

- [54] **ADJUSTABLE ASSEMBLY FOR A DAMPENING ROLLER OF AN OFFSET PRINTING PRESS**
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[63] Continuation-in-part of Ser. No. 797,834, Feb. 10, 1969, abandoned.

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- [51] Int. Cl. **B41f 7/26, B41f 7/32**
- [58] Field of Search..... **101/148, 147, 351, 101/352, 247, 350, 206-208**

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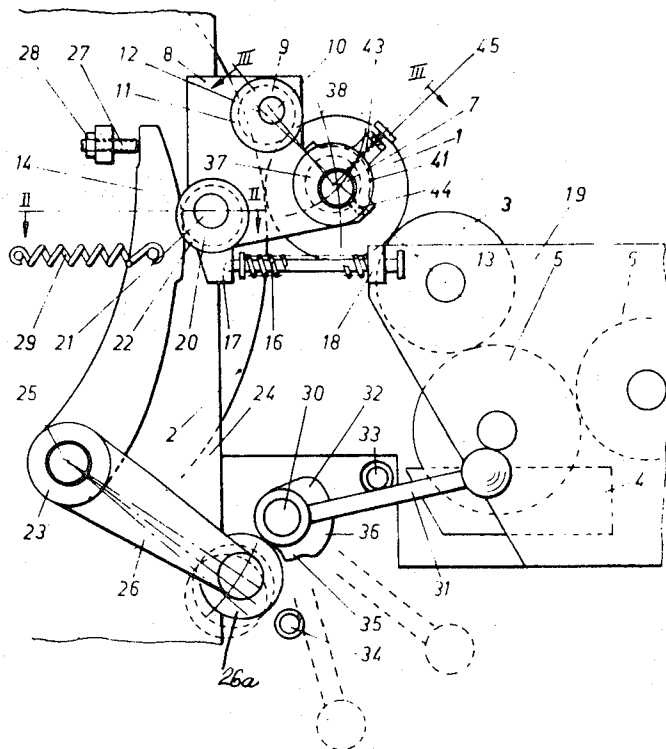
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[57] ABSTRACT

A bearing assembly for a dampening roller of an offset printing press permits movement of the dampening roller relative to an intermediate roller used for applying moisture to the dampening roller and to a plate cylinder of the press for selectively positioning the dampening roller into and out of engagement with the plate cylinder and/or the intermediate roller.

