

Dec. 21, 1937.

H. C. OSBORN

2,102,641

METHOD OF AND APPARATUS FOR PLANOGRAPHIC PRINTING

Filed Nov. 22, 1934

2 Sheets-Sheet 1

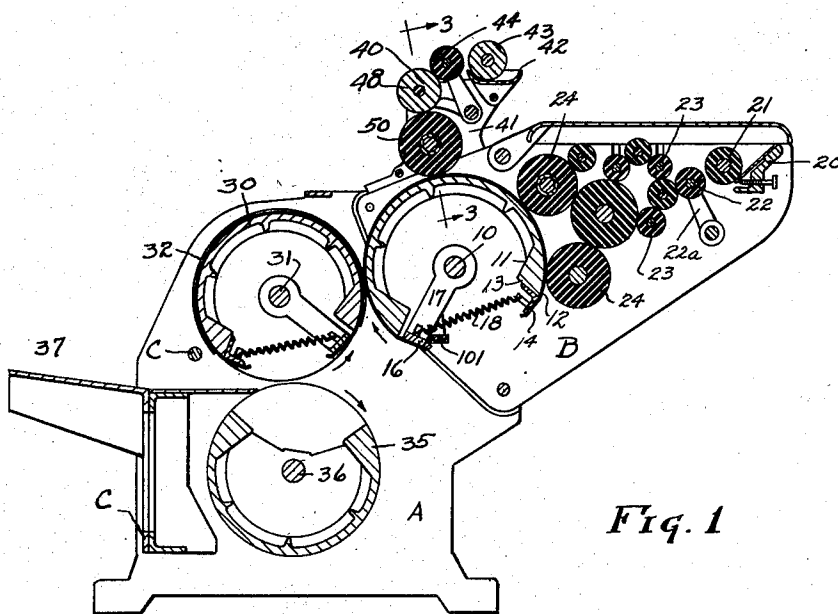


Fig. 1

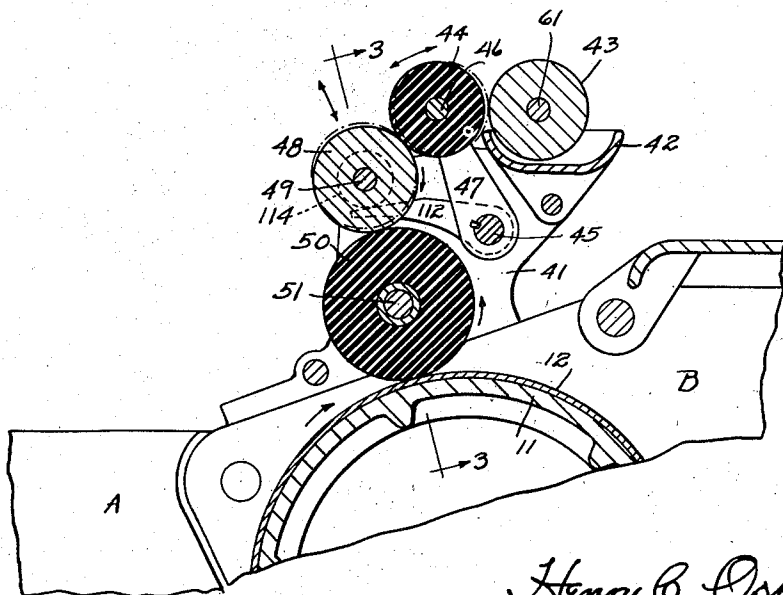


Fig. 2

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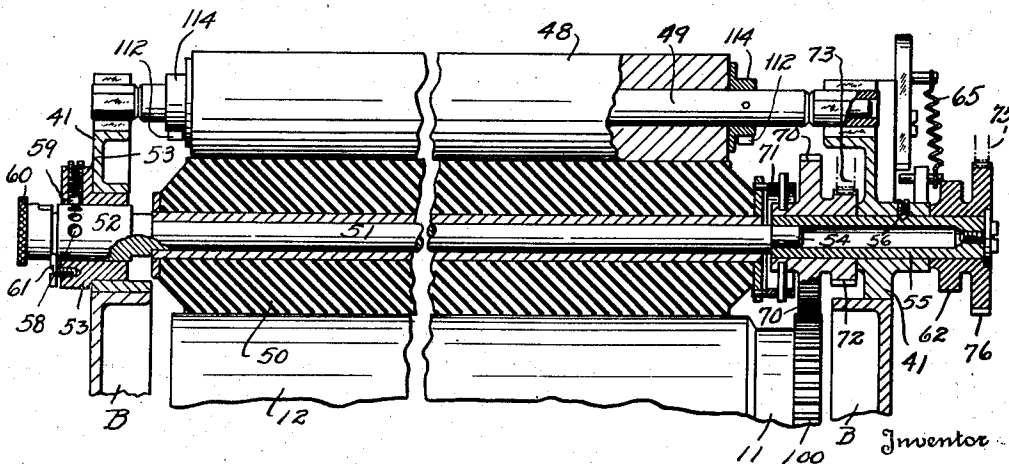
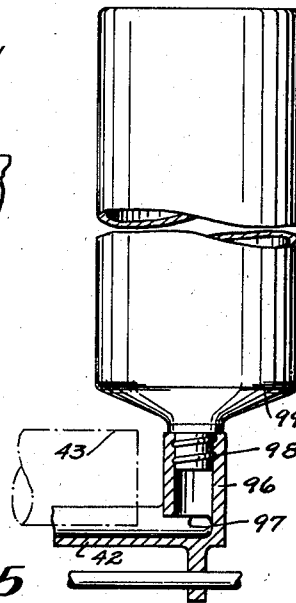
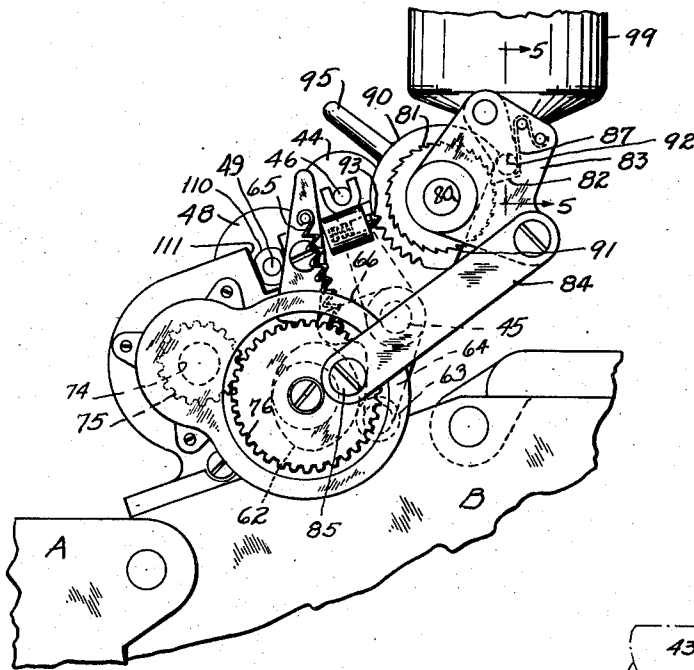


Fig. 3

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UNITED STATES PATENT OFFICE

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METHOD OF AND APPARATUS FOR PLANOGRAPHIC PRINTING

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tion of Delaware

Application November 22, 1934, Serial No. 754,247

10 Claims. (Cl. 101-148)

This invention relates to a method and apparatus for planographic printing, and is especially concerned with a method and apparatus for applying an ink repellent to a printing plate used in a planographic printing system.

In general, planographic printing systems employ a metallic printing plate, usually zinc or aluminum. Such plates are treated, by methods well known in the planographic art, to render their non-image areas receptive to an ink repellent. The ink repellent is generally in the form of a liquid and during the printing operation is continually applied to the printing plate so that the ink will not adhere to the non-image areas thereof. Thus, the non-image bearing portions on the printing plate during the printing operation carries a thin film of moisture or repellent. An inking roller is brought into contact with the printing plate and the image areas thereof are supplied with ink, the repellent on the non-image bearing areas preventing the ink from adhering to such areas. Generally ink on the image is then removed from the printing plate by a suitable offset roll and transferred to the article to be printed. The plate is again furnished with a fresh application of ink repellent and ink and the operation is repeated continuously. The general object of this invention is to provide a method and apparatus for applying an ink repellent solution to the printing plate in such a manner as to enhance the reproduction of the design or image.

In the past it has been the practice to apply the ink repellent to the printing plate by a dampening roller, which generally comprised a brass core covered with successive layers of flannel, and an outside layer or covering of molleton or other cotton fabric. Occasionally, cushioning layers of other materials have been used instead of the flannel, such layers being surrounded by an outer cover of molleton, as in the case of the flannel layers. A distributor roller was used to supply the repellent to the dampening roller. The distributor roller was usually a smooth brass roll, which was generally assembled in the same frame as the printing plate or in a directly associated frame.

