



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
14.11.2012 Bulletin 2012/46

(51) Int Cl.:
D21J 3/10 (2006.01) **D21J 7/00** (2006.01)
B65D 1/02 (2006.01)

(21) Application number: **11165671.6**

(22) Date of filing: **11.05.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

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(54) **Container**

(57) The present invention relates to an apparatus for producing a container defining a container geometry, the apparatus comprising a frame comprising a base supporting at least one mold, the mold including an opening, a pulp material feeding device configured to reciprocally enter the mold via the opening, a pulp reservoir in communication with the pulp material feeding device, the pulp

reservoir configured to hold a pulp material, a pulp pressure reservoir configured to provide pressure so as to deliver the pulp material from the pulp reservoir via the pulp material feeding device to the at least one mold, an expandable device configured to be inserted into the at least one mold via the opening, wherein the expandable device have a geometry corresponding to the container geometry.

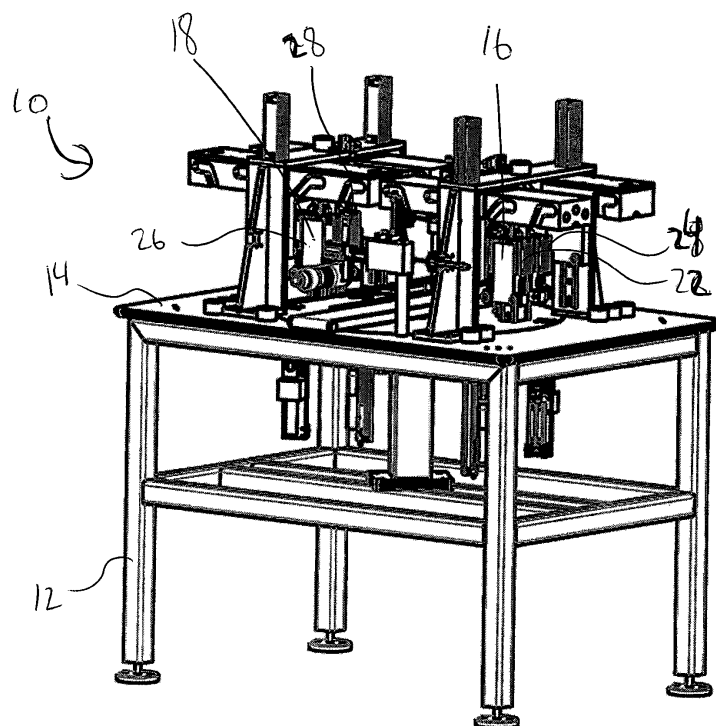


Fig. 1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a container, a method for making a container and an apparatus for making a container. Specifically the present invention relates to a container made from a pulp material, a method for making a container from a pulp material, and an apparatus for making a container from a pulp material.

BACKGROUND OF THE INVENTION

[0002] The of containers for e.g. beverages, such as carbonated beverages, alcoholic beverages and non-carbonated beverages have a tendency to be discarded by the consumer shortly after consuming the beverage. If the container is made from a non-biodegradable material, such as PET, the container will be present in the environment for a long time. The amount of waste on the global scene is rising and landfill areas are filling up.

[0003] The various return systems for collecting and reusing specifically beverage containers, but also other plastic products; seek to reduce the amount of waste. However, there is always a part of the containers on the marked that do not return via the return system and thus end up in unwanted places polluting the environment. Therefore there is a need for a container that allow storage of a fluid and where the container is degradable so that the container is not unwantedly present for a prolonged period of time.

[0004] The use of pulp material for certain beverage containers have been described in some publications such as US 7,077,933, US 5,356,518, GB 501224 A or GB 461372 A.

[0005] Molding plastic is less complex than molding pulp material. The elasticity of plastic simplifies manufacturing and allow pouring heated plastic into a mold having a desired shape, allowing the plastic to harden, and removing the hardened plastic from the mold. Further, the elasticity of plastic allows it to bend in different directions and resiliently recover when drawn from a mold, thus as pulp material is inelastic and fragile molding techniques used for plastic is not transferrable to pulp material. Applying plastic molding techniques causes the pulp to tear. Additionally, pulp molding is less capable of attaining complex shapes, e.g., reverse drafts on surfaces, since it cannot elastically recover when drawn from molds.