5 Claims, 7 Drawing Figures



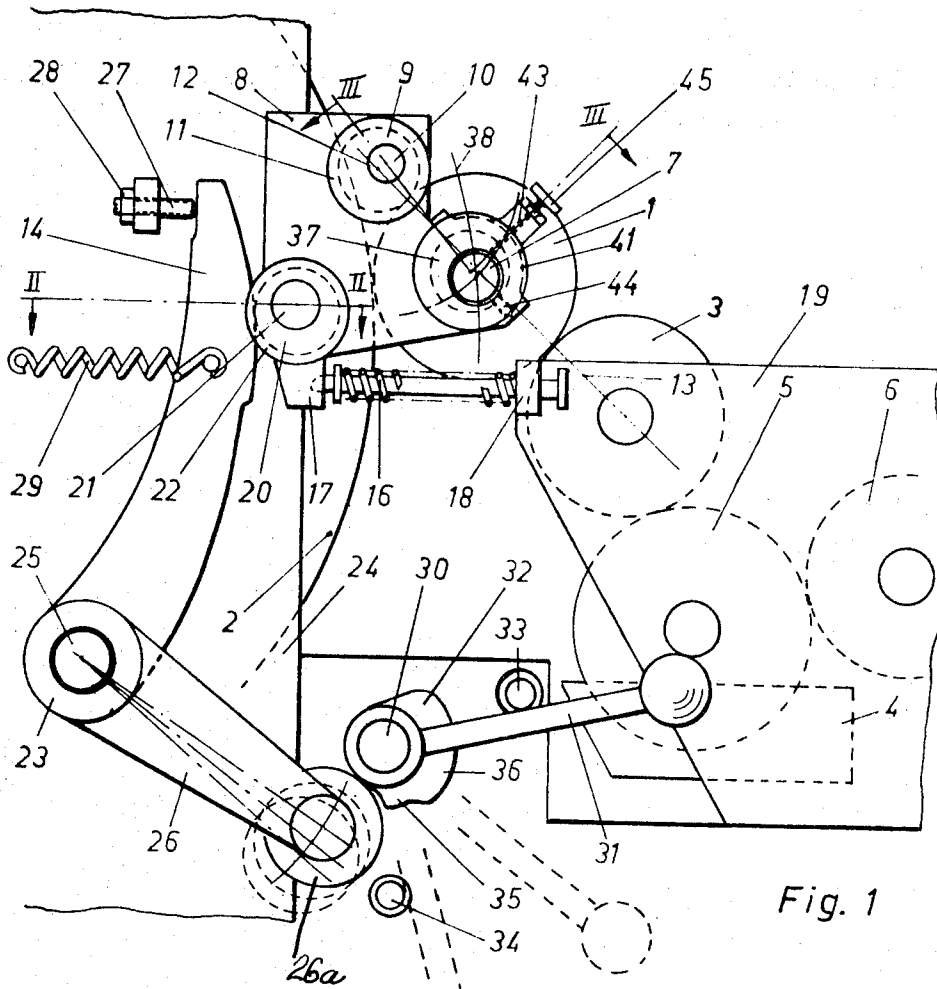


Fig. 1

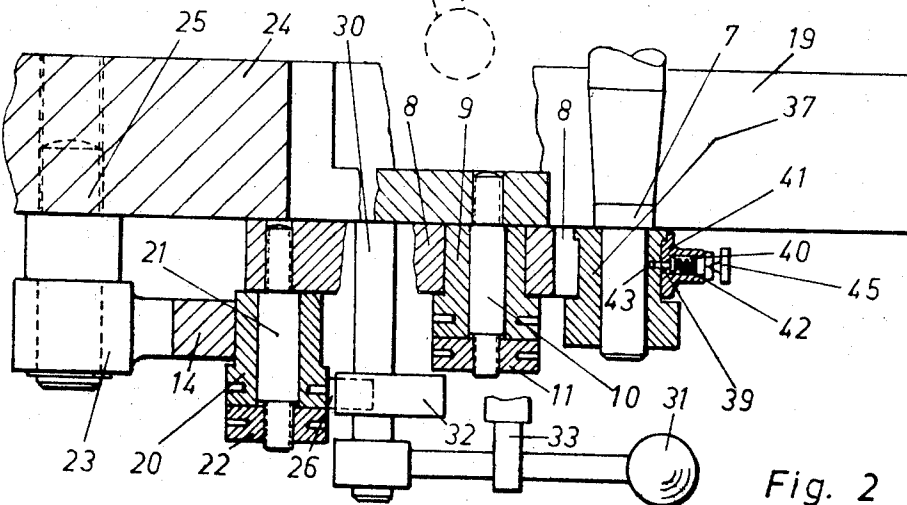


Fig. 2

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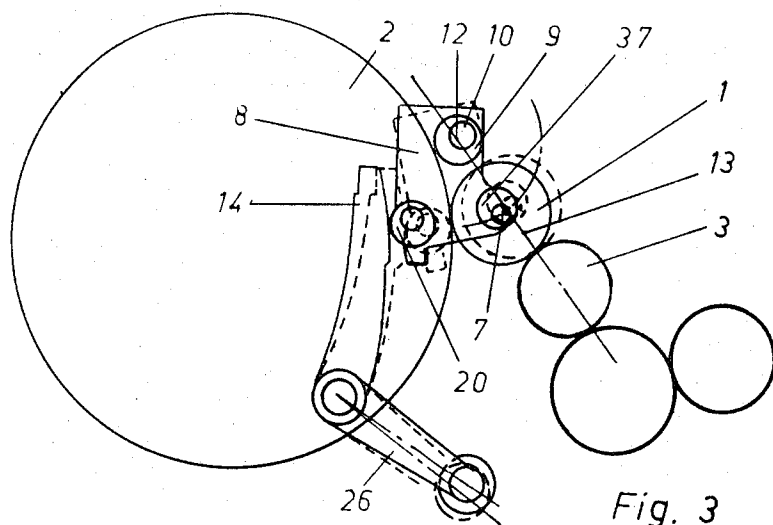


