

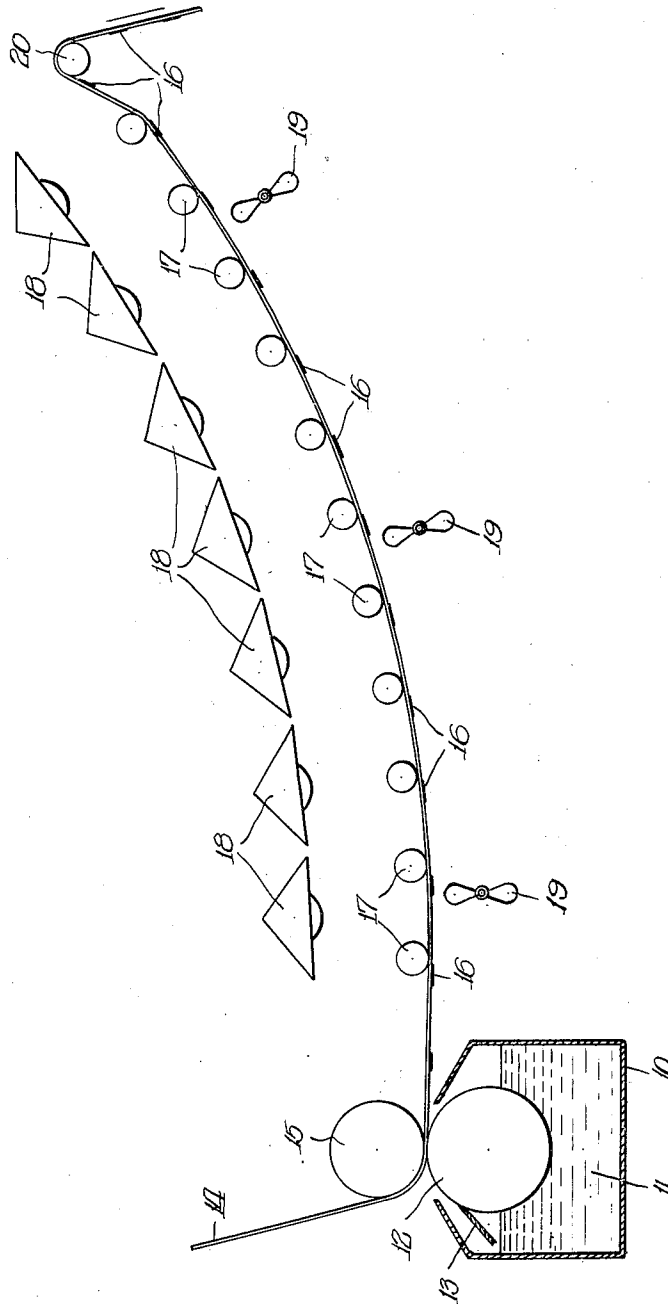
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PRINTING TRANSPARENT MATERIAL

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PRINTING TRANSPARENT MATERIAL

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4 Claims. (Cl. 101—416)

The present invention relates to an improved method of printing transparent materials such as the product known as Cellophane, and has particular reference to the use of infra-red rays in the drying of intaglio inks of the quick-drying type.

A principal object of the invention is the provision of a more satisfactory method of driving off the solvent of a quick-drying ink after the ink has been deposited upon transparent materials.

An additional object of the invention is the provision of a method for drying or setting intaglio or similar types of inks in which the body of the ink is carried in a relatively low boiling solvent, the method including the use of radiant heat imparted by infra-red rays preferably directed from a source positioned on the side of the transparent material opposite that upon which the ink is deposited.

Still another object of the invention is the drying of intaglio ink deposits between colors by the combined use of radiant heat originating from a source on the side of the transparent material opposite that upon which the ink is deposited and direct heat supplied from rollers rotating in surface contact with the transparent material.

These and other objects will be evident upon the consideration of the following description of a preferred embodiment of the invention and by reference to the drawing, in which the single figure is a diagrammatic view of apparatus constructed in accordance with the invention and adapted to carry out the improved method.

In the printing of transparent materials it has been recognized as desirable to employ the intaglio process. A successful method of printing transparent material in this manner is described in my Patent No. 1,867,314. As disclosed in my prior patent, the transparent material is passed from a roll through a series of intaglio color units in which the colors are deposited in superimposed relation with respect to each other. In such a method, and in fact in any intaglio type of printing, it is desirable to dry the deposits of ink thoroughly before the next color is reached, this drying operation being necessary to prevent offset or smearing of the ink. Various types of drying methods have been employed for setting the inks between colors. The inks generally are of the lacquer type in which the body of the ink is contained in a relatively low boiling organic solvent.