[0006] The inventor of the present invention has appreciated that an improved container is of benefit, and has in consequence devised the present invention.

SUMMARY OF THE INVENTION

[0007] It would be advantageous to achieve an improved container, an apparatus for manufacturing a container and a method for making a container. In general,

the invention preferably seeks to mitigate, alleviate or eliminate one or more of the above mentioned disadvantages singly or in any combination. In particular, it may be seen as an object of the present invention to provide a method that solves the above mentioned problems, or other problems, of the prior art.

[0008] To better address one or more of these concerns, in a first aspect of the invention an apparatus is presented that allow production of containers from pulp material. The apparatus for producing a container may comprise a frame comprising a base supporting at least one mold, the mold including an opening, a pulp material feeding device configured to reciprocally enter the mold via the opening, a pulp reservoir in communication with the pulp material feeding device, the pulp reservoir configured to hold a pulp material, and a pulp pressure reservoir configured to provide pressure so as to deliver the pulp material from the pulp reservoir via the pulp material feeding device to the at least one mold.

[0009] It should be noted that the apparatus' and methods described herein may be used to make or produce any suitable geometry of a container made of pulp material. The method is advantageous for producing a container having a relatively small opening, such as seen on beer bottles, soft-drink bottles, juice bottles, oil cans etc.. The container body may advantageously be rotationally symmetrical around the longitudinal axis, as most of the containers for beverages are today, but the apparatus allow for more complex geometries if desired.

[0010] The frame, base and mold are preferably made from a metallic material so as to allow long apparatus lifetime and high resistance to wear. Further, it is contemplated that providing the apparatus in a metallic material cleaning of the apparatus. The frame attached the apparatus to a surface, e.g. a floor.

[0011] The at least one mold is provided for producing at least one product at a time. By providing two molds the apparatus may produce two products at one time etc. The mold includes an opening, and as will be apparent later, the opening may be used for inserting different devices into the mold for different purposes. The opening may correspond approximately in size to the opening in the finished product.

[0012] The pulp material feeding device may be a conduit with a valve and/or dispersive element for allowing the pulp material to be sprayed into the mold, preferably in a layer having a somewhat even thickness.

[0013] The mold may be a two-part mold having female parts defining the outline of the product to be produced. The mold may include grooves or ridged for providing the surface of the finished product with aesthetic features.

[0014] The pulp reservoir may be any suitable container, such as a plastic container, container of a metallic material.

[0015] The pulp pressure reservoir is configured to provide pressure so as to deliver the pulp material from the pulp reservoir via the pulp material feeding device to the

at least one mold. The pulp pressure reservoir may include a pressure generator for generating during the operation of the apparatus. The pulp pressure reservoir may feed the pressure directly to the pulp reservoir for driving the pulp material to the mold. Other suitable configurations are also possible.

[0016] The material used for the container is preferably a recyclable material, a disposable material, a plant fiber material such as hemp fibers or flax, i.e. *Linum usitatissimum*, and/or a compostable cellulose fiber material. The material used for the container may be a mixture of then mentioned materials. Also additives of different kinds may be used for establishing different material properties. The pulp material does preferably not include recycled material as the material used for a beverage container should not release possibly toxic material to the beverage. However if an appropriate, i.e. food grade, coating is used it is contemplated that recycled material may be used for the container. The coating will then ensure that any contaminants will not be transferred from the container and into the liquid, e.g. beverage, inside the container.

[0017] Advantageously the apparatus further comprises an expandable device configured to be inserted into the at least one mold via the opening. The expandable device may be collapsible so that the expandable device may be retracted from the interior of the mold, and thus also from the interior of the product. The expandable device is configured to apply pressure to the pulp material disposed in the mold. The expandable device may be regulated so as to control the amount of pressure applied.

[0018] Advantageously the expandable device is a balloon-like device. The shape of the expandable device may match the female part of the mold, so that the expandable device may be regarded as a male part of the mold. The expandable device is also collapsible so that the expandable device may be retracted from the mold after the pressure has been applied.

