

PATENT SPECIFICATION

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(54) BOTTLE CAP CLOSURES

(71) We, THE CROWN CORK COMPANY (MALAYA) LIMITED, a Corporation organised and existing under the laws of the Republic of Singapore, of Jurong Industrial Estate, Jurong, Republic of Singapore, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to bottle cap closures, particularly to a method of manufacturing bottle cap closures such as crown cork closures, wherein an underprinted removable plastics liner is provided.

A removable liner unit in a bottle cap made in accordance with the invention enables a mark or image to be transferred onto the underside of the bottle cap liner so that the liner can be used in promotional activities in connection with the bottling industry. It also provides a printed indicia which may be sent through the post by consumers, customers or manufacturers without fear of any resultant damage to automatic postal sorting machines.

In prior attempts to achieve easy removal of cap liners, a number of incompatible interior coatings were used which resulted in the mark or indicia occasionally breaking up between the cap shell and the liner, and in the majority of cases produced a liner covered by a lacquer process which made it unattractive as a marketing or promotional object.

The present invention is concerned with a process where one coating and one print pass is required to produce the requisite bond of the liner to the shell and which allows easy removal of the liner with the imposed image being clearly and precisely transferred to the back of the cap liner.

According to the present invention, there is provided a method of manufacturing bottle cap closures by applying a coating of a high solids low adhesion vinyl lacquer to a sheet of material from which rigid bottle cap shells can be stamped; curing the coated sheet; printing an inked image on a coated surface of the sheet; curing the printed ink on the

sheet such that the image releasably adheres to the lacquer coating thereon; stamping a bottle cap shell, embracing the image, from the sheet; and lining the bottle cap shell with a removable liner; said vinyl lacquer containing sufficient of a lacquer/metal adhesion promoter and a lacquer/liner adhesion controller such that the ink of the image is transferred from the said coating to the adjacent surface of the liner and such that the liner can be easily removed from the coated shell with the inked image attached thereto.

In the specification, the term "high solids" vinyl lacquer" is used in the normal sense to means a vinyl lacquer having a high non-volatiles content, typically in the range 58 to 62%.

Reference will hereinafter be made to the accompanying drawings which illustrate one embodiment of the invention by way of example, and of which:

Figure 1 shows a sheet of material from which a number of crown caps are to be pressed, having a number of indicia or marks printed thereon;

Figure 2 illustrates a cross section of a crown cap shell and liner assembly; and

Figure 3 illustrates a crimped crown cap with its liner partially removed.

With reference to the drawings, a sheet of material 1, of metal, for example, from which a plurality of crown cap shells are to be stamped is first coated with a low adhesion high solids vinyl (organosol) transparent or pigmented material 2, for example, the lacquer made by Donald Macpherson and Company Limited under their reference number 3845/504 which has a lacquer/metal adhesion promoter in the form of unsaturated polyester resin (60% N.V. in Xylol) in the range 5 to 15%, preferably 12.2%, and a lacquer/liner adhesion controller in the form of amine-formaldehyde resin in the range 0.5 to 5%, preferably 0.75%, the latter being augmented by 10% ASBI wax dispersion in the range of 1 to 5%, preferably 2.1%. The lacquer coating is preferably applied at a film weight of 7.5 grams to 9.0 grams per square metre of material, the

sheet being then baked in an oven at a temperature of between 380°F and 410°F for a period of approximately 10 minutes.

Images or indicia 3 in a single colour or several colours are then printed on the sheet 1 at points 4 on the sheet where the crown caps are to be stamped out in the form of shells. The printing operation is performed by any suitable method, using a suitable printing ink material; preferably it is performed by an offset litho-graphic method. The printed sheets are preferably baked at a temperature from 290°F to 310°F for a period of 15 minutes in order to cure the printed ink.

Crown cap shells 5 such as that shown in Figure 2 are then stamped from the sheet 1 and are each lined with a removable sealing gasket or liner 6 of a foamed polyvinyl chloride plastisol material of known type, and are preferably cured in an oven for 1 minute at a temperature of 410°F to 420°F. Alternatively, liners of polyethylene or vinyl acetate compounds may be used.

The method of applying the sealing compound or liner 6 to the shell 5 may vary from a moulded or profiled heat treated process to a "spun in" method of application. The liner can be easily removed from any container closure cap regardless of the composition or formation or method of manufacture of the liner itself.

Thus, whilst the ink marks or indicia are cured on the sheet 1, when the liner is removed from the shell, by a customer, for example, the indicia are transferred to the liner which can then be used as a promotional feature. For example, a customer may be encouraged to collect a number of liners bearing particular indicia in order to claim a reward of some kind.

It is also possible to produce a crown cap where one indicium 3a remains on the crown shell when the liner is removed, whilst at the same time allowing an additional mark or image 3b to be transferred to the liner (Figure 3). This is performed by using different ink formulae for each indicium, and enables the crown cap shell to be used as a promotional or commercial feature also.

