advance the copy sheets to the bight between the drum 11 and the pressure or platen roller 18 so that the copy sheets are pressed against the master sheet as it passes between the drum 11 and the platen roller 18. The copy sheets are discharged onto a tray 95 (Fig. 1). As the copy sheets pass between the rollers 32 and 33 the roller 32 deposits a thin film of solvent on the upper surfaces of the sheets. The solvent is supplied to the roller 32 by means comprising the pump mechanism 61 which causes the solvent to be sprayed onto the rollers 45 and 32 at their bight. The grooves 55 regulate the amount of solvent which passes between the rollers 45 and 32 and the strip 91 tends to distribute the solvent evenly over the roller 32 so that the film of solvent deposited upon each copy sheet will be substantially of the same thickness over the entire copy sheet.

In Figs. 8 and 9 a moistening mechanism embodying another form of the invention is disclosed. The moistening mechanism shown in Fig. 8 may be substituted for the moistening mechanism shown in Figs. 1 to 7, inclusive, if it is so desired. In Figs. 8 and 9 a roller 32a is shown, which roller 32a is preferably identical in construction with the roller 32 described above and is mounted in the same manner. The roller 32a cooperates with a roller 33a which is identical in construction with the roller 33 described above and is mounted in the same manner so that it is yieldingly urged against the roller 32a. It will be readily understood that the rollers 32a and 33a are combined feeding and moistening rollers adapted to advance copy sheets to the drum 11 and the platen roller 18 if the moistening mechanism shown in Figs. 8 and 9 were substituted for that shown in Figs. 1 to 7, inclusive. A roller 45a engages the roller 32a and is identical in construction and function with the roller 45 described above. Solvent is sprayed from a tube 42a which is identical in construction and has the same function as the tube 42 described above. The solvent is sprayed onto the rollers 45a and 32a at points adjacent their bight. The means for supplying the solvent to the tube 42a is preferably identical with the means described above for supplying solvent to the tube 42. A felt strip 84a is preferably mounted in the same manner as the felt strip 84 described above. The function of the strip 84a is identical with that of the strip 84. A housing member 86a is provided which is identical with the housing 86 described above and has the same function. Hinged to the upper end of the housing 86a is a housing member 90a which is similar in construction to the housing member 90 and has journaled in its lower end a roller 100 preferably formed of metal. Springs 93a corresponding to the springs 93 described above yieldingly urge the roller 100 against the roller 32a. The roller 100 has a roughened cylindrical surface contacting the

roller 32a. The roughening of the cylindrical surface of the roller 100 is preferably done by cutting a fine screw thread therein. In practice goods results have been obtained by cutting a screw thread having a pitch of 0.0030 of an inch. Obviously such a screw thread is hardly perceptible to the eye but it has been found that with the surface of the roller 100 roughened in this manner the roller distributes the solvent evenly upon the roller 32a.

The moistening mechanism shown in Figs. 8 and 9 functions in the same manner as that shown in Figs. 1 to 7, inclusive, with the exception that the roller 100 is employed to distribute the solvent on the roller 32a instead of using the sponge Neoprene or rubber strip 91.

Referring now to Fig. 10, the reference character 45c designates generally a roller which is of the same dimensions as the roller 45 and may be substituted therefor. It is preferably made of the same material as the roller 45. However, instead of having longitudinal grooves 55 thereon the roller 45c has its cylindrical surface provided with a plurality of minute depressions 45b which are shown diagrammatically in Fig. 10. The depressions 45b preferably are of a width equal to the width of the grooves 55.

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 to apply a film of liquid thereto, a second roller engaging the first-mentioned roller, means for spraying the liquid on at least one of said rollers at a point where it must pass between said rollers before it contacts the copy sheet, and means for spreading the liquid on the first-mentioned roller after it has passed between said rollers.

2. Apparatus for moistening a copy sheet, or the like, comprising a roller for engaging the copy sheets to apply a film of liquid thereto, a second roller engaging the first-mentioned roller, means for spraying the liquid on at least one of said rollers at a point where it must pass between said rollers before it contacts the copy sheet, and a roller engaging the first-mentioned roller for distributing said liquid thereon after it has passed between said first-mentioned roller and said second roller and before it has been brought into contact with said copy sheet.