[0019] Advantageously the container may be provided with a threaded part for engaging with a closure device for establishing a seal for closing the container when an appropriate liquid has been filled into the container. The closure device may advantageously be made from a material similar to that of the container.

[0020] A second aspect of the present invention relates to a method for producing a container using an apparatus comprising a frame comprising a base supporting at least one mold, the mold including an opening to the interior of the mold, a pulp material feeding device configured to reciprocally enter the mold via the opening, a pulp reservoir in communication with the pulp material feeding device, the pulp reservoir configured to hold a pulp material, and a pulp pressure reservoir configured to provide pressure so as to deliver the pulp material from the pulp reservoir via the pulp material feeding device to the at least one mold, the method comprising the steps of operating the apparatus by supplying pressure from the pulp pressure reservoir so as to dispose the pulp material

from the pulp reservoir via the pulp material feeding device to the interior of the at least one mold, and applying a vacuum pressure to the mold so that the pulp material is distributed in the mold. By supplying pressure from the pulp pressure reservoir the pulp material is disposed inside the mold. The vacuum ensures that the pulp material is distributed inside the mold and that a somewhat even layer is formed. When a layer of a certain thickness is formed the vacuum does no longer attract new pulp material.

[0021] Advantageously the apparatus further comprises a pressure application device configured to be inserted into the mold and the method includes applying pressure to pulp material within the mold. This helps the product to obtain a more stable form. This also allows the product to be moved from a mold station to a curing station where the product is to be cured.

[0022] Advantageously the pressure application device is a flexible device configured to expand so as to provide the mentioned pressure to the pulp material within the mold, the method comprising supplying a pressure application device pressure to the pressure application device. The flexible device may after application of pressure be collapsed and removed from the interior of the container. The application of pressure also establishes a smoother surface on the inner surface of the container than compared to containers where such a pressure is not established.

[0023] Advantageously the pressure application device is preshaped so as to correspond to the geometry of the container. This is contemplated to allow the pressure application device to hold or support the container when it is to be moved from one station in the apparatus for producing the container to another station in the apparatus. Also, the preshaped pressure application device is contemplated to provide a flexible inner core that may be inflated so that it does not apply pressure to the mold material constituting the container at this point, but only supports the material. The pressure application device then supports the fragile material when the container is removed from the mold, if the pressure application device was not preshaped, the pressure application device would then return to the original shape which would then cause the container to be damaged or destroyed.

[0024] A third aspect of the present invention relates to a method of configuring a product by using an apparatus comprising a mold having a cavity defining a geometry, a storage device for storing a molding material product for constituting part of the product, a molding material product delivery device configured for spraying the molding material product into the cavity, and a pressure transfer device configured to be inserted into the cavity for transferring pressure to a part of the inside surface of the product, the method including spraying the molding material product into the mold, applying pressure to the part of the inside surface of the product via the pressure transfer device.

[0025] Advantageously the apparatus further comprises

es a curing device, and the method further comprises curing the product in the curing device. This allows the container product to achieve an increased strength. The curing may include heat, pressure, vacuum, radiation or a combination of these. The curing process hardens the container so that the container may be provided with e.g. a carbonated beverage or a non-carbonated beverage.

[0026] Advantageously the pressure transfer device is an inflatable device and the application of pressure includes supplying gas at a pressure being higher than the surrounding air pressure. Advantageously the gas is a gas that is non-toxic and does not leave any substantial amount of material in the container. Advantageously the pressure transfer device is further pre-shaped to match the geometry of the product.

[0027] Advantageously the molding material product is a pulp material and the method comprises drying the pulp material after spraying the molding material product into the mold. The main part of the drying may be performed in a curing station. The mold station may also at least partly dry the container.

[0028] Advantageously the method further comprises applying a coating to the interior of the container. The coating may ensure that the container is capable of storing a liquid. The coating may make the container impermeable to the liquid that the container is to store. The specific coating may be chosen based on the intended liquid. If the container is intended for use as a foodstuff container, e.g. beverages, any coating should be approved for use in connection with food, such as approved by FDA (Food and Drug Administration in USA).

