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(54) **METHOD AND APPARATUS FOR MAKING A BUNDLE OF CONTAINERS WITH CONTROLLED HEAT-SHRINKING, AS WELL AS A BUNDLE OBTAINED WITH SUCH A METHOD**

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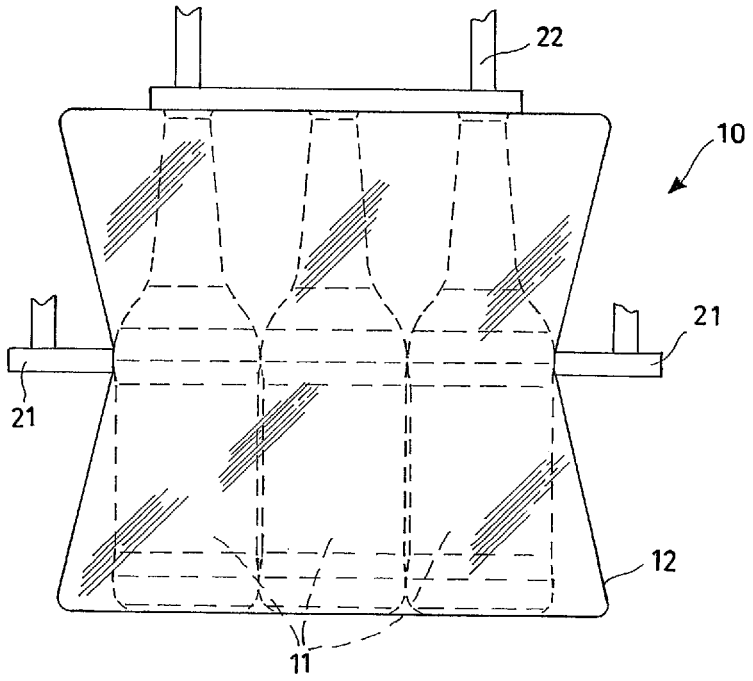
(57) **ABSTRACT**

Method for making a bundle (**10**) of the type comprising a plurality of containers (**11**) positioned along at least one row and wound in a heat-shrunk film (**12**) due to a heat-treatment effect; said method comprising the steps of: a) arranging a heat-shrinkable film (**12**) around said containers (**11**) ordered along at least one row in order to obtain an open tunnel (**13**) along the transverse direction (**20**) with respect to the longitudinal direction of advancement (**20'**), said open tunnel (**13**) identifying along said transverse direction (**20**) lateral over-edge portions (**14**) with respect to said containers (**11**); b) handling said over-edge portions (**14**); c) supplying said containers (**11**) and said heat- shrinkable film (**12**) to a heat-treatment device, so that said over-edge portions (**14**) are compacted to said containers for heat-shrinking; in which said step of handling said over-edge portions comprises the step of making said over-edge portions (**14**) at least partially adhere to said containers (**11**).