Fig. 3

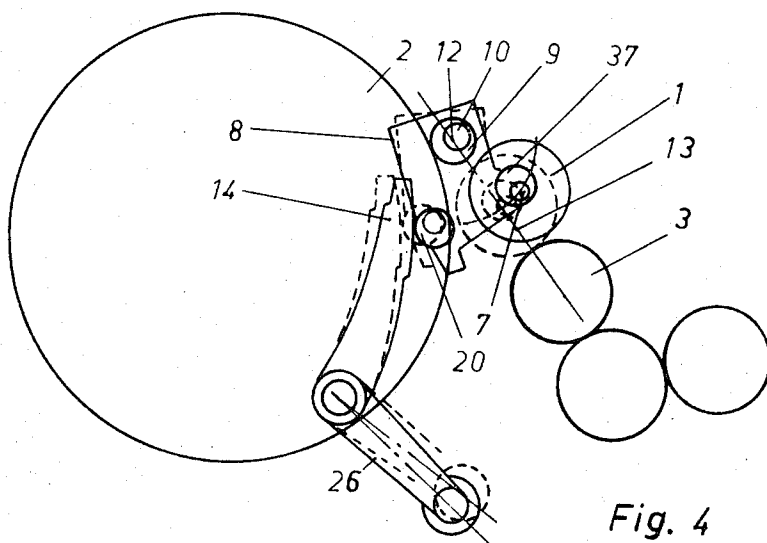


Fig. 4

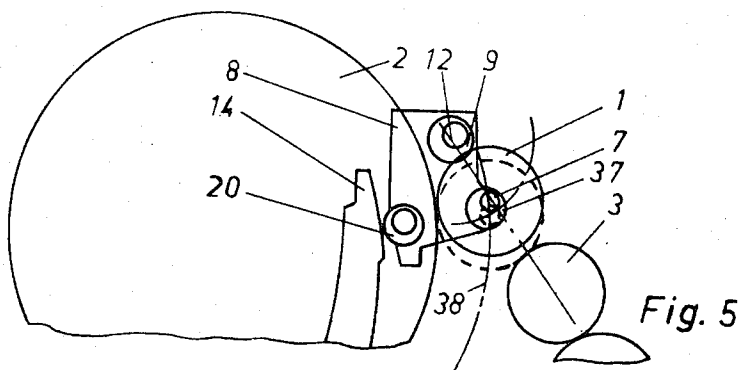


Fig. 5

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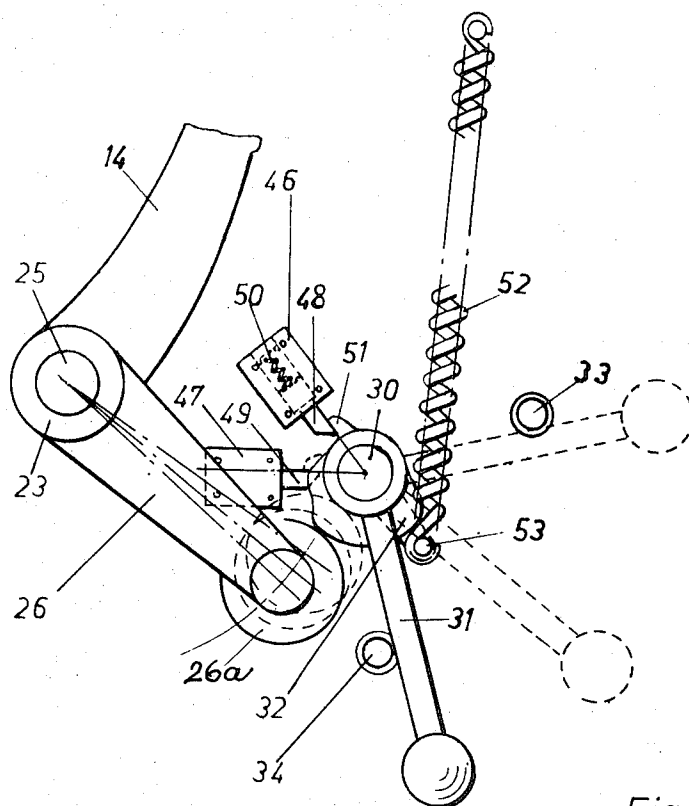


Fig. 6

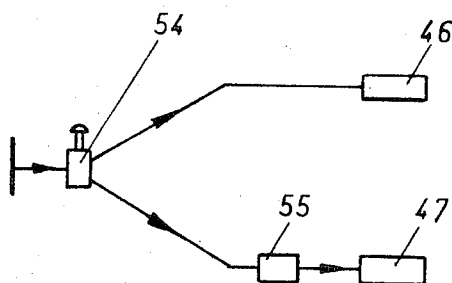


Fig. 7

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ADJUSTABLE ASSEMBLY FOR A DAMPENING ROLLER OF AN OFFSET PRINTING PRESS

This application is a continuation-in-part application based on our copending application Ser. No. 797,834, filed Feb. 10, 1969 now abandoned.

