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G. SCHNALL

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WETTING APPARATUS FOR LITHOGRAPHIC PRINTING MACHINES

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3 Sheets-Sheet 1

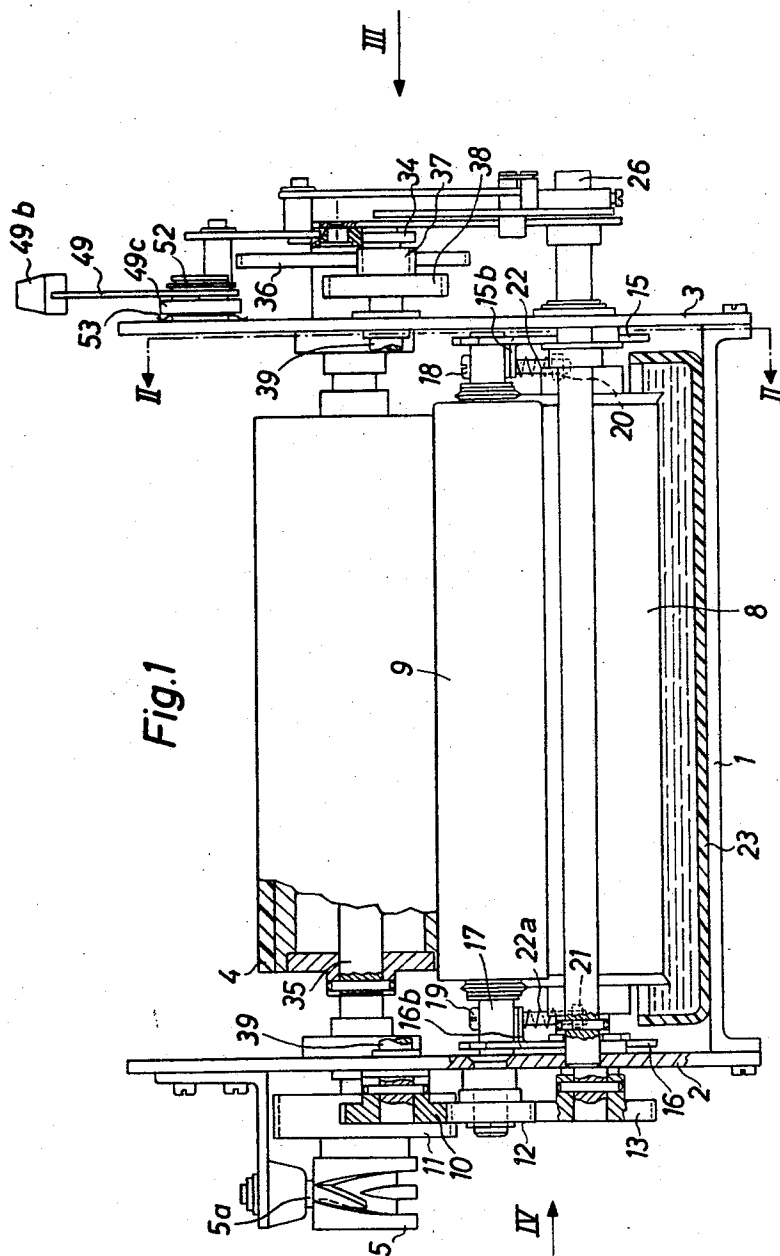


Fig. 1

INVENTOR.

