METHOD AND APPARATUS FOR WRAPPING A LABEL ONTO A CONTAINER WITH A GLUELESS LEADING EDGE

A labeling machine (10) and method of labeling containers (12) with a label (15) that has a glueless leading edge and is caused to wrap around a container (12) by the application of an aqueous solution that is applied to the container (12) prior to applying the label (15) to the container (12). The aqueous solution is preferably applied to the label panel portion of the container (12). The surface tension of the aqueous solution causes the label (15) to wrap around the container (12). Glue is applied to the trailing edge of portion and is confined to the portion of the label (15) forming a sleeve in situ that is not adhered by glue to the container (12). The aqueous solution is applied to the container (12) to be labeled by means of an aqueous solution supply system (28) having a roll-on pad including a sponge (66).
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METHOD AND APPARATUS FOR
WRAPPING A LABEL ONTO A CONTAINER
WITH A GLUELESS LEADING EDGE

TECHNICAL FIELD

5 The present invention relates to a method and apparatus for labeling containers.

BACKGROUND ART

Many different methods and machines have been developed for applying labels to containers. Labeling containers has many advantages when compared to directly decorating containers by painting or printing. Labeling containers is generally less expensive and can provide a aesthetically pleasing container appearance that provides a convenient way to label a container with all required information and decorative graphics.

One type of label is a pressure sensitive adhesive label that generally provides a full coating of adhesive that is protected prior to application by means of a backing layer. The backing layer is removed from the label prior to application and the label is adhered to the container by means of the adhesive on the back of the label. Another type of label is a preformed sleeve label that is then slid over one end of the container and either glued or shrunk in place. Sleeve labels are generally made of more expensive materials and are difficult to form and assemble to a container when compared to roll fed labels. Wrap around labels are applied to containers by wrapping the label around a container after first adhering the leading edge with a trailing edge being secured by adhesive to the outside of the leading edge or the container wall.

25 Containers are frequently recycled by remelting or washing for reuse. When recycling it is generally first necessary to remove the labels and glue,
especially if they are different in composition from the container. Frequently when labels are removed, a glue residue remains on the container if the label is glued to the container. The value of recycled containers is increased if the containers are free of contaminants such as glue and label fragments.

During the labeling process, glue applied to container bodies can result in wrinkling that may be caused by the glue affixing portions of the label to the container during heat shrinking while other portions of the container are permitted to move. Wrinkling can also be caused with full coating adhesive application if the glue layer is not of a consistent thickness. Applying labels to containers with glue also increases the amount of glue required for the labeling operation that also increases cost.

These and other problems and disadvantages associated with prior art labeling methods and machines are addressed by the labeling machine and system disclosed in this application.

DISCLOSURE OF INVENTION

According to the present invention a machine for labeling containers is disclosed that includes a container infeed conveyor for feeding containers into the machine. A label feeder supplies labels having a leading edge portion and a trailing portion from a label supply source. A vacuum drum receives labels from the label feeder. A wetting solution applicator is disposed on the labeling machine near the infeed conveyor for applying an aqueous solution to each of the containers as they are fed into the machine by the infeed conveyor. The solution is applied to a label panel portion of each container. A glue applicator is disposed adjacent the vacuum drum and has protruding portions spaced about the periphery of the vacuum drum corresponding to the trailing edge portions of the labels. The protruding portions cause the trailing edge portions to contact the glue applicator thereby coating the trailing edge portions with glue. The vacuum drum applies labels to the containers by causing the aqueous solution on the containers to wet the labels causing the labels to wrap around the containers as they are separated from the cylindrical surface of
the vacuum drum. The trailing edge portion is wrapped onto the leading edge portion of the labels and is secured to the leading edge portion of the labels by glue.

According to another aspect of the invention, a method of labeling containers is provided. The method comprises the steps of feeding labels having an inside surface and an outer surface to a labeling machine having a vacuum drum for supporting the labels during the labeling process. Containers having a label panel portion are fed to the labeling machine from a container supply source. An aqueous solution is applied to the containers to wet the label panel portion of the containers. Glue is applied to a limited portion of the inside surface of the labels while the labels are supported on the vacuum drum. The labels are wrapped about the containers by causing the aqueous solution on the containers to wet the inside surface of the labels. The limited portion of the inside surface of the labels having glue applied thereto is secured to a portion of the outer surface of the label.

