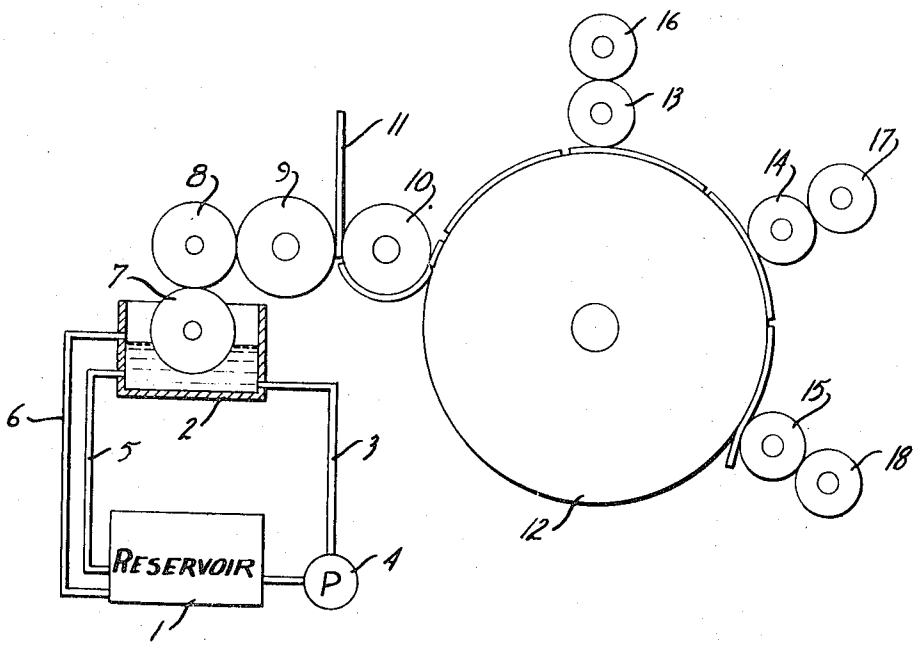
Nov. 24, 1970 F. C. LANG 3,542,578

METHOD OF PREVENTING STATIC CHARGES IN PRINTING

Original Filed Feb. 1, 1966



INVENTOR
FRANK C. LANG
BY
Andrus & Starke
Attorneys

United States Patent Office 3,542,578 Patented Nov. 24, 1970

3,542,578

METHOD OF PREVENTING STATIC CHARGES IN PRINTING

Frank C. Lang, 9733 W. Hampton, Apt. 11, Milwaukee, Wis. 53225

Continuation of application Ser. No. 524,002, Feb. 1, 1966. This application May 7, 1969, Ser. No. 824,747
Int. Cl. H05f 1/02
U.S. Cl. 117—14
9 Claims

ABSTRACT OF THE DISCLOSURE

A method of eliminating static charge on blanks during printing by applying an evaporable organic liquid to a surface of the blank. The liquid has a spot drying time in the range of 4 to 7 minutes and provides a liquid film between the metallic impression roller and the blank during printing to eliminate the static charge on the blanks during the printing operation. The liquid film remains for a short period of time after stacking of the blanks to aid in setting up the printing.

This application is a continuation of Ser. No. 524,002, filed February 1, 1966, now abandoned.

The invention relates to a method of preventing the development of static charges during printing.

During printing operations, such as offset or rotogravure printing, the blanks or continuous roll to be printed acquire a static charge when brought into contact with the impression cylinder, with the result that the printed blanks, after delivery, cannot be properly aligned or stacked. As a further difficulty due to the static charge, the blanks, in some cases, cannot be peeled from the impression cylinder, resulting in a buildup of blanks on the cylinder and a jamming of the press. When jamming occurs, the jammed blanks must be removed by hand from the press and this requires substantial time and labor, resulting in considerable down-time for the press.

As an added problem in rotogravure printing, highly flammable inks are used, and any static charge developed on the blank may tend to cause flash fires. Therefore, it is highly desirable to eliminate the static charge on the blanks during printing.

The present invention is directed to a novel and inexpensive method of eliminating the static charge on blanks during printing. More specifically, the method of the invention consists of applying a volatile organic liquid to the backside of the blank prior to printing. The organic liquid is colorless having a spot drying time in the range of 4 to 7 minutes and a flash point in the range of 70° F. to 140° F.

If the back side of the blank is not to be printed, the liquid is applied to the backside of the blank in the pure state, while if the backside of the blank is to be printed, the liquid is added to the ink and applied with the ink during printing of the back surface of the blank.