The invention relates to a bearing assembly for dampening rollers of offset printing presses, and more particularly, for a dampening roller covered with a resilient non-absorbing material which is rollable on the plate cylinder and to which moisture is supplied via a moisture supply roller driven at the peripheral speed of the plate cylinder and rotatable about a spatially stationary axis.

BACKGROUND

Fabric covered dampening rollers, as conventionally used in offset printing presses, have the advantage of an adequate reserve of moisture, but storage capacity of the roller is only retained if the cover is regularly and thoroughly cleaned. Such cleaning requires removal of the rollers from the printing press, which is time-consuming. Experience shows that even with the use of roller washing machines, it is impossible to prevent a gradual loss of the absorbent capacity of the fabric cover due to dried-on ink which causes the fabric to become hard so that it has to be changed. Further disadvantages of a fabric cover are due to the fact that cleaning is necessary every time the ink is changed; that fibers from the cover migrate to the printing plate and that the pattern of a woven fabric is distinctly noticeable on the printed sheets.

The afore-outlined disadvantages have led to increasing use of resilient dampening rollers without a fabric cover. Such rollers are free of the above-mentioned disadvantages and they can be cleaned together with the inking rollers, by using the same solvent provided the ink roller and the damping roller are both moved into engagement with the plate cylinder during the cleaning operation.

It is necessary to ensure, however, that when the printing press and hence the dampening roller are stopped, that ink adhering to the dampening roller does not leak back into the fountain basin. Moreover, when the press is not running, a depression tends to form in the dampening roller at the point of contact between the dampening roller and the moisture supply roller which latter is usually a rubbing roller. Such deformation in the dampening roller disappears only slowly when the press is restarted and its presence manifests itself in the form of stripes on the printed sheets. In some cases, even a permanent set in the dampening roller may occur. The only safe way to avoid such set is to remove the roller from the press during prolonged standstills.

Another problem with dampening rollers without fabric cover is that the storage capacity of such rollers is very low and particular attention must therefore be given to the supply of moisture which must be accurately regulated and, hence, also to a careful pressure adjustment with respect to the plate cylinder and the moisture supply roller as any out-of-true shape of this roller would affect the supply of moisture.

In a device according to U.S. Pat. No. 3,283,707, in which a rubber-covered dampening roller is used, means are provided for adjusting the contact pressure between the dampening roller and the printing cylinder in contact therewith on the one hand, and the roller

transferring moisture to the dampening roller on the other hand. For this purpose, both rollers are mounted in bearings which by means of guides can be displaced in the direction of the plate cylinder. However, engaging, disengaging or adjusting the dampening roller in the direction of the plate cylinder while accurately maintaining the position of the roller supplying moisture to the dampening roller is virtually impossible because moving of the dampening roller into engagement with the plate cylinder leads to a simultaneous movement of the moisture supply roller away from the dampening roller. The supply roller must be caused to follow every movement of the dampening roller.

In a dampening assembly according to Swiss Patent 428,783, wherein a dampening roller rolling on the plate cylinder cooperates with an intermediate moisture supply roller, both these rollers are likewise movable in the direction of the plate cylinder. The dampening roller can be disengaged from both the plate cylinder and the moisture supply roller, but this can only be effected by changing the position of the moisture supply roller. Such change in position, however, necessitates a displacement of the drive for the moisture supply roller also, and this leads to an unacceptable additional expense for the required structure. An increase in the contact pressure of the dampening roller against the plate cylinder cannot be obtained without a simultaneous reduction in the contact pressure between the dampening roller and the moisture supply roller. No means are provided for adjusting this contact pressure.

THE INVENTION

It is an object of the invention to provide a novel and improved bearing assembly for dampening rollers which is simple in design, has the above-mentioned prerequisites for an advantageous use of rubber-covered dampening rollers, and permits a stationarily fixed bearing assembly for the moisture supply roller in contact with the dampening roller thereby avoiding the disadvantages of the aforescribed known devices.