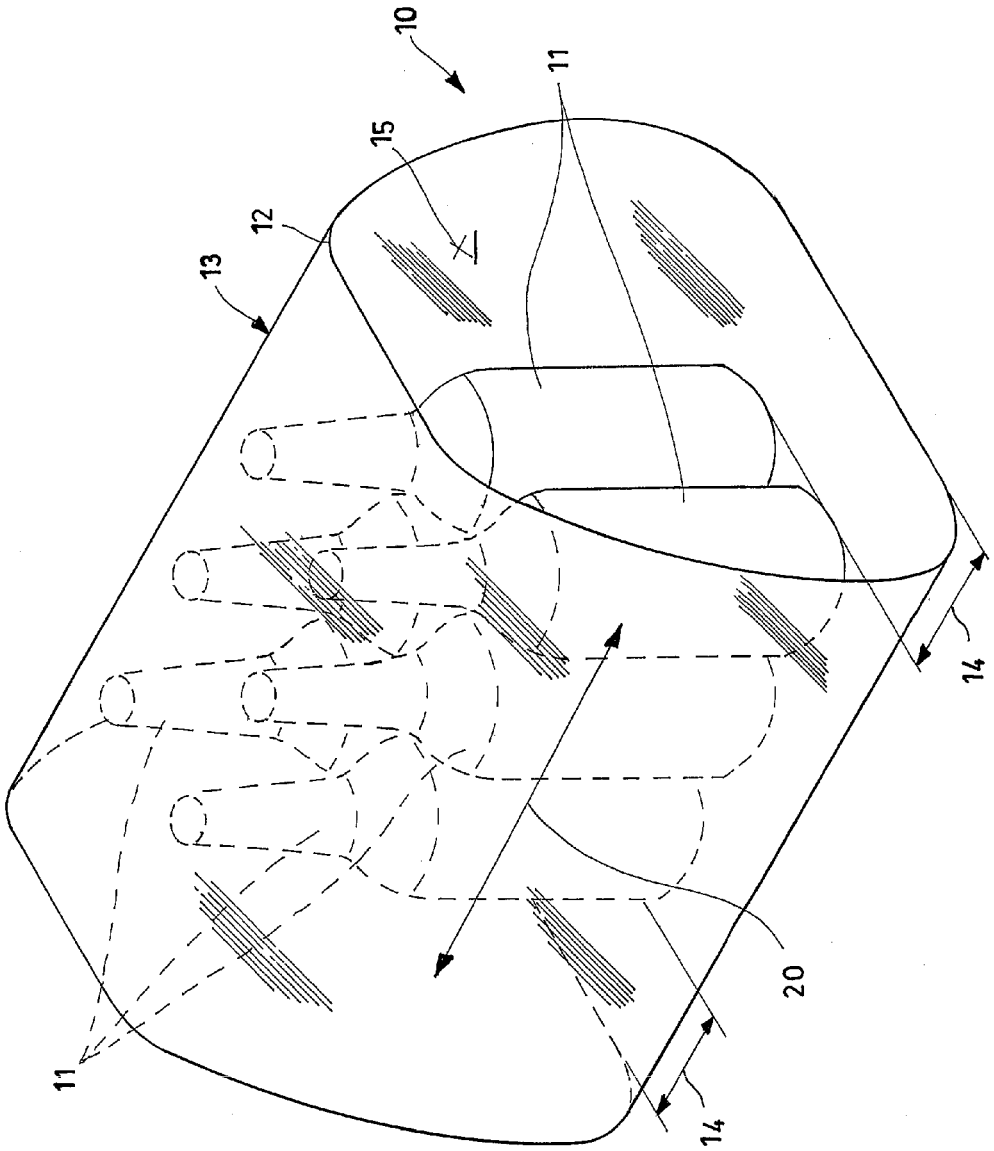


Fig. 1

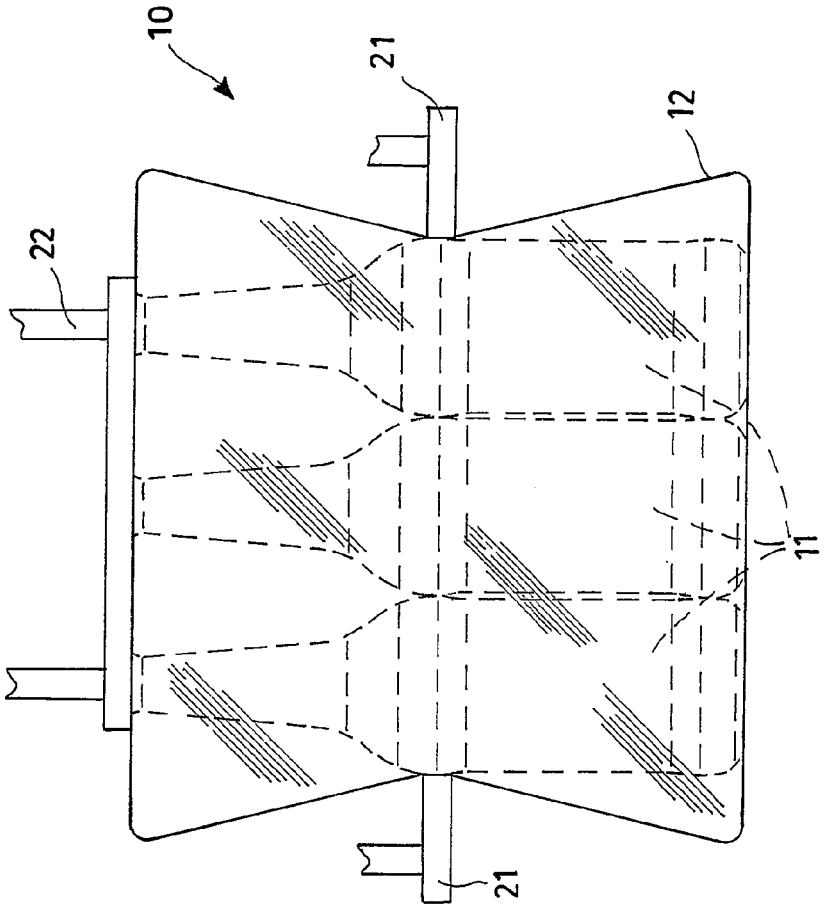


Fig.2

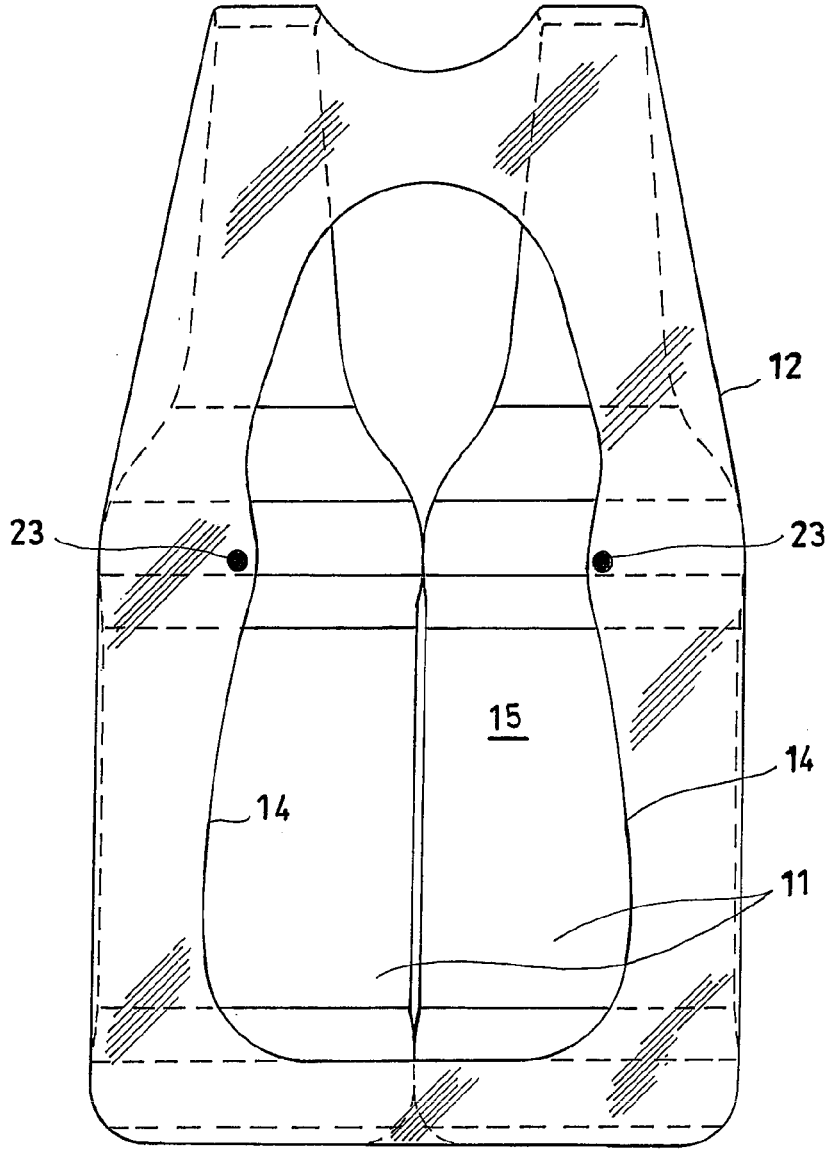


Fig.3

METHOD AND APPARATUS FOR MAKING A BUNDLE OF CONTAINERS WITH CONTROLLED HEAT-SHRINKING, AS WELL AS A BUNDLE OBTAINED WITH SUCH A METHOD

[0001] The present invention refers to a method and to an apparatus for making a bundle of containers with controlled heat-shrinking.

