

March 22, 1960

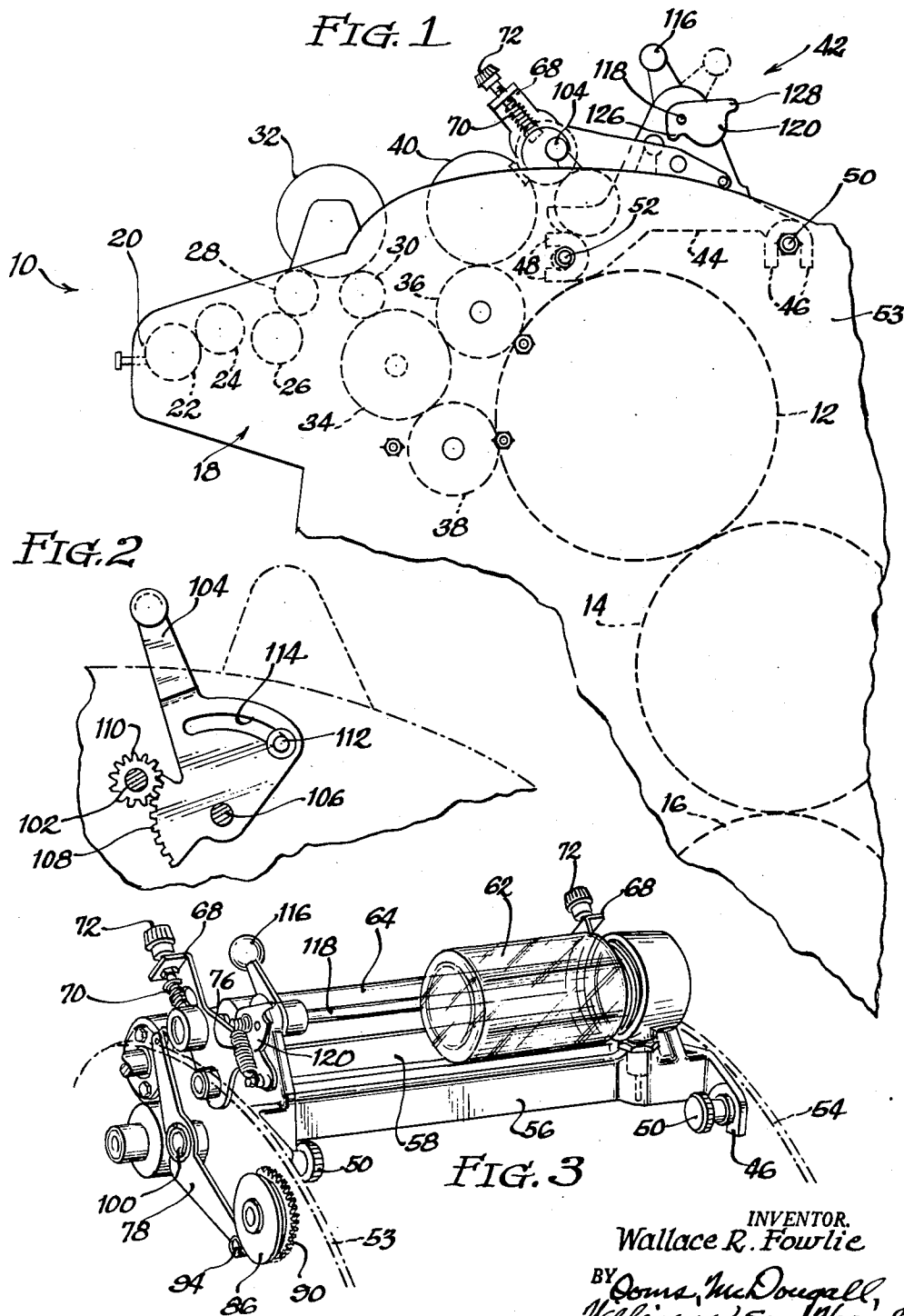
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REPELLENT SYSTEM FOR LITHOGRAPHIC DUPLICATORS

