Aug. 15, 1939. I. GURWICK 2,169,641

PRINTING DEVICE

Filed Jan. 21, 1938

Fig. 1.

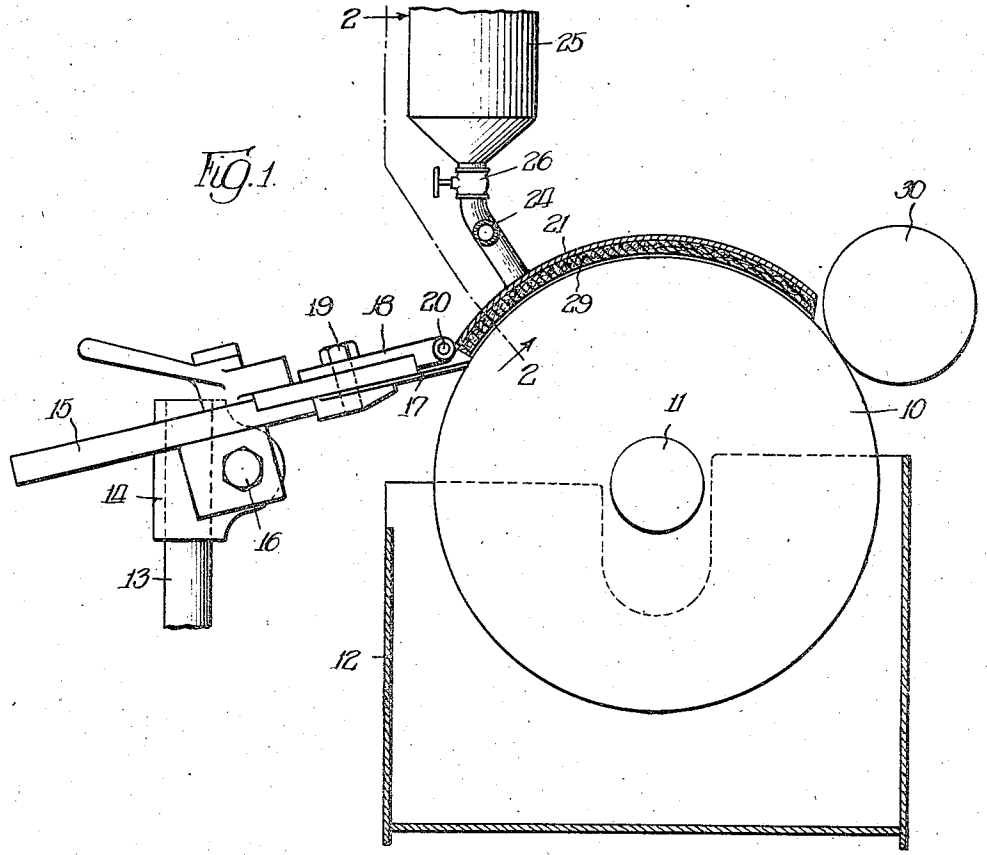
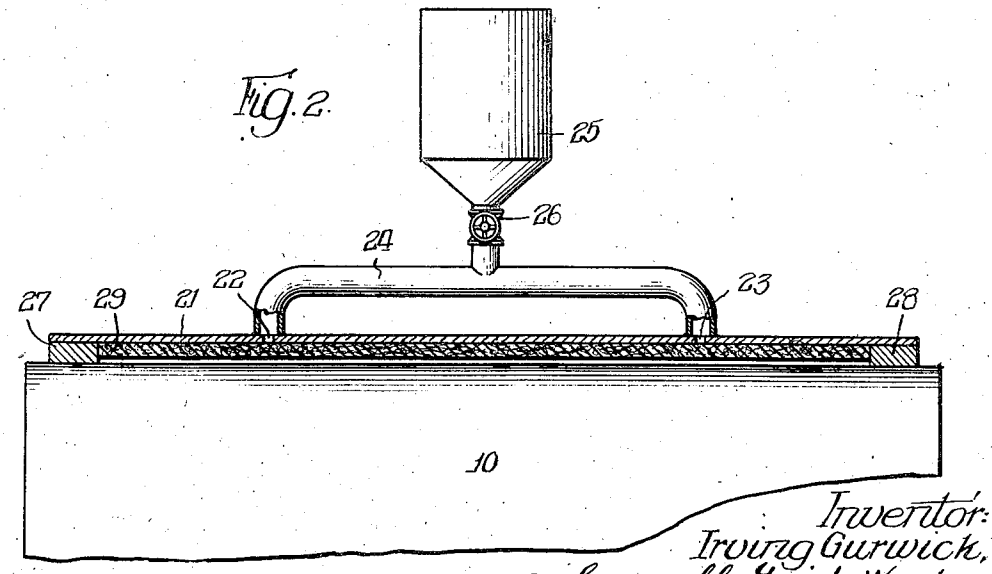



Fig. 2.