[0002] Moreover, the present invention refers to the bundle obtained with the aforementioned method.

[0003] Today, particular product packages/containers, called bundles, are known and are available on the market which, in brief, correspond to a plurality of products ordered along at least one row wound in a heat-shrunk film.

[0004] Furthermore, the bundle can also comprise base supports that are in the form of a plate, called a pad, or in the form of a tray.

[0005] The methods known today for making a bundle as described above comprise the steps of:

[0006] arranging an open tunnel of heat-shrinkable film around containers ordered along at least one row so that the heat-shrinkable film has, orthogonally to the longitudinal direction of advancement, over-edge portions with respect to the bulk of the containers;

[0007] handling the over-edge portions;

[0008] supplying the containers and the handled heat-shrinkable film to a heat-treatment device, or rather a ventilated oven, so that the over-edge portions are compacted to the containers by heat-shrinking.

[0009] EP2219954 describes a method for making a bundle according to the preamble of claim **1**, in which the step of handling the over-edge portions provides for orderly folding the over-edges over themselves, in order to obtain, post-heat-shrinking, the complete closure of the lateral portions of the bundle.

[0010] According to other prior arts, which are less sophisticated than the one described in EP2219954, the step of handling the over-edge portions only provides the lifting/directing of the over-edge portions so that, post-heat-shrinking, they are compacted on the lateral front portions of the bundle leaving lateral openings.

[0011] The second prior art is used more often nowadays because it requires a lower consumption of film and because it is easier to implement.

[0012] Such a prior art provides that, as the dimensions of the containers vary, it is necessary to replace the film so as to always ensure that there is a wide over-edge portion.

[0013] Moreover, the film used must have a specific differentiated heat-shrinking, or rather:

[0014] longitudinally, according to the direction of advancement of the bundle variable, indicatively from 50% to 80%;

[0015] transversally orthogonally with respect to the direction of advancement of the bundle variable, indicatively from 0% to 35%.

[0016] However, this prior art has some drawbacks, such as the presence of creases on the finished bundle right at the areas of adhesion of the over-edge portions.

[0017] Such creases, which are generated during the heat-shrinking of the over-edge portions in ventilated ovens, can indeed prevent or make the handling of the finished bundle much more difficult.

[0018] Starting from such a prior art, the purpose of the present invention is that of implementing a method and an apparatus for making a bundle of the laterally open type which are an alternative with respect to those known and that are particularly efficient.

[0019] In detail, one purpose of the present invention is that of implementing a method for making a bundle that requires less consumption of film without jeopardising the stability of the bundle and without making any crease.

[0020] According to the most general aspect of the invention such purposes are achieved by controlling the arrangement of the over-edge portions with respect to the containers by making the film adhere to the products already upstream of the heat-shrinking oven.

[0021] In order to obtain such an effect it is possible to use rotating tines that are capable of making the film adhere perfectly to the product upstream of the heat-shrinking oven.

[0022] According to one particularly efficient embodiment, in addition to the adhesion it is also envisaged to be able to constrain the film on products already upstream of the heat-shrinking oven.

[0023] For example, as constraint means it is worth mentioning:

[0024] possible use of a spray of adhesive materials on the product, in one or more points;

[0025] possible use of a spray of adhesive materials on the film, in one or more points;

[0026] possible use of adhesive tape that is applied to the film;

[0027] possible use of means for electrostatically charging the film.

[0028] As can be understood, in such a way the heat-shrinking of the over-edge portions occurs in a more controlled manner since the film is already arranged in a suitable manner around the lateral portions of the products.

[0029] One first advantageous aspect of such a control is the reduction of the consumption of film without having the risk of excessively uncovering the lateral portions of the bundle.

[0030] The bundle with controlled heat-shrinking of the present invention can, indeed, be also made with a film the orthogonal dimension of which is reduced by 10% to 35% with respect to the advancing of the bundle itself compared to a conventional bundle made with the prior art.

[0031] In addition to the smaller consumption, the aforementioned control ensures that a film can be used, the heat-shrinking factor of which, orthogonal to the direction of advancement of the bundle, is close to zero and that the over-edge portion is controlled when the heating/heat-shrinking step of the film begins.