GÜNTHER SCHNALL

BY

Michael S. Striker  
Attorney

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**G. SCHNALL**

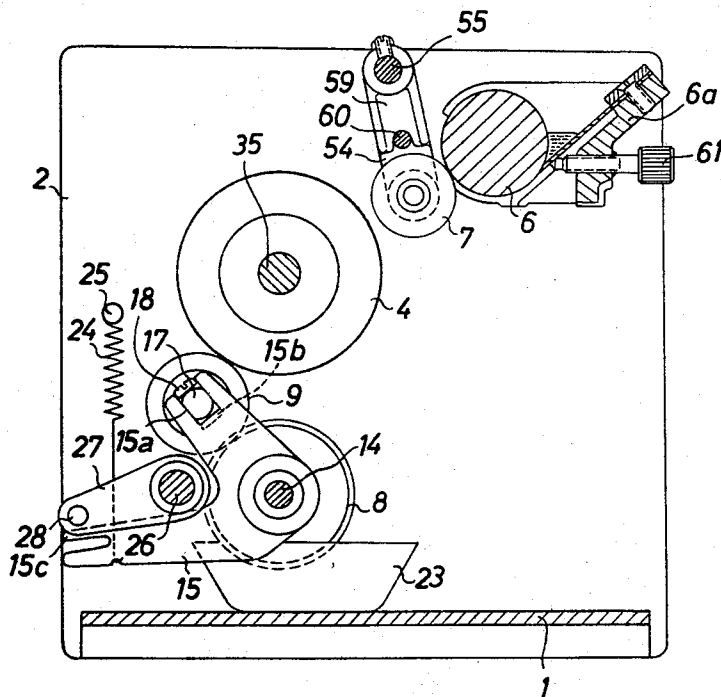
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# WETTING APPARATUS FOR LITHOGRAPHIC PRINTING MACHINES

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*Fig.2*



INVENTOR.

GÜNTHER SCHNALL

**BY**

BY *Michael S. Sullivan*  
*Attorney*

April 14, 1970

G. SCHNALL

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WETTING APPARATUS FOR LITHOGRAPHIC PRINTING MACHINES

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Fig.3

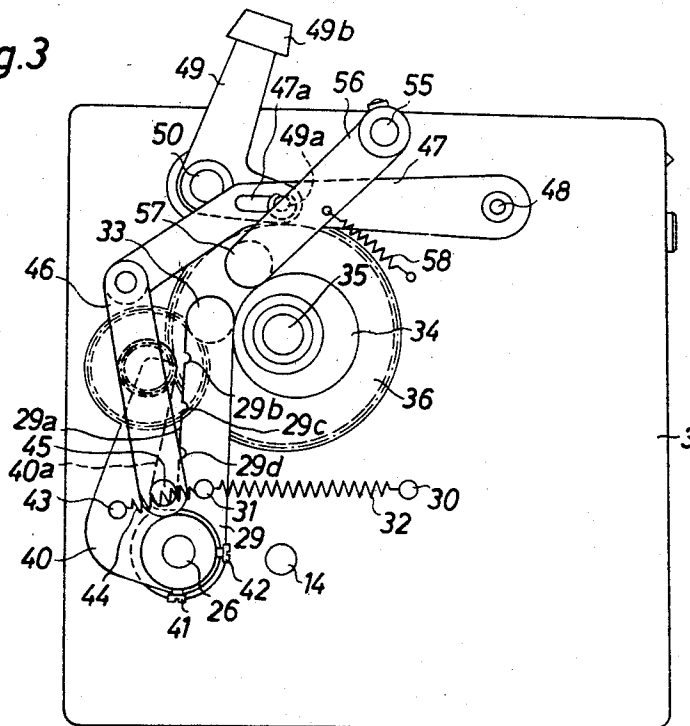
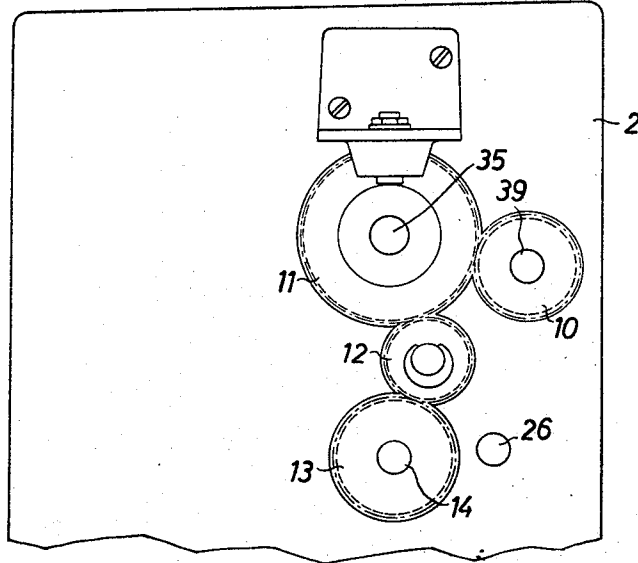


Fig.4



INVENTOR.

