This invention relates to lithographic offset printing machines, such as rotary sheet and web fed lithographic presses, wherein the image areas of the printing plate of the cylinder are ink or grease receptive and the non-image or non-printing areas have an affinity for moisture, and in particular, a rotary brush spaced from the printing plate and not having physical contact therewith, and means for conveying moisture to the brush whereby upon rotation of the brush moisture is atomized and bombarded against the surface of the printing plate and wherein means is provided for regulating the amount of moisture supplied to the brush.

The purpose of this invention is to provide means for moistening the surface of a printing plate of a lithographic offset printing machine without physical contact with the plate and wherein the amount of moisture supplied to the plate is controlled.

In the conventional method of applying moisture to printing plates of lithographic offset printing or planographic printing machines, a pair of rollers covered with a fibrous or other absorbent material and supplied with moisture by various devices are in continuous contact with the surface of the printing plate and with continuous use of rollers of this type the soft surfaces become crusty and greasy and distortions of images of the printing plates are prevalent. With the moisture applied continuously, the moisture builds up over the gap in the printing plate causing over-moistening of the leading edge of the plate. The excess water which accumulates in the dampening rolls must be disipated while the machine is in operation or the machine must be stopped to permit sufficient time for drying. Such rolls also deposit lint in the ink areas of the plate resulting in deterioration or wear of the images of the plates.

With this thought in mind, this invention contemplates an improved method of supplying moisture to the printing plates of lithographic offset machines without physical contact of the applying means with the printing plate, with means for withholding the moisture during passing of the gap between the ends of the plate, with means for controlling the amount of moisture supplied to the applying means and with means for adjusting the applying means laterally to compensate for paper or other sheets of material of different sizes.

The object of this invention is, therefore, to provide means for applying a proper amount of moisture to the printing plate of a lithographic offset printing machine without physical contact of the plate with the moisture applying means and with means for controlling the amount of moisture supplied to laterally disposed areas of the plate.

Another object of the invention is to provide moistening means for printing plates of lithograph offset printing machines by projecting a stream of moisture against the surface of the plate whereby the moisture is applied without physical contact of the applying means.

Another important object of the invention is to provide means for applying moisture to printing plates of lithographic offset printing machines without smearing or scumming the plate.

A further object of the invention is to provide means for applying moisture to printing plates of lithographic offset printing machines wherein the amount of moisture supplied to the plate is controlled.

A still further object of the invention is to provide an improved means for supplying moisture to printing plates of lithographic offset printing machines without physical contact of the applying means with the plates in which the device is of a simple and economical construction.

With these and other objects and advantages in view, the invention embodies a lithographic offset printing machine having a printing plate mounted on a cylinder with conventional inking rollers, and a brush rotatably mounted parallel to the cylinder and positioned with the surface of the brush spaced from the surface of the cylinder and in which means is provided for rotating the brush and also for regulating the amount of moisture supplied to the brush to be propelled against the plate.

Other features and advantages of the invention will appear from the following description, taken in connection with the drawings, wherein:

Figure 1 is a plan view of a portion of a lithographic offset printing machine showing an improved vapor producing brush positioned at one side of the printing plate cylinder with means for rotating the brush and also means for controllably conveying lithographic dampening solution up to the brush to be atomized and propelled against the revolving plate cylinder, the intermediate part of the machine being broken away.

Figure 2 is a cross section through the portion of the machine shown in Figure 1 illustrating the relative positions of the moisture supplying brush and dampening, operating and control means therefor.

Figure 3 is a longitudinal section taken on line 3—3' of Figure 2 showing the means of connecting the control means of the brush to the eccentric mounting of the blanket or rubber cylinder.

Figure 4 is a cross section similar to that shown in Figure 2 illustrating the relative positions of the moisture supplying brush and roller for conveying moisture up to be swept into the vapor stream.

Figure 5 is a section somewhat similar to that shown in Figure 4 showing an apron adapted to extend between the brush and moisture supplying roller for controlling the amount of moisture supplied to sections of the brush.

Figure 6 is a sectional plan taken on line 6—6' of Figure 5 showing the position of the moisture controlling apron at one side of the machine.

