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PRINTING PROCESS

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1 Claim. (Cl. 101—426)

The invention relates to printing materials and processes and has for its principal object the provision of a material and process particularly adapted for printing upon surfaces coated with a lacquer film and which will provide a speedy, rapidly drying, durable printed impression.

Another object of the invention is to provide a printing material and process of the character described in which the ink is set upon the lacquer surface by absorption of the ink solvent by the lacquer out of the ink, thereby enabling the latter to rapidly set up.

A further object of the invention is to provide in a printing material and process of the character described, the combination of a fast drying ink and a slow solvent which will prevent drying of the ink on the rollers, type, plates or other parts of the printing apparatus and yet function by the process of absorption as above noted to rapidly set the ink upon contact with the lacquer surface.

The invention possesses other objects which with the foregoing will be set forth in the following description of the preferred forms of the invention. It is to be understood, however, that I do not limit myself to said description, as I may adopt variations, from said forms within the scope of the invention as set forth in the claim.

Briefly stated, the material and process of the present invention utilizes the combination of a dry lacquer film base to be printed upon, a fast drying ink and a slow solvent contained in and miscible with the ink to prevent drying of the latter upon exposure to the atmosphere, but being rapidly and substantially completely absorbed by the base film when applied so as to enable a rapid setting up of the ink upon the film.

The material and process may be used on lacquer films deposited by lacquers of various formula and consistency as obtainable on the market. The manufacture of lacquers is a highly developed art in itself and since the invention may be used with substantially all the varying grades and types of lacquers available on the market, applicant is not concerned with any particular type of lacquer. Generally it may be stated that the process may be used with any pyroxylin, nitro-cellulose and probably cellulose acetate type of lacquer, the dry film of which is readily soluble with lacquer thinner, butyl alcohol, butylcellosolve, Cellosolve and other solvents of this type.

Similarly substantially any of the so-called

fast drying inks may be used in the present invention. A relatively large number of such inks are available on the market and their specific manufacture and formula is generally a trade secret. Generally it may be stated that substantially any ink having a relatively highly volatile vehicle may be used, as for example those formed by grinding pigments into synthetic vehicles having no linseed oil or varnish properties. However, the type of ink herein denoted as a fast drying ink is well known in the art and insofar as applicant is aware, substantially any of these fast drying inks may be used.

In accordance with the present invention I incorporate in the fast drying ink a relatively slow solvent or plasticizer which is miscible with the fast drying ink and retains the same in a wet state upon exposure to the atmosphere even for protracted periods and which has the particular quality of being rapidly absorbed into the lacquer film upon contact therewith. By reason of this inclusion, the ink may be used on conventional types of printing apparatus and the ink will remain wet on the latter for hours without appreciable change of tack or viscosity. Upon application to the lacquer film, however, the slow solvent is extracted from the ink by absorption into the lacquer film, thereby permitting the ink to set up rapidly within a period of a few seconds and varying from five to ten seconds, depending upon the amount of ink applied and proportions used. Several slow solvents may be used in the present invention. Because of their common chemical properties these solvents are frequently classed together and include dibutyl phthalate, butyl Cellosolve, Cellosolve, dimethyl phthalate, triethylene glycol. Probably additional slow solvents may be used having the specific qualities of firstly being miscible with a fast drying ink to retard its setting, and secondly being readily and substantially completely absorbable in a lacquer film. Of the above enumerated group I have found that dibutyl phthalate is preferable at least in connection with the fast drying inks tested.

The proportion of slow solvent to fast drying ink may be varied somewhat within the test that the amount of solvent must be sufficiently large to retard the drying of the ink in the printing press or rubber printing plates a sufficient length of time to permit printing operations, and yet be sufficiently small as to be substantially completely removed from the ink by absorption when applied to the lacquer film. If too great an amount of slow solvent is included, the same cannot be

completely removed from the ink by the lacquer film contacted and consequently the ink will remain wet and tacky for an appreciable period of time. I have found that a good average working range may be obtained by incorporating one part of slow solvent to approximately nine parts of fast drying ink. For example, the combination of fifty c. c. dibutyl phthalate to one pound (453 grams) of fast drying ink, denoted in the trade as casing ink, afforded an excellent working material both from the standpoint of delayed drying on the rolls and type or rubber printing plates of the printing apparatus and from the standpoint of a rapid setting up and drying of the ink on the lacquer film. This combination may be adjusted for lower or higher viscosity of the ink by incorporating a minimum of approximately forty c. c. dibutyl phthalate per pound of ink for the higher viscosity and a maximum of approximately sixty c. c. dibutyl phthalate per pound for a thin viscosity ink.

The present material and process can be used for printing on substantially any lacquered surface whether the lacquer be applied to paper,

wood, glass, metal, etc. One important use to which the material and process has been put is in the printing of bombs where the ink is applied to a metal body having a lacquered surface.

I claim:

In a process of printing upon a dried cellulose ester lacquer film with a fast drying ink comprising a volatile solvent, a pigment, and a film forming binder for said pigment, the steps which comprise inhibiting drying of said ink prior to printing on said lacquer film by incorporating in said ink a drying retardant selected from the group consisting of dibutyl phthalate, butyl Cellosolve, Cellosolve, dimethyl phthalate, and triethylene glycol, said retardant being incorporated in said ink in an amount sufficient to maintain said ink in a wet tacky state for a protracted period in the order of several hours when said ink is spread in a thin film on printing type; applying said ink to said lacquer film, and setting said ink on said film within about 10 seconds at atmospheric temperatures by evaporation of said solvent and absorption of said retardant into said lacquer film.

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