Great care has been exercised in inking the plate to apply the ink evenly and in proper amounts to the image, so as to enable a faithful and accurate reproduction of the image without blurring or raggedness of the impression. For this purpose complicated inking mechanisms have been devised in which much attention has been paid to the smoothing and distributing of the

ink by various rolls, which have been made of carefully selected materials to obtain rolls having specific surface characteristics to better accomplish the distribution of the ink.

In the past little or no attention has been paid to the action of the repellent applicator system on the plate other than to attempt to secure the proper amount of repellent to prevent the ink from adhering to the non-image bearing areas of the printing plate. I have found that the fabric-wrapped repellent applicator roller affects the distribution of the ink over the image bearing areas in several ways. First the fabric surface of the roller is uneven, and the lint or short fibers in the fabric form ridges on the surface of the roller which increase with the use of the roller. It is well known, that after the inked image has been transferred from the plate to the offset roll or article to be printed, a considerable quantity of ink still remains on the image—indeed a sufficient amount to make several impressions. Test impressions made in the absence of the repellent roll indicate that this surplus ink is evenly distributed over the image.

In the normal operation of a planographic printing press, the plate with ink retained thereon after one impression or transfer has been made, is subjected to the action of the repellent applicator roll. I have found that the roughened or linty surface of the repellent applicator roll disturbs the evenness of the surplus ink on the plate to such an extent that even though utmost care is used in subsequently applying ink to the plate, the result is that the coating ink on the image is somewhat uneven and a poor impression is liable to result. The lint ridges on the applicator roll seem at times to cause the ink remaining on the plate to form in ridges thereon thereby causing raggedness of the impression. An object of the present invention is to provide a repellent applicator to overcome this disadvantage and thereby facilitate the making of more accurate reproductions, and I prefer to accomplish this object by the provision of a repellent applicator which will present at all times a smooth surface to the printing plate.

A smooth surfaced rubber applicator roll will not become saturated with ink as does a fabric-covered roll. However, the roll does pick up some of the ink remaining on the plate after an impression has been made, but the use of a rubber roll turns this from a disadvantage to an advantage, because such roll picks up the ink from blemished portions of the non-image areas of the plate and, due to the difference in peripheral

lengths of the printing drum and the rubber roll, will transfer such ink to available portions of the image on the printing plate.

Another disadvantage of the fabric covered repellent applicators is the fact that they are difficult to adjust, to control, with any degree of accuracy, the amount of liquid repellent applied to the printing plate. I find that the fabric acts as a reservoir which at the outset must be filled with repellent before the actual printing operations can take place. I also find that because the adjustment of the supply of repellent is difficult, generally too much is supplied. This is especially true when the press is operated by a non-professional, as is the case with office equipment. Some of the excess supply of repellent seems to be left in minute globules on the ink remaining on the image of the printing plate after an impression has been made. When the inking rollers contact with these globules of repellent an emulsion is formed, thereby changing the nature of the ink itself and resulting in an impression which seems to smear readily.

Another object of the present invention is to provide a method and apparatus easily adjustable to apply the proper amount of repellent to the printing plate and eliminate the adherence of surplus repellent on the image bearing areas of the printing plate. I prefer to accomplish this by applying the repellent to the printing plate with a compressible, non-liquid-absorptive roll. I find that such a roll has an added feature, namely, if the condition of the plate and speed of the press is such that it is desirable to provide contact with the plate of an excess amount of repellent, such excess may be fed to the applicator roll and the pressure of the roll controlled so that it will act on the plate as a squeegee and remove any excess repellent, such excess forming a wave extending along and in front of the line of contact between the roll and the plate, and dropping into the gap in the drum which carries the printing plate. The gap in the drum may be provided with a suitable absorbant material to take up the excess.

To prevent oxidation of the printing plate, which would negative the treatment given to the non-image portions of the plate to make such areas repellent, substances including certain salts are added to the solution and render it slightly acid. Unfortunately, due to the acidity of the solution, an electrolytic action is set up which is detrimental to the plate and especially to the image-bearing areas.

The electrolytic action tends to corrode the printing plate and changes the "pH" of the solution to such an extent as to render the solution less capable of acting as an ink repellent. This electrolytic action is caused by the formation of an electrolytic cell, in which the repellent fluid acts as an electrolyte, the machine frame as an external circuit, the printing plate as an anode, and the metallic portion of the liquid feeding rollers as a cathode. This condition is especially noticeable where the printing plate is made of zinc or aluminum, and a brass or other metallic member is used in the repellent applicator system.

Several methods have been advanced to eliminate this electrolytic action. Such as, for instance, the making of some or all of the rollers in the ink repellent applicator system of the same material as the plate, or of a non-metallic composition, or of a material having the same electric potential as the printing plate. Such methods of elimination have disadvantages which are difficult to over-

come. To make the applicator roller, which contacts with the plate, of metal would not permit the use of such roller as a squeegee roller and would make adjustment of the amount of repellent to be applied difficult, with the attendant disadvantages heretofore mentioned.