[0029] Advantageously the method further comprises applying a coating to the exterior of the container. The coating may ensure that the container is not damaged due to exposure to e.g. rain, spills, or other effects of handling the container. The coating for the interior of the container and the exterior does not need to be the same kind, but may in some instances be of the same kind.

[0030] A fourth aspect of the present invention relates to a container having a container body defining a longitudinal axis, the container body defining a maximum diameter at a point on the container body, the container body defining a first end and an opposite second end, the first end and the second end being disposed in the longitudinal axis orientation, the first end being closed, the second end including an opening being smaller than the maximum diameter, and the container body being formed from a pulp material. The pulp material is contemplated to allow the container to be biodegradable or compostable, such that the container will be decomposed if it is dumped as litter..

[0031] Advantageously the container may further comprise a liquid impermeable coating at an interior surface therefor allowing the container to store a liquid. The coating is contemplated to protect the pulp material after the pulp material has cured or hardened, as the liquid to be stored in the container may dissolve the pulp material. The container may advantageously have a relative small

opening or orifice for dispensing the liquid, e.g. the opening may have a size suitable for a person to drink directly from the container. Advantageously the coating does not mix substantially with the liquid to be stored in the container. Advantageously the coating is degradable. The coating may be applied to the entire inner surface of the container or at least a part of the inner surface of the container. A mixture of different types of coating may be used on the interior surface, e.g. one type of coating may be used for a part of the inner surface and another type of coating may be used for a different part of the inner surface. The coating may advantageously be approved for use with foodstuffs, such as beverages.

[0032] Advantageously the container may further comprise a liquid impermeable coating at an exterior surface thereof providing protection of the pulp material in the container when exposed to liquids from external sources. The exterior coating may be applied to the entire outer surface. A mixture of different types of coating may be used. Advantageously the coating is degradable. The coating may be applied to the entire outer surface of the container or at least a part of the outer surface of the container. A mixture of different types of coating may be used on the outer surface, e.g. one type of coating may be used for a part of the outer surface and another type of coating may be used for a different part of the outer surface.

[0033] A fifth aspect of the present invention relates to a container comprising a first portion and a second portion, where the first portion have a first diameter and the second portion have a second diameter and the second diameter being larger than the first diameter, the first portion including an opening, a threaded portion being provided at the first portion.

[0034] Advantageously the container has one opening. The threaded portion is advantageously located at the opening so that a closure device may be provided to establish a good closure for the container. The closure device will then ensure that the content in the container is kept inside the container until the closure device is removed.

[0035] Advantageously the first portion of the container may be a neck portion. The container may be shaped as a conventional bottle having a larger diameter where the liquid is stored and a smaller diameter at the neck portion wherefrom the liquid may be dispensed.

[0036] Advantageously the threaded portion is provided at the outside of the first portion and the closure device is to be fastened. Advantageously the threaded part is provided as a helical thread. The closure device is then to be provided with a matching thread so that the closure device may be screwed onto the first portion of the container.

[0037] In general the various features and advantages of the mentioned aspects of the invention may be combined and coupled in any way possible within the scope of the invention. These and other aspects, features and/or advantages of the invention will be apparent from

and elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] Embodiments of the invention will be described, by way of example only, with reference to the drawings, in which

Fig. 1 is a schematic perspective view of an apparatus for producing a container,
 Fig. 2 is a schematic top-view of an apparatus for producing a container,
 Fig. 3 is a schematic side-view of an apparatus for producing a container,
 Fig. 4 is a schematic view of a mold station,
 Fig. 5 is a schematic view of a part of an apparatus for producing a container seen from below,
 Fig. 6 is a schematic view of a mold station with a pulp delivery device,
 Fig. 7 is a schematic view of a mold station with a pressure delivery device, and
 Fig. 8 is a schematic view of a curing station.

DESCRIPTION OF EMBODIMENTS

[0039] An embodiment of the invention is illustrated in Fig. 1 which illustrates an apparatus 10 having a frame 12 and a base plate 14. The base plate is supported by the frame 12. The base plate 14 supports a molding station 16 and a curing station 18. In the embodiment in Fig. 1 a second set of molding station and curing station is located opposite the stations 16 and 18.