GÜNTHER SCHNALL

BY

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## WETTING APPARATUS FOR LITHOGRAPHIC PRINTING MACHINES

Guenther Schnall, Munich, Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

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12 Claims 10

### ABSTRACT OF THE DISCLOSURE

The carriage of the transfer roller which delivers liquid repellent to the master cylinder of a lithographic printing machine is swingable about the axis of a fountain roller and into and from engagement with a distributor roller which transfers the thus received liquid repellent to the master cylinder. The device which swings the carriage comprises a rotary eccentric cam which is tracked by a first follower arm rotatable on a supporting shaft carrying a second follower arm adapted to transmit motion to the carriage. The mutual inclination of the two arms determines the time of engagement between the transfer roller and the distributor roller, and such inclination can be changed by a pin which is inserted between the two arms and is movable substantially radially toward and away from the supporting shaft. The position of the pin may be adjusted by a manually operable selector which is mounted on the frame of the wetting apparatus.

### BACKGROUND OF THE INVENTION

The present invention relates to lithographic printing machines in general, and more particularly to improvements in wetting apparatus which are utilized in printing machines to apply liquid repellent to a distributor roller which, in turn, transfers such repellent and ink to the master cylinder. Still more particularly, the invention relates to a novel regulating unit which can determine the time of engagement between the distributor roller and a transfer roller which transfers liquid repellent to the distributor roller.

In presently known wetting apparatus of the just outlined character, the time of engagement between the transfer roller and the distributor roller is regulated by a screw provided on a follower which receives motion from a rotary cam. Such mode of regulation is not entirely satisfactory because the screw is not accessible or is difficult to adjust when the wetting apparatus is in actual use. It is also known to regulate the aforementioned time of engagement by changing the eccentricity of a lever with reference to its shaft. Such adjustments cannot be carried out when the apparatus is in use. Furthermore, very small changes in eccentricity might cause excessive changes in time of engagement between the two rollers.

Accordingly, it is an important object of my present invention to provide a novel and improved wetting or moistening apparatus wherein the time of engagement between the distributor roller and the roller which transfers thereto liquid repellent may be regulated not only when the apparatus is idle but also at the time when the apparatus is installed and is in actual use in a lithographic printing machine.

Another object of the invention is to provide a novel regulating unit which may be used in a wetting apparatus to permit for rapid, accurate and simple adjustment of the time of engagement between the distributor roller and the roller which transfers liquid repellent to the distributor roller.

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A further object of the invention is to provide a regulating unit which includes a selector movable between a plurality of positions and a motion transmitting connection between the selector and the transfer roller and wherein the connection can change the time of engagement between the distributor roller and the transfer roller proportionally with the extent to which the selector is moved by hand between a plurality of positions, each of which corresponds to a different time of engagement between the two rollers.

An additional object of the invention is to provide a regulating unit which occupies little room, which can be installed in presently known wetting apparatus by necessitating only minor changes in the construction of such apparatus and which is highly sensitive not only when the time of engagement between the transfer roller and distributor roller is relatively long but also when such time is very short.

### SUMMARY OF THE INVENTION

Briefly outlined, the improved wetting apparatus includes a first roller arranged to convey liquid repellent to the master cylinder of a lithographic printing machine, a fountain accommodating a supply of liquid repellent, a fountain roller rotatable in the fountain and arranged to dip into the liquid repellent therein, a rotary transfer roller engaging the fountain roller to receive therefrom a film of liquid repellent, carriage means rotatably supporting the transfer roller and mounted for swinging movement about the axis of the fountain roller to thereby move the transfer roller toward and away from engagement with the first roller, means for swinging the transfer roller toward and away from engagement with the first roller including a rotary cam, a first follower receiving motion from the cam and a second follower which is arranged to receive motion from the first follower and is operatively connected with the carriage means, motion transmitting means engaging with the followers to transmit motion from the first follower to the second follower, and guide means for adjusting the position of the motion transmitting means with reference to the followers to thereby change the time of engagement between the first roller and the transfer roller.

The followers are preferably turnable about a common axis and relative to each other, and the mutual inclination of these followers determines the time of engagement between the first roller and the transfer roller. The motion transmitting means may be constituted by a pin which is interposed between the two followers and is movable substantially radially of their common axis to thereby change the mutual inclination of the followers. These followers can resemble the jaws or blades of shears and are provided with straight or otherwise configured elongated faces which are biased into engagement with the motion transmitting means.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved wetting apparatus itself, however, both as to its construction and its mode of operation, together with additional features and advantages thereof, will be best understood upon perusal of the following detailed description of certain specific embodiments with reference to the accompanying drawing.

### BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevational view of a wetting apparatus which embodies the present invention;

FIG. 2 is a transverse vertical section as seen in the direction of arrows from the line II-II of FIG. 1;

FIG. 3 is an end elevational view as seen in the direction of arrow III shown in FIG. 1; and

FIG. 4 is an end elevational view as seen in the direction of arrow IV in FIG. 1.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIGS. 1 to 3, there is shown a wetting or moistening apparatus which can be installed in a lithographic printing machine and includes a frame having a plate-like base 1 and two upstanding side walls 2, 3. The lower edge portions of the side walls 2, 3 are bolted to the base 1 and these side walls are further connected to each other by suitable tie rods which are not shown in the drawings. The space between the side walls 2, 3 accommodates a first roller 4 (hereinafter called distributor roller) which receives liquid repellent and further serves as a means for grinding ink supplied by an inking unit including a swingable ink transfer roller 7. In order to enhance its grinding action, the roller 4 is not only rotatable, but is also reciprocable axially to the extent determined by a cylindrical cam 5 which is affixed to its shaft 35 and cooperates with a follower 5a affixed to the side wall 2. Ink is being fed from a tank 6a by a withdrawing roller 6 which is spaced from the distributor roller 4 and can apply a coat of ink to the periphery of the transfer roller 7.

The distributor roller 4 receives liquid repellent from a transfer roller 9 which is mounted for swinging movement about the axis of a fountain roller 8, the latter dipping into a fountain 23 supported by the base 1. The drive for the rollers 4 and 8 is shown in FIGS. 1 and 4 and includes a power train composed of gears 10, 11, 12 and 13. Gear 10 drives the gear 11 which is fixed to the shaft 35 of the distributor roller 4, and the gear 11 meshes with the gear 12 which drives the gear 13 on the shaft 14 of the fountain roller 8. The gear 10 is mounted on a shaft 39 and, when the frame 1-3 is properly installed in a lithographic printing machine, the gear 10 is driven by a gear on the shaft of the master cylinder (not shown).

A carriage which rotatably supports the transfer roller 9 for swinging movement about the axis of the shaft 14 includes two bell cranks 15, 16. The upper arms of the bell cranks 15, 16 are respectively provided with open slots (see the slot 15a in FIG. 2), which receive the shaft 17 of the transfer roller 9. The coupling means between the bell cranks 15, 16 and shaft 17 of the transfer roller 9 includes two threaded bolts 18, 19 which extend diametrically through the shaft 17 and mesh with nuts 20, 21. Helical expansion springs 22, 22a are interposed between the nuts 20, 21 and projections or lugs 15b, 16b of the bell cranks 15, 16, these springs serving to bias the shaft 17 in a direction toward the respective lugs. The bias of the springs 22, 22a may be changed by rotating the nuts 20, 21 and/or by rotating the bolts 18, 19. The two bolts are slidable in apertures provided therefor in the lugs 15b, 16b. The springs 22, 22a maintain the transfer roller 9 in rolling contact with the fountain roller 8.

The transfer roller 9 is permanently biased against the periphery of the distributor roller 4 by helical springs 24 attached to posts 25 on the side walls 2, 3 and to the lower arms of the bell cranks 15, 16. Only one of the springs 24 is shown in FIG. 2. Thus, in the absence of forces which would keep the transfer roller 9 away from the distributor roller 4, this transfer roller is in permanent linear contact with the distributor roller and also bears against the fountain roller 8.

A supporting shaft 26 which is mounted in the side walls 2, 3 in parallelism with the shaft 14 of the fountain roller 8 is rigidly connected with a one-armed lever 27 having a rocking pin 28 which bears against a bent-over projection or stop 15c of the bell crank 15. A second one-armed lever may be provided on the supporting shaft 26 to cooperate with a stop of the bell crank 16.