If an attempt is made to eliminate the electrolytic action by the use of non-metallic members throughout the applicator system, it is often difficult to keep such members from becoming clogged or covered with printing ink. Many other disadvantages have been encountered in such system, nor is the situation improved by insulating the bearings of the rollers to interrupt the outside circuit (as has been proposed) as this increases the undesirable static electricity in the press.

To overcome the formation of an electrolytic cell, I prefer to make the repellent applicator roll, which contacts with the plate, of a material which will not act as a cathode or as a conductor of electric energy, preferably of rubber or a composition having similar characteristics. I thereby eliminate any chance of electrolytic action being formed between such applicator roller and the printing plate. However, to prevent such roller from becoming covered with ink, requiring frequent removal for cleaning purposes, I may provide a metallic distributor roll, which will be arranged to contact with the non-metallic roll and act not only to distribute the repellent to such roll, but to maintain the applicator roll comparatively free from ink which may pass to it from the plate. I believe this latter result is accomplished by a breaking up of ink on the non-metallic roll by the metallic roll, so that such ink is returned to the printing image. At any rate, regardless of the actual action and reaction taking place, a metallic distributor roll coacting with a rubber roll accomplishes the result set forth.

By using a repellent applicator roll having a non-absorbent non-metallic surface in connection with the metallic roll, I find that notwithstanding such metallic roll might constitute a cathode and the printing plates an anode, I am still able to prevent for all practical purposes electrolytic action from taking place. The repellent applicator roll having a surface which will not absorb liquid repellent materially decreases the action of the electrolytic cell. The return stretch of the applicator roll between the printing plate and the distributor roll, which stretch or surface has given up the greater part of its repellent to the printing plate, is comparatively dry due to the squeegee action of the roll, and hence any electrolytical energy must pass through the thin film of liquid repellent on the opposite surface of the applicator roll, and as such portion of the roll is covered with only a minimum amount of repellent the resistance to the passage of electrical energy is great. I further increase such resistance by lengthening the peripheral distance on such roll by employing a roll of comparatively large diameter. Thus by thinning the film and lengthening it, I increase the resistance until it is so great that for all practical purposes it will prevent any electrolytic action from taking place, even though the elements of an electrolytic cell be present. This, therefore, is another feature of the invention.

Other features of my invention will be hereinafter more fully set forth in connection with the following description, which refers to a preferred form of apparatus, shown in the accompanying

drawings, and which may be used to carry out my improved method. The essential features of the invention will be set forth in the claims.

Referring now to the drawings, Fig. 1 is a centrally located vertical section through the planographic printing press having my improved repellent applicator incorporated therein; Fig. 2 is a fragmentary sectional view, of the press shown in Fig. 1, illustrating my improved repellent applicator on an enlarged scale; Fig. 3 is a fragmentary sectional view of the repellent applicator indicated by the line 3-3 on Figs. 1 and 2; Fig. 4 is a side elevation of my repellent applicator looking from the right-hand side of Fig. 3; Fig. 5 is a fragmentary sectional view, as indicated by the line 5-5 on Fig. 4.

Referring again to the drawings, and especially to Fig. 1, I illustrate one form of planographic printing machine, in which my improved repellent applicator is arranged to carry out my method. Such printing machine comprises in general a pair of frame plates A spaced apart by suitable transverse frame members B. A pair of supplemental frame plates are secured to the frame members A and support certain parts of the inking mechanism and the repellent applicator, as will hereinafter be more fully described.

Journalled in the frame plate B is the pattern roll shaft 10, on which a suitable pattern roll 11 is drivingly secured. This roll carries on its periphery a planographic printing plate 12, having an image to be reproduced thereon in the usual manner. As shown, the printing plate 12 is removable from the roll 11, the end portions of the roll being held within a gap 13 in the pattern roll.

The printing plate 12 comprises a comparatively thin, flexible, metallic member. One end of this plate is first secured to the roll 11, as at 14, after which the plate is wrapped about the periphery of the roll and at the other end is engaged in a suitable manner by a retaining plate 16. The retaining plate 16 is supported by suitable arms 17, which extend into the gap 13 in the roll 11, and rotatably supported on the shaft 10. Suitable springs 18 are interposed between the arm 17 and the roll 11, to draw the plate 12 tightly into contact with the periphery of the roll to maintain it taut during the printing operation.