With this improved process of moistening the printing plate of a lithographic offset printing machine, the liquid is projected through space by the springy action of the bristles of the brush in being released from the moistened surface of the liquid supplying roller whereby the liquid is atomized and bombarded against or evenly distributed over the surface of the printing plate.

Referring now to the drawings, wherein like reference characters denote corresponding parts, the improved moistener for lithographic offset printing machines of this invention includes a rotary brush 10 mounted on a shaft 11, a water or other liquid supplying roller 12 positioned to extend into a tray 13, a cam 14 mounted on a shaft 15 of a cylinder 16 on which a conventional printing plate 17 is mounted, a variable speed transmission 18 for controlling the speed of the supply roller 12, a hand lever 19 for manually engaging the brush with the roller 12, when the blanket or rubber cylinder is in the off-impregnation position, and a rod 20 for engaging the brush with the water supplying roller when the blanket or rubber cylinder, as indicated by the numeral 21, is in the printing or in-
pression position. The rod 20 also moves the brush upward out of engagement with the roller 12 as the cylinder 21 moves to the off-impression position.

The shaft 11 of the rotary brush 10 is rotatably mounted in bearings 22 and 23 in the ends of arms 24 and 25, respectively, and the arms are adjustably mounted on the ends of a shaft 26 that is mounted in frame members 27 and 28 of the machine.

The arms 24 and 25 which are provided with bifurcated ends are adjustably secured to the shaft with bolts 29 and 30 which extend through extended ends thereof and which provide means for independently adjusting the positions of the arms, thereby making it possible to adjust the ends of the arms so that the roller 12 may be positioned parallel to the surface of the roller 12.

The brush 10 is rotated by a chain 31, trained over sprockets 32 and 33, and the sprocket 33 is positioned on the side of a pulley 34 whereby it is rotated by the pulley upon rotation of the pulley by a belt 35. The belt 35 extends to independent driving means whereby the rotary brush 10 is adapted to be rotated independent of the operation of the machine.

The arms 24 and 25 are positioned to rest upon discs 36 and 37 eccentrically positioned on a shaft 38 and with the shaft adapted to be actuated by the hand lever 19 or by a motor turned to adjust the pressure between the brush and the roller 12 or to elevate the brush 10 above the roller, as illustrated in Figure 2, when the machine is idling. The lever 19 is also adapted to actuate the discs 36 and 37 to bring the brush 10 into contact with the supply roller 13 after the machine has been idling or with the blanket or rubber cylinder in the off-impression position in order to supply moisture to the printing plate before the inking rollers are brought into contact with the plate and before printing pressure is applied. The arms 24 and 25 are urged against the surfaces of the eccentrically positioned discs 36 and 37 with springs 39 and 40, the upper ends of which are attached to the arms, as shown in Figure 4, and the lower ends of which are attached to a rod 41 mounted in the frame members 27 and 28.

The rod 41 is also provided with arms 42 and 43 which extend from the tray 13 and the extended ends of the arms are provided with hubs 44 and 45 that are secured to the rod with set screws 46 and 47. By this means the position of the tray 13 is adapted to be adjusted in relation to the supply roller 12.

As shown in Figure 5, the rod 41 is also adapted to be provided with arms 48 having hubs 49 on the lower ends with thumb screws 50 therein for adjusting the positions of the arms 48, and having hubs 51 on the upper ends in which a rod 52 is mounted and the rod 52 provides mounting means for aprons, as indicated by the numeral 53; the aprons extending between the supply roller 12 and the brush 10 whereby the bristles of the brush 10 contacting the roller 12 through teeth 54 extend from the extended end of the apron, means is provided for regulating the area of contact between the bristles and surface of the supply roller 12 whereby the amount of moisture supplied at the sides of the machine is adapted to be adjusted to compensate for the amount desired on the printing plate. By this means moisture may only be supplied to an area in which sheets of material are being printed or a comparatively small amount of moisture may be applied to the sides of the printing plate that are not being used to prevent ink from adhering thereto.