According to the invention, this object and other objects which will be pointed out hereinafter, are obtained by an arrangement such that a dampening roller with a resilient and non-absorbent cover is adapted to be engaged with, disengaged from and adjusted in relation to both the plate cylinder and the moisture supply roller. The cover of the dampening roller may consist of rubber or a suitable and non-absorbing plastic material. In the disengaged state, the dampening roller is not in contact either with the plate cylinder or with the moisture supply roller. There is therefore no risk that, on interruption in the supply of moisture, a residue of ink remaining on the dampening roller will flow via the moisture supply roller into the fountain basin. Flats or other deformations at the circumference of the dampening roller as may be caused by prolonged contact pressure between the dampening roller and the moisture supply roller when the rollers are not revolving, are likewise avoided so that the cylindrical shape of the dampening roller is retained.

In one embodiment of the invention, a means is provided for bringing the dampening roller stepwise into engagement first with the moisture supply roller and then with the plate cylinder. Such means prevents the dampening roller from being moved into engagement with the plate cylinder while the roller is still dry at its circumference thereby possibly damaging the plate on

the cylinder, or erroneously indicating correct moistening of the plate. The means also makes allowance for the fact that a rubber-covered dampening roller does not have any appreciable moisture storage capacity.

According to another aspect to the invention, a further means is provided for step-wise moving the dampening roller out of engagement first with the plate cylinder and then with the moisture supply roller. Thus, a disengaging mechanism similar to the engaging mechanism is obtained and hence, a simplification in design.

In a further embodiment of the invention, the assembly is associated with a timer which controls the difference between the period of time in which the dampening roller is first brought into engagement with the moisture supply roller and then with the plate cylinder, and the period of time in which the dampening roller is first disengaged from the plate cylinder and then from the moisture supply roller. The timer is preferably adjustable or set for a period of time such that the interval of time for which the dampening roller is in engagement only with the moisture supply roller and not with the plate cylinder is just sufficient to moisten the dampening roller completely before its final engagement. Such fully moistened dampening roller is then brought into engagement with the plate cylinder; equilibrium between the moisture supplied to the dampening roller and that transferred therefrom to the plate cylinder is established immediately from the moment of engagement onwards. Conversely, on cessation of a printing operation, the supply of moisture for the dampening roller can be maintained for an adjustable period of time which may be different from the above-mentioned period of time, or be reduced for a short time in such a manner that only just the amount of moisture lost by evaporation is restored to the dampening roller. The film of moisture on the dampening roller will then retain precisely the thickness that is normally present during the printing process. By this means it is possible to ensure that during short interruptions in printing, the supply of moisture does not need to be interrupted and, afterwards, the printing process can be resumed immediately by moving the dampening roller into engagement with the plate cylinder.

The invention also provides means for moving the dampening roller out of engagement with the moisture supply roller while retaining its engagement with the plate cylinder. By this means, it is very simple to wash off dirt accumulating on the dampening roller. The dampening roller while disengaged from the moisture supply roller is in contact with the plate cylinder. Hence, when cleaning of the inker unit and the plate cylinder is carried out as usual by supplying detergents or other cleaning fluids to the inker unit with the inker rollers in engagement with the plate cylinder, the cleaning fluids are automatically transferred to the dampening roller also but cannot flow into the fountain basin. Such method of washing cannot be used with fabric-covered and thus moisture absorbent dampening rollers because the fluids used for cleaning the inker unit are absorbed by such covers and cannot be washed out of them again. The dampening roller covers would thus become no longer serviceable.

As it is now evident, the bearing assembly according to the invention for the rollers results in a dampening roller position which is of particular importance when resilient and non-absorbent dampening roller covers are used.

DETAILED DESCRIPTION OF THE INVENTION

Several embodiments of the invention are described in detail by way of example with reference to the accompanying drawings in which:

FIG. 1 is an elevational side view of a dampening roller bearing assembly and of the associated mechanisms for engaging, disengaging and adjusting the dampening roller;

FIG. 2 is a sectional view of FIG. 1 along section lines II—II and III—III of FIG. 1;

FIG. 3 is a diagrammatic view of the bearing assembly with the dampening roller shown respectively engaged with both the plate cylinder and the moisture supply roller (full lines) and in engagement only with the moisture supply roller (broken lines);

FIG. 4 shows a view as in FIG. 3 with the dampening roller disengaged from both the plate cylinder and the moisture supply roller (full lines) and in engagement only with the moisture supply roller (broken lines);

FIG. 5 shows a view as in FIGS. 3 and 4, with the dampening roller in engagement only with the plate cylinder, that is, in the washing position (full lines) and in engagement with both the plate cylinder and the moisture supply roller (broken lines);

FIG. 6 shows an elevational view of a device for automatic and step-wise engagement of the dampening roller; and

FIG. 7 shows a flow chart of the automatic device of FIG. 6.

