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METHOD FOR PLANOGRAPHIC PRINTING

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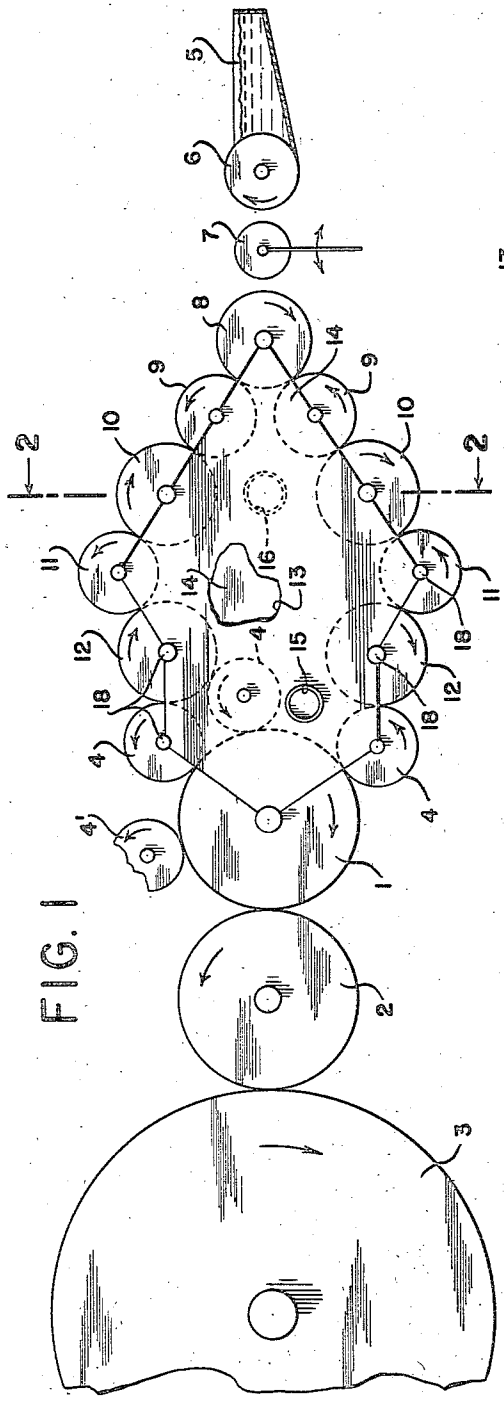


FIG. 1

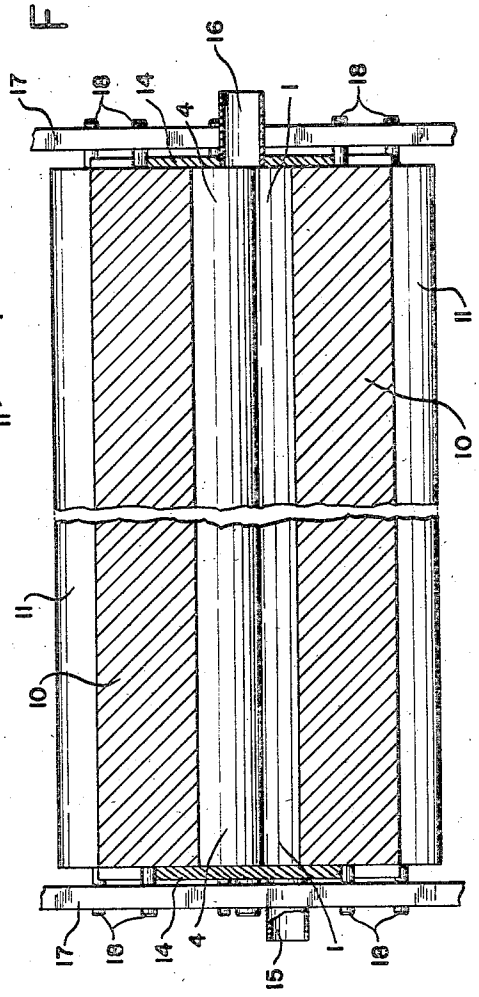


FIG. 2

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METHOD FOR PLANOGRAPHIC PRINTING

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3 Claims. (Cl. 101—141)

This invention relates to the art of printing and, more particularly, to off-set printing. It is of particular utility in conjunction with printing operations using planographic or lithographic printing plates to which water and ink are alternately applied.