Filed April 26, 1956

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 4

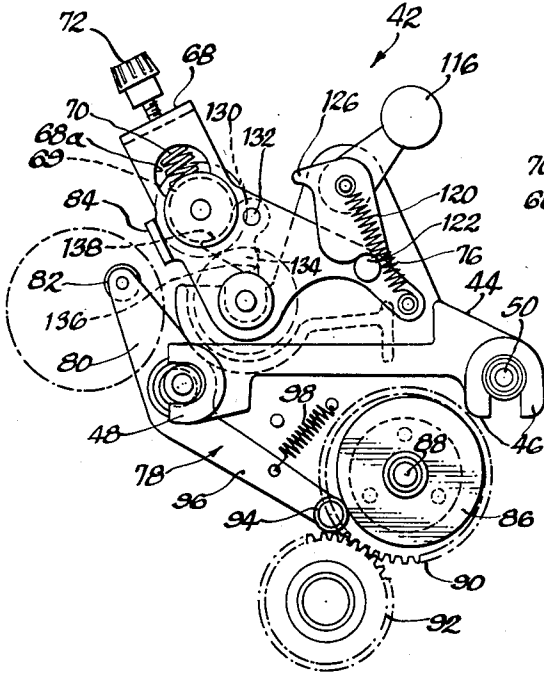


*Fig. 5*

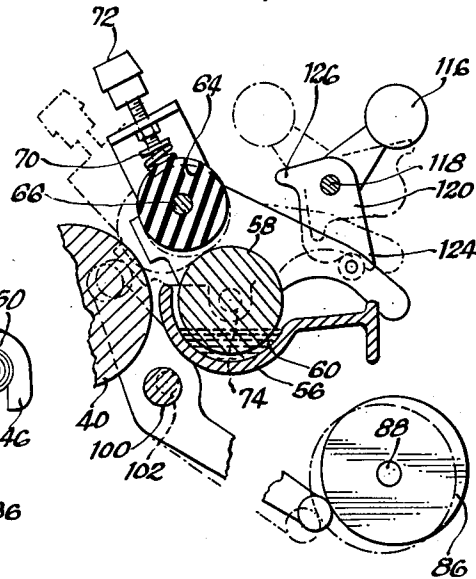


FIG. 7

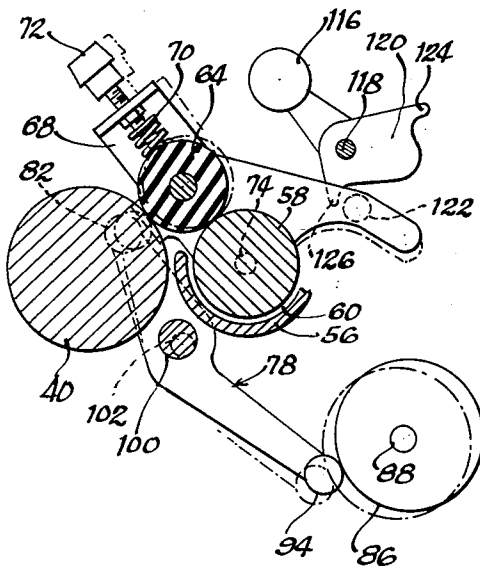
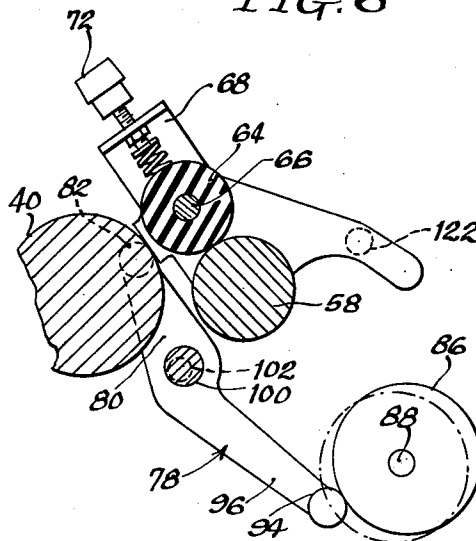


FIG. 6



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## REPELLENT SYSTEM FOR LITHOGRAPHIC DUPLICATORS

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10 Claims. (Cl. 101—148)

This invention relates to lithographic duplicators or printing machines and particularly to repellent systems for applying water or other liquid ink repellent to lithographic master plates or sheets employed on such machines.

One principal object of the present invention is to provide a new and improved repellent system for a lithographic printing machine, whereby the amount of repellent applied to the lithographic master may be controlled and varied as desired, in a convenient and advantageous manner.

A further object is to provide a new and improved repellent system which affords an extremely wide range of adjustment of the rate at which repellent is applied to the master.

Another object is to provide a new and improved repellent system having adjusting means which may readily be operated with the printing machine running.

It is a further object to provide a repellent system having new and improved means for completely suspending the feeding of repellent.