The supply roller 12 which is formed with a knurled or roughened surface is mounted on a shaft 55 that is rotatably mounted in the frame members 27 and 28 and, as illustrated in Figure 2, a gear 56 mounted on one end of the shaft 55 meshes with a gear 57 on a shaft 58 that extends from the variable speed transmission 18 and on which a gear 59 that meshes with a gear 60 on the shaft 15 of the plate cylinder is positioned. By this means the speed of the moisture supply roller 12 is adjustable in relation to the speed of the plate cylinder, this speed ratio being controlled by a hand crank 61 to correspond with requirements of different jobs being performed by the machine, and the like. It will be understood that with this arrangement the speed ratio between supply roller 12 and the plate cylinder will be maintained with increases and decreases in press speed. The variable speed transmission is conventional, and it will be understood that a unit of any suitable design may be used. The plate cylinder 16 and the printing plate 17 are also conventional, and as illustrated in Figure 4, the ends of the plate are held by mounting elements 62 and 63 with the gap 64 provided between the ends of the plate and to prevent moisture being supplied to the printing cylinder as the gap passes the brush 10; the brush 10 being elevated to such a position that it is spaced from the roller 12. The brush is actuated as a lobe 65 when the cam 14 engages a roller 66 in an arm 67 on the arm 24 whereby at the time the gap is passing the brush 10 the brush is elevated to the inoperative position shown in Figure 2. Although the arm 67 is shown as being attached to the arm 24 with screws 68 it is understood that the roller 66 may be attached to the brush mounting elements by other suitable means and the cam for actuating the roller may also be of any other suitable design.

The cam 14 is secured on the shaft 15 with clamping screws 69 and 70 that are threaded in lugs 71 and 72 of the cam and that extend through similar lugs 73 and 74 of a complementary member 75. It will also be understood that the cam may be mounted by other suitable means.

The positions of the discs 36 and 37 which elevate the brush are automatically adjusted with the movement of the blanket or rubber cylinder to the idling position wherein the blanket or rubber cylinder is spaced from the plate cylinder or to the upper or printing position, by the rod 20, the lower end of which is connected to the impression throw on link through a collar 77, as illustrated in Figure 3. The collar 77 with which the blanket cylinder eccentric arm 78 is connected to the blanket cylinder eccentric 79 is positioned between washers 80 and 81 and the plate is adjustably secured to the link 76 with adjusting nuts 82 and 83.

The upper end of the rod 20 extends through an opening in a head 84 on an extension 85 of an arm 86 extended from the lower end of the lever 19, and the head is resiliently held by springs 87 and 88, positioned on the rod 20, and adjustably held by set collars 89 and 90.

Probably no other factor involved in the lithographic offset printing process controls or limits production and quality of work so much as the conventional dampener roller method of moistening the plate on the press.

A study of these problems and disadvantages of the conventional dampening system will bring to light the solution lies in a method of conveying moisture to the plate without physical contact of the plate and the moisture source and with a more exacting and responsive overall and lateral control across the plate.

Following are listed some of the problems and disadvantages encountered in the conventional dampening method which will be eliminated by the use of this brush type dampening method:

1. The cost of dampener covering materials.
2. Costly down time of press and labor necessary to change and reset dampeners when they are worn or too dirty for job or too worn and dirty to prevent scumming of plate.
3. The excess water which may accumulate in dampener rolls must be dissipated while running or machine must be stopped to allow sufficient time for drainage.
4. Dampeners must daily run in and time allowed to wet up evenly.

1. A means for automatically adjusting the speed of the moisture supply roller 12 in relation to the speed of the plate cylinder, this speed ratio being controlled by a hand crank 61.
2. A means for automatically adjusting the speed of the plate cylinder in relation to the speed of the moisture supply roller 12.
3. A means for automatically adjusting the speed of the plate cylinder in relation to the speed of the moisture supply roller 12.
4. A means for automatically adjusting the speed of the plate cylinder in relation to the speed of the moisture supply roller 12.
5. A means for automatically adjusting the speed of the plate cylinder in relation to the speed of the moisture supply roller 12.
6. A means for automatically adjusting the speed of the plate cylinder in relation to the speed of the moisture supply roller 12.
7. A means for automatically adjusting the speed of the plate cylinder in relation to the speed of the moisture supply roller 12.
8. A means for automatically adjusting the speed of the plate cylinder in relation to the speed of the moisture supply roller 12.
9. A means for automatically adjusting the speed of the plate cylinder in relation to the speed of the moisture supply roller 12.
There is the problem of lint in the inked areas of the plate, especially in new dampeners.