The pattern roll is inked by a suitable inking mechanism. Such inking mechanism may be of any well-known type and is preferably supported in the frame member B. As shown in Fig. 1, the inking mechanism comprises an ink fountain 20 having the usual fountain roll 21. The ink is removed from the fountain roll by a ductor roll 22, which oscillates between the fountain roll and one of a series of distributor rolls 23 carried by the frame B. The rolls 23 act to evenly distribute the ink to suitable form rollers 24, which engage and transfer the ink to the image of the plate.

The inked image on the plate 12 is transferred to the surface of an offset roll 30, which lies forwardly (to the left in Fig. 1 of the pattern roll 11). As shown in Fig. 1, the offset roll 30 comprises a cylindrical roll, similar to the pattern roll, and is drivingly mounted on a suitable shaft 31. An offset blanket 32 composed of rubber or other suitable ink-transferring material is mounted on the periphery of the roll 30 in the same manner as the pattern plate 12 mounted on the pattern roll 11.

The ink pattern or image which is transferred to the offset roll 30 from the pattern roll 12 is impressed on or transferred to the material to be

printed by such offset roll. As shown in Fig. 1, a suitable platen roll 35 is drivingly mounted on a shaft 36, which is journalled in the frame plates A. The material to be printed is fed over the surface of a suitable guide table 37 into the bite of the offset roll 30 and the platen 35, and thereby receives the impression from the offset roll.

The pattern roll, the offset roll, and the platen roll 30, as well as certain rolls in the ink fountain, may be driven in any well-known manner. Suffice it to say that a gear 100 (Fig. 3) is secured to the pattern roll 11 and drives the repellent applicator, hereinafter more fully described in detail.

My improved repellent applicator 40 comprises a series of rolls and a fountain, all of which are mounted between a pair of frame plates 41 which are secured to the frame plates B, heretofore mentioned. As shown in Figs. 1, 2 and 6, the quantity of repellent, which is a chemical solution, is carried in a suitable fountain trough 42. The repellent in the fountain is automatically replenished from time to time, as will be hereinafter more fully described.

Suitable mechanism is provided to transfer the repellent from a fountain 42 to the printing plate 12, in a manner capable of fine adjustment, so that repellents which are required in comparatively small amounts may be applied with a high degree of accuracy. Such repellents are generally chemical solutions, and are usually more viscous than water and slightly acid. These repellents are transferred from the fountain 42 to the pattern roll in such a manner as to prevent an excess amount of repellent from remaining on the printing plate and in a manner such as will prevent any electrolytic action taking place between the plate and the repellent applicator mechanism, either of which would be detrimental to the accuracy of the reproduction.

Mounted with the lower edge in the fountain 42 is a fountain roll 43. This roll is preferably a metallic roll having a knurled or otherwise roughened surface. This roughened surface enables the roll consequent upon its rotation to pick a quantity of repellent from the fountain and carry it upwardly on its surface, so that it may be transferred to a suitable ductor roll 44. As hereinafter described, this roll 43 is intermittently given step by step rotation, with short periods of rest, permitting surplus liquid to drain from it.

The ductor roll 44 preferably comprises a non-metallic or composition roll. The roll is mounted on a shaft 46 journalled in the upper end of a pair of arms 47, carried by a shaft 45, which, in turn, is journalled in the frame plate members 41. The shaft 46 is oscillated to cause the ductor roll 44 to alternately move in contact with the fountain roll 43 and a suitable distributor roll 48. The ductor roll is made of insulating material and therefore prevents any electrical circuit being formed between the fountain roll and other rollers in contact with the ductor. The distributor roll 48 is preferably, as heretofore mentioned, a smooth surfaced roll, such roll may be a metal roll for purposes heretofore set out. The distributor roll 48 is carried by a suitable shaft 49, which is mounted in the frame plate 41 and serves to transfer the repellent to a form roll 50, which is rotatably mounted on a suitable shaft 51 carried by the frame plate 41.

The form roll 50 preferably comprises, for purposes heretofore set out in detail, a resilient, smooth-surfaced, non-liquid-absorptive roller,

and I find that a rubber-surfaced roller has the desired characteristics. Likewise, the form roll 50 being of rubber, which is a non-conductor of electrical energy, will not form any part of a circuit between the metal distributing roll 48 and the pattern plate 12. It will be noted that the roll 50 is larger in diameter than the roll 48, and hence the peripheral distance on the roll 50 between its line of contact with the printing plate and its line of contact with the distributing roll is comparatively great. I find that this distance, together with the fact that only a small quantity of repellent is carried by the roll 50, causes the resistance of the repellent solution to electrical energy to be so great as to prevent practically any transmissal of electrical energy from the distributor roll 48 to the plate 12.