Referring now to the figures in detail, FIG. 1 shows a dampening roller in engagement with a plate cylinder 2 and a roller 3. This roller is supplied with a film of moisture by a water fountain roller 5 dipping into a water fountain or supply basin 4 and thus constitutes a moisture supply roller for the dampening roller 1 disposed intermediate this roller and roller 5. The supply of moisture to the dampening roller 1 is regulated in the usual manner by varying the speed of rotation of water fountain roller 5 and by means of a squeeze roller 6 which can be brought into engagement with the fountain roller.

A shaft 7 for the dampening roller 1 is mounted in a bearing plate 8 (FIG. 2).

In FIG. 2 is shown and in the following description reference is made to one end of roller 1 only because the construction of the other end of the roller is the same in every way. The bearing plate 8 is pivotal about a sleeve 9 with an eccentric bore which is fitted upon a pin 10 secured to a portion of press housing 24. As it is now evident, pivoting of plate 8 about the sleeve 9 causes a corresponding spatial displacement of shaft 7 parallel to itself and thus of roller 1 in relation to cylinder 2 and roller 3. Bearing plate 8 and its eccentric mounting constitute a bearing means for the dampening roller 1. The pin is detachably secured to housing 24 by a lock nut 11. Upon loosening of this nut and turning of the sleeve 9 on pin 10, the rotational axis 12 about which the bearing plate 8 is pivotable can be displaced approximately along a line 13 intersecting axis 12 and the rotational axis of roller 3. Accordingly, for fine adjustment purposes the spatial position of dampening roller 1 can be adjusted in relation to the spatial position of cylinder 2 and roller 3, by adjusting the angular position of sleeve 9 on pin 10.

The pivotal motion of bearing plate 8 and hence of shaft 7 of dampening roller 1 about the axis 12 is posi-

tively limited in the direction of the plate cylinder 2 by the angular position of a stop arm 14 and is biased in the opposite direction by the action of a compression spring 16 abutting at one end against a shoulder 17 on the bearing plate 8 and on the other end against a shoulder 18 on a frame 19 of the assembly. The stop arm 14 bears against a sleeve 20 which has an eccentric bore with which it is fitted upon a pin 21 screwed into bearing plate 8. Sleeve 20 is detachably secured on the pin by a lock nut 22. The position in which the dampening roller is stopped by arm 14 is adjustable in relation to plate cylinder 2 by turning sleeve 20. Stop arm 14 constitutes one arm of a two-armed lever 23 which is pivotally mounted on a pin 25 secured into press housing 24 and the other arm 26 of which mounts a roll 26a constituting a cam follower. The angular position of lever 23 is positively limited in one direction by a set screw 27 the position of which can be fixed by a lock nut 28, and in the other direction biased by a tension spring 29. The lever can be pivoted in clockwise direction against the force of the tension spring 29 by manually turning a lever 31 mounted on a shaft 30 which, in turn, mounts a two-stage cam 32. The cam acts upon follower 26a on arm 26, the turning angle corresponding to the height of the particular cam stage 35 or 36. The turning of the lever 31 is limited by two stops 33 and 34. Upon release of lever 31, spring 29 turns lever 23 counterclockwise until stopped by set screw 27, that is, lever 23 is returned into the full line position. The position of lever 23, and more specifically of its arm 14, controls via sleeve 20 and plate 8 the spatial position of dampening roller 1 with reference to the plate cylinder and roller 5, as will be more fully explained herein after.

As is now apparent, lever 23 and the elements associated therewith constitute a setting means for the bearing plate 8 and its eccentric mounting.

According to FIGS. 1, 3 and 4, the rotational axis of the dampening roller 1, that is, the center axis of shaft 7 is a little to the left of a line 13 when the dampening roller 1 is in engagement with plate cylinder 2 and also with moisture supply roller 3.

