

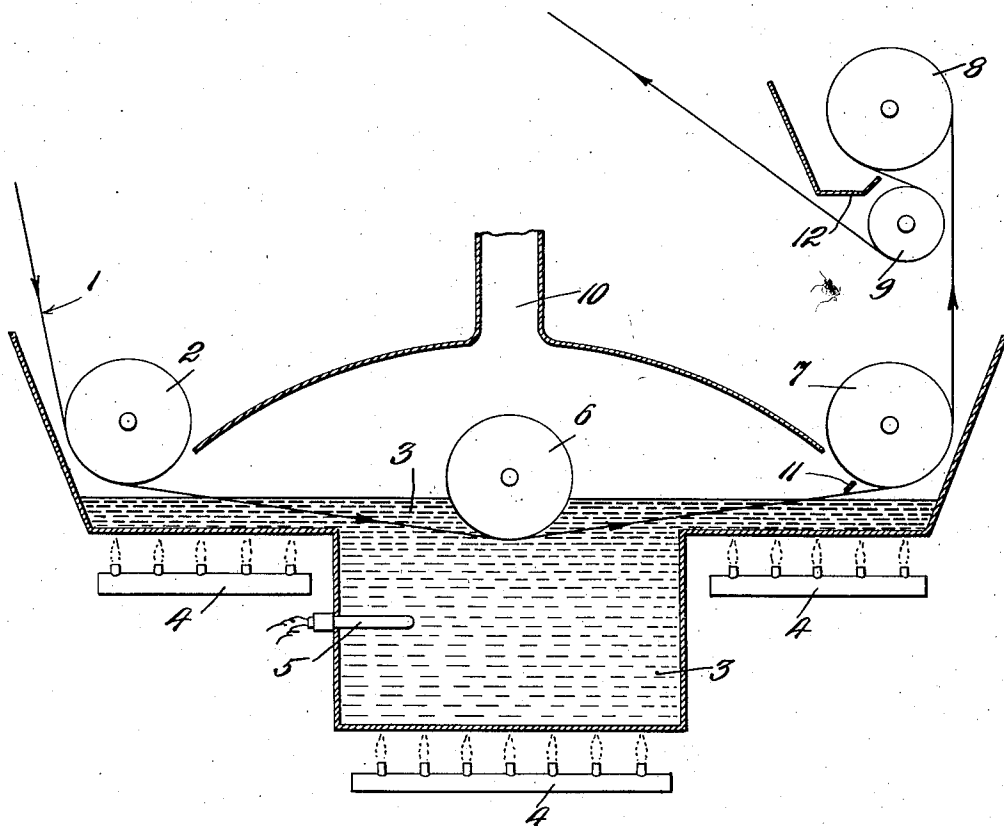
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DRYING PRINTING INKS

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DRYING PRINTING INKS

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This invention relates to printing, and has particular reference to a new and novel method of drying printing ink containing a difficultly volatilizable solvent. More particularly, my method contemplates passing the prints through a hot bath of inert material, such as molten metal, to drive off the solvents from the ink.

Recently, a new type of printing ink has been introduced into the printing art. These inks comprise dispersions of pigments in vehicles consisting of plastic to solid binders, dissolved in solvents which are substantially non-evaporating at ordinary press-room temperatures, but which evaporate at elevated temperatures. Prints of these inks are ordinarily dried either by passing them over a drum heated to a very high temperature or by subjecting them to very high temperatures, of the order of 1000° F. to 2000° F. for a few seconds. Flashing and burning of the ink vapors have likewise been resorted to in order to improve the drying of such inks.

In order to obtain high press speeds with these methods, the heat applied to the paper must be considerably higher than that actually required to dry the ink, since the paper passes the heat at such speeds that the prints never attain maximum temperature. Because of the use of such high heats, there is always danger that the paper used will scorch, where unusual conditions permit of the development of too high a heat at some spot on the paper. This is particularly true with heat-sensitive stocks, such as bread wrapper paper, which scorches as low as 200° C.