3. Apparatus for moistening a copy sheet, or the like, comprising a roller for engaging the copy sheet to apply a film of liquid thereto, a second roller engaging the first-mentioned roller, means for spraying the liquid on at least one of said rollers at a point where it must pass between said rollers before it contacts the copy sheet, and a roller having a roughened surface engaging the first-mentioned roller for distributing the liquid thereon after it has passed between the first-mentioned roller and said second roller and before it has been brought into contact with said copy sheet.

4. Apparatus for moistening a copy sheet, or the like, comprising a roller for engaging the copy sheet to apply a film of liquid thereto, a

second roller engaging the first-mentioned roller, means for spraying the liquid on at least one of said rollers at a point where it must pass between said rollers before it contacts the copy sheet, and a roller having a grooved surface engaging the first-mentioned roller for distributing the liquid thereon after it has passed between the first-mentioned roller and said second roller and before it has been brought into contact with said copy sheet.

5. Apparatus for moistening a copy sheet, or the like, comprising a roller for engaging the copy sheet to apply a film of liquid thereto, a second roller engaging the first-mentioned roller, means for spraying the liquid on at least one of said rollers at a point where it must pass between said rollers before it contacts the copy sheet, and a roller having a screw-threaded surface engaging the first-mentioned roller for distributing the liquid thereon after it has passed between the first-mentioned roller and said second roller and before it has been brought into contact with said copy sheet.

6. Apparatus for moistening a copy sheet, or the like, comprising a roller, means for driving said roller, means for holding a sheet in operative engagement with said roller so as to be forwarded thereby, a second roller having a grooved surface engaging the first-mentioned roller, means for supplying liquid to said second roller, and a third roller for spreading said liquid on the first-mentioned roller after it has passed between the first-mentioned roller and said second roller, said third roller having its cylindrical surface roughened.

7. In an apparatus for moistening a copy sheet as it is carried forwardly to the drum of a liquid process duplicating machine, the combination of a comparatively hard revolving member mounted in position, means for driving said revolving member, a comparatively much more yielding revolving member having a non-absorbent facing in pressure relationship with the downwardly moving face portion of said first named member so as to cooperate therewith for providing support for a small quantity of liquid, means for delivering liquid to said cooperating parts above their line of contact with each other so as to be carried downwardly between the first named member and the pressure member, and means for holding a copy sheet in operative engagement with a forwardly moving portion of one of said members so as to forward the sheet toward the drum and to apply a film of liquid to the face of the sheet, one of said members having its peripheral surface roughened so as to have a great number of fine indentations in its face arranged for carrying liquid in regulated amounts in the indentations downwardly past the line of contact of the members as they revolve and so as effectively to prevent movement of the liquid downwardly between the members when they are stationary.

8. In an apparatus for moistening a copy sheet as it is carried forwardly to the drum of a liquid process duplicating machine, the combination of a comparatively hard revolving member, means for driving said revolving member, a comparatively much more yielding revolving member having a non-absorbent facing in pressure relationship with the downwardly moving face portion of said first named revolving member so as to cooperate therewith for providing support for a small quantity of liquid, means for delivering liquid to said cooperating members

above their line of contact with each other so as to be carried downwardly between said members, and means for holding a copy sheet in operative engagement with a forwardly moving portion of the more yielding one of said members so as to forward the sheet toward the drum and to apply a film of liquid to the face of the sheet, the harder one of said members having its peripheral surface roughened so as to have a great number of fine indentations in its face arranged for carrying liquid in regulated amounts in the indentations downwardly past the line of contact of the members as they revolve and so as effectively to prevent movement of the liquid downwardly between the members when they are stationary.

9. In an apparatus for moistening a copy sheet as it is carried forwardly to the drum of a liquid process duplicating machine, the combination of a relatively hard roller rotatably mounted in horizontal position, a second rotatably mounted roller substantially softer than the first named roller and in pressure relationship with the downwardly moving face portion of said first named roller, means for driving said rollers, means for holding a copy sheet in operative engagement with the softer one of said two rollers so as to be forwarded toward the drum thereby, and means for delivering liquid to said rollers above their line of contact with each other so as to be carried downwardly between the rollers for application to a copy sheet, the harder one of said rollers having its peripheral surface roughened by a great number of fine indentations so as to carry liquid in substantial and regulated amounts downwardly between the rollers as they rotate and so as effectively to prevent movement of the liquid downwardly between the rollers when the rollers are stationary.