As best shown in FIG. 3, the supporting shaft 26 further carries a follower arm 29, which is freely turnable thereon and has a roller 33 arranged to track an eccentric

cam 34. The arm 29 carries a post 31 for one end of a helical spring 32 which biases the roller 33 against the cam 34. The other end of the spring 32 is attached to a post 30 on the side wall 3. The cam 34 is rotatable on the shaft 35 of the distributor roller 4 and is rigid with a gear 36 which meshes with a gear 37. The latter is coaxially secured to a gear 38 fixed to the shaft 39 of the aforementioned gear 10. The gear 38 meshes with a driver gear (not shown) on the shaft of the master cylinder. It will be seen that the cam 34 derives motion from the printing machine and its speed is different from the speed of the rapidly rotating distributor roller 4. As a rule, the rotational speed of the cam 34 corresponds to or approximates the rotational speed of the master cylinder so that the transfer rollers 7, 9 engage the periphery of the distributor roller 4 once during each revolution of the master cylinder. It is preferred to select the transmission ratio in such a way that the number of oscillatory movements of the transfer rollers 7, 9 per unit of time deviates slightly from the number of revolutions of the master cylinder in order to insure that ink and repellent will be applied to different portions of the peripheral surface of the master cylinder. This guarantees better distribution of ink and repellent on the master.

The arm 29 and the cam 34 constitute component parts of rocking means for the carriage 15, 16 and transfer roller 9. This rocking means further includes a second follower arm 40 which is fixed to the supporting shaft 26 by screws 41, 42 and has an edge face 40a which abuts against an adjustable motion transmitting pin 45. This pin 45 forms part of a novel regulating unit and bears against an edge face 29a of the follower arm 29. The two arms 29, 40 resemble the jaws or blades of shears and their mutual inclination depends on the distance between the motion transmitting pin 45 and the supporting shaft 26. The arm 40 carries a post 43 for one end of a helical spring 44, the other end of which is attached to the aforementioned post 31 on the arm 29. Thus, the spring 44 urges the edge face 40a against the motion transmitting pin 45 by tending to turn the arm 40 in a clockwise direction, as viewed in FIG. 3.

The pin 45 is mounted on an adjusting link 46 which is articulately connected with a lever 47 rockable on a pivot pin 48 affixed to the side wall 3. The lever 47 has an elongated guide slot 47a for a pin 49a provided on a two-armed selector lever 49 rockable on a pin 50 and having a knob 49b which can be engaged by hand to change the inclination of the lever 49. The latter is rigid with a ring 49c which is rotatable on the pin 50 and is biased by a dished spring 53 which urges the lever 49 into frictional engagement with a washer 52 on the pin 50. The spring 53 causes the lever 49 to bear against the washer 52 with such friction that the angular position of the lever 49 normally remains unchanged. The edge face 29a of the arm 29 is provided with shallow recesses 29b, 29c, 29d which constitute detent means for the motion transmitting pin 45 and assist the spring 53 in normally maintaining the lever 49 in a selected angular position. The operator will feel when a portion of the pin 45 snaps into one of the recesses 29b-29d and then knows that the pin 45 is located at a certain distance from the shaft 26, such distance corresponding to a given time of engagement between the rollers 4 and 9. Similar recesses may be provided in the edge face 40a of the arm 40. The recesses in the edge face 29a and/or 40a may be omitted if the lever 49 cooperates with a suitable detent device which can be provided in addition to or as a substitute for the parts 49c, 52, 53. For example, the lever 49 can be provided with notches adapted to receive a spring biased detent member capable of holding the lever 49 and pin 45 in selected positions of adjustment.

When the cam 34 rotates and cooperates with the spring 32 to oscillate the arm 29, the motion transmitting pin 45 will travel up and down along the edge faces 29a, 40a

and will rock the arm 40 (and hence the supporting shaft 26) to the extent determined by the angular position of the selector lever 49. The spring 44 biases the edge face 40a against the pin 45 and simultaneously biases the pin 45 against the edge face 29a. The pin 45 is oscillatable with the adjusting link 46. Oscillatory movements of the arm 40 are transmitted to the lever 27 which cooperates with the spring 24 to rock the bell crank 15 and to thus swing the transfer roller 9 about the axis of the fountain roller 8.

FIG. 3 illustrates the selector lever 49 in an end position. If this lever is turned in a counterclockwise direction, its pin 49a rocks the lever 47 in a clockwise direction and the motion transmitting pin 45 is moved upwardly and away from the shaft 26. During such adjustment, the pin 45 travels substantially radially with reference to the shaft 26 and turns the arm 40 in a counterclockwise direction. In another words, the pin 45 then changes the initial angular position of the arm 40 with reference to the arm 29 and reduces the time of engagement between the rollers 4 and 9, i.e., the roller 9 is moved away from the roller 4 earlier and returns into engagement with the roller 4 later than if the knob 49b is held in the position shown in FIG. 3.