FIG. 3 shows, in broken lines, the dampening roller 1 turned about pivot axis 12 of plate 8 and swung away from the plate cylinder 2 by a distance controlled by the height of the first stage 35 of cam 32. The rotational axis for the dampening roller 1, that is, the center axis of shaft 7 is now by a short distance to the right of the line 13. Thus, the distance of the axis from the plate cylinder 2 has increased while its distance from the roller 3 has not changed. By further pivoting the dampening roller 1 corresponding to the height of the second stage 36 of the cam 32, the rotational axis of the dampening roller moves away also from roller 3, as shown in FIG. 4. Accordingly, the dampening roller 1 is now disengaged from both plate cylinder 2 and from roller 3. As is now evident, the cam assembly constitutes an actuating means for controlling the pivoting of lever 23. As it is also evident, returning of lever 31 to its full line position upon release of lever 31, as previously described, automatically reverses the aforescribed movements of the dampening roller, that is, the dampening roller moves first into engagement with roller 3 only and then into engagement with the plate cylinder also, due to the also afore-described coaction between cam follower 26a and cam 32.

As shown in FIGS. 1 and 2, the shaft 7 of the dampening roller 1 is journaled in an eccentrically bored sleeve or bush 37 which is rotatable in bearing plate 8. As the rotational axis of the shaft 7 and the pivot axis of the sleeve 37 do not coincide, the spatial position of the dampening roller 1 can be additionally varied by turning sleeve 37. Turning this sleeve 37 may be effected in such a manner that the axis of the shaft 7, that is, also of the dampening roller 1, intersects an imaginary circle 38, which according to FIGS. 1 and 5 is concentric with the plate cylinder 2, when the dampening roller 1 is in engagement with plate cylinder 2 and roller 3 (broken lines in FIG. 5), and also when dampening roller 1 is in engagement with plate cylinder 2 but disengaged from roller 3 (full lines), that is, the position of roller 1 with reference to the plate cylinder remains unchanged.

Turning of the bearing bush 37 is limited by a detent pin 39 (FIG. 2) disposed in a bore 40 in a bearing cover 41 bolted to the bearing plate 8. Pin 39 is urged by a compression spring 42, likewise mounted in bore 40, against the outer cylindrical surface of bush 37, or into openings 43, 44 (FIG. 1) in the outer wall of the bush. The position of pin 39 in setting holes 43 and 44 is indicated at 39a and 39b in FIGS. 1 and 4. Detent pin 39 may be withdrawn from the particular opening 43, 44 by gripping its head 45.

As it is now evident, sleeve or bush 37 constitutes a bearing means for disengaging dampening roller 1 from roller 3 without affecting the fine adjustment defined by sleeve 9.

FIGS. 6 and 7 show an embodiment of the invention wherein step-wise engagement of the dampening roller 1 is automatically effected. Cam follower 26a and lever 31 are shown in full lines for the disengaged position of the dampening roller 1. The lever positions shown in broken lines, as seen in counter-clockwise direction, represent first the engagement of dampening roller 1 with moisture supply roller 3 and then with both roller 3 and plate cylinder 2. Two lifting solenoids 46 and 47 are mounted in the press frame. The cores 48, 49 thereof are in the form of stops, and when the solenoids are deenergized project by the action of compression springs 50 into the pivotal range of a nose 51 secured to shaft 30 and hence to cam 36 for rotation therewith. A tension spring 52 acts on a bracket 53 secured to shaft 30 and tends to turn the bracket in counter-clockwise direction. As shown in FIG. 6, this rotation is prevented by the first stop core 48. Upon actuation of a switch 54, as shown in FIG. 7, the solenoid 46 attracts its core 48 and permits rotation of shaft 30 until nose 51 strikes against the second stop core 49 of solenoid 47. At the same time as switch 54 is actuated, a timer 55 of conventional design is operated and, after an adjustable period of time, actuates the second solenoid 47, whereupon shaft 30 can be further rotated until lever 31 is stopped by stop 33. The effect upon the spatial positions of the dampening roller 1 is the same as has been described in connection with FIGS. 1 to 5.