In the printing of Cellophane it is desirable to run the web through the machine at as fast a speed as possible. Speeds of the order of 200 to 600 feet per minute normally are attained in intaglio printing machines. In accordance with the present invention the ink of the consecutively applied colors is dried between color units even at these high speeds by the use of infra-red lamps which provide radiant heat, preferably from the side of the web opposite that upon which the printing matter is applied.

As shown in the drawing, an intaglio printing unit is indicated diagrammatically. The color bath 10 carries a body of intaglio printing ink 11 in which the etched printing cylinder 12 rotates. A conventional doctor blade 13 removes excess ink from the printing cylinder before it comes in contact with the web 14 of transparent material. An impression cylinder 15 is mounted above the etched printing cylinder and forces the web against the etched cylinder sufficiently to provide a good printing impression.

As the web 14 passes through the printing unit it has deposited on the under side thereof a series of designs indicated at 16. The intaglio printing ink is of the quick-drying lacquer type in which the body of the ink may be composed of nitrocellulose and gums, resins and the like, together with the conventional pigments and plasticizers contained in a relatively low boiling organic solvent such as toluol, xylol, and petroleum products.

After passing through the intaglio printing unit the web is carried along on the under side of a series of idler rolls 17 which are spaced apart as shown in the drawing.

Above the series of idler rolls 17 is positioned a battery of infra-red ray lamps 18, which direct radiant heat upon the unprinted side of the transparent material. Since the web 14 is transparent the radiant heat does not cause a rise in temperature of the web itself. However, the infra-red rays pass through the transparent material and contact the underside of the deposits of ink 16. Since the deposits of ink are opaque the radiant heat heats the ink and immediately causes the driving off of the solvent. It is of importance to note that the driving off of the solvent is from the underside of the ink. This causes the ink to dry from adjacent the Cellophane, and since the drying of the ink adjacent the Cellophane does not prevent the ink from being heated by the infra-red rays the drying operation proceeds to the surface of the freshly

deposited ink and causes complete drying without the formation of an outer skin.

It is preferred to employ a series of fans 19 or any other suitable type of air transfer mechanism for carrying away the solvent-laden air from adjacent the underside of the Cellophane.

It will be noted that the rollers 17 cover a rather substantial area on the unprinted side of the Cellophane and shade the Cellophane from the effects of the radiant heat from lamps 18. In the structure shown this shading effect does not prevent the Cellophane from being subjected to heat throughout its length of travel because of the heating effect of the lamps 18 upon the rollers themselves. That is, although the rollers 17 have no electrical coils they are heated up by the effect of the lamps 18 and being in direct contact with the transparent Cellophane assist in the drying operation. In this manner there is no dead web space between the printing unit and the roller 20, about the upper part of which the web finally is passed to the next intaglio printing unit.

It will be seen that this method of operation is most effective in connection with transparent materials, since these transparent materials are not themselves heated up by the infra-red rays. The solvent of the ink is driven out from the bottom of the deposit and the process is so efficient that thorough drying is obtained between adjacent colors. This type of heat treatment may be employed to advantage in the setting of inks by chemical action. For instance, the radiant heat when applied on the unprinted side of the web will hasten drying or setting of inks of the oxidation or polymerization type.

The various changes which may be made in the arrangement of the apparatus and in the operation of the process without departing from the scope of the invention are intended to be included in the appended claims.

I claim:

1. The process of printing, which comprises passing a transparent web through a printing operation in which there is deposited on one side of the web a lacquer ink having a relatively low boiling solvent, and subjecting the unprinted side of the web to the action of radiant heat of sufficient intensity to drive off said solvent in a relatively short period of time.

2. The process of printing, which comprises depositing an intaglio lacquer ink containing a relatively low boiling solvent on one side of the web of transparent material, and passing the unprinted side of the web adjacent a source of radiant heat.

3. The process of printing a transparent web, which comprises passing said web through spaced printing units operative to deposit on said web a quick-drying ink, and subjecting the unprinted side of the web to the action of radiant heat between said color units.

4. The process of printing a transparent web, which comprises depositing a quick-drying ink on one side of the web, passing the unprinted side of the web in contact with a heated surface, and subjecting the unprinted side of said web to the action of radiant heat.

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