Further objects and advantages of the present invention will appear from the following description, taken with the accompanying drawings, in which:

Fig. 1 is a diagrammatic side elevational view of an offset-type lithographic duplicator equipped with a repellent system constituting one illustrative embodiment of the present invention.

Fig. 2 is a fragmentary enlarged side elevational view showing a manually adjustable lever and associated mechanism for adjusting the rate at which repellent is fed to the master cylinder, the view being partly in section for clarity of illustration.

Fig. 3 is a fragmentary perspective view showing a portion of the repellent system.

Fig. 4 is a fragmentary enlarged side elevational view of the repellent system with certain parts of the machine removed for clarity of illustration.

Fig. 5 is a view similar to Fig. 4 but with certain components shown in section, the adjustment of the mechanism being such as to provide maximum transfer of repellent to the master cylinder.

Fig. 6 is a view similar to Fig. 5, but with the mechanism adjusted to interrupt the transfer of repellent.

Fig. 7 is another view similar to Figs. 5 and 6, but with the mechanism adjusted to give an intermediate rate of repellent flow to the master cylinder.

As already indicated, Fig. 1 illustrates an offset-type lithographic duplicator 10 equipped with a master cylinder 12, an offset or blanket cylinder 14, and an impression cylinder 16. Machines of this type are known in the art. The master cylinder 12 is adapted to hold a lithographic master plate or sheet having an ink receptive image thereon. The non-image areas of the master are receptive to water or other liquid repellent. When coated with repellent, the non-image areas are not receptive to ink.

The blanket cylinder 14 is engageable with the master cylinder 12 and is adapted to receive an offset, reverse,

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inked image therefrom. Copy sheets or the like are adapted to be fed between the offset and impression cylinders 14 and 16 so that the inked image on the offset cylinder 14 will be transferred to the copy sheets.

5 Ink is applied to the master on the master cylinder 12 in a known manner, by means of an inking system 18. In this instance, the ink is supplied by an ink fountain 20 which includes an ink fountain roller 22. An oscillating ductor roller 24 transfers the ink intermittently to a transfer roller 26, which carries the ink to a second transfer roller 28. A distributor roller 32 carries the ink between the transfer roller 28 and another transfer roller 30. In order to spread the ink evenly, the distributor roller 32 may be made to oscillate endwise in a known manner. The roller 30 engages a roller 34, which in turn engages two form rollers 36 and 38. It will be seen that the form rollers 36 and 38 actually engage the master cylinder 12 and are adapted to transfer the ink to the master.

20 In the illustrated machine, an additional distributor or transfer roller 40 engages the form roller 36. The distributor roller 40 may be oscillated in an axial direction to spread the ink, although such oscillation may be considered optional. In addition, the roller 40 serves to carry repellent to the form roller 36 and thence to the lithographic master on the master cylinder 12. Thus the roller 40 and the form roller 36 are components of both the inking and repellent systems of the machine. The other form roller 38 and the roller 34 also play a part in distributing and spreading the repellent.

25 Repellent is supplied to the distributor or transfer roller 40 by means of a repellent mechanism 42. Most of the components of the repellent mechanism 42 are mounted on a sub-frame 44 which is detachably mounted on the printing machine 10 so that the repellent system may readily be removed from the machine. In this instance, the repellent sub-frame 44 has forked lugs 46 and 48 adapted to be mounted on studs or the like 50 and 52 carried by main side frames or plates 53 and 54 on the machine 10.

30 The repellent or dampening mechanism 42 includes a trough-shaped repellent fountain 56 which, in this instance, is formed as a portion of the repellent sub-frame 44. A repellent fountain roller 58 is positioned in the fountain 56 so as to be partly immersed in a pool 60 of repellent contained therein. Repellent is fed to the fountain 56 from a reservoir 62 of the inverted bottle-feeder type. In this way, the level of the repellent is maintained approximately constant in the fountain 56.

35 The fountain roller 58 picks up the water or other repellent from the fountain 56 and applies the repellent to a transfer roller 64 which continuously engages the fountain roller 58. Any suitable material may be employed in the fountain roller 58, such as metal with a roughened surface. Likewise, any suitable material may be employed in the transfer roller 64, such as rubber, synthetic rubber, or other soft, resilient materials. The fountain roller 58 may be continuously driven by suitable gearing or the like, not shown, approximately at the peripheral speed of the master cylinder 12 and the various inking rollers. The transfer roller 64 may be frictionally driven by the fountain roller 58.

