Sept. 4, 1956 W. H. WOOD ET AL 2,761,382

ROTARY LITHOGRAPHIC PLATE DAMPENING MEANS AND METHOD

Filed April 11, 1956

2 Sheets-Sheet 1

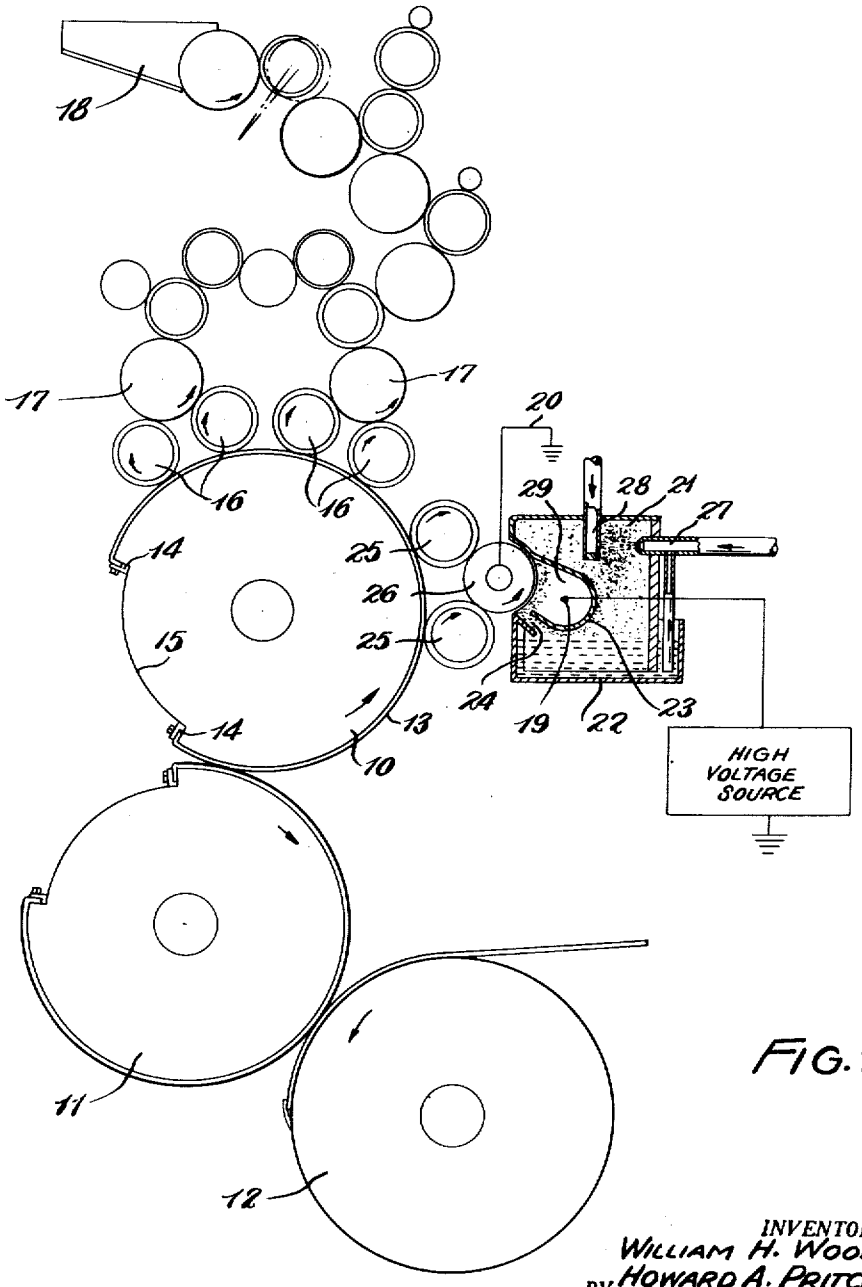


FIG. 1

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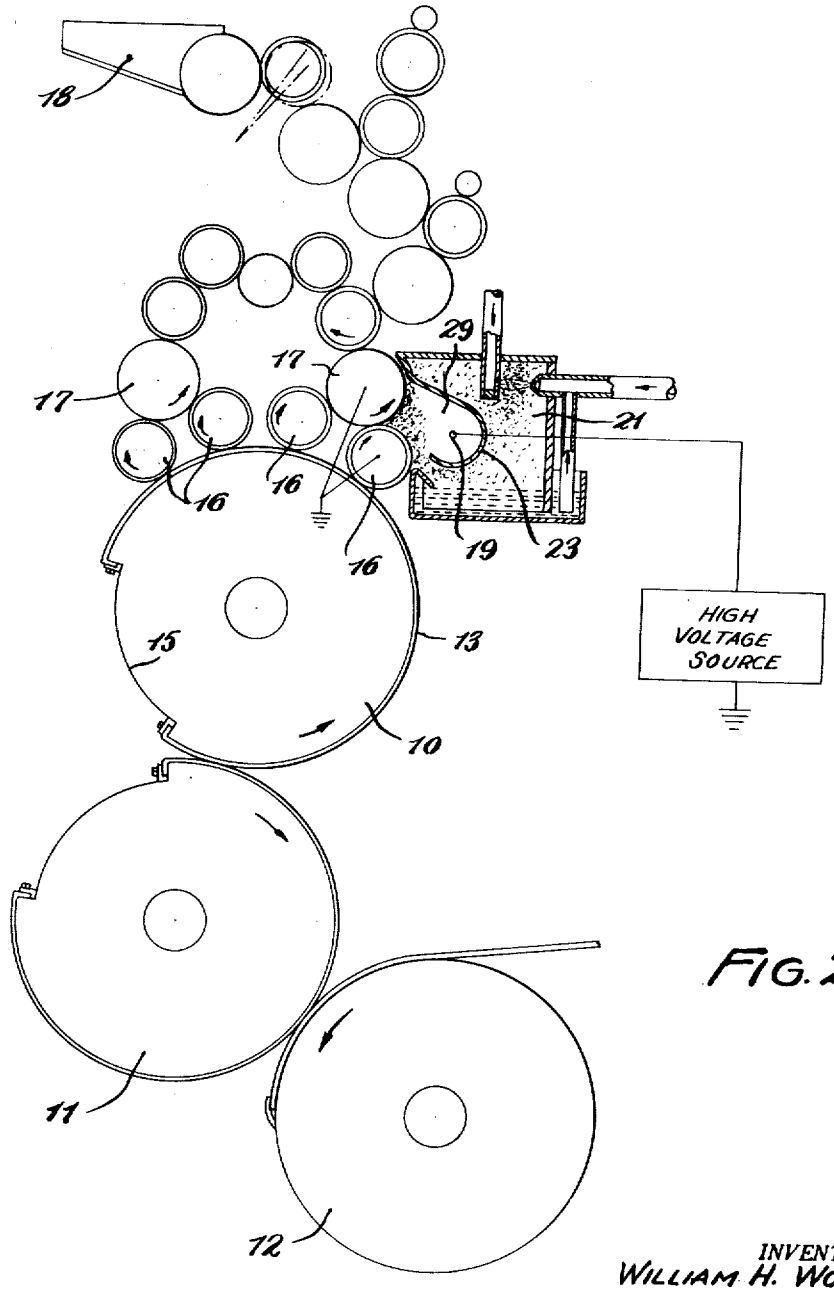


FIG. 2

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ROTARY LITHOGRAPHIC PLATE DAMPENING MEANS AND METHOD

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Application April 11, 1956, Serial No. 577,503

6 Claims. (Cl. 101—147)

This invention relates to a method and apparatus for applying dampening fluid to lithographic plates or the like for maintaining the non-image areas thereof ink repellent.