What is claimed is:

1. An adjustable bearing assembly for a dampening roller of an offset printing press in which the dampening roller applies moisture to a plate cylinder when in engagement therewith and is supplied with moisture by a moisture supply roller driven at the peripheral speed of the plate cylinder and rotatable about a spatially sta-

tionary axis, said bearing assembly comprising in combination:

- a plate cylinder;
- a moisture supply roller, said plate cylinder and said supply roller being rotatable about mutually parallel and spatially fixed axes;
- a dampening roller having an elastic and non-absorbing cover; bearing means supporting said dampening roller rotatable about an axis parallel to the rotational axes of the plate cylinder and the moisture supply roller, said bearing means comprising a bearing plate, a bearing sleeve mounted on the bearing plate and including a bearing hole eccentrically disposed with respect to the center axis of the sleeve, said sleeve being rotatably fitted in said bearing plate for adjustment purposes and said bearing plate being pivotal about said sleeve, and a stationarily mounted pivot pin received in said eccentric hole whereby pivoting of the bearing plate about the sleeve corresponding varies the spatial position of the rotational axis of the dampening roller with reference to the rotational axes of the plate cylinder and the moisture supply roller;
- rotatable mounting means having a center axis, said mounting means supporting said dampening roller on an axis eccentric with reference to said center axis;

setting means coacting with said mounting means for rotating the same, rotating of the mounting means laterally displacing the rotational axis of the dampening roller with reference to the rotational axes of the plate cylinder and the moisture supply roller into a position in which the dampening roller is spaced apart from the moisture supply roller but in contact with the plate cylinder and a position in which the dampening roller is in contact with the plate cylinder and the moisture supply roller; and actuating means coacting with said bearing plate for selectively pivoting the same about an axis parallel to the axis of the plate cylinder in a position in which the dampening roller is in engagement with the plate cylinder and the moisture supply roller or in a position in which the dampening roller is spaced apart from the plate cylinder but in engagement with the moisture supply roller or in a position in which the dampening roller is spaced apart from the plate cylinder and the moisture supply roller.

2. The assembly according to claim 1 wherein said actuating means comprise a two-arm lever, one arm of said lever coacting with said bearing plate for pivoting the same, and wherein said actuating means comprise control means coacting with the other arm of the lever for pivoting the same in one rotational direction through successive predetermined angles by operation of the control means, pivoting of the lever through a first predetermined angle and in said one rotational direction causing turning of said bearing plate into a pivotal position in which the dampening roller is moved from the position engaging both the plate cylinder and the moisture supply roller into the position engaging the moisture supply roller only, pivoting of the lever through a further predetermined angle and in the same rotational direction causing pivoting of said bearing

plate into the position in which the dampening roller is separated from both the plate cylinder and the moisture supply roller, and pivoting of the lever successively through both said angles but in opposite rotational direction causing pivoting of said bearing plate through pivotal positions in which the dampening roller is successively returned first into coaction with the moisture supply roller only and then with the plate cylinder also.

3. The assembly according to claim 2 wherein said control means comprise a rotatable shaft and a cam member secured upon said shaft and having differently shaped peripheral camming surfaces, said other arm of the lever being biased into engagement with said camming surfaces to follow the same as the cam member is turned and thus correspondingly pivoting the lever, and operating means coupled to the cam member for turning the same in either direction.

4. The assembly according to claim 3 wherein said operating means comprise a nose radially protruding from said shaft for rotation in unison therewith, a first and a second solenoid means each having a movable core biased to extend into the path of said nose when the respective solenoid means is deenergized thereby preventing rotation of the shaft and thus of the cam member, the core of the first solenoid means being spatially correlated with the nose and one of the camming surfaces of the cam member and the core of the second solenoid means being spatially correlated with the nose and the other camming surface, energization of the solenoid means causing withdrawal of the cores from the path of the nose whereby the state of energization of the solenoid means and said camming surfaces control pivoting of said lever through said predetermined angles, and control circuit means including a normally open switch means and a timer means, closing of said switch means causing energization of the first solenoid means and of the timer means and energization of the timer means causing energization of the second solenoid means after a predetermined period of time whereby energization of the solenoid means via the switch means and the timer means releases the shaft for turning the cam member into the angular positions causing pivoting of the two-armed lever through said predetermined angles.

5. The assembly according to claim 1 wherein said setting means comprise a spring actuated pin being guided in said bearing plate and being releasable by means of a knob and coacting with setting holes disposed in said mounting means; said mounting means comprising a sleeve being rotatably mounted in said bearing plate and having a bearing hole eccentrically disposed with respect to the center axis of said sleeve and carrying the axis of the dampening roller; said setting holes being circumferentially disposed on said sleeve, and rotation of said sleeve from one engaging position of the pin in one hole to the other engaging position of the pin in the other hole displacing the axis of the dampening roller from a position in which the dampening roller is in contact with the plate cylinder and the moisture supply roller in a position in which the dampening roller is in contact with the plate cylinder but spaced apart from the moisture supply roller.

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