Title: CONTAINER COMPRISING A RELIEF-LIKE OUTER SURFACE AND METHOD FOR PRODUCING SUCH A CONTAINER

Abstract: The container with a relief-like outer surface comprises a container wall (1), a layer of UV-hardened lacquer (2), in certain areas a layer of silk screen printing lacquer (3), a layer of heat hardened lacquer (4) and in certain areas a layer of hot stamping foil (5). The relief is substantially defined by the layer of silk screen printing lacquer (3) and protected by the layer of hot stamping foil (5). The container and the method for producing such a container are especially suited for creating Braille labelled packages. Applying the relief can be done in an off line process, is fast and relatively inexpensive.
Container comprising a relief-like outer surface and method for producing such a container

Technical Field

The invention relates to a container and to a method for processing a container wall according to the preamble of the independent claims.

Containers of this kind are used for packaging e.g. pharmaceutical, dental or cosmetic products such that blind or visually impaired people can recognise the container by their sense of touch.

Background Art

Known containers of this kind, as described in US 6,227,371, are usually difficult and expensive to produce and/or are not suited for a wide spread use and acceptance by general customers which rely not on a relief-like surface as a recognition aid.

It is known to create a relief-like surface during an injection moulding process. This method has the disadvantage that changing the design of the relief can be very costly and time consuming. For every change the mould has to be adapted or be remade and the containers cannot be prefabricated. In the case of tubes, the only part which is fabricated by injection moulding is usually the head or shoulder of the tube. Generally, however, it is desirable to provide the main body of the container with a relief-like label.

It is also known to create a relief-like surface by hot-stamping or engraving a laminate foil, which is then used for making tubes. The engraving has to be performed in an early stage of the production of the laminate foil, since engraving at a later stage would impair its barrier function, in particular by harming lay-
ers of lacquer and/or foil. The disadvantages are similar to those of the injection moulding process described above. Changing the design of the relief is very costly and time consuming. The process is therefore not suited for small lots. For every change a new kind of laminate foil has to be made and it is not possible to prefabricate entire tubes.

A relief-like surface can also be created by attaching an embossed sticker or label to the container. Such a sticker has the disadvantage, that it is usually not suited for flexible containers. In addition, only certain shapes of containers are suited for attaching stickers. Finally the overall visual appearance of a container with sticker is usually not as good as if the printing or embossment is applied directly on the container.

Disclosure of Invention

A problem to be solved by the present invention lies therefore in providing a container of the kind mentioned at the outset, which can be produced at a low price, and which allows to change the design of the relief more flexible than it is possible with known containers.

This problem is solved by independent claim 1 by providing a container with a relief-like outer surface comprising in at least one area a layer of silk screen printing lacquer which is at least partially covered by a layer of hot-stamping foil.

A further problem to be solved by the present invention lies in providing a method for producing a container of the kind mentioned at the outset, which is less costly and allows to change the design of the relief faster and at a lower price.
This problem is solved by independent claim 8 by providing a method for creating a relief-like surface on a container wall which comprises the steps of applying a layer of silk screen printing lacquer by silk screen printing to at least one first area applying a layer of hot stamping foil by hot stamping to at least one second area, wherein the at least one first area and the at least one second area overlap at least partially.

**Brief Description of Drawings**

Further preferred features and aspects of the present invention are described in the dependent claims as well as in the following description, which makes reference to the enclosed figures. These figures show:

Figs. 1a to 1e cross sectional partial views of a preferred embodiment of a container with a relief-like outer surface according to the invention in different stages of its production,

Fig. 2 a three dimensional cross sectional partial view of a container with a relief-like outer surface according to the invention,

Fig. 3 a cross sectional partial view of a further embodiment of a container with a relief-like outer surface according to the invention,

Fig. 4 a cross sectional partial view of a further embodiment of a container with a relief-like outer surface according to the invention,

Fig. 5 a view of a tube with Braille symbols according to the invention,

Fig. 6 a hot stamping apparatus and a tube in a cross sectional partial view.
Best Mode for Carrying Out the Invention

The method for producing a container according to the invention is illustrated by Figs. 1a to 1e.

Each figure shows the container in a cross sectional partial view in a particular production stage. The method for applying a relief to a container according to the invention comprises substantially four steps.