40 In the illustrated machine, the transfer roller 64 is mounted for rotation about its own axis, and for swinging movement about the axis of the fountain roller 58. It will be seen that the transfer roller 64 is swingable into and out of engagement with the distributor roller 40. When the transfer roller 64 engages the roller 40, repellent is transferred thereto and thence is conveyed to the master cylinder 12.

45 It will be seen that the illustrated transfer roller 64 is rotatably mounted on a shaft 66 carried on a pair of swing frames or carriages 68. To allow movement of

the roller 64 toward and away from the roller 58, each carriage 68 is formed with a longitudinal slot 68a. A bearing 69 is slidable in each slot 68a. Each bearing 69 supports one end of the roller shaft 66. Springs 70 are mounted on the carriages 68 to bias the transfer roller 64 against the fountain roller 58. The springs 70 are backed up by manually adjustable screws 72 which may be rotated to vary the pressure between the rollers 58 and 64. Such pressure variation affects the rate at which repellent is fed to the master cylinder 12.

It will be seen that the fountain roller 58 is provided with end shafts 74 which support the fountain roller for rotation about its own axis. In addition, the carriages 68 are pivoted in coaxial relation to the shafts 74 for swinging movement about the axis of the fountain roller.

Provision is made for oscillating the roller 64 and the carriages 68 in a variable manner so as to vary the time intervals during which the roller 64 engages the distributor roller 40. In this instance, the transfer roller 64 is biased toward the distributor roller 40 by means of springs 76 which act upon the carriages 68. Cam follower levers 78 are provided to swing the transfer roller 64 away from the distributor roller 40, counter to the biasing action of the springs 76. Lost motion connections are provided between the levers 78 and the carriages 68 so that the range of movement of the levers may exceed that of the carriages. More specifically, each of the levers 78 has an upper arm 80 which carries a roller 82 adapted to engage a lug 84 on the corresponding carriage 68.

Oscillating motion is imparted to the cam follower levers 78 by means of cams 86 which are rotatable about shafts 88. Suitable gearing is employed to drive the cams 86, preferably at a rotary speed differing slightly from that of the master cylinder 12 and not a multiple or sub-multiple thereof. In this way, the cycle of the cams 86 will differ slightly from that of the master cylinder so that repellent will be supplied thereto with improved uniformity. More specifically, each of the illustrated cams 86 is provided with a gear 90 which meshes with a slightly smaller gear 92 secured to the master cylinder 12. With this manner of driving the cams 86, quite a number of cycles of the master cylinder 12 will elapse before there is any repetition of similar relationships between the master cylinder and the repellent system.

To ride the cams 86, a roller 94 is mounted on a lower arm portion 96 of each lever 78. A spring 98 is arranged to bias the lever 78 so that the roller or rider 94 will continuously engage the corresponding cam 86.

It will be seen that each of the follower levers 78 is swingably mounted on a pivot 100. Provision is made for shifting the pivots 100 laterally so as to vary the manner in which the roller 64 is oscillated. In this instance, the pivots 100 are formed eccentrically on a shaft 102 which is supported for rotary adjustment. Rotation of the shaft 102 displaces the axis of the pivots 100, with the result that the paths of the rollers 82 are varied.

Such rotary adjustment of the pivot shaft 102 may be effected by swinging a manually operable control lever 104 about its supporting pivot 106. In this instance, a sector gear 108 is formed on the lever 104 and is arranged to mesh with a pinion 110 secured to the pivot shaft 102. The range of swinging movement of the lever 104 is limited by a pin 112 which extends through an arcuate slot 114 formed in the lever.

Rotating the eccentric pivots 100 moves the rollers 82 toward and away from the lugs 84 on the carriages 68. Figs. 4 and 5 show the pivots 100 in such a position that the rollers 82 are moved away from the carriages 68 to a maximum extent. When the pivots 100 are thus positioned, the rollers 82 on the cam follower levers will not engage the carriages 68 during any portion of the oscillating movement of the levers 78. Accordingly, the transfer roller 64 will be held continuously in engage-

ment with the distributor roller 40. Under these conditions, a maximum amount of repellent will be fed to the master cylinder 12.

In Fig. 6, the pivots 100 have been turned through 180 degrees so as to move the levers 78 toward the carriages 68 to the maximum possible extent. Under this condition, the carriages 68 will follow the levers 78 throughout their range of oscillation, and the transfer roller 64 will be held away from the distributor roller 40 at all times. In other words, there will be no contact between the transfer roller 64 and the distributor roller 40. Accordingly, no repellent will be fed to the distributor roller 40.