I have discovered a new and novel method of printing paper with such inks without danger of scorching, which comprises passing the printed paper through a bath of inert fluid heated to a temperature sufficiently high to cause rapid vaporization of the solvent, but below the scorching point of the paper. The paper thus attains a maximum temperature above which it cannot rise, thus eliminating the danger of scorching.

The fluid must be substantially non-volatile at the high temperatures used (in the neighborhood of 150° C. to 200° C.), must not affect the ink or the paper, and preferably be cheap and easy to heat. The metals are particularly suitable from all points of view; and I prefer to use low melting metals and alloys, such as wood metal (M. P. 65.5° C.) as the heating bath.

The diagrammatic drawing attached hereto is illustrative of the process. A web of paper 1, which bears a wet print, passes under a roller 2 into a bath of molten metal 3, maintained at the desired temperature by burners 4. The molten

metal is kept at a uniform temperature by any known thermostatic device, indicated at 5. The paper web passes under roll 6 and finally out under roll 7, then over cooling rolls 8 and 9, to a rewind. As can be seen from the drawings, the rollers 2, 6 and 7 are preferably journaled above the bath to prevent the possibility of contact between molten metal and the roll shaft bearings.

As the paper passes through the bath, it rapidly reaches the temperature of the bath, owing to the excellent heat transfer of the metal. The solvent evaporates into the bath, and rises to its surface, from whence it is exhausted up a stack 10.

The metal is removed from the unprinted side of the paper by a doctor blade 11, which wipes the back side clean just as it emerges from the bath. Any metal clinging to the printed side of the paper is removed either by centrifugal force while passing about the roll 7 at a high speed, while molten, or by gravity and centrifugal force while going about the cooling roller 9, after the metal has set a solid. Such metal is collected in a box 12, placed under the roller.

By the use of my method, the bath may be heated up to temperatures within 10° C. of the scorching point of the paper, with assurance that the paper will not be damaged. This heating requires a minimum time, because of the high rate of heat transfer of the metal, so that complete drying may be obtained with press-stable inks, by keeping the web immersed in the bath for as short a time as 2 to 3 seconds.

As indicated above, I prefer to operate at as high a temperature as possible, while running no danger of scorching the paper. With more heat-sensitive stocks, such as scorch at 200° C. to 220° C., I prefer to operate at 180° C. to 200° C.; with less sensitive stocks (scorching at 250° C. to 300° C.), temperatures of 225° C. to 240° C. may be used.

While my method is particularly applicable to printing inks containing difficultly volatilizable solvents, it is likewise applicable to printing inks containing polymerizable synthetic resins and the like which are set largely by heat, as my method provides for the application of maximum heat to the prints without danger of scorching.

What I claim is:

1. The method of drying prints of printing inks containing solvents which are substantially non-volatile at 20° C. but which evaporate rapidly at 150° C., which comprises passing the prints through a bath of an inert fluid heated to a temperature of the order of 150° C. or higher the

passage through the bath being completed in a few seconds.

2. The method of drying wet films containing solvents which are substantially non-volatile at 20° C. but which evaporate rapidly at temperatures of the order of 150° C. on paper carrying such films, which comprises passing the paper through a bath of fluid metal heated to a temperature of at least the order of 150° C., but below the scorching point of the paper, the passage through the bath being completed in a few seconds.

3. The method of drying wet films containing solvents which are substantially non-volatile at 20° C. but which evaporate rapidly at temperatures of the order of 150° C. on paper carrying such films, which comprises passing the paper through a bath of fluid metal heated to a temperature of at least the order of 150° C., but below the scorching point of the paper, the pas-

sage through the bath being completed in a few seconds, and removing the metal from the unmarked side of the paper with a doctor knife after it emerges from the bath.

4. The method of drying wet films containing solvents which are substantially non-volatile at 20° C. but which evaporate rapidly at temperatures of the order of 150° C. on paper carrying such films, which comprises passing the paper through a bath of fluid metal heated to a temperature of at least the order of 150° C., but below the scorching point of the paper, the passage through the bath being completed in a few seconds, removing the metal from the unmarked side of the paper with a doctor knife after it emerges from the bath, and from the marked side by gravity and by centrifugal force applied to the paper.

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