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DAMPENING MECHANISM FOR LITHOGRAPHIC PRINTING PRESS

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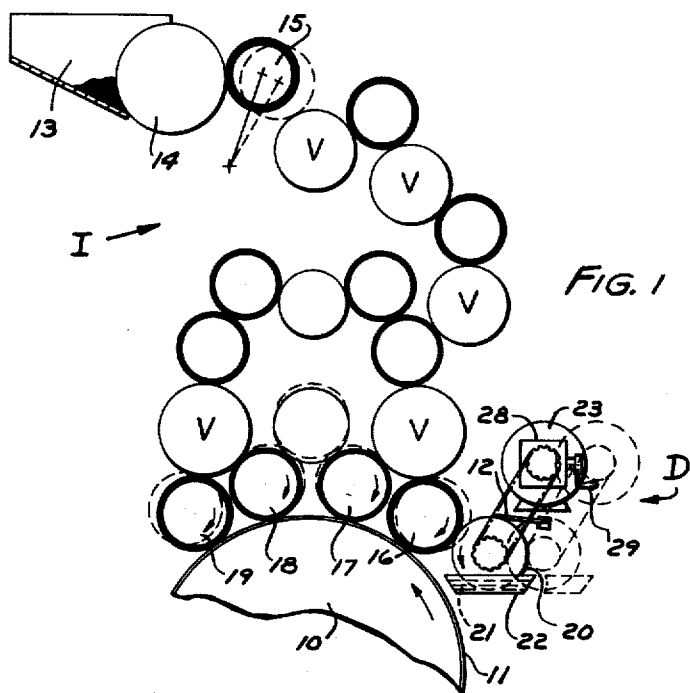


FIG. 1

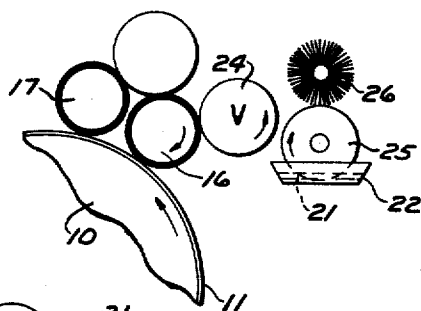


FIG. 2

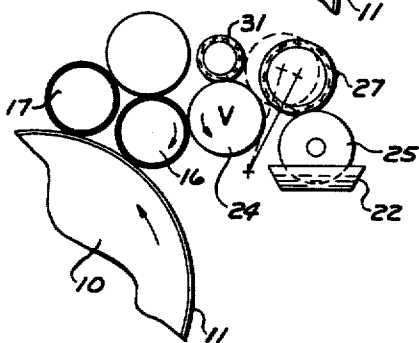


FIG. 3

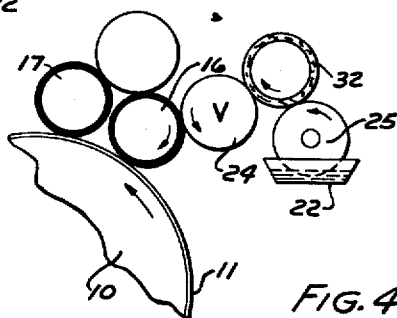


FIG. 4

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DAMPENING MECHANISM FOR LITHOGRAPHIC PRINTING PRESS

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12 Claims. (Cl. 101-148)

This invention relates to means for applying ink repellent solution to the surface of a lithographic plate mounted on a cylinder of a lithographic printing press.

The primary object of this invention is to provide a simple, inexpensive dampener for a printing unit of a lithographic printing press.

More specifically, the object of this invention is to provide a simple means for varying the quantity of dampening solution supplied through a portion of an inking system to the plate of a lithographic printing press.

Other objects and advantages will be apparent from the following description in which reference is made to the accompanying drawings.

In the drawings:

FIG. 1 is a simplified elevational view of a lithographic printing press unit embodying one form of the invention.

FIGS. 2, 3, and 4 are fragmentary elevational views similar to FIG. 1 illustrating alternative forms of the invention.