For many years the usual dampening system of a lithographic press has comprised a pair of cloth covered rollers running on the plate, an intermediate or distributing roller contacting the cloth covered rollers, a slowly turning water feed roller carrying the dampening fluid, and an oscillating cloth covered ductor roller alternately contacting the water feed roller and the intermediate roller. This system has many well recognized disadvantages and much effort has been spent to improve it or replace it with a different system.

In this connection many arrangements have been devised for applying a spray of dampening fluid directly to the surface of the lithographic plate but none of these arrangements has come into general commercial use. Two problems in particular are encountered, namely (1) the problem of distributing over the relatively large surface of the plate, in finely divided discrete particles, the extremely small quantity of dampening fluid which is required by the plate, and (2) the problem of preventing contamination of the press and surrounding atmosphere by particles of dampening fluid which do not reach the plate.

The first of these problems is made difficult by the turbulent condition of the air close to the surface of the very rapidly traveling plate and by the deflection of the air streams which are ordinarily used to impart velocity to the spray particles.

Both of these effects result in the more desirable, finer and lighter particles being carried away by the air currents while those particles which do reach the surface are the less desirable larger and heavier ones. This results in a tendency to spottiness and a difficulty in applying very small quantities of dampening fluid.

The second of these problems is difficult of solution because of the necessity of providing clearance between the moving surface of the plate and the stationary parts of the dampening device. The air turbulence adjacent the surface of the rotating plate and the use of air streams for imparting velocity to the particles, mentioned above, causes particles to escape through the clearance space into the surrounding atmosphere. It is essential that such escape be effectively eliminated since dampening solutions used in lithography contain, in addition to water, various acids or salts and gums which would corrode or contaminate the press and would be objectionable to the operator.

In the copending application Serial Number 210,392 of W. H. Wood et al., filed February 10, 1951, a method of applying dampening fluid directly to a lithographic plate is described and claimed which in large measure overcomes the problems just referred to.

In addition to past efforts directed toward applying dampening fluid in the form of a spray directly to the lithographic plate, many devices have also been tried, the

purposes of which have been to (1) apply dampening fluid to the plate by incorporating it in the ink prior to application thereof by the inking rollers or (2) to improve or eliminate the ductor roller mechanism of the usual dampening system.

Referring to the first of these, various ways of incorporating the dampening fluid in the ink have been tried. Among these, the application of air-borne particles of dampening fluid to the surface of the inking rollers in that portion of the inker which is first contacted by the lithographic plate as it rotates, indicates promise and has certain advantages, for example, freedom from contamination of the fluid supply by the ink, and preferential localization of emulsification of the ink.

Likewise the use of a spray to dampen the intermediate water roller has certain advantages in that it eliminates the ductor roll, avoids contamination of dampening fluid supply by ink picked up by the dampening rollers and conveyed back into the system, and permits continuous rather than intermittent application of moisture to the dampening rollers.

While the use of the spray technique for applying dampening fluid to the inking rollers or to the intermediate roller of the usual water system has the above stated advantages, some of the same problems exist under these latter circumstances as exist when one attempts to apply dampening fluid by spray directly to the lithographic plate. These problems as mentioned above are (1) the difficulty of applying an extremely small quantity of fluid in particle form uniformly over the surface of the lithographic plate and (2) the difficulty of preventing the escape of dampening material into the surrounding atmosphere.

The present invention is directed to the solving of these problems in the situation where it is desired to apply the dampening fluid to the plate through the use of roller means while at the same time employing spray means, with its attendant advantages, for applying the dampening fluid to the roller means.

Accordingly, objects of the invention, singly and in combination are as follows:

To provide a dampening method enabling the smooth application of very small amounts of dampening fluid over the surface of a lithographic plate.

Enabling such application in a manner which avoids contamination of the dampening fluid supply.

Enabling such application while preventing or minimizing the escape of dampening fluid into the surrounding air.

Enabling such application to the lithographic plate through roller means contacting the plate.