As shown, the form roll has a smooth, resilient surface, with no liquid absorbing qualities, and the metallic distributor roll presents a smooth surface to ink which may remain on the surface of the form roll after its contact with the pattern. I have found that by so arranging such rolls, the surface characteristics thereof prevent the accumulation of any undue amount of ink on the form roll, or the transfer of such ink to the distributor roll, thereby eliminating the necessity of cleaning the rolls at frequent intervals. Likewise, if cleaning is desired, such smooth, non-liquid-absorbing surfaced rolls are readily cleaned without removing them from the press,—an advantage lost when fabric covered rolls are used. At the same time, the distributor roll acts to smooth out any ink which is transferred to the form roll 50 by the printing plate and so distributes it that when it is reapplied to the plate it will not disturb the evenness of the film of ink to be applied by the inking mechanism.

As shown in Figs. 3 and 4, the fountain roll 43 and the form roll 50 are positively driven. The form roll 50 is rotatably journaled on a shaft 51, one end of which has an eccentric portion 52, which is journaled in a bushing 53. The other end has an eccentric stub 54, which is journaled in a bushing 55 secured to the frame plate 41 by means of a suitable screw 56. Thus, by rotating the shaft by means of a knob 60, the shaft may be adjusted to move bodily to or from the printing plate 12, thereby regulating the pressure between the roll 50 and the printing plate or pattern 12.

As shown in Fig. 3, the left-hand end of the shaft is provided with a series of notches or recesses 58, which coact with a spring-pressed plunger 59, so that the shaft may be readily positioned to any one of a number of predetermined positions, thereby enabling the pressure of the roll on the printing plate to be regulated. This arrangement also retains the shaft in the desired position. The bushing 53 which is eccentrically mounted in the frame and is given a partial rotation to raise or lower the left-hand end of the shaft 51, thereby permitting the operator to align the roll 50 accurately with the printing plate 12, so as to enable the entire length of the roll to contact evenly with the plate. A suitable screw 61 secures the bushing in place once it is adjusted.

The adjustment of the roll 50 by turning the shaft 51 regulates the amount of repellent left on the plate by varying the squeegee action of the roll. This permits the feeding of an excess amount of repellent to the roll 50 to insure a thorough dampening of the plate with the repellent, while at the same time limiting the amount

of repellent actually deposited on the plate. The excess repellent forms in a bead or wave extending along and in front of the line of contact between the roll 50 and the plate. Such excess may drop into the gap in the drum where it may be absorbed by any suitable absorbent material, such as is indicated at 101, Fig. 1.

As the roll 50 acts on the plate as a squeegee, it is obvious that it may likewise act as a squeegee on the hard surfaced distributor roll 48. Ordinarily, this latter squeegee action could, for all practical purposes, be disregarded. However, I contemplate the use of my repellent applicator in office printing equipment which, for the most part, will be operated by non-professional or inexperienced help. Therefore, provision should be made for the disposal of any excess repellent which may possibly form at the line of contact between the rolls 50 and 48.

The disposal of this excess is also advantageous as, when the machine is used for uninterrupted operation over long periods of time. In such instances, the repellent remaining on the roll 50 after the contact with the plate may accumulate at the line of contact between the rolls 48 and 50.

In the event of an abnormal accumulation of repellent at the bite of the rolls 48 and 50, I find that the repellent may be unevenly distributed to the plate by the form roll 50. If this excess is permitted to continue for a material period of time, it may flow to the plate around the surface of the roll 50 in a reverse direction despite the direction of rotation of the roll. In such instances, the repellent would drop to the surface of the plate between the repellent applicator and the inking mechanism. The plate, therefore, would have an excess amount of repellent distributed unevenly, over its surface, resulting in a faulty application of ink, as well as lessening the resistance to electrical energy of the film of repellent on the roll 50, by bridging the gap between the plate and the distributor roll with a heavy film of repellent.

To prevent accumulation of repellent before the line of contact between the rolls 48 and 50, I prefer to periodically raise the roll 48 from contact with the roll 50, and thereby permit any excess repellent to be distributed around the periphery of the rolls 48 and 50. As shown in Fig. 4, the roll 48 is mounted in bearings 110, which are slidably mounted in ways 111, in the frame members 41, so that this roll may slide in the frame upwardly, out of contact with the roll 50 and in such a manner that it will likewise be moved out of contact with the ductor roll 44, while the latter is in contact with the fountain roll. To effect the periodic raising and lowering of the roll 48, I prefer to provide, as shown in Fig. 2, a pair of levers or arms 112, which are rigidly secured to the shaft 45, heretofore described, and the outer ends of which are arranged to engage flanges 114, carried by the roll 48. The rocking movement of the shaft 45 hereinafter described in detail serves to periodically raise the roll 48 in the direction of the arrow in Fig. 2, the weight of the roll retaining it in contact with the arms 112. I find that such an arrangement prevents the accumulation of an undue amount of repellent between the rolls 48 and 50.