Fig. 1a shows the container wall 1 before applying the method according to the invention. The container wall is for example a laminate, comprising plastics and a metal layer. The container wall 1 is in particular a Neopac Polyfoil® laminate. The production process of the container body is substantially finished except for its outer surface.

In the first step a layer of UV-lacquer 2 is applied. The lacquer is applied to the entire outer surface of the container wall 1. It provides a base for the subsequent silk screen printing. The lacquer is hardened using UV-light. Lacquers suitable for application in this step are e.g. provided by Schekolin AG, Liechtenstein. The container at the end of the first step is shown in Fig. 1b.

Up to this point, no information about the shape, text and/or design of the particular label or relief is necessary. Therefore the processing up to this point is preferably done "inline". The following steps involve such label information and are therefore preferably performed "off line".

In a second step a layer of silk screen printing lacquer 3 is applied to certain areas using a silk screen printing technique. By this step the actual relief is defined. The pattern of the relief can for example comprise Braille symbols, textures, letters and brand logos. The layer of silk screen printing lacquer 3 has preferably a thickness in the range of about 10 µm to 100 µm, in particular about 40 µm which can be well per-
ceived by the sense of touch. The silk screen printing lacquer 3 is hardened using UV-light. It is also possible to perform the silk screen printing more than once to obtain a greater thickness. The container at the end of the second step is shown in Fig. 1c.

In a third step a layer of lacquer 4 is applied to the entire surface, i.e. onto the areas with and without silk screen printing lacquer 3. The lacquer 4 is heat hardened. Heat hardened lacquers have the advantage that they have a better elasticity than UV hardened lacquers. Lacquers suitable for application in this step are e.g. provided by Valspar Corp., Minneapolis. The container at the end of the third step is shown in Fig. 1d.

In a fourth step a foil 5 is applied to certain areas and in particular to the printed areas using a hot stamping technique. In this process hot stamping is not applied to create a negative relief, but is rather applied to enhance the positive relief created by the silk screen printing of the second step, in particular by providing it with a protective layer. The hot stamping is therefore preferably performed using a relatively soft polymer cliché with a shore value of 90 or less, in particular with a shore value between 85 and 60. Using a soft cliché assures that the positive relief created by the silk screen printing is not impaired. The use of a soft cliché also assures, that the barrier function of the container wall is not impaired. Hot stamping a negative relief, in particular by using a hard cliché, would damage barrier layers. The hot stamping foil has preferably a thickness between 10 and 15 μm. The hot stamping foil can be transparent, coloured and/or metallised. Suited hot stamping foils are e.g. provided by Leonhard Kurz GmbH & Co. KG, Fürth, Germany. The container at the end of the fourth step, i.e. the finished container, is shown in Fig. 1e.

Fig. 2 shows a three dimensional cross sectional partial view of a container with a relief-like
outer surface according to the invention. A container wall 1 carries UV-hardened lacquer 2, silk screen print lacquer 3, a heat hardened lacquer 4 and hot stamping foil 5. The shown arrangement can e.g. be used for Braille symbols. The arrangement of screen printing lacquer 3 covered by hot stamping foil 5 is more resistant to wear than a sole layer of screen printing lacquer 3.

Fig. 3 shows a cross sectional partial view of a container with a relief-like outer surface according to the invention. The method for producing a container according to the invention allows to create different kinds of areas: First areas 7 to which silk screen print lacquer 3 was applied, second areas 8 to which hot stamping foil 5 was applied, and third areas 9 to which both screen printing lacquer 3 and hot stamping foil 5 was applied. By arranging these different kinds of areas beside of a relief various visual effects can be achieved without additional process steps. The UV-hardened lacquer 2 and the heat hardened lacquer 4 are both applied to the entire surface, i.e. to all areas.

Fig. 4 shows a cross sectional partial view of a further embodiment of a container with a relief-like outer surface according to the invention. In this embodiment a 3D texture is created using the method according to the invention. Containers which are designed in this way can be recognised by the blind very quickly, since large portions of the container can have a certain characteristic relief, than rather just a small field of Braille symbols. These textures have also the advantage that also special visual effects can be achieved e.g. by applying a metallised hot stamping foil 5 to certain areas of the texture.