It will be understood that the pivots 100 may be adjusted to any intermediate position between the extremes represented by Figs. 5 and 6. Fig. 7 illustrates one intermediate position in which the transfer roller 64 will engage the distributor roller 40 intermittently, for a portion of each cycle of the cams 86. By adjusting the position of the control lever 104, the time of engagement between the rollers 64 and 40 may be varied as desired. In this way, the amount of repellent fed to the master cylinder may be closely controlled.

Provision is made for moving the transfer roller 64 away from the distributor roller 40 without disturbing the adjustment of the control lever 104. Such disengagement of the rollers 64 and 40 is desirable when the machine is out of service. In this instance, the roller 64 may be retracted by swinging a hand lever 116 to the position shown in Fig. 4. It will be seen that the lever 116 is mounted on a shaft 118 which carries a pair of cams 120 adapted to engage follower rollers 122 or the like on the carriages 68. When the hand lever 116 is rotated clockwise to the position shown in Fig. 4, the high portion of each cam 120 swings the corresponding carriage 68 in a clockwise direction so as to retract the roller 64 from the distributor roller 40. Movement of the lever 116 in the opposite direction, to the position shown at Fig. 7, brings the low portion of each cam 120 into operative relation with the corresponding roller 122 and thereby permits the springs 76 to swing the roller 64 toward the distributor roller 40. Stop fingers 124 and 126 are provided at the opposite ends of each cam 120 to define the range of movement of the lever 116.

When the roller 64 is swung away from the roller 40 by the operation of the disabling lever 116, the roller 64 is also separated from the fountain roller 58. This is brought about by camming arms 130 which are mounted on pivots 132 carried by the carriages 68. Each arm 130 has a finger or shoe portion 134 which engages a fixed vertical stop or abutment 136 when the carriages 68 are swung away from the roller 40 by the lever 116. As the carriages 68 complete their clockwise movement, the arms 130 are swung counterclockwise on the pivots 132, as shown in Fig. 4. Each arm 130 has an actuating portion 138 on the opposite edge of the arm from the shoe portion 134. The actuating portions 138 are effective to engage and lift the bearings 69 when the arms 130 are swung clockwise. Thus, the roller 64 is moved away from the fountain roller 58. The roller 64 is returned automatically against the roller 58 when the disabling lever 116 is operated to return the carriages 68 toward the roller 40.

During normal operation of the repellent-feeding mechanism, the cam-operated levers 78 do not swing the carriages 68 far enough away from the roller 40 to disengage the roller 64 from the fountain roller 58. In other words, the cam arms 130 have sufficient lost motion to keep them from separating the rollers 64 and 58 during normal oscillation of the carriages 68. The roller-separating action of the arms 130 comes into play only when the carriages 68 are swung beyond their normal range by the disabling lever 116.

In the operation of the repellent system, the bottle 62 feeds repellent to the fountain 56 and maintains the level

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of the repellent therein. The repellent is picked up by the rotating fountain roller 58 and is carried to the roller 64. The pressure between the rollers 64 and 58 spreads the repellent over the surface of the roller 64 in a thin film.

The cams 86 continuously oscillate the cam follower levers 78. When the pivots 100 for the levers are adjusted as shown in Fig. 7, the rollers 82 on the levers 78 engage the lugs 84 on the carriages 68 for a portion of the cycle of the cams 86. Thus, the levers 78 are effective to carry the roller 64 away from the roller 40 for a portion of the cycle. Repellent is transferred to the roller 40 when the rollers 64 and 40 are in engagement, but not when they are separated. Thus, the amount of repellent which is fed to the roller 40 depends upon the portion of the cycle during which the rollers 64 and 40 are in contact.

The oscillating movement of the roller 64 may be varied by adjusting the position of the control lever 104 so as to rotate the shaft 102 and shift the eccentric pivots 100. Shifting the pivots moves the paths of the levers 78 toward and away from the carriages 68. Movement of the levers toward the carriages 68 increases the portion of the cycle during which the roller 64 is swung away from the roller 40 and thereby decreases the amount of repellent fed to the roller 40. Conversely, shifting the levers 78 away from the carriages 68 increases the amount of repellent fed to the roller 40. In one extreme position of the pivots 100, shown in Fig. 5, the roller 64 is swung away from the roller 40 during the entire cycle of the cams 86 so that there is never any contact between the rollers 64 and 40. Fig. 7 illustrates the other extreme position in which the levers 78 never engage the carriages 68, with the result that the roller 64 continuously engages the roller 40.