In this method of printing, the ink customarily used is one containing a relatively volatile organic solvent and for best results the ink must be substantially free from water.

The surfaces of such printing plates are composed of different materials one of which is water-receptive and ink repellant and the other being water-repellant and ink-receptive.

In practice, it is customary to apply water to the printing plate by rotating the plate in rolling contact with the surface of a roller which has been wet with water and thereafter to pass the plate in rolling contact with the surface of one or more form rollers wet with ink. The ink is usually supplied from a fountain and is conveyed therefrom to the form roller, or rollers, over an ink train composed of a number of cooperating rollers, as is well understood in the art. Frequently, the ink is conveyed from the fountain to the plate cylinder over two parallel trains of ink-distributing rollers.

I have observed, that in operations of the type described, there is a tendency for the form rollers to pick up substantial amounts of water from the plate cylinder in passing in rolling contact therewith, and a tendency for the water so picked up by the form rollers to accumulate in the ink film thereon and work back through the ink train, or trains, thus polluting the ink films with moisture and detracting from the high quality of the printing.

In accordance with my present invention, I avoid the consequences of the conditions just described by subjecting the ink films on the surfaces of the rollers of the ink train, or trains, to continuous or intermittent dehydration and thereby avoid the presence of objectionable amounts of water in the ink film applied to the printing plate.

I accomplish this dehydration in accordance with the present invention by positively circulating over the ink films on the surfaces of the ink distributing rollers, as the ink travels toward the plate cylinder a substantially dehydrated atmosphere containing substantial proportions of the vapors of the organic solvent present in the particular ink being used. By reason of the low partial pressure of water vapor in this dehydrated atmosphere, the water present in the ink film is vaporized and carried off by the circulating atmosphere.

By this means, I not only prevent objectionable pollution of the ink film by water working back through the form rollers, but I protect the ink film from moisture normally present in the atmosphere of the press room, especially in damp, humid weather.

A further advantage of my present invention is the retarding of the vaporization of the solvent originally present in the ink, thus preserving the consistency of the ink and avoiding excessive tackiness due to excessive loss of the ink solvent through evaporation.

The atmosphere, which is circulated in contact with the ink film, may consist solely of solvent vapors or this atmosphere may consist primarily of dehydrated air, or other gases to which the solvent vapors have been added, and containing a moisture content sufficiently low to promote vaporization of moisture contained in the ink film. The extent to which the air so used, must be dehydrated will, of course, vary with temperature and partial pressures, and the amount of moisture initially present in the air. Such dehydration may be effected by chilling or by passing the air over a dehydrating agent or by other means well known to the art.

For optimum results, the atmosphere circulated in contact with the ink films should be substantially saturated with the solvent vapors. However, good results may be obtained where lower concentrations of the solvent are used. Where little or no solvent vapor is present in the circulated atmosphere, there is a tendency to cause excessive vaporization of the solvent from the ink film.

Where the tendency of the water to work backward along the ink train is relatively great, some vaporization of the solvent from the ink film may be desirable as it appears to promote the removal of water from the ink film perhaps by forming an azeotrope therewith.

In general, the proportion of ink solvent present in the dehydrated atmosphere should be within the range extending from saturation, under existing temperature and pressure conditions, to not less than about one-fourth that amount.

The atmosphere may with advantage be prepared by dehydrating air, or other gases inert with respect to the ink, by any known method, and passing the dehydrated air, or a predetermined proportion thereof, through, or in contact with a body of the particular solvent used.

These solvents are usually hydrocarbon fractions boiling within a range of 450° to 600° F. Low concentrations of these vapors in the press room are customary and are not particularly objectionable. However, in order to avoid excessive concentrations of these vapors in the press room and to avoid the mixing of the humid atmosphere of the press room with the gases being circulated over the ink films, I enclose the ink train, or at least a portion thereof, over which the dehydrated atmosphere is circulated.

The invention will be further described and illustrated with reference to the accompanying drawings which represent conventionally and diagrammatically a particularly advantageous embodiment of the invention, and of which

Fig. 1 represents a side view of the press, with the supporting side frames omitted for greater clarity, and

Fig. 2 represents a vertical sectional view along the lines 2—2 of Fig. 1 with the position of the side frames indicated.