The precise action of the liquid in eliminating the static charge is not completely understood, but it is believed that the liquid provides a thin film which serves to insulate the blank from the impression cylinder and prevents a static charge from being builtup. The spot drying time of the organic liquid is such that it will remain as a liquid during the printing, delivering and stacking of the blank and the evaporation of the liquid during stacking aids in setting up the printing and prevents offset or transfer of the printed impression to the backside of adjacent blanks in the stack.

The method of the invention can be readily used with conventional offset, rotogravure or letter press printing operations and serves to eliminate the buildup of a static charge on the blanks during the printing operation. This results in the blanks being more readily stacked and aligned at delivery and prevents jamming of the blanks on the impression cylinder. Moreover, the elimination of the static charge also eliminates the hazard of flash fires which may occur in rotogravure printing due to the use of highly flammable inks.

Other objects and advantages will appear in the course of the following description.

The drawings illustrate the best mode presently contemplated of carrying out the invention.

The drawings are a diagrammatic view of a three-color, offset printing operation incorporating the method of the invention.

The drawing illustrates, in diagrammatic form, a conventional three-color, dry, offset press which includes a reservoir or container **1** to contain the volatile, organic liquid used in preventing the development of a static charge on the blank. The liquid within the reservoir **1** is supplied to a tank **2** through a line **3** by pump **4** and the liquid is returned to the reservoir through a return line **5**. In addition, an overflow line **6** is connected between the tank **2** and the reservoir **1** at a location above the return line **5** and serves to maintain the maximum level of liquid in the tank **1**.

A roller **7** is mounted for rotation within the tank and lower portion of the roller is in contact with the liquid within the tank. Roller **7** is adapted to ride in contact with an etched roller **8** which in turn rides against the surface of a rubber plate cylinder **9**. With this construction, the liquid within the tank is transferred from the surface of the roller **7** to the etched roller **8** and then to the plate cylinder **9**.

The cylinder **9** rotates in contact with a metallic surfaced impression cylinder **10** and the blank or sheet **11** to be printed passes between the plate cylinder **9** and the impression cylinder **10** so that the liquid is applied to the backside of the blank.

A large metallic surfaced impression cyinder **12** serves to support the blank after it leaves the small impression cylinder **10**, and the three colors are printed onto the front side of the blank by blanket cylinders **13**, **14** and **15**. The ink is applied to each individual blanket cylinder by plate cylinders **16**, **17** and **18**, respectively. After the last of the three colors is printed on the front side of the blank by the blanket cylinder **15**, the blank is removed from the impression cylinder by a conventional vacuum delivery mechanism, not shown.

The three-colored, dry, offset press, which is shown diagrammatically in the drawing, merely illustrates a typical process in which the method of the invention can be utilized and is not meant to restrict the invention to this type of printing.

In an operation where there is to be no printing on the back surface of the blank, the volatile organic liquid is contained within the reservoir **1** and is applied to the back surface of the blank **11** by the plate cylinder **9**. The liquid should be colorless so that no color residue remains on the blank after the liquid has evaporated. The organic liquid should have a flash point in the range of 70° to 140° F., and preferably in the range of 106° to 120° F., and should have a spot drying time in the range of 4 to 7 minutes.

Specific examples of organic liquids which can be used are glycol ethers, such as ethylene glycol monomethyl ether and ethylene glycol monoethyl ether; ketones, such as methyl n-amyl ketone; and the like. Ethylene glycol monomethyl ether and ethylene glycol monoethyl ether are readily available materials having flash points of 106° F. and 113° F., respectively, and spot drying times of 4 minutes, 20 seconds, and 5 minutes, 40 seconds, respectively.

The term "organic liquid," as used in the description and claims, is intended to mean not only a single compound having the above mentioned physical properties, but also mixtures of miscible liquids in which the mixture has a single or composite spot drying time and flash point falling within the above mentioned ranges. The volatile organic liquids to be used are generally referred to as organic solvents but in this application they are not functioning as solvents but are used to provide an evaporable liquid film.

The liquid which is applied to the backside of the blank by the plate cylinder **9** forms a thin film between the blank **11** and the impression cylinder **12** as the blank moves over the surface of the cylinder, thereby preventing the buildup of a static charge on the blank. The spot drying time of 4 to 7 minutes is important so that the organic liquid will be in the form of a liquid film on the backside of the blank as is passed over the impression cylinder and will remain as a liqud film for a considerable period after the blanks have been delivered and stacked. The evaporation of the liquid film on the stacked blanks serves to set up the printing and prevents offset or transfer of the ink from one blank to the adjacent blanks in the stack, with the result that the quality of printing is substantially improved.