When the machine is to be shut down, or when it is desired that no repellent be fed to the master cylinder, the transfer roller 64 may be retracted from the distributor roller 40 by swinging the lever 116 to the position shown in Fig. 4. This may be done without disturbing the position of the control lever 104. When the lever 116 is thus moved, the cams 120 swing the carriages 68 away from the roller 40 and beyond the range of motion of the cam follower levers 78. The movement of the carriages 68 causes the camming arms 130 to move the roller 64 away from the roller 58. Thus, the lever 116 provides a night latch to separate the rollers 40, 64 and 58 when the machine is shut down overnight or for longer periods. Returning the lever 116 to the position shown in Fig. 7 again restores the repellent system to its operative condition.

It will be understood that the repellent system gives close control over the amount of repellent fed to the master cylinder. Moreover, the amount of repellent may be adjusted over an extremely wide range. The repellent system may be disabled independently of the normal adjusting means, so that the repellent system may be restored instantly and accurately to its operating adjustment.

Various modifications, alternative constructions and equivalents may be employed without departing from the true spirit and scope of the invention as exemplified in the foregoing description and defined in the following claims:

I claim:

1. In a lithographic printing machine having a master cylinder for holding a lithographic printing plate, the combination comprising a first roller arranged to convey liquid repellent to the master cylinder for application to the printing plate, a fountain for holding a supply of the repellent, a fountain roller rotatable in said fountain and adapted to be partly immersed in the repellent therein, a rotatable transfer roller engaging said fountain roller, carriage means rotatably supporting said transfer roller and mounted for swinging movement about an axis coinciding with the axis of said fountain roller, said transfer

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roller thereby being swingable into and out of engagement with said first roller for applying repellent thereto, a rotatable cam, means for driving said cam at a rotary speed differing from the speed of the master cylinder and not a multiple or sub-multiple thereof, a follower lever having a rider thereon engageable with said cam, resilient means biasing said follower lever to maintain said rider against said cam, said cam thereby being effective to rock said lever, said lever having a portion engageable with said carriage means for swinging the same, adjustable supporting means for said lever and including a shaft having a pivot portion swingably supporting said lever and a mounting portion which is eccentric with respect to said pivot portion, and means for adjustably rotating said shaft about the axis of said mounting portion for shifting the axis of said lever so as to vary the time of engagement between said transfer roller and said first roller during each cycle of said cam, the eccentricity of said pivot portion being sufficient to vary said time of engagement from zero to continuous engagement.

2. In a printing machine having a master cylinder for holding a lithographic printing master, the combination comprising a first roller arranged to convey liquid repellent to said master cylinder for application to said master, a fountain for holding a supply of the repellent, a fountain roller rotatable in said fountain and adapted to be partly immersed in the repellent therein, a transfer roller for engaging said fountain roller, swingable carriage means rotatably supporting said transfer roller, means supporting said carriage means for swinging movement about an axis substantially coinciding with the axis of said fountain roller, said transfer roller thereby being swingable into and out of engagement with said first roller, a lever having a lost motion connection to said carriage means for swinging the same, resilient means biasing said carriage means to urge said transfer roller toward said first roller, said lever being operative to swing said carriage means counter to said resilient means, a rotatable cam, a rider on said lever engageable with said cam, means biasing said lever to maintain said rider against said cam, pivot means supporting said lever for swinging movement, means for laterally shifting said pivot means to vary the time of engagement of said transfer roller with said first roller between zero and continuous engagement, and a manually operable cam engageable with said carriage means and operative to swing said transfer roller away from said first roller so as to prevent said transfer roller from engaging said first roller at any time.

3. In a lithographic printing machine having a master cylinder for holding a lithographic printing plate, the combination comprising a first roller arranged to convey liquid repellent to the master cylinder for application to the printing plate, a fountain for holding a supply of the repellent, a fountain roller rotatable in said fountain and adapted to be partly immersed in the repellent therein, a rotatable transfer roller engaging said fountain roller, carriage means rotatably supporting said transfer roller and mounted for swinging movement about an axis coinciding with the axis of said fountain roller, said transfer roller thereby being swingable into and out of engagement with said first roller for applying repellent thereto, a rotatable cam, means for driving said cam at a rotary speed differing from the speed of the master cylinder and not a multiple or sub-multiple thereof, a follower lever swingable by said cam, a lost motion connection between said lever and said carriage for swinging the same, adjustable supporting means for said lever and including a shaft having a pivot portion swingably supporting said lever and a mounting portion which is eccentric with respect to said pivot portion, and means for adjustably rotating said shaft about the axis of said mounting portion for shifting the axis of said lever so as to vary the time of engagement between said transfer roller and said first roller during each cycle of said cam.