The method of the invention, by which the above objects are achieved, comprises establishing an electrical field of force adjacent a roller means which contacts the plate, such field extending the full length of the roller means and to a limited extent in a direction transverse to the length of the roller means, providing finely divided elements of aqueous dampening fluid suspended in air in the electrical field, which elements are electrically charged, the field functioning to influence the particles toward and onto the surface of the roller means, and conveying such deposited particles by the roller means to the surface of the plate whereby the non-image areas of the plate are maintained ink repellent. Different mechanisms for applying the method of the invention are illustrated in the drawings and pointed out in the claims.

In the drawing,

Fig. 1 is a side view partly in vertical section illustrating an arrangement for depositing fine particles of dampening fluid on roller means comprising rollers whose principal function is to convey the fluid to the plate.

Fig. 2 is a similar view illustrating an arrangement wherein fine particles of dampening fluid are deposited upon certain rollers of an inking mechanism which rollers function to convey both ink and dampening fluid to the surface of the plate.

Referring to the drawing, **10** represents the plate cylinder of a lithographic press of which **11** and **12** are the blanket and impression cylinders respectively, and **13** is the lithographic plate which is held in clamps **14** situated in the usual gap **15** of the plate cylinder.

Ink is applied to the lithographic plate **13** by means of form rollers **16**, storage rollers **17** and further ink distributing and conveying rollers which receive ink from an ink fountain **18** of usual construction and convey it to the storage rollers, as illustrated.

In the form of the invention illustrated in Figure 1 an electrical field of force is established adjacent the rapidly moving surface of roller means which run in contact with the lithographic plate **13**. This is accomplished by applying a relative high electrical potential to the wire **19**, preferably direct current, and grounding the roller means as indicated at **20**. A fog of finely divided particles of dampening fluid is created in the chamber **21** and conveyed between the fluid sump **22** and the shield **23** through an opening **24** into the electrical field in the region adjacent the surface of the roller means. The roller means as illustrated in Fig. 1 comprises a group of three rollers two of which are numbered **25** and constitute rollers running in contact with the plate **13** and a grounded roller **26** in contact with the rollers **25**. The rollers **25** are cloth covered rollers, termed molleton rollers, and roller **26** is a distributing roller taking the place of the usual intermediate roller.

The fog is preferably generated by opposed nozzles **27** and **28** in the chamber **21** as more fully described in the copending application of Howard A. Pritchard, Serial No. 278,772, filed March 27, 1952. Such fog is evenly distributed across the width of the machine and travels through the opening between shield **23** and the fluid in sump **22** so that a general current of air-borne fog, evenly distributed along the roller means **26** is emitted through the opening **24** into the electrical field. The particles of fog are then charged by the ionized atmosphere around the wire **19** and immediately thereafter become influenced by the field between the wire **19** and the roller **26** and are conveyed by that field toward and onto the surface of the roller **26**. These particles are then conveyed by the action of the rollers **26** and **25** to the surface of the plate **13**. The latter is then inked by the rollers **16** in the usual manner.

In the form of the invention illustrated in Figure 2, use is made of certain of the inking rollers of the inking system of the press. In this form the chamber **21** and the wire **19** and other associated parts are located adjacent the first form roller **16** and the first storage roller **17** of the inking mechanism which are grounded, these rollers acting to convey the particles of dampening fluid deposited thereon to the surface of the plate **13**. While as illustrated the arrangement provides for deposition of fog particles upon both the rollers **16** and **17**, such deposition may be limited to either of such rollers but preferably includes the first form roller **16**. At the extremities of the shell **23** there are end plates, indicated at **29**, and in the space enclosed by the shell and end plates the fog particles are confined. It will be appreciated however that there is necessarily some space between such end members and the rollers and also between the shell **23** and the rollers. Normally such a condition would permit the escape of relatively large amounts of the air-borne fluid particles owing to the turbulence of the air adjacent the surface of the roller means and owing to the use of air to create the fog and convey it into the region where it is to be used. By the employment of an electrical field of force, however, such escape is effectively prevented.