According to the invention, the first one of a plurality of ink form rollers of a lithographic printing unit is contacted by a dampening roller which is provided with means for adjusting the speed thereof to control the quantity of ink repellent solution ultimately applied to a lithographic plate on a plate cylinder of the unit.

Referring now to the drawings, a plate cylinder 10 of a lithographic printing unit has the usual lithographic plate 11 mounted thereon by any conventional plate clamp means (not shown).

An inker "I" includes an ink fountain 13, a fountain roller 14, an oscillating ductor roller 15, ink form rollers 16, 17, 18 and 19 and a train of rollers intermediate the ductor roller 15 and the ink form rollers 16-19. The train of rollers includes a bridge of rollers connecting the first pair 16 and 17 of the form rollers with the second pair 18 and 19. The rollers in the train connecting the ink fountain with the bridge contact the bridge at a point closer to the first pair 16 and 17 of form rollers than to the second pair 18 and 19, to supply the heavier charge of ink to the first pair as described in U.S. Pat. 2,448,975 of Harrold et al. The ink form rollers 16-19 and those other rollers in the ink train which are similarly illustrated in the drawings are customarily made of some ink receptive resilient rubber or composition material. The fountain roller 14 and vibrator rollers "V" of the ink train are conventionally metallic and each has a surface which is preferably of steel or steel plated with copper or other ink receptive material. The vibrator rollers "V" reciprocate in an axial direction in the usual manner to provide a lateral smoothening action of the ink as it travels down the ink train toward the plate.

A pan roller 20 of a dampening means "D" dips into solution 21 contained in a pan 22, and runs in contact with the ink form roller 16, which is the first form roller engaged by a given line across the plate 11 as the cylinder 10 rotates. The pan roller 20 may be driven by an auxiliary motor 23 through either a chain and sprocket or a V-belt drive. The roller 20 preferably has an aluminum or hard chrome surface which is desensitized by any known method to make it receptive to the ink repellent solution while at the same time maintaining it ink

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rejecting. Such a roller is readily distinguishable from a brush or loop type roller which has an interrupted surface made up of a multiplicity of brush or loop elements. Intermediate the motor 23 and the pan roller 20, any conventional means may be provided for varying the speed of the pan roller 20 as it rotates in contact with the first ink form roller 16. For example, the motor may drive through a gear reducer 28 which has a speed adjustment means illustrated simply by a handle 29. Or, if a V-belt drive is used, one of the belt pulleys may have an adjustable diameter. Preferably, the speed of the pan roller 20 is substantially less than the surface speed of the ink form roller 16, but may, depending on the speed of the press, the ink-water balance and numerous other variables, be almost any speed found desirable. By varying the speed of the pan roller 20, I am able to control the ink-water balance and can therefore control the quantity of solution 21 traveling from the pan 22 to the surface of the plate 11. If desired, water stops in the form of a plurality of resilient blades 12 may be positioned across the roller 20 and pressed against that roller with sufficient force to squeegee the solution from the roller to provide an additional control of the quantity of solution. By varying the pressure of certain ones of the water stops 12, lateral control of water distribution can be had for those printing jobs requiring the same.

FIG. 2 illustrates another form of dampening mechanism embodying the invention. In this embodiment, a vibrator roller 24 runs in contact with the ink form roller 16. The vibrator roller 24 takes the place of the roller 20 of FIG. 1 insofar as the control of the quantity of ink repellent solution is concerned. The vibrator roller may be of the same material and is also provided with any similar drive means and control means as illustrated and described for roller 20 of FIG. 1. The pan 22 in the FIG. 2 embodiment has a pan roller 25 which dips into the solution 21 and preferably rotates in the direction of the arrow. A cylindrical brush roller 26 runs in contact with the pan roller 25 and flicks moisture from the pan roller in minute droplet form toward and onto the adjustable speed vibrator roller 24. As the pan roller 25 rotates, it picks up a thin film of solution from the pan and presents it into position to be engaged and flicked by the bristles of the brush roller 26 with an impelling force sufficient to drive the droplets created by the flicking action toward and onto the roller 24.