Inability to get and hold exact lateral control of moisture across the plate. This causes “washed out” areas as well as “catch-ups.” Also causes the sticking of sheets when water slings to the delivery stack due to excess water in certain areas.

The deterioration or wear of the images and plates and the distortion of images caused by dampener friction.

The inability to get immediate increases or decreases in overall moisture film or to vary immediately local areas.

The inability to get immediate pH changes due to the reserve of moisture in the dampeners.

The problem of over-moistening the leading edge of the plate due to a build-up of moisture in the gap.

Probably more plates are lost (on the press) due to faulty dampening control than any other reason.

The study of these problems and disadvantages of the conventional dampener system will indicate that the solution lies in a method of applying a proper amount of moisture to the plate without physical contact of the plate and the source and with a method of more exacting overall and lateral control across the plate.

It will be understood that modifications, within the scope of the appended claims, may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

1. In a printing plate moistener for a lithographic offset printing machine having a rotatable plate cylinder with a lithographic offset printing plate mounted thereon, the combination which comprises, an elongate cylindrical brush rotatably mounted on the machine in spaced parallel relationship to the exterior side of the plate; an elongate liquid retaining tray mounted on the machine and extending parallel to the brush; a quantity of wetting liquid in said tray; an elongate liquid supply roller rotatably mounted on the machine parallel to the brush, having one side thereof immersed in said liquid and the other side thereof in rotative contact with the brush with the peripheral surface of the roller impressed into the bristles of the brush, whereby upon release of the bristles from the roller, as the roller and brush rotate, the liquid on the surface of said roller is atomized and projected against the surface of the printing plate as the plate is rotated; means to rotate the brush, roller, and plate cylinder; and adjusting means at the ends of the brush for adjusting the position of the brush with relation to the liquid supply roller.

2. In a printing plate moistener for a lithographic offset printing machine having a rotatable plate cylinder with a lithographic offset printing plate mounted thereon, the combination which comprises, an elongate cylindrical brush rotatably mounted on the machine in spaced parallel relationship to the exterior side of the plate; an elongate liquid retaining tray mounted on the machine and extending parallel to the brush; a quantity of wetting liquid in said tray; an elongate liquid supply roller rotatably mounted on the machine parallel to the brush, having one side thereof immersed in said liquid and the other side thereof in rotative contact with the brush with the peripheral surface of the roller impressed into the bristles of the brush, whereby upon release of the bristles from the roller, as the roller and brush rotate, the liquid on the surface of said roller is atomized and projected against the surface of the printing plate as the plate is rotated; means to rotate the brush, roller, and plate cylinder; and means for adjusting the position of the liquid retaining tray in relation to the liquid supply roller.

3. In a printing plate moistener for a lithographic offset printing machine having a rotatable plate cylinder with a lithographic offset printing plate mounted thereon, the combination which comprises, an elongate cylindrical brush rotatably mounted on the machine in spaced parallel relationship to the exterior side of the plate; an elongate liquid retaining tray mounted on the machine and extending parallel to the brush; a quantity of wetting liquid in said tray; an elongate liquid supply roller rotatably mounted on the machine parallel to the brush, having one side thereof immersed in said liquid and the other side thereof in rotative contact with the brush with the peripheral surface of the roller impressed into the bristles of the brush, whereby upon release of the bristles from the roller, as the roller and brush rotate, the liquid on the surface of said roller is atomized and projected against the surface of the printing plate as the plate is rotated; means to rotate the brush, roller, and plate cylinder; and means for actuating the moistener to stop the supply of liquid to the printing plate with the machine idling, and manual actuating means for supplying moisture to the printing plate with the machine idling.

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