The roll 50 is driven from the pattern roll 11 through the medium of a gear 100, heretofore mentioned. As shown in Fig. 3, the gear 100 meshes with a gear 70 of a composite gear mem-

ber which is journaled on the bushing 55, and which is drivingly connected with the roll 50, through the medium of an Oldham coupling 71. The inter-engaging portions of the coupling 71 have sufficient lost motion to permit the roll 50 to be driven, under frictional influence with the printing plate 12 and at a slightly greater speed than the positive drive of the gear. The roll 50 is positively driven across the gap of the pattern roll to secure a fresh supply of repellent at all times, but when in engagement with the plate 12, it has a true rolling action thereon, preventing difference in peripheral speed between the two. The coupling also provides for non-alignment of the axis of the roll and the axis of the driving gear.

The ductor roll shaft 46 is oscillated by a cam 62, which is rotatably mounted on the bushing 55, heretofore described, and which coacts with a roller 63 carried by one arm of a bell crank 64, and which is rigidly secured to the ductor roll supporting shaft 45. A suitable spring 65 interposed between the other arm of the bell crank 66 and a relative stationary part of the mechanism maintains the roller 63 in contact with the periphery of the cam 62.

The cam 62 is driven by the gear 100, heretofore mentioned. The gear 100 meshes with a gear 70 of a composite gear member, which also carries a gear member 72 meshing with a gear 73, which is secured to a stub-shaft 74 journaled in a suitable bushing carried by the frame member 41. A suitable gear 75 is rigidly secured to the stub shaft 74 and meshes with a gear 76, which is drivingly secured to or integral with the cam member 62, thereby rotating the cam member.

The fountain roll 43 is intermittently given a partial rotation by the gear 76. As shown in Fig. 4, the fountain roll 61, Figs. 2 and 4, is rigidly secured to a shaft 80, journaled in the frame member 41. Secured to the outer end of the shaft is a ratchet 81, which is intermittently advanced by a pawl 82, carried by a plate 83, which is rotatably mounted on the shaft 80. Suitable links 84 are connected at one end to the plate 83 and at the other end to a pin 85 eccentrically carried by the gear 76. In this manner the pawl is intermittently driven to advance the ratchet a number of teeth at a time. A suitable spring 87, Fig. 4, serves to maintain the pawl in contact with the ratchet.

The amount of movement imparted to the ratchet wheel 81 is controlled, to thereby regulate the amount of repellent transferred to the ductor roll 44 from the fountain roll 43. As shown, a cam disk 90 is rotatably secured to the shaft 80 and is provided with a cam surface 91, which cooperates with a pin 92 on the pawl 82, to disengage the pawl from the ratchet at a predetermined point in the movement of the plate 83.

A spring pressed plunger 93 engages notches in the disk 90 and maintains the disk in any one of several adjusted positions, whereby the position of the cam surface 91 may be adjustably positioned to change the effective stroke of the pawl 82. A lever 95 is secured to the disk 90 to enable the operator to readily vary the effective stroke to the pawl 82, as more or less repellent is required.

I have found it desirable, because of the chemical characteristics of the repellent, to provide a repellent fountain or trough such as is shown in Figs. 1 and 5, and which will retain a comparatively small amount of fluid. I also find it ad-

visable to arrange the trough so that the repellent may be automatically replenished and the level of the fluid in the trough maintained substantially constant. For this purpose I provide the trough with an upstanding tubular portion 96, as shown in Fig. 5, the lower end of the tube opening into the trough as at 97. The upper end is provided with suitable formation 98 to engage the neck of a bottle or suitable storage reservoir or container 99. Hence, as soon as the repellent is lowered below the bottom line of the tubular portion 96 of the trough, air will be admitted to the container 99 and will replace sufficient repellent to bring the level of the trough substantially to the bottom line of the tube 96.