According to another aspect of the invention the label supply source is preferably a roll of labels. Alternatively, the label supply source could also be a cut and stack label magazine or other label supply source.

The preferred wetting solution applicator is a roll-on pad. Alternatively, the wetting solution applicator could be a spray applicator.

The glue applicator is preferably a hot melt glue applicator and the glue applied is preferably hot melt glue. The hot melt glue is preferably applied to the trailing portion of the label in such a way that no glue is applied to the container. While in its most preferred form no glue is applied to the container, some glue spatter or a minimal quantity of glue could be applied between the label and the container but this glue is not intended to cause the transfer of the label to the container.

The method can also include the step of heating the label to shrink the label material about contours or into reduced diameter portions of the container.
The above objects and advantages of the invention will be better understood with reference to the attached drawings and following detailed description of the invention.

**BRIEF DESCRIPTION OF DRAWINGS**

FIGURE 1 is a partially plan view of a labeling machine and a partial elevation view of an aqueous solution applicator system made in accordance with the present invention.

FIGURE 2 is an elevation view of a container having a label partially applied thereto in accordance with the present invention.

FIGURE 3 is a plan view of a vacuum drum made in accordance with the present invention.

FIGURE 4 is a cross-section view of a container having a label applied thereto in accordance with the present invention.

**BEST MODE FOR CARRYING OUT THE INVENTION**

Referring now to FIG. 1, a labeling machine 10 for labeling containers 12 is shown. Containers 12 are fed into the labeling machine 10 on an infeed conveyor 14. Labels 15 are provided by a label feeder 16. The label feeder 16 may incorporate a cutter 18 for cutting labels that are received from a roll of labels 20 through a tensioner 22 as is well known in the art. Alternatively, the label feeder 16 can be a cut and stack label magazine. A vacuum drum 24 is used to support discrete labels 15 after they are received from the label feeder 16 until they are secured to the containers 12.

As the containers are fed into the machine they are contacted by a solution applicator 26 that is preferably in the form of a roll on pad. An aqueous
solution of water and from about 1% to 5% glycerine is supplied to the solution applicator 26 from a solution supply system 28. The solution supply system 28 includes a mixing tank 30 in which the water and glycerine is mixed in the desired proportion. Solution is provided to the solution applicator 26 by means of a pump 32. A premix tank 34 is preferably provided to provide a reservoir of glycerine in a more concentrated form that is then diluted by a later addition of water prior to supplying it to the solution applicator 26. A mounting post 36 is provided on the labeling machine base for mounting the solution applicator to the labeling machine.

Referring now to FIG. 2, a container 12 is shown with the label 15 partially peeled back to illustrate the wetting solution 40 on the label panel portion 42 of the container 12. The label 15 has glue 46 applied to the label overlap.

Referring to FIG. 1, the glue applicator 50, preferably a hot melt glue wheel applicator is shown adjacent the vacuum drum 24. Referring now to FIG. 3, the vacuum drum 24 has a generally cylindrical surface 52 and is designed to accommodate two to three labels. Protruding portions 54 are provided at spaced locations about the perimeter of the cylindrical surface 52. The generally cylindrical surface includes undercut portions 56 in which a labeling segment is held on the vacuum drum 24. The vacuum drum cover 58 is preferably formed with Tygon, a relatively rigid elastomeric material that can be machined to provide a desired contour.

Referring now to FIGS. 2 and 4, the label 15 is shown with its leading edge portion 60 and trailing edge portion 62. The leading edge portion 60 is the first portion of the label 15 to contact the container while the trailing edge portion 62 is the last portion of the label to be transferred to the container 12 as the label 15 is applied. The trailing edge portion 62 is secured to the leading edge portion 60 by hot melt glue 46.

The solution supply system 28 is described with reference to FIG. 1. A tube 64 provides the aqueous solution, or wetting solution 40 to a sponge 66 that forms part of the solution applicator 26. The sponge is preferably a PVA sponge that
is a durable, compressive material that retains the wetting solution for transfer to the container prior to labeling. A manifold 70 is provided to distribute the aqueous solution. A strainer (not shown) is provided to strain any foreign particles from the flow of aqueous solution prior to supplying it to the sponge 66. A pressure regulator is provided for controlling the fluid pressure in the solution supply system 28. A valve 78 is provided to control the flow of the aqueous solution.