In the apparatus represented by the drawing, the plate cylinder 1 rotates in contact with the blanket cylinder 2 which, in turn, rotates in contact with the web passing over impression cylinder 3. The plate cylinder 1 is equipped with means for securing to the periphery thereof, a printing plate to which water is applied by means of rollers indicated at 4' and to which ink is applied by the form rollers 4.

The ink is picked up from the fountain 5 by the fountain roller 6 and is conveyed therefrom by means of the ductor 7 to the ink distributing roller 8 and, from thence, is carried to the form rollers 4 by two parallel trains of ink distributing rollers 9, 10, 11 and 12.

These various rollers and cylinders are rotatably mounted on parallel axis and are supported at each end by the press frame indicated at 17 in Fig. 2.

The space 13 between the two parallel ink trains is enclosed by the respective parallel trains of rollers, the plate cylinder 1 and side plates 14. The dehydrated atmosphere

is introduced into the enclosure 13 by means of inlet duct 15 and passes therefrom through effluent duct 16. It is frequently advantageous to provide baffles in the enclosure 13 so positioned as to direct the dehydrated atmosphere more uniformly on the ink films, in order to promote maximum dehydration of the ink. However, such use of baffles is not essential.

In operation, the water receptive surfaces of the printing plate, carried by plate cylinder 1, is wetted with water by means of roller 4'. The plate then passes in contact with the ink film carried by form rollers 4 and the ink receptive surfaces of the plate are thereby wetted with ink. The ink image is then applied to the blanket cylinder 2 and is printed onto the web passing around the impression cylinder 3, as is well understood in the art.

As previously described, relatively small proportions of the water applied to the printing plate have been found to be picked up by the form rollers and carried thereby to the ink distributing rollers 12. This moisture thus works backwardly along the respective trains of ink distributing rollers and tends to contaminate the ink film being carried thereby to the printing plate. As the ink film is constantly working forward along the ink train, the amount of water with which it is contaminated tends to accumulate to an extent which interferes with the selectivity of the printing plate surfaces with respect to water and ink.

By the constant, or even periodic circulation of the dehydrating atmosphere in contact with the ink films being conveyed through the enclosed area 13, the accumulation of objectionable proportions of water in the ink film may be prevented.

The atmosphere blown through enclosure 13 and withdrawn through outlet duct 15 may, if desired, be reconditioned to the predetermined moisture and solvent vapor content and recirculated in contact with the ink film within the enclosure 13.

The side plates 14 are shown in the drawings as positioned inside the press side-frames. Their arrangement may be varied to suit the construction of the particular press. While it is desirable to prevent, so far as practical, the escape of the circulated atmosphere from the enclosure 13 into the press room, some leakage is usually permissbile. In the arrangement shown the shafts 18 of the respective roller may extend through openings through the plates or through notches cut in the edges of the plates. It is usually desirable that the edges of the plates

extend, at least, to the points of contact between the respective rollers so as to form a more perfect enclosure for the dehydrating atmosphere.

It will be understood that reference herein to dehydrating, or dehydrated, atmosphere is intended to mean an atmosphere of substantially lower relative humidity than the atmosphere of the press room. Considerable variation is permissible with respect to the moisture content of the circulated atmosphere, depending largely upon the temperature and volume of the atmosphere circulated and the amount of water to be evaporated from the ink film. Where only moderate amounts of water are to be evaporated from the film, I may, for instance, circulate the dehydrating atmosphere at room temperature and having a relative humidity of about 50%.

I claim:

1. In the process of off-set printing wherein an ink containing a volatile organic solvent is applied to the surface of a printing plate, which has previously been wet with water, by rolling contact with the surface of a form roller to which a film of the ink is supplied over a train of cooperating ink-distributing rollers the step of preventing the accumulation of water in the ink film being conveyed to the printing plate by circulating in contact with a portion of said ink film a substantially dehydrated atmosphere comprising a substantial proportion of vapors of the ink solvent while shielding said portion of the ink film from press-room atmosphere.

2. The process of claim 1 in which the dehydrated atmosphere comprises a proportion of the ink solvent within the range extending from saturation to not less than about one-quarter the amount required for saturation under the existing temperature conditions.

3. Process of claim 1 in which the ink solvent is a hydrocarbon fraction boiling within the range of from about 450° to 600° F.

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