[0040] The molding station 16 comprises first and second mold parts 22 and 24. The first mold part 22 and second mold part 24 each comprising a half of the product, i.e. the female part of the mold or negative, as seen in e.g. Fig. 4.

[0041] The curing station 18 comprises first and second curing station parts 26 and 28. The first curing station part 26 and the second curing station part 28 each comprise a female half of the geometry of the finished product.

[0042] The operation of the molding station 16 and the curing station 18 will be discussed in more detail below.

[0043] The apparatus 10 is configured for producing containers, specifically containers made from pulp material. The pulp material is preferably paper pulp material that does not comprise recycled material. The recycled material usually comprises materials that are not well suited for containers for foodstuff, e.g. print ink and the like. However, for certain containers this may not be an issue, e.g. if the container is to be used for storing oil or other liquid not suited for human consumption.

[0044] Fig. 2 is a top-down view of the apparatus 10. The apparatus 10 comprises four stations, where two stations are molding stations, and two stations are curing stations. The curing stations may also be pressing stations as will be discussed.

[0045] The base plate 14 includes a rotatable part 20. A product is first formed at the mold station and then rotated to the curing station via the base plate 14.

[0046] Fig. 3 is a schematic side-view of the apparatus 10. The figure also illustrates a pulp delivery part 30 that is configured to be in communication with the mold station 16. When the two mold parts, 22 and 24, are brought together a chamber is formed. The chamber defines a negative of the product to be formed. A pressure supply device 32 is also illustrated. The function of this will be discussed below.

[0047] Fig. 4 schematically illustrates a mold 34 comprising a negative or female image 36 of an object to be produced, here a part of a bottle-shaped product. The mold 34 is part of the mold station 16. An opening 38 is defined in one end of the image. At the opening 38 an external thread 40 is formed. The external thread 40 is to interface with a closure device, i.e. a cap or the like. The cap to be fitted at the thread 40 could be made from a fibrous material similar to that of the container or a cap made from another material, such as plastic. The cap could be coated with a coating suitable for foodstuff.

[0048] Fig. 4 further illustrates the pulp delivery part 30. When the two parts of the molding station, namely the first and second mold parts 22 and 24, are assembled to form the mold the pulp delivery part 30 is moved into the interior chamber formed in the mold.

[0049] Fig. 5 schematically illustrates the apparatus where the mold station 16 and the curing station 18 are opened. The apparatus 10 is view from below and without the frame 12 or base plate 14. The mold part 22 constitutes one half of the mold. The mold part 22 may pivot about the point at 42.

[0050] As illustrated in Fig. 6 a pulp delivery part 30 is introduced into the mold chamber 44 formed in the mold station 16 by the mold parts 22 and 24. The pulp delivery part 30 is in communication with a pulp material reservoir, not illustrated here, wherefrom the pulp material is sprayed into the mold chamber 44. The pulp material is a wet pulp material. By disposing the pulp material by spraying the material into the chamber 44 the inside surface of the resulting product, here a container, will likely have a non-smooth surface as the fibers will be unorganized on the surface. It may be a disadvantage to have a relative large surface as this allows certain bacteria to grow, even though beverages to be stored in the container is subject to requirements regarding bacteria content. Therefore establishing a surface having a relatively small area, i.e. a smooth surface, in the product, especially the inner surface of the container, is advantageous.

[0051] Fig. 7 schematically illustrates the molding station 16 where an expandable device 46 has been inserted into the chamber 44. The expandable device 46 is in the embodiment illustrated in Fig. 7 an inflatable balloon, made from silicone, but other materials may be used, e.g. latex. Preferably the material used for the expandable device 44 is chosen so that the device may be used several times. The expandable device 46 is also collaps-

ible to that after use it may be removed from the inside of the product. The cost and durability may have an impact on the choice of material. The expandable device 46 is shaped so as to match the inner geometry of the end-product. The expandable device 46 could be viewed as a male part of a mold. In the molding station 16 the expandable device 46 is expanded just enough so that the product is supported by the expandable device 46. The mold station 16 is then opened, i.e. the two mold parts 22 and 24 are separated and the product is shifted or rotated to the curing station 18. At this stage the product have a thickness of around 3 mm and is soft and fragile.