The FIG. 3 embodiment is similar to FIG. 2, but this dampener utilizes a different type of means for getting the ink repellent solution to the adjustable speed vibrator roller 24. The means for carrying the liquid from the roller 25 to the roller 24 is a conventional ductor roller 27 which in this instance has an absorbent covering of molleton or similar material. Both rollers 24 and 25 in the FIG. 3 embodiment are preferably ink rejecting and water receptive so as to be kept clean of ink. If desired, a molleton-covered storage roller 31 may run in contact with roller 24 to supply that roller with dampening solution for those short intermittent periods while the ductor roller 27 is away from roller 24.

Referring now to the FIG. 4 embodiment, I here utilize a molleton-covered roller 32 in the place of the ductor 27 of the FIG. 3 embodiment. Roller 32 is mounted for pressure adjustment against pan roller 25, so that the quantity of solution reaching the plate 11 may be controlled in this manner as well as by controlling the speed of roller 24.

Referring once again to FIG. 1, I prefer to operate my mechanism in the following manner. When a printing job is to be commenced, I first start feeding ink from the fountain 13 down to the form rollers 16-19 with the form rollers being in their dotted line positions, i.e.,

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out of contact with the surface of the plate 11. At this time I also start operation of the pan roller 20 at an approximate preselected speed set in accordance to the type of job to be printed. Customarily, inkers are provided with means for automatically moving the ink form rollers 16—19 between their full and dotted-line positions. For example, with the press running and the form rollers in contact with the plate, should something occur in the printing operation which requires the printing to be discontinued, a conventional means is automatically operated to move the rollers 16—19 to their dotted-line positions and the press is simultaneously tripped to slow speed. Since, however, the ink repellent solution must keep the surface of the plate 11 wet during the short period normally required to correct the malfunction, the first form roller 16 must be kept in contact with the plate and the solution must continue to be fed from the pan 22 to the plate 11. Therefore, I desire that rolls 17, 18 and 19 be operated in the manner of known presses as heretofore, but provide that the roller 16 be disconnected from automatic operation and be normally spring-urged toward its dotted-line position of FIG. 1.

Returning again to starting up of the printing operation (the ink form rollers 16—19 in their dotted-line positions and the inker "I" inked, and the dampener "D" in its dotted-line position and dampened), I first move the dampening unit leftwardly as viewed in FIG. 1 toward but not fully into its full-line position, until the roller 20 engages the roller 16 while the roller 16 is still in its dotted-line position. This provides the roller 16 with both ink and a surface layer of ink repellent solution from the pan 22, due to contact of roller 16 by the roller 20 which is dipping in the pan. I then move the dampening unit "D" the rest of the way to its full-line position of FIG. 1 until the roller 20 pushes against the spring-urged roller 16 to cause the roller 16 to engage and run in contact with the plate 11. I may then let the cylinder make a few revolutions with only the form roller 16 in contact with the surface of the plate. During this time, both ink and water are being transferred to the plate simultaneously. After these few revolutions, I throw the remaining ink form rollers 17, 18 and 19 against the plate 11 either manually or automatically to fully ink the plate so that printing of sheets may now begin. At any later time during the printing operation when the press is subsequently tripped to slow speed, only the rollers 17, 18 and 19 will move to their dotted-line positions and rollers 16 and 20 will remain in their respective full-line positions.

While I have described the drive means for the variable speed roller 20 or 24 as being a separate drive, obviously the drive can come directly from the printing press itself, and can incorporate any kind of speed adjusting means. Furthermore, in each embodiment, the variable speed roller is preferably movable with the other rollers of the dampener as a unit toward and away from roller 16.

Various modifications may be made in the details of the construction without departing from the spirit and scope of the invention.

Having described my invention, I claim:

1. In a lithographic printing press including a plate cylinder having a printing plate thereon and a plurality of ink form rollers running in contact with the plate at the surface speed of the cylinder, an ink supply, roller means for continuously transferring ink from the supply to the ink form rollers, a dampening roller having an uninterrupted surface running in contact with that ink form roller which is in position to first lay ink onto a given line across the plate as the cylinder rotates, means for driving the dampening roller having an uninterrupted surface at a preselected speed different than the surface speed of the first ink form roller, and means for supplying ink repellent fluid to the dampening roller to run its surface, said surface of said dampening roller being recep-

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tive to said fluid applied thereto and at the same time nonreceptive to ink.