The arrangement is preferably such that the motion transmitting pin 45 is movable to an end position in which it prevents any contact of transfer roller 9 with the distributor roller 4 during a full revolution of the cam 34. Furthermore, the lever 49 is preferably movable to a position in which the lever 27 is constantly out of motion transmitting engagement with the projection 15c of the bell crank 15. The spring 24 then maintains the transfer roller 9 in continuous engagement with the distributor roller 4. Thus, the selector lever 49 can effect continuous transfer of liquid repellent to the distributor roller 4, intermittent transfer of repellent, or no transfer at all. The time of engagement between the rollers 4 and 9 can be regulated when the printing machine is in actual use, and the exact time of engagement can be selected with a desired degree of precision. The configuration of the edge faces 29a, 40a can be readily selected in such a way that angular displacements of the selector lever 49 by increments of equal magnitude result in proportional increase or decrease of transfer of liquid repellent to the periphery of the distributor roller 4. This is of considerable importance when the roller 9 is to transfer small quantities of liquid repellent because a very small increase in the length of time during which the roller 9 engages with the roller 4 will result in transfer of a greatly increased amount of liquid repellent. It is further desirable to maintain the transfer roller 9 in exact parallelism with the distributor roller 4. The inclination of the roller 9 with reference to the roller 4 can be changed by changing the inclination of the projection 15b or 15c on the bell crank 15 and/or by changing the inclination of the corresponding projection or projections on the bell crank 16.

The ink transfer roller 7 is mounted on swingable levers 54 which are oscillatable on a shaft 55. The latter carries a follower arm 56 for a roller 57 which is biased against the cam 34 by a helical spring 58. Thus, the cam 34 can effect or initiate oscillatory movements of the transfer roller 9 and oscillatory movements of the transfer roller 7. The shaft 55 carries a clamping member 59 which engages a spring bar 60 serving to transmit oscillatory motion to the levers 54. The feed of the ink from the tank 6a can be regulated by a screw 61 and/or by changing the rotational speed of the withdrawing roller 6.

It will be seen that the motion transmitting pin 45 is adjustable by selector lever 49 in a direction radially of the supporting shaft 26, which is substantially normal to the direction in which the pin 45 transmits motion to the arm 40 (at right angles to the axis of the shaft 26). The parts 46, 47, 49 together constitute a guide for the

motion transmitting pin 45 and such guide enables this pin to move radially of the shaft 26. The parts 49c, 52, 53 constitute a simple brake which normally locates the lever 49 in selected position of adjustment but can yield to finger pressure against the knob 49b.

Of course, my wetting apparatus is susceptible of many additional modifications without departing from the spirit of the present invention. For example, the aforementioned brake 49c, 52, 53 and the recesses 29b-29d of the arm 29 can be replaced by other suitable detent means and braking means for the lever 49 and motion transmitting pin 45. Furthermore, and as stated before, the edge faces 29a, 40a of the follower arms 29, 40 need not be straight; their curvature will determine the changes in time of engagement between the rollers 4 and 9 in response to changes in the position of the pin 45.

At least the projection 15b or 15c of the bell crank 15 (and the corresponding projection or projections of the bell crank 16) will preferably consist of a deformable material which is ductile but can retain its shape in response to pressures transmitted thereto by the pin 28 of the lever 27. Such deformability of one or more portions of the carriage 15, 16 enables an operator to insure accurate alignment of the transfer roller 9 with the distributor roller 4 and fountain roller 8. The operator can resort to pliers, to a screwdriver or to another simple tool. Such adjustment will be carried out upon completed assembly of the wetting apparatus.