WHAT WE CLAIM IS:—

1. A method of manufacturing bottle cap closures by applying a coating of a high solids low adhesion vinyl lacquer to a sheet of material from which rigid bottle cap shells can be stamped; curing the coated sheet;

printing an inked image on a coated surface of the sheet; curing the printed ink on the sheet such that the image releasably adheres to the lacquer coating thereon; stamping a bottle cap shell, embracing the image, from the sheet; and lining the bottle cap shell with a removable liner; said vinyl lacquer containing sufficient of a lacquer/metal adhesion promoter and a lacquer/liner adhesion controller such that the ink of the image is transferred from the said coating to the adjacent surface of the liner and such that the liner can be easily removed from the coated shell with the inked image attached thereto.

2. A method as claimed in claim 1, in which the coating is applied to the sheet of material at a film weight in the range 7.5 grams to 9.0 grams per square metre of the sheet of material.

3. A method as claimed in claim 2, in which the coated sheet is cured at a temperature in the range 380°F to 410°F, for a period of 10 minutes.

4. A method as claimed in any of claims 1 to 3, in which the printed ink is cured at a temperature in the range of 290°F to 310°F, for a period of 15 minutes.

5. A method as claimed in any of claims 1 to 4, in which the sheet is printed with an inked image using an offset lithographic process.

6. A method as claimed in any of claims 1 to 5, in which the liner is formed of foamed polyvinyl chloride material, and the lined shell is cured at a temperature in the range 410°F to 420°F, for a period of one minute.

7. A method of manufacturing bottle cap closures substantially as hereinbefore described with reference to the accompanying drawings.

8. A bottle cap closure manufactured by a method as claimed in any one of claims 1 to 7.

9. A crown cap closure manufactured by a method as claimed in any one of claims 1 to 7.

10. A crown cap closure as claimed in claim 9 substantially as hereinbefore described with reference to the accompanying drawings.

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Images or indicia 3 in a single colour or several colours are then printed on the sheet 1 at points 4 on the sheet where the crown caps are to be stamped out in the form of shells. The printing operation is performed by any suitable method, using a suitable printing ink material; preferably it is performed by an offset litho-graphic method. The printed sheets are preferably baked at a temperature from 290°F to 310°F for a period of 15 minutes in order to cure the printed ink.

Crown cap shells 5 such as that shown in Figure 2 are then stamped from the sheet 1 and are each lined with a removable sealing gasket or liner 6 of a foamed polyvinyl chloride plastisol material of known type, and are preferably cured in an oven for 1 minute at a temperature of 410°F to 420°F. Alternatively, liners of polyethylene or vinyl acetate compounds may be used.

The method of applying the sealing compound or liner 6 to the shell 5 may vary from a moulded or profiled heat treated process to a "spun in" method of application. The liner can be easily removed from any container closure cap regardless of the composition or formation or method of manufacture of the liner itself.

Thus, whilst the ink marks or indicia are cured on the sheet 1, when the liner is removed from the shell, by a customer, for example, the indicia are transferred to the liner which can then be used as a promotional feature. For example, a customer may be encouraged to collect a number of liners bearing particular indicia in order to claim a reward of some kind.

It is also possible to produce a crown cap where one indicium 3a remains on the crown shell when the liner is removed, whilst at the same time allowing an additional mark or image 3b to be transferred to the liner (Figure 3). This is performed by using different ink formulae for each indicium, and enables the crown cap shell to be used as a promotional or commercial feature also.

WHAT WE CLAIM IS:—

1. A method of manufacturing bottle cap closures by applying a coating of a high solids low adhesion vinyl lacquer to a sheet of material from which rigid bottle cap shells can be stamped; curing the coated sheet;

printing an inked image on a coated surface of the sheet; curing the printed ink on the sheet such that the image releasably adheres to the lacquer coating thereon; stamping a bottle cap shell, embracing the image, from the sheet; and lining the bottle cap shell with a removable liner; said vinyl lacquer containing sufficient of a lacquer/metal adhesion promoter and a lacquer/liner adhesion controller such that the ink of the image is transferred from the said coating to the adjacent surface of the liner and such that the liner can be easily removed from the coated shell with the inked image attached thereto.

2. A method as claimed in claim 1, in which the coating is applied to the sheet of material at a film weight in the range 7.5 grams to 9.0 grams per square metre of the sheet of material.

3. A method as claimed in claim 2, in which the coated sheet is cured at a temperature in the range 380°F to 410°F, for a period of 10 minutes.

4. A method as claimed in any of claims 1 to 3, in which the printed ink is cured at a temperature in the range of 290°F to 310°F, for a period of 15 minutes.

5. A method as claimed in any of claims 1 to 4, in which the sheet is printed with an inked image using an offset lithographic process.

6. A method as claimed in any of claims 1 to 5, in which the liner is formed of foamed polyvinyl chloride material, and the lined shell is cured at a temperature in the range 410°F to 420°F, for a period of one minute.

7. A method of manufacturing bottle cap closures substantially as hereinbefore described with reference to the accompanying drawings.

8. A bottle cap closure manufactured by a method as claimed in any one of claims 1 to 7.

9. A crown cap closure manufactured by a method as claimed in any one of claims 1 to 7.

10. A crown cap closure as claimed in claim 9 substantially as hereinbefore described with reference to the accompanying drawings.

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