10. In an apparatus for moistening a copy sheet as it is carried forwardly to the drum of a liquid process duplicating machine, the combination of a relatively hard roller rotatably mounted in horizontal position, a second rotatably mounted roller substantially softer than the first named roller and in pressure relationship with the downwardly moving face portion of said first named roller, means for driving said rollers, means for holding a copy sheet in operative engagement with the softer one of said two rollers so as to be forwarded thereby, and means for delivering liquid to said rollers above their line of contact with each other so as to be carried downwardly between the rollers for application to a copy sheet, the harder one of said rollers having its peripheral surface roughened by a great number of fine grooves extending longitudinally of the roller so as to carry liquid in substantial and regulated amounts downwardly between the rollers as they rotate and so as to prevent movement of the liquid downwardly between the rollers when the rollers are stationary.

11. In an apparatus for moistening a copy sheet as it is carried forwardly to the drum of a liquid process duplicating machine, the combination of a non-absorbent roller rotatably mounted in horizontal position, a second non-absorbent roller having a facing portion of substantially harder material than that of the first named roller and rotatably mounted at one side of and at a higher level in pressure relationship with the downwardly moving face portion of said first named roller, means for driving said rollers, means for holding a copy sheet in operative en-

gagement with the under surface of said first named roller so as to be forwarded thereby, and means for delivering liquid to said rollers above their line of contact with each other so as to be carried downwardly between the rollers for application to a copy sheet, said second roller having its peripheral surface roughened by a great number of fine grooves extending longitudinally of the roller so as to carry liquid in substantial and regulated amounts downwardly between the rollers as they rotate and so as effectively to prevent movement of the liquid downwardly between the rollers when the rollers are stationary.

12. In an apparatus for moistening a copy sheet as it is carried forwardly to the drum of a liquid process duplicating machine, the combination of a comparatively hard revolving member mounted in position, means for driving said revolving member, a comparatively much more yielding revolving member having a non-absorbent facing in pressure relationship with the downwardly moving face portion of said first named member so as to cooperate therewith for providing support for a small quantity of liquid, means for delivering liquid to said cooperating parts above their line of contact with each other so as to be carried downwardly between the first named member and the pressure member, means for holding a copy sheet in operative engagement with a forwardly moving portion of one of said members so as to forward the sheet toward the drum and to apply a film of liquid to the face of the sheet, one of said members having its peripheral surface roughened so as to have a great number of fine indentations in its face arranged for carrying liquid in regulated amounts in the indentations downwardly past the line of contact of the members as they revolve and so as effectively to prevent movement

of the liquid downwardly between the members when they are stationary, said members having transversely extending surfaces on their opposite end portions, and means engaging said surfaces to prevent the escape of the normal supply of liquid from between said members at opposite ends thereof.

13. In an apparatus for moistening a copy sheet as it is carried forwardly to the drum of a liquid process duplicating machine, the combination of a non-absorbent roller rotatably mounted in horizontal position, a second non-absorbent roller having a facing portion of substantially harder material than that of the first named roller and rotatably mounted at one side of and at a higher level in pressure relationship with the downwardly moving face portion of said first named roller, means for driving said rollers, means for holding a copy sheet in operative engagement with the under surface of said first named roller so as to be forwarded thereby, means for delivering liquid to said rollers above their line of contact with each other so as to be carried downwardly between the rollers for application to a copy sheet, said second roller having its peripheral surface roughened by a great number of fine grooves extending longitudinally of the roller so as to carry liquid in substantial and regulated amounts downwardly between the rollers as they rotate and so as effectively to prevent movement of the liquid downwardly between the rollers when the rollers are stationary, said rollers having transversely extending surfaces on their opposite end portions, and means engaging said surfaces to prevent the escape of the normal supply of liquid from between said rollers at opposite ends thereof.

STEPHEN KOKAY.