[0032] This type of film makes it possible to eliminate the creases that can normally form in this step of the process.

[0033] Another advantage, related to the fact that the constancy of the adhesion of the film on the product is ensured, consists of improving the lateral protection of the product itself.

[0034] In the case in which a neutral film is used, by suitably orienting the product—moreover as occurred in the prior art—a label or a print of the product itself can be used as the final image of the bundle with obvious reduction of costs and of logistics.

[0035] Indeed, only one dimension of band of film can pack different types of products making it possible to use a code, for example a "QR Code", as an identification element for the package.

[0036] Further characteristics of the invention shall be highlighted in the dependent claims.

[0037] The characteristics and the advantages of a method for making a bundle according to the present invention shall become clearer from the following description, given as an example and not for limiting purposes, with reference to the attached schematic drawings, in which:

[0038] FIG. **1** shows a first step of making the bundle according to the present invention upstream of the heat-shrinking oven;

[0039] FIG. **2** shows a second step for making the bundle according to the present invention upstream of the heat-shrinking oven; and

[0040] FIG. **3** shows the bundle finished with the method of the present invention.

[0041] With reference to the figures, reference numeral **10** shows a bundle of containers, bottles, cans, multipacks, cluster packs, boxes, etc., which are obtained with the method object of the present invention.

[0042] Such a bundle **10** is of the type comprising a plurality of containers **11** that are positioned along at least one row and are wound in a film **12**, in particular a heat-shrinkable film.

[0043] The method comprises the steps of:

[0044] a) arranging a heat-shrinkable film **12** around containers **11** that are ordered along at least one row in order to obtain an open tunnel **13** along the transverse direction **20** with respect to the longitudinal direction of advancement **20'**; such an open tunnel **13** defines along the transverse direction **20** lateral over-edge portions **14** with respect to the containers **11**;

[0045] b) handling the over-edge portions **14**;

[0046] c) supplying the containers **11** and the heat-shrinkable film **12** to a heat-treatment device, so that the over-edge portions **14** are compacted to the containers **11** by heat-shrinking.

[0047] In particular according to the invention, the step of handling the over-edge portions **14** comprises the step of making the over-edge portions **14** at least partially adhere to the containers **11** upstream of the heat-treatment device.

[0048] For example, such a heat-treatment device is a ventilated oven, whereas the tunnel **13** can be many sheets of film **12** that are joined together and folded back on themselves.

[0049] Furthermore, in addition to the simple adhesion of the film **12** on the containers **11**, the present invention also provides the possibility of at least partially constraining the over-edge portions **14** in the configuration of adhesion to the containers **11**.

[0050] FIG. **2** schematically shows the technical means **21**, such as mechanical tines, for bringing the over-edge portions **14** in contact with the front and rear portions of the containers **11**.

[0051] Such a constraint can be achieved through bonding agents between the film **12** and containers **11** or simply by electrostatically charging the over-edge portions **14**.

[0052] For example, the glue **23** can be duly arranged through spraying nozzles on the containers **11** and/or on the film **12**.

[0053] Alternatively, adhesive tapes can be arranged on the film **12** before the adhesion to the container.

[0054] In combination with the lateral tines **21** an upper stabilizing device **22** can be provided.

[0055] The bundle **10** obtained with the method described has particular characteristics, like not having creases and/or the presence of constraint points **24** between the film **12** and the containers **11**.

[0056] The apparatus for the implementation of the method according to the invention comprises:

[0057] means for handling and orienting the containers **11** and the film configured for arranging the heat-shrinkable film **12** around the containers **11** ordered along at least one row so as to form an open tunnel **13** of heat-shrinkable film **12**, in which such a tunnel **13** has orthogonally **20** with respect to the longitudinal direction of advancement **20'** over-edge portions **14** with respect to the containers **11**;

[0058] means for handling the over-edge portions **14**;

[0059] heat-treatment means of the bundle, so that the over-edge portions are compacted to the containers by heat-shrinking.

[0060] According to the invention, the handling means of the over-edge portions **14** are configured for impressing the at least partial adhesion of the over-edge portions **14** to the containers **11** operating upstream of the heat-treatment means.

[0061] It can also be provided for there to be means for constraining the over-edge portions **14** in the configuration adherent to the containers operating upstream of the heat-treatment means.