The spring 32 can be omitted if the spring 44 is connected between the arm 40 and side wall 3 and if the spring 44 is strong enough to invariably maintain the roller 33 in engagement with the face of the eccentric cam 34. However, the arrangement which is shown in FIG. 3 is preferred at this time because the motion transmitting pin 45 can be adjusted by exertion of a smaller force. The spring 44 is just strong enough to maintain the edge face 40a in abutment with the pin 45 so that the latter can be shifted with a minimum of effort. Utilization of separate biasing means for the arms 29, 40 and lever 27 is advisable for the additional reason that these relatively weak springs cannot cause excessive wear and cannot cause the biased parts to produce excessive noise.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims:

1. In a lithographic printing machine, a combination comprising a first roller arranged to convey liquid to the master cylinder; a fountain for a supply of liquid; a fountain roller rotatable in said fountain and arranged to dip into the liquid therein; a rotary transfer roller engaging said fountain roller; carriage means rotatably supporting said transfer roller and mounted for swinging movement about the axis of said fountain roller to thereby move said transfer roller toward and away from engagement with said first roller; rocking means for swinging said transfer roller from engagement with said first roller including a rotary cam, a first follower receiving motion from said cam, and a second follower arranged to receive motion from said first follower and operatively connected with said carriage means, said followers being turnable about a common axis and relative to each other and the mutual inclination of said followers determining the time of engagement between said first roller and said transfer roller; motion transmitting means engaging with said followers to transmit motion from the first follower to the second follower, said motion transmitting means being interposed between and being arranged to change the mutual inclination of said followers in response to movement toward and away from said common axis; and guide means for adjusting the position of said motion transmitting means with reference to said followers to thereby change the time of engagement between said first roller and said transfer roller.

2. A combination as defined in claim 1, further comprising a source of ink and a second transfer roller oscil-

latable between a first position in which it receives ink from said source and a second position in which it transfers ink to said first roller.

3. A combination as defined in claim 2, further comprising third follower means arranged to track said cam and to thus oscillate said second transfer roller.

4. A combination as defined in claim 3, wherein said first roller is a distributor roller which is arranged to convey ink and liquid repellent to the master cylinder of the printing machine and further comprising means for rotating and for reciprocating said first roller.

5. A combination as defined in claim 1, wherein said cam is an eccentric cam and said motion transmitting means comprises a pin which engages with elongated faces provided on said followers.

6. A combination as defined in claim 5, wherein said followers resemble the jaws of shears and wherein said pin is movable by said first follower substantially at right angles to said common axis to thereby transmit motion to said second follower.

7. A combination as defined in claim 6, further comprising a frame supporting said fountain and said rollers, said guide means comprising an adjusting member supportingly connected with said motion transmitting pin and a selector movably supported by said frame and arranged to move said pin substantially radially of said axis through the intermediary of said adjusting member and in response to movement with reference to said frame.

8. A combination as defined in claim 6, further comprising brake means for yieldably holding said motion transmitting pin against movement radially of said common axis.

9. A combination as defined in claim 8, wherein said guide means comprises an adjusting member supportingly connected with said pin, and a selector movably supported by a frame which supports said rollers, said brake means being operative between said frame and said selector and said selector being movable by hand against the opposition of said brake means to move said pin radially of said common axis through the intermediary of said adjusting member.

10. A combination as defined in claim 6, further comprising detent means for yieldably holding said pin at predetermined distances from said common axis.

11. A combination as defined in claim 10, wherein said detent means comprises recesses provided in one of said faces and each adapted to accommodate a portion of said pin.

12. In a lithographic printing machine, a combination comprising a first roller arranged to convey liquid to the

master cylinder; a fountain for a supply of liquid; a fountain roller rotatable in said fountain and arranged to dip into the liquid therein; a rotary transfer roller engaging said fountain roller; carriage means rotatably supporting said transfer roller and mounted for swinging movement about the axis of said fountain roller to thereby move said transfer roller toward and away from engagement with said first roller; rocking means for swinging said transfer roller toward and away from engagement with said first roller including a rotary cam, a first follower receiving motion from said cam, and a second follower arranged to receive motion from said first follower and operatively connected with said carriage means, said followers being turnable about a common axis; an operative connection between said second follower and said transfer roller, comprising at least one deformable member forming part of said carriage means; motion transmitting means engaging with said followers to transmit motion from the first follower to the second follower; guide means for adjusting the position of said motion transmitting means with reference to said followers to thereby change the time of engagement between said first roller and said transfer roller; a supporting frame for said rollers and said guide means; and a supporting shaft mounted in said frame and having an axis which coincides with said common axis, said first follower being rockable on said shaft and said second follower being rigid with said shaft, said shaft comprising a motion transmitting lever arranged to move said carriage means in response to rocking of said shaft by said second follower.

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J. R. FISHER, Assistant Examiner

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