[0052] By introducing a specific amount of gas into the expandable device 46 the expandable device reach a certain size. In an embodiment the expandable device 46 could be inflated to a volume of 3 dl and the end-product have a volume of approximately 5 dl. The expandable device will have a geometry corresponding to the end-product, i.e. container, but with a smaller volume. There will be a gap of around 0,5 mm from the inflated expandable device 46 and the pulp material. Pressure is then applied so that the pulp is blown onto the expandable device 46, thereby releasing it from the inside of the molding station 16. As the expandable device 46 is close to the product the product will not break despite being very fragile. The product is supported by the expandable device 46 during the shift to the curing station 18.

[0053] Further it is important that the pulp is not pressed into the mold by the expandable device 46. This is ensured not to happen as the expandable device will not apply any pressure to the inside of the pulp material while the pulp material is at the mold.

[0054] The curing station 18 comprises the two parts 26 and 28. When the parts are assembled a curing station chamber 48 is formed. When the product is placed in the curing station chamber 48 and the chamber is closed, the expandable device 46 is expanded so that the pulp material is pressed against the inner walls of the curing station parts 26 and 28. The curing station parts 26 and 28 are configured with steam ducts 50. The steam ducts 48 lead steam or moisture from the product, which is generated when the product is under pressure from the expandable device 46. Further a vacuum pressure may be applied from the outside of the curing mold to speed up the process.

[0055] The expandable device 46 is deflated and twisted by a supporting member so that it may be retracted from the now cured product via the opening of the container. As the expandable device 46 is twisted around the supporting member it will not damage the product. If the expandable device 46 was allowed to simply deflate inside the product there is a risk that it will damage the product while it is being retracted. If the expandable device 46 is deflated by applying a low pressure or suction, the shape of the deflated expandable device 46 cannot be controlled. The supporting member help control the shape of the expandable device 46 as it is being deflated.

[0056] A heating device may be applied to provide heat to the product during the pressing process so as to dry the molding material, i.e. the wet pulp material. Advantageously the product is heated to around 180 degrees C. After this curing process the product have a substantial strength and may be passed on to further processing, such as coating, printing or the like. The expandable device 46 is deflated and retracted from the product and reused for the production of the next product.

[0057] While the invention has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive; the invention is not limited to the disclosed embodiments. Other variations to the disclosed embodiments can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure, and the appended claims. In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality. A single processor or other unit may fulfill the functions of several items recited in the claims. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage. A computer program may be stored/distributed on a suitable medium, such as an optical storage medium or a solid-state medium supplied together with or as part of other hardware, but may also be distributed in other forms, such as via the Internet or other wired or wireless telecommunication systems. Any reference signs in the claims should not be construed as limiting the scope.

[0058] With reference to the drawings the following reference numerals are used:

- 10 Apparatus
- 12 Frame
- 14 Base plate
- 16 Molding station
- 18 Curing station
- 20 Rotatable part
- 22 Mold part
- 24 Mold part
- 26 Curing station part
- 28 Curing station part
- 30 Pulp delivery part
- 32 Pressure supply device

- 34 Mold
- 36 Negative image
- 38 Opening 5
- 40 External thread
- 42 Point 10
- 44 Mold chamber
- 46 Expandable device
- 48 Curing station chamber 15
- 50 Steam ducts
- Claims** 20
1. An apparatus for producing a container defining a container geometry, the apparatus comprising:
- a frame comprising a base supporting at least one mold, the mold including an opening, a pulp material feeding device configured to reciprocally enter the mold via the opening, a pulp reservoir in communication with the pulp material feeding device, the pulp reservoir configured to hold a pulp material, a pulp pressure reservoir configured to provide pressure so as to deliver the pulp material from the pulp reservoir via the pulp material feeding device to the at least one mold, and an expandable device configured to be inserted into the at least one mold via the opening, wherein the expandable device have a geometry corresponding to the container geometry. 25 30 35 40
2. The apparatus according to claim 1 further comprising a curing station for curing the container.
3. A method for producing a container using an apparatus comprising:
- a