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## PRINTING DEVICE

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5 Claims. (Cl. 101—157)

The present invention relates to an improved type of intaglio printing unit and has as its principal object the provision of a printing unit for use in connection with quick-drying inks in which the printing cylinder is protected against the undue escape of solvents between the doctor blade and the point at which the printing impression is made.

An additional object of the invention is to provide means for supplying a volatile solvent atmosphere for an intaglio printing cylinder between the doctor blade and the impression roll, so that the ink contained in the etched portions of the cylinder will remain in a fluid condition without being deleteriously affected by the solvent atmosphere.

Still another object of the invention is to provide a sheltered wick-like evaporator or solvent applicator between the doctor blade of an intaglio printing cylinder and the impression roll, the wick-like solvent applicator to be supplied with a liquid volatile solvent which evaporates from the applicator adjacent the printing cylinder to prevent the ink in the etched portions of the printing cylinder from losing undue amounts of its solvent before reaching the web to be printed.

These and other objects will be evident upon a consideration of the following description of a preferred embodiment of the invention and by reference to the accompanying drawing, in which

Fig. 1 is an end view partly in section of a device for applying solvents in accordance with the present invention; and

Fig. 2 is a longitudinal sectional view taken along line 2—2 of Fig. 1.

In intaglio printing better results can be obtained if the ink contained in the etched printing cylinder is maintained in a fluid condition without undue loss of solvents up to the point of application to the web to be decorated. This is particularly true in cases where the doctor blade by which the excess ink is removed from the cylinder is spaced from the impression roll a substantial distance. Evaporation of the solvent in which the ink is contained between the doctor blade and the impression roll may result in inferior printing at the point of application of the color to the web to be decorated. In accordance with the present invention there is provided an improved means whereby the printing cylinder is protected against solvent loss between the doctor blade and the impression roll by providing a solvent atmosphere which will maintain the ink on the printing cylinder fluid and will not cause the ink to become too fluid or to produce a blotched or pebbled effect upon the printed web.

In the device shown in Figs. 1 and 2 of the drawing the numeral 10 denotes an etched intaglio printing cylinder of conventional construction. This cylinder rotates about shaft 11 in a color bath denoted generally at 12. Within the color bath 12 is maintained a body of liquid ink of the usual type employed in intaglio presses. Generally these inks contain a colored pigment and a body-imparting substance such as a gum or cellulose compound which is contained in a liquid volatile solvent of low boiling point. As the cylinder 10 rotates in the color bath it picks up an overall coating of the ink both in its etched and unetched surfaces.

Mounted adjacent the cylinder 10 is a doctor blade mechanism including an upright standard 13 upon which is mounted an adjustable sleeve 14. The sleeve 14 carries an adjustable doctor blade holding device 15, the latter being mounted to the sleeve 14 by an adjustable screw 16. To the end of the holder 15 adjacent the printing cylinder 10 is clamped a conventional doctor blade 17. This doctor blade and the solvent applicator holder 18 are secured to the holder 15 by means of the bolts 19. It will be understood that the inner end of the doctor blade 17 bears against the surface of the printing cylinder 10 and acts to remove excess ink from the cylinder except where the cylinder is etched. These blades are of conventional construction and need no further description.

The holder 18 has rotatably mounted to it at its inner end 20 a semi-cylindrical shield 21 composed of a thin metal or similar gas-impervious cover. This hood or shield is shaped concentrically with the cylinder 10 and is spaced therefrom as shown in the drawing. At space points 22 and 23 the hood 21 is perforated and secured over these perforations is a communicating solvent supply line 24. Line 24, in turn, has connected to it a reservoir 25, the reservoir being adapted to contain a liquid supply of the solvent with which it is desired to maintain the ink in a fresh condition. A suitable valve 26 acts to control the amount of the solvent added to the device.

Beneath the cover or hood 21 and adjacent the end thereof are bearing members 27 and 28, these members acting to space the hood 21 from the printing cylinder and to provide a substantially gas-tight compartment therebetween. The bearing members are secured to the under side of the hood and ride on the outer, unetched marginal portions of the printing cylinder. Between the members 27 and 28 there is provided a fibrous pad 29. This pad may be felt or some other composition which will absorb solvent coming through the lines 24 and prevent the solvent from dripping onto the printing cylinder in liquid condition, and is secured to the under side of the hood 21. The pad also is spaced from the surface of the printing cylinder to an extent sufficient to prevent contact of the pad with the etched portions of the cylinder.

Valve 26 is regulated to supply the desired quantity of liquid solvent to line 24, and this solvent passes from line 24 through the openings 22 and 23 to the wick-like solvent applicator 29. The solvent is distributed interiorly of the solvent applicator 29 by capillary attraction. From the under surface of the pad 29 the solvent is free to evaporate into the space between shield 21 and the printing cylinder. This causes the space to become saturated with the solvent. When this space becomes saturated with the vaporous solvent it will be seen that evaporation of the solvent contained in the ink of the etched portions of the printing cylinder will be retarded. This insures the ink reaching the printing cylinder in the same fresh condition in which it is applied to the cylinder. Ordinarily where there is a substantial space between the doctor blade 17 and the impression roller there is a time interval during which the ink may evaporate to an undesirable extent between the doctor blade and the impression roller. This is prevented by the protective atmosphere of solvent supplied adjacent the printing cylinder by the evaporation applicator.