Referring now to FIG. 1, as containers 12 are fed into the labeling machine 10, they are initially guided by an infeed guide 80 and are fed into the machine in a timed relationship by means of a starwheel 82. A container guide 84 is located on the opposite side of the infeed conveyor 14 from the infeed guide 80 and the solution applicator roll-on pad 26. As the containers follow the container guide 84 around the solution applicator 26, the containers 12 are rotated so that substantially the entire circumference of the container 12 becomes wetted by the aqueous solution. After the container 12 has been wetted with the aqueous solution, the container 12 is moved into contact with the label 15 on the vacuum drum 24. As each container 12 moves around the vacuum drum, the label 15 is wrapped around the container. A roll-on pad 86 is provided to hold the container 12 against the vacuum drum while permitting the container to rotate.

After the labels 15 are applied they may be heat shrunk onto the containers by applying heat to the labels with a hot air blower or by passing the labeled container through an oven as is well known in the prior art.

While embodiments of the invention have been illustrated and described, it is not intended that these embodiments illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the invention.
WHAT IS CLAIMED IS:

1. A machine for labeling containers comprising:
   a container infeed conveyor that feeds containers into the machine;
   a label feeder that supplies labels having a leading edge portion and
   a trailing edge portion from a label supply source;
   a vacuum drum that receives labels from the label feeder;
   a wetting solution applicator disposed to apply an aqueous solution to
   each of the containers as they are fed into the machine by the infeed conveyor, said
   solution being applied to a label panel portion of the containers;
   a glue applicator disposed adjacent the vacuum drum, said vacuum
   drum having a generally cylindrical surface that supports one or more labels, said
   generally cylindrical surface of the vacuum drum having one or more protruding
   portions spaced about the periphery of the vacuum drum at locations corresponding
   to the trailing edge portion of the labels that causes the trailing edge portion to
   contact the glue applicator coating the trailing edge portion with glue; and
   the vacuum drum applying labels to the containers by causing the
   aqueous solution on the containers to wet the labels causing the labels to wrap around
   the containers as they are separated from the cylindrical surface of the vacuum drum
   until the trailing edge portion wraps onto the leading edge portion of the labels and
   is secured thereto by glue.

2. A machine for labeling containers according to claim 1 wherein
   the label supply source is a roll of labels.

3. The machine for labeling containers of claim 1 wherein the
   wetting solution applicator is a roll-on pad.

4. The machine for labeling containers according to claim 1
   wherein the wetting solution is a one percent to five percent solution of glycerine and
   water.
5. The machine for labeling containers of claim 1 wherein the glue applicator is a hot melt glue applicator and said glue is hot melt glue.

6. A method of labeling containers comprising the steps of:
   feeding labels having an inside surface and an outer surface to a labeling machine having a vacuum drum for supporting the labels during the labeling process;
   feeding containers having a label panel portion to the labeling machine from a container supply source;
   applying an aqueous solution to the containers to wet the label panel portion of the containers;
   applying glue to a limited portion of the inside surface of the labels while supported on the vacuum drum;
   wrapping labels about the containers by causing the aqueous solution on the containers to wet the inside surface of the labels; and
   securing the limited portion of the inside surface of the labels having glue applied thereto to a portion of the outer surface of the label.

7. The method of for labeling containers of claim 6 wherein the step of applying glue to the trailing edge portion of the label is performed such that when the label is applied to the containers no glue is applied to the container.

8. The method of labeling containers of claim 6 wherein the step of feeding labels is performed by feeding a web of label material from a roll of label material.

9. The method of claim 6 wherein the step of applying an aqueous solution to the containers is performed with a roll-on pad.

10. The method of labeling containers of claim 6 wherein the step of applying glue is performed by a hot melt glue applicator.
11. The method of labeling containers of claim 6 wherein the aqueous solution is applied about the entire circumference of the containers.

12. The method of labeling containers of claim 6 wherein the portion of the label to which glue is applied is the trailing edge portion of the labels.

13. The method of claim 6 wherein the method further comprises the step of applying heat to the labels after they are applied to the containers causing the labels to shrink to the container including any reduced diameter portions of the containers.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : B65C 3/16, 9/04; B32B 31/00
US CL : 156/390, 542, 556, 568

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)

U.S. : 156/390, 542, 556, 566, 567, 568

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search
27 MARCH 2000

Date of mailing of the international search report
06 APR 2000

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