4. In a printing machine having a master cylinder for holding a lithographic printing master, the combination comprising a first roller arranged to convey liquid repellent to said master cylinder for application to said master, a fountain for holding a supply of the repellent, a fountain roller rotatable in said fountain and adapted to be partly immersed in the repellent therein, a transfer roller engageable with said fountain roller, swingable carriage means supporting said transfer roller for rotation about its own axis and movement toward and away from said fountain roller, means supporting said carriage means for swinging movement about an axis substantially coinciding with the axis of said fountain roller, said transfer roller thereby being swingable into and out of engagement with said first roller, resilient means biasing said transfer roller against said fountain roller, a lever having a lost motion connection to said carriage means for swinging the same, resilient means biasing said carriage means to urge said transfer roller toward said first roller, said lever being operative to swing said carriage means counter to said resilient means, a rotatable cam, a rider on said lever engageable with said cam, means biasing said lever to maintain said rider against said cam, pivot means supporting said lever for swinging movement, means for laterally shifting said pivot means to vary the time of engagement of said transfer roller with said first roller between zero and continuous engagement, a manually operable cam engageable with said carriage means and operative to swing said carriage means and said transfer roller away from said first roller so as to prevent said transfer roller from engaging said first roller at any time, a swingable arm carried by said carriage means and operable in one direction to move said transfer roller away from said fountain roller, and a stop engageable by said arm in the course of movement of said carriage means away from said first roller by said manually operable cam and effective to operate said arm in said one direction to separate said transfer roller from said fountain roller.

5. In a printing machine having a master cylinder for holding a lithographic printing master, the combination comprising a first roller arranged to convey liquid repellent to said master cylinder for application to said master, a fountain for holding a supply of the repellent, a fountain roller rotatable in said fountain and adapted to be partly immersed in the repellent therein, a transfer roller engageable with said fountain roller, swingable carriage means supporting said transfer roller for rotation about its own axis and movement toward and away from said fountain roller, means supporting said carriage means for swinging movement about an axis substantially coinciding with the axis of said fountain roller, said transfer roller thereby being swingable into and out of engagement with said first roller, resilient means biasing said transfer roller against said fountain roller, means for cyclically rocking said carriage to move said transfer roller into and out of engagement with said first roller, a manually operable cam engageable with said carriage means and operative to swing said carriage means and said transfer roller away from said first roller so as to prevent said transfer roller from engaging said first roller at any time, a swingable arm carried by said carriage means and operable in one direction to move said transfer roller away from said fountain roller, and a stop engageable by said arm in the course of movement of said carriage means away from said first roller by said manually operable cam and effective to operate said arm in said one direction to separate said transfer roller from said fountain roller.

6. In a printing machine having a master cylinder for holding a lithographic printing master, the combination comprising a first roller arranged to convey liquid repellent to said master cylinder for application to said master, a fountain for holding a supply of the repellent, a fountain roller rotatable in said fountain and adapted to be partly immersed in the repellent therein, a transfer roller

engageable with said fountain roller, swingable carriage means supporting said transfer roller for rotation about its own axis and movement toward and away from said fountain roller, means supporting said carriage means for swinging movement about an axis substantially coinciding with the axis of said fountain roller, said transfer roller thereby being swingable into and out of engagement with said first roller, resilient means biasing said transfer roller against said fountain roller, means for cyclically rocking said carriage to move said transfer roller into and out of engagement with said first roller, manually operable means engageable with said carriage means and operative to swing said carriage means and said transfer roller away from said first roller so as to prevent said transfer roller from engaging said first roller at any time, a swingable arm carried by said carriage means and operable in one direction to move said transfer roller away from said fountain roller, and a stop engageable by said arm in the course of movement of said carriage means away from said first roller by said manually operable means and effective to operate said arm in said one direction to separate said transfer roller from said fountain roller.