Fig. 5 shows a view of a tube 11 with Braille symbols 10 according to the invention. The Braille symbols are created by a layer of silk screen printing lacquer 3 and hot stamping foil 5 as described above referring to fig. 2. The tube 11 is flexible and preferably
made from a laminate material, such as the NEOPAC Polyfoil® tube. The container according to the invention can also be a bottle or a flacon.

Fig. 6 shows a hot stamping apparatus and tube 11 in a cross sectional partial view. The tube 11 is carried by a rotatable mandrel 13. During hot stamping the mandrel 13 is rotated while the cliché 12 is moved horizontally along with the rotation. A similar arrangement can also be used in the lacquering or silk-screen printing. In each case a mandrel is rotated while the particular lacquer is applied.

According to embodiments of the invention described so far the method for creating a relief-like surface is applied to a prefabricated container, in particular to a prefabricated tube. Alternatively the method for creating a relief-like surface can also be applied to a foil, wherein the container is fabricated later using this foil. However prefabricating containers has the advantage that changing the text and design of the label or relief can be done faster and at a lower price.

The invention is in particular suitable for Braille labelling primary packages. In many known packaging systems only the secondary package is Braille labelled. Braille labelling primary packages according to the invention reduces the risk that packages and thereby also their contents are mixed up significantly.
Claims

1. Container comprising a relief-like outer surface, characterised in that it comprises in at least one area a layer of silk screen printing lacquer (3) which is at least partially covered by a layer of hot-stamping foil (5).

2. Container of claim 1, characterised in that it comprises a layer of lacquer, in particular a layer of UV-hardened lacquer (2), providing a base for other layers, in particular providing a base for the layer of silk screen printing lacquer (3).

3. Container of one of the preceding claims, characterised in that it comprises a layer of lacquer, in particular a layer of heat hardened lacquer (4), between the layer of silk screen printing lacquer (3) and the layer of hot stamping foil (5).

4. Container of one of the preceding claims, characterised in that it has a substantially cylindrical or conical shape and/or that it has the shape of a tube (11), a bottle or a flacon.

5. Container of one of the preceding claims, characterised in that it is flexible and substantially made from plastics, in particular from a laminate.

6. Container of one of the preceding claims, characterised in that the relief-like outer surface comprises Braille symbols (10) and/or a texture.

7. Container of one of the preceding claims, characterised in that the layer of silk screen printing lacquer (3) has a thickness in the range of 10 μm to 100 μm and has in particular a thickness of about 40 μm.

8. Method for creating a relief-like surface on a container wall (1), in particular for use in the production of a container according to one of the claims 1 to 7, characterised by the steps of
applying a layer of silk screen printing lacquer (3) by silk screen printing to at least one first area

applying a layer of hot stamping foil (5) by hot stamping to at least one second area, wherein the at least one first area and the at least one second area overlap at least partially.

9. Method of claim 8, characterised in that a layer of lacquer (2) is applied and hardened, in particular by UV-light, before applying the layer of silk screen printing lacquer (3).

10. Method of one of the claims 8 or 9, characterised in that a layer of lacquer (4) is applied and hardened, in particular by heat, after applying the layer of silk screen printing lacquer (3) and before applying the layer of hot stamping foil (5).

11. Method of one of the claims 8 to 10, characterised in that the layer of screen printing lacquer (3) is hardened by UV-light.

12. Method of one of the claims 8 to 11, characterised in that for the hot stamping a cliché is used, in particular a polymer cliché (8) which has a shore value of 85 or less.

13. Method of one of the claims 8 to 12, wherein the container wall (1) is part of a container (11), characterised in that the container (11) is mounted on a mandrel (13), which is rotated, in particular during lacquering, silk screen printing and/or hot stamping.
### A. CLASSIFICATION OF SUBJECT MATTER

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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)

- IPC 7 G09B B41M C08J B65D

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

- Electronic database consulted during the international search (name of database and, where practical, search terms used)
  - PAJ, WPI Data, EPO-Internal

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

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| X        | PATENT ABSTRACTS OF JAPAN
  vol. 006, no. 227 (C-134),
  12 November 1982 (1982-11-12)
  & JP 57 131235 A (YOSHINO KOGYOSHO:KK),
  14 August 1982 (1982-08-14)
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search:
26 August 2003

Date of mailing of the international search report:
12/09/2003

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