[0062] It has thus been seen that the method for making a bundle according to the present invention achieves the purposes previously highlighted.

[0063] Indeed, the method for making a bundle according to the present invention requires less consumption of film without jeopardising the stability of the bundle and without making any crease.

[0064] The method of the present invention thus conceived can undergo numerous modifications and variants, all covered by the same inventive concept; moreover, all the details can be replaced by technically equivalent elements. In practice, the materials used, as well as their dimensions, can be of any type according to the technical requirements.

1) Method for making a bundle (**10**) of the type comprising a plurality of containers (**11**) positioned along at least one row and wound in a heat-shrunk film (**12**) due to a heat-treatment effect; said method comprising the steps of:

a) arranging a heat-shrinkable film (**12**) around said containers (**11**) ordered along at least one row so as to obtain an open tunnel (**13**) along the transverse direction (**20**) with respect to the longitudinal direction of advancement (**20'**), said open tunnel (**13**) identifying along said transverse direction (**20**) lateral over-edge portions (**14**) with respect to said containers (**11**);

b) handling said over-edge portions (**14**);

c) supplying said containers (**11**) and said heat-shrinkable film (**12**) to a heat-treatment device, so that said over-edge portions (**14**) are compacted to said containers for heat-shrinking;

characterised in that

said step of handling said over-edge portions comprises the step of making said over-edge portions (**14**) at least partially adhere to said containers (**11**).

2) Method according to claim **1** characterised in that said intermediate step of making said over-edge portions (**14**) adhere to said containers (**11**) comprises the step of at least partially constraining said over-edge portions (**14**) in said adhesion configuration to said containers (**11**).

3) Method according to claim **2** characterised in that said step of at least partially constraining said over-edge portions (**14**) in said configuration of adhesion to said containers (**11**)

comprises the step of arranging a bonding agent between said film (**12**) and said containers (**11**).

4) Method according to claim **3** characterised in that said step of arranging a bonding agent between said film (**12**) and said containers (**11**) comprises the step of spraying the bonding agent on said containers (**11**) and/or on said film (**12**).

5) Method according to claim **2** characterised in that said step of at least partially constraining said over-edge portions (**14**) in said configuration of adhesion to said containers (**11**) comprises the step of arranging an adhesive tape on said film (**12**).

6) Method according to claim **2** characterised in that said step of at least partially constraining said over-edge portions (**14**) in said configuration of adhesion to said containers (**11**) comprises the step of electrostatically charging said film (**12**).

7) Bundle (**10**) according to any one of the preceding claims comprising a plurality of containers (**11**) positioned along at least one row wound in a heat-shrunk film (**12**) due to a heat-treatment effect; said bundle (**10**) having lateral openings (**15**) orthogonal (**20**) to the longitudinal direction of advancement (**20'**) delimited by the over-edge portions (**14**) of said film (**12**) compacted on said containers (**11**), characterised in that the over-edge portions (**14**) of said film (**12**) compacted on said containers (**11**) are not provided with creases.

8) Bundle (**10**) according to claim **7** characterised in that said over-edge portions (**14**) of said film (**12**) compacted on said containers (**11**) are at least partially constrained to said containers (**11**).

9) Apparatus for the implementation of the method according to any one of the preceding claims comprising:

means for handling and orientation of said containers (**11**) and said film (**12**) configured for arranging said containers (**11**) ordered along at least one row within an open tunnel (**13**) of heat-shrinkable film (**12**) along the direction (**20**) orthogonal to the longitudinal direction (**20'**) of advancement of said bundle, said open tunnel (**13**) having lateral over-edge portions (**14**) with respect to said containers (**11**);

means for handling said over-edge portions (**14**);

means for the heat-treatment of said bundle, so that said over-edge portions are compacted to said containers for heat-shrinking;

characterised in that it comprises said means for handling said over-edge portions (**14**) configured for impressing the at least partial adhesion of said over-edge portions (**14**) to said containers (**11**) operating upstream of said means for the heat-treatment.

10) Apparatus for the implementation of the method according to claim **9** characterised in that it comprises means for constraining said over-edge portions (**14**) in said configuration of adhesion to said containers operating upstream of said heat-treatment means.

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