It will likewise be appreciated that by the arrangement shown very fine particles of dampening fluid suspended in air will be utilized. Under ordinary circumstances the particles would never reach the surface of the roller means owing to the turbulence of air around the rapidly moving surfaces thereof. Even if such fine particles were given a considerable velocity by means of a strong air jet or current, many of them, particularly the finest ones, could not reach the surface because they would be conveyed away by the air currents deflected away from the surface of the roller means. By the employment of an electrical field acting most strongly upon the finer particles, velocity is imparted to those particles and they are made to travel toward and attach themselves to the surface of the roller means by which they may be conveyed then to the surface of the lithographic plate.

An important feature of the method of this invention lies in the electrical application of fine fog particles to roller means rather than directly to the plate itself. As is well known, plate cylinders, particularly in sheet fed lithographic presses, have a relatively large gap **15** for receiving the ends of the plate. If fine fog particles are to be deposited directly upon the plate, it is necessary to prevent their deposition to as great an extent as possible in the gap of the cylinder for obvious reasons. It is also necessary to provide some means for minimizing the escape of such particles into the atmosphere which may be caused by the passage of the cylinder gap past the fog applying means. In the method of the present invention, these difficulties are avoided by electrically depositing the particles upon roller means and conveying such particles to the plate through such roller means. The use of such roller means eliminates gap problems and the conditions to be met in depositing particles on the rollers are constant throughout each cycle of the press as well as from cycle to cycle as the press continues to operate.

Thus it will be seen that a method of dampening a lithographic plate has been provided which enables the even application, across the width and the length of the relatively large surface of a lithographic plate, of the extremely small quantity of dampening fluid normally required, without the usually attendant escape of particles into the surrounding air heretofore encountered when utilizing spray methods.

Having thus described our invention, we claim:

1. The method of dampening a lithographic plate mounted upon a rapidly rotating cylindrical support and contacted by roller means turning at the same surface speed as said cylindrical support for supplying dampening fluid and ink to said plate, the ink from said plate being transferred to a blanket cylinder and being printed by the latter cylinder on print receiving material by pressure exerted against an impression cylinder, which method comprises establishing an electrical field of force adjacent said roller means and extending throughout the effective length thereof and of limited extent in the direction transverse to the length of said roller means, and providing finely divided elements of aqueous lithographic plate dampening material suspended in air in said field, said elements being electrically charged, said field being of such potential gradient as to influence the movement of electrically charged particles suspended in air in said field toward said roller means while avoiding spark discharge, said finely divided electrically charged elements being impelled by said field toward said roller means and onto the surface thereof and being conveyed thereby to the surface of said rotating lithographic plate to apply dampening fluid to adjacent image and non-image areas of said lithographic plate whereby said non-image areas are maintained in ink repellent condition.

2. The method as defined in claim 1 wherein said electrical field of force is adjacent a portion of the roller means which applies ink to the plate.

3. The method as defined in claim 1 wherein said electrical field of force is located adjacent a surface portion of the roller means which conveys the finely divided

elements of dampening material deposited thereon directly to said lithographic plate without prior contact with any other surface.

4. The method as defined in claim 1 wherein said electrical field of force is located adjacent a portion of said roller means which is separated from the portion of said roller means which supplies ink to the lithographic plate.

5. In mechanism for applying ink repellent material to a plate on the plate cylinder of a rotary lithographic printing machine, a roll parallel to the plate cylinder, means for grounding said roll, means for creating a fog of aqueous ink repellent material in a narrow field adjacent said roll throughout the length thereof, an elongated electrode parallel to said roll and to the length of

said field, and means for applying a relatively high electrical potential to said electrode, whereby the fine constituents of said fog are impelled toward and onto the said grounded roll, said mechanism being adapted to to transfer onto the plate of said plate cylinder the ink repellent material received by said grounded roll.

6. Mechanism as defined in claim 5, wherein said grounded roll is the distributing roller of a dampening mechanism and wherein the ink repellent material deposited on said distributing roller is transferred by one or more molleton rollers onto the plate of the plate cylinder.

No references cited.