2. The invention set forth in claim 1 wherein the driving means for said dampening roller includes means for adjustably varying the output speed thereof.

3. The invention set forth in claim 2 wherein the dampening roller is partially immersed in ink repellent fluid contained in a pan.

4. The invention set forth in claim 2 wherein the means for supplying the ink repellent fluid comprises constant speed roller means spaced from the dampening roller.

5. The invention set forth in claim 4 wherein said constant speed roller means comprises means for creating a fog of finely divided particles of the ink repellent fluid suspended in air adjacent the dampening roller and for driving the particles toward and onto said roller.

6. In a lithographic printing press including a plate cylinder having a printing plate thereon and two pairs of ink form rollers running in contact with the plate at the surface speed of the cylinder, an ink supply, a bridge of ink rollers connecting the first pair of ink form rollers with the second pair, an ink roller train connecting the ink supply with the bridge of rollers at a point in said bridge closer to the first pair of ink form rollers than to the second pair, a dampening roller having an uninterrupted surface running in contact with the first ink form roller of the first pair, said first ink form roller being that one which is in position to first lay ink onto a given line across the plate as the cylinder rotates, means for driving the dampening roller to run its surface at a preselected speed different than the surface speed of the first ink form roller, and means for supplying ink repellent fluid to said dampening rollers, said surface of said dampening roller being receptive to said fluid applied thereto and at the same time nonreceptive to the ink on the first ink form roller.

7. The invention set forth in claim 6 wherein the driving means for said dampening roller includes means for adjustably varying the output speed thereof.

8. The invention set forth in claim 7 wherein the dampening roller is partially immersed in ink repellent fluid contained in a pan.

9. The invention set forth in claim 7 wherein the means for supplying the ink repellent fluid comprises constant speed roller means spaced from the dampening roller.

10. The invention set forth in claim 9 wherein said constant speed roller means comprises means for creating a fog of finely divided particles of the ink repellent fluid suspended in air adjacent the dampening roller and for driving the particles toward and onto said roller.

11. In a lithographic printing press including a plate cylinder having a printing surface thereon, an ink supply, roller means for continuously transferring ink from the supply to said printing surface comprising a plurality of ink transfer rollers, a dampening roller supported in pressure relationship with one of said ink transfer rollers and having an uninterrupted surface adapted to run in contact with said one of said ink transfer rollers, means for driving the dampening roller to run said uninterrupted surface at a speed different from the surface speed of said one of said ink transfer rollers contacted thereby, and means for supplying ink repellent fluid to said uninterrupted surface of the dampening roller, said uninterrupted surface being a surface which is receptive to the ink repellent fluid supplied thereto and at the same time relatively nonreceptive to ink.

12. In a lithographic printing press including a plate cylinder having a printing surface thereon, an ink supply, roller means for continuously transferring ink from the supply to said printing surface comprising a plurality of ink transfer rollers, means for applying a layer of ink-repellent dampening fluid onto a layer of ink on one of said ink transfer rollers including a dampening

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roller supported in contact with said one of said ink transfer rollers and having a hard metal cylindrically curved peripheral surface extending about the axis of the dampening roller coaxially therewith and which forms the peripheral surface on which the dampening roller is adapted to roll while in pressure relationship with said one of said ink transfer rollers and upon which the layer of ink-repellent fluid is formed for transfer onto the layer of ink on said one of said ink transfer rollers, means for driving the dampening roller to run said curved surface thereof at a speed different from the surface speed of said one of said ink transfer rollers to control the ink-dampening fluid relationship, and means for supplying dampening fluid to said surface of the dampening roller, said curved peripheral surface of the dampening roller being a surface which is receptive to

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the dampening fluid supplied thereto and at the same time relatively nonreceptive to ink.

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