The particular solvent to be used in the improved applicator may vary widely. In an intaglio ink the solvent generally consists of a mixture of different low boiling compounds such as toluol and the like, and these solvents may have different boiling points. A mixture of such solvents may be employed in the reservoir 25 or one of the solvents may be so utilized. By utilizing the lowest boiling of the solvents employed in the ink the atmosphere beneath the hood 21 will be saturated in this lower boiling solvent and when so saturated the content of this solvent in the ink on the cylinder will be maintained. The higher boiling solvents may evaporate to some extent but this evaporation is retarded by the presence of the saturated solvent atmosphere above the cylinder. By employing small quantities of the higher boiling solvent in the reservoir 25 along with the lower boiling solvent even this evaporation may be maintained at a minimum.

In one embodiment of the invention there is provided in the reservoir 25 a solvent of a substantially high boiling point. The atmosphere adjacent the printing cylinder and beneath the hood 21 between the doctor blade and the impression roller then will contain this relatively high boiling solvent. The relatively high boiling solvent may penetrate to some extent the outer surface of the ink contained in the etched portions of the printing cylinder. As it is this outer surface of the ink which is contacted with the web to be printed it will be seen that the layer of ink after application to the printed surface will be richer in low boiling solvents on the outside and adjacent the printed web there will be a greater content of high boiling solvent. The low boiling solvents will quickly escape with travel of the web from the unit to produce a crust of dried ink on the outer surface of the web. More time will be allowed for the higher boiling solvent adjacent the web to dry and it will be found that this type of printing is particularly desirable in many cases.

Where the solvent applicator involves the evaporation of the solvent from a fibrous surface of the nature described herein there is no deleterious effect upon the printing cylinder. A wick-like pad will allow the vapors to saturate the atmosphere between the hood 21 and the printing cylinder at a temperature substantially the same as the temperature of the printing cylinder, so that evaporation of the ink from the printed matter in the etched portions of the cylinder is minimized and the solvent from the pad 29 does not condense upon the printing cylinder. It is important that the solvent not be present in the form of globules of unvaporized solvent even though these globules may be quite small as in the case of a very fine spray. Such a spray contains very small particles of liquid solvent which impart to the printed matter on the cylinder 10 a pebbled appearance which is very undesirable.

The particular type of solvent applicator pad 29 may be varied quite considerably. Also, the space between the hood 21 or the pad 29 and the printing cylinder likewise is subject to wide variation. In some cases it will not be found necessary to employ the bearing members 27 and 28, since the escape of solvent from the ends of the hood 21 is replaced by additional solvent from the reservoir 25 to maintain the space between the hood and the printing cylinder saturated with the solvent.

The various modifications which may be made in the invention as described herein for purposes of illustration and explanation are intended to be included in the appended claims.

I claim:

1. In an intaglio printing unit, an etched printing cylinder, means for supplying said printing cylinder with an intaglio ink containing a volatile solvent, a doctor blade for said printing cylinder adapted to remove excess ink therefrom, an impression roller spaced from said doctor blade, a hood extending between said doctor blade and said impression roller, a fibrous pad attached to the under side of said hood, and a reservoir for solvents communicating through said hood and with said pad.

2. In an intaglio printing unit, an etched printing cylinder, means for supplying to said etched printing cylinder a liquid ink containing a volatile solvent, a doctor blade for removing excess ink from the printing cylinder, an impression roller spaced from the doctor blade, and a solvent pad adjacent said printing cylinder between the doctor blade and impression roll.

3. In an intaglio printing unit, an etched printing cylinder, means for supplying to said etched printing cylinder a liquid ink containing a volatile solvent, a doctor blade for removing excess ink from the printing cylinder, an impression roll spaced from the doctor blade, and an absorbent solvent pad adjacent said printing cylinder between the doctor blade and the impression roll, said pad including means for supplying liquid solvent thereto.

4. In a printing unit, a printing cylinder, means for supplying to said printing cylinder a liquid ink having a volatile solvent, an absorbent porous material positioned adjacent a portion of said printing cylinder, and means for supplying to said material a solvent of like nature to the solvent in said ink.

5. In a printing unit, a printing cylinder, means for supplying to said printing cylinder a mobile ink having a volatile solvent, and an absorbent porous material positioned adjacent a portion of said printing cylinder spaced from said means for supplying ink thereto, said material having a volatile solvent constituting a vehicle for said ink therein and providing an atmosphere of said solvent adjacent said cylinder.

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