7. In a lithographic printing machine having a master cylinder for holding a lithographic printing plate, the combination comprising a first roller arranged to convey liquid repellent to the master cylinder for application to the printing plate, a fountain for holding a supply of the repellent, a fountain roller rotatable in said fountain and adapted to be partly immersed in the repellent therein, a rotatable transfer roller engaging said fountain roller, carriage means rotatably supporting said transfer roller and mounted for swinging movement about an axis coinciding with the axis of said fountain roller, said transfer roller thereby being swingable into and out of engagement with said first roller for applying repellent thereto, a rotatable cam, means for continuously rotating said cam, a follower lever having a rider thereon engageable with said cam, resilient means biasing said follower lever to maintain said rider against said cam, said cam thereby being effective to rock said lever, said lever having a portion engageable with said carriage for swinging the same, adjustable supporting means for said lever and including a shaft having a pivot portion swingably supporting said lever and a mounting portion which is eccentric with respect to said pivot portion, and means for adjustably rotating said shaft about the axis of said mounting portion for shifting the axis of said lever so as to vary the time of engagement between said transfer roller and said first roller during each cycle of said cam, the eccentricity of said pivot portion being sufficient to vary said time of engagement from zero to continuous engagement.

8. In a lithographic printing machine having a master cylinder for holding a lithographic printing plate, the combination comprising a first roller arranged to convey liquid repellent to the master cylinder for application to the printing plate, a fountain for holding a supply of the repellent, a fountain roller rotatable in said fountain and adapted to be partly immersed in the repellent therein, a rotatable transfer roller engaging said fountain roller, carriage means rotatably supporting said transfer roller and mounted for swinging movement about an axis coinciding with the axis of said fountain roller, said transfer roller thereby being swingable into and out of engagement with said first roller for applying repellent thereto, yieldable means biasing said carriage means in a direction to urge said transfer roller toward said first roller, a rotatable cam, means for continuously rotating said cam, a follower lever having a rider thereon engageable with said cam, resilient means biasing said follower lever to maintain said rider against said cam, said cam thereby being effective to rock said lever, said lever having a portion engageable with said carriage means for swinging the same counter to said yieldable means and thereby moving said transfer roller away from said first roller, adjustable

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supporting means for said lever and including a shaft having a pivot portion swingably supporting said lever and a mounting portion which is eccentric with respect to said pivot portion, and means for adjustably rotating said shaft about the axis of said mounting portion for shifting the axis of said lever so as to vary the time of engagement between said transfer roller and said first roller during each cycle of said cam, the eccentricity of said pivot portion being sufficient to vary said time of engagement from zero to continuous engagement.

9. In a lithographic printing machine having a master cylinder for holding a lithographic printing plate, the combination comprising a first roller arranged to convey liquid repellent to the master cylinder for application to the printing plate, a fountain for holding a supply of the repellent, a fountain roller rotatable in said fountain and adapted to be partly immersed in the repellent therein, a rotatable transfer roller engaging said fountain roller, carriage means rotatably supporting said transfer roller and mounted for swinging movement about an axis coinciding with the axis of said fountain roller, said transfer roller thereby being swingable into and out of engagement with said first roller for applying repellent thereto, yieldable means biasing said carriage means in a direction to urge said transfer roller toward said first roller, a rotatable cam, means for continuously rotating said cam, a follower lever having a rider thereon engageable with said cam, resilient means biasing said follower lever to maintain said rider against said cam, said cam thereby being effective to rock said lever, said lever having a portion engageable with said carriage means for swinging the same counter to said yieldable means and thereby moving said transfer roller away from said first roller, adjustable supporting means for said lever and including a pivot swingably supporting said lever, and means for adjustably shifting the axis of said pivot so as to vary the time of engagement between said lever and said carriage means and thereby vary the time during which said trans-

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fer roller is disengaged from said first roller for each cycle of said cam.

10. In a lithographic printing machine having a master cylinder for holding a lithographic printing plate, the combination comprising a train of rollers, one of said rollers engaging said master cylinder to apply ink and repellent to the lithographic plate thereon, means for supplying ink to said roller train, a fountain for holding a supply of the repellent, a fountain roller rotatable in said fountain and adapted to be partly immersed in the repellent therein, a transfer roller engaging said fountain roller for receiving repellent therefrom, said transfer roller being mounted for swinging movement into and out of engagement with one of the rollers of said train for supplying repellent thereto, means including a rotatable cam for effecting such swinging movement of said transfer roller, and means for driving said cam at a rotary speed generally equal to but differing slightly from the rotary speed of said master cylinder and not a multiple or submultiple of the rotary speed of said master cylinder so that the cycles of said transfer roller and said master cylinder will concur only at long intervals of many cycles, said last mentioned means comprising a first gear secured to and rotatable with said master cylinder, and a second gear meshing with said first gear and secured to and rotatable with said cam, said gears having a gear ratio generally equal to unity but differing from unity by a small minor fraction.

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