It will be seen from the foregoing description that by my invention liquid repellent is supplied to the plate, before it reaches the first acting inking form roller, by means of a repellent applicator roll which supplies the plate with a predetermined amount of repellent, regardless of the amount of repellent transferred to the applicator roll, and such repellent roll is provided with a non-absorptive surface so that it will not act as a reservoir for liquid repellent. Because the roller is made of a resilient non-absorptive material it may be pressed against the printing plate to act as a squeegee roller to remove excess repellent; because of its insulating qualities the roller itself cannot act as a pole for an electrolytic cell; because of its non-absorptive qualities and diameter it so increases the resistance of the electrolyte on its surface that for all practical purposes it prevents the formation of an electrolytic cell; because of its smooth surface it does not affect the evenness of the layer of ink remaining on the printing image after the impression has been made and thereby permits even distribution of ink by the inking system; and because of the smooth surface of such roller, together with the smooth surface of its distributor or coating roller, any ink removed from the image by the applicator roller is evenly redistributed to the printing plate.

I claim:

1. In a planographic press wherein the image-carrying member comprises a metallic plate, one dampening roller in contact with such printing plate, said roller having a surface of a material which is resilient and at the same time non-absorptive, and means for adjusting the pressure of said roll against the plate to cause a squeegee action.

2. A planographic press having an impression member, a liquid repellent applicator roller in contact with the impression member, said roller having a smooth resilient surface, a metallic distributor roller in contact with said applicator roller and adapted to supply the applicator roller with liquid repellent, said distributor roller having a smooth surface, and means for adjusting the pressure of the applicator roller against the plate to cause said roller to have a squeegee action on the plate.

3. In a planographic printing machine, the combination of a repellent reservoir, a fountain roll depending into the reservoir, positive means for giving the fountain roll partial rotations, means for carrying a printing plate, a non-metallic form roll having a smooth, flexible, non-absorbing surface pressed against the plate with a squeegee pressure, a metallic distributor roll having a smooth surface engaging the form roll, and a smooth surfaced non-metallic ductor roll between the fountain roll and the distributor roll.

4. In a planographic printing machine having a planographic printing plate, a liquid repellent applicator system, said system including a metallic distributor roll, a ductor roll mounted to periodically move into and out of contact with the distributor roll to transfer liquid repellent thereto, a repellent applicator roll arranged to contact with the plate to supply repellent thereto, said repellent applicator roll being normally in contact with said distributor roll, and means to periodically move the distributor roll out of contact with the repellent applicator roll.

5. In a planographic printing machine, having a planographic printing plate, a liquid repellent applicator system, said system including a repellent fountain, a fountain roll coating with such fountain, a metallic distributor roll, a ductor roll mounted to swing from contact with the fountain roll to contact with the distributor roll to transfer liquid repellent from the fountain to the distributor roll, a resilient surfaced form roll or repellent applicator roll arranged to contact with the plate to supply repellent thereto, said repellent applicator roll being normally in contact with said distributor roll, and means to periodically move the distributor roll out of contact with the repellent applicator roll.

6. The combination with a planographic printing press having a printing plate, and means for feeding the liquid repellent to the printing plate, said means comprising a smooth-surfaced form roll in contact with the printing plate, a smooth-surfaced distributor roll adapted to feed the repellent to the form roll to distribute repellent thereto, a ductor roll, said ductor roll adapted to supply the distributor roll with repellent, means to periodically move the ductor roll out of contact with the distributor roll, and means to periodically move the distributor roll out of contact with the form roll and the ductor roll simultaneously.

7. The combination with a planographic printing press having a printing plate, said plate hav-

ing image and non-image bearing areas, the non-image bearing areas being treated to prevent adhesion of ink thereto, and means for continuously feeding liquid repellent to the printing plate, said means comprising a rubber surfaced roller in contact with the printing plate, a hard surfaced distributor roller adapted to feed the repellent to said rubber surfaced roller, a ductor roller adapted to supply the distributor roller with repellent, means to periodically move the ductor roller out of contact with the distributor roller, and means to periodically move the distributor roller out of contact with the rubber surfaced roller and the ductor roller.

8. In a planographic printing machine having a printing plate, a liquid repellent applicator system, said system including a rubber surfaced squeegee roller in contact with the printing plate, and means comprising a metallic roller to supply a film of liquid repellent to said squeegee.

9. A planographic press wherein the image-carrying member comprises a metallic plate, and there is a resilient dampening roller in contact with the printing plate, said roller having a surface of a material which is a non-conductor of electric energy and is non-absorptive and said roller being pressed against the plate with sufficient pressure to cause the roller to act as a squeegee to remove excess liquid from the plate, a metallic roller contacting with the dampening roller, and means for keeping the metallic roller supplied with more liquid than the plate needs.

10. The method of planographic printing comprising supplying an excess of liquid repellent by means of a metallic roller to a resilient non-absorbent roller contacting therewith, while said non-absorbent roller is having a rolling contact with the plate, and causing such pressure of the non-absorbent roller against the plate as will cause it to act as a squeegee to remove the excess repellent from the plate.

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