If printing is to be done on the back surface of the blank **11**, the liquid is mixed with the ink in the reservoir **1**. The ink to be employed is a standard alcohol-base dye ink, and the amount of the organic liquid to be used in the ink must be correlated with the alcohol content to provide the necessary drying time for the ink, as well as to provide the liquid film on the backside of the blank during printing as well as stacking. It has been found that an ink formulation containing about 2.5 to 3.0 parts by weight of the organic liquid and up to 2 parts by weight of alcohol to 1 part of the colorant or dye formula provides a satisfactory ink formulation which provides proper drying time for the ink so as to eliminate any ink buildup on the impression cylinder as well as providing the necessary film of the organic liquid on the backside of the blank during the printing operation. A preferred ink formulation contains 2.75 parts of the organic liquid and 0.25 part of ethyl alcohol to 1 part of the colorant. When the organic liquid is added to the alcohol base ink, the alcohol base will evaporate before the organic liquid to set up the printing, and the organic liquid will not completely evaporate until after stacking of the blanks to maintain the desired insulating film between the blank and the impression cylinder and prevent the buildup of static charge on the blank.

The method of the invention is a novel and inexpensive method of preventing the buildup of a static charge on blanks during printing operations, such as offset, rotogravure and letter press printing. By eliminating the static charge, the blanks, after delivery, can be more easily stacked and aligned. The elimination of the static charge also prevents jamming of the blanks on the impression cylinder, thereby minimizing down-time for the press. As a further advantage, the organic liquid which is applied to the backside of the blank evaporates after delivery and stacking of the blanks, and the evaporation effect serves to set up the printing and prevent transfer of the ink from one blank to another in the stack, thereby improving the overall quality of the printing.

While the drawings illustrate a sheet-fed press for printing separate sheets or blanks, the invention can also be utilized with a web-fed press for printing a continuous sheet or roll. The term "blank" as used in the description and claims is intended to mean either separate sheets or a continuous roll.

I claim:

1. In a method of printing, the steps of applying to a first surface of a blank to be printed an evaporable organic liquid having a spot drying time in the range of 4 to 7 minutes, disposing said first surface against a metallic member, printing on the opposite surface of the blank before evaporation of said liquid whereby said liquid provides a film between the blank and said metallic member to eliminate static charge on the blank, and disposing the blank in a series of superimposed layers before complete evaporation of said liquid, whereby evaporation of the remaining liquid aids in setting up the printing and prevents transfer of the printing between adjacent layers.

2. The method of claim **1**, in which the liquid has a flash point in the range of 70° to 140° F.

3. The method of claim **2** in which the liquid is substantially colorless.

4. The method of claim **1**, in which the liquid is a glycol ether selected from the group of ethylene glycol monoethyl ether and ethylene glycol monomethyl ether.

5. The method of claim **1**, in which the metallic member is an impression cylinder.

6. In a method of printing, the steps of applying an alcohol base ink composition containing an organic liquid to the backside of a blank to be printed, said organic liquid having a spot drying time in the range of 4 to 7 minutes and having a flash point in the range of 70° to 140° F., disposing said backside of the blank in contact with an impression cylinder, and printing on the front side of the blank before evaporation of said organic liquid, said liquid providing a film between the blank and the impression cylinder to thereby prevent the build-up of static charge on the blank.

7. The method of claim **6** in which the ink composition is applied to the backside of the blank by a cylinder.

8. The method of claim **6**, in which the ink composition contains up to 2 parts by weight of alcohol and from 2.5 to 3.0 parts by weight of said organic liquid to 1 part of coloring agents.

9. In a method of printing, the steps of applying to a first surface of a blank to be printed an evaporable organic liquid having a spot drying time in the range of 4 to 7 minutes, disposing said first surface against a metallic member, printing on the opposite surface of the blank before evaporation of said liquid whereby said liquid provides a film between the blank and said metallic member to eliminate static charge on the blank, and disposing the blank in a stack with a plurality of similar blanks before complete evaporation of said liquid, and evaporating the remaining liquid while the blanks are stacked to set up the printing and prevent offset of the printing to adjacent blanks in the stack.

References Cited

UNITED STATES PATENTS

2,665,443	1/1954	Simon et al.	
2,649,143	8/1953	Simon et al.	
1,996,125	4/1933	Shillenn	106—20

ALFRED L. LEAVITT, Primary Examiner

A. GRIMALDI, Assistant Examiner

U.S. Cl. X.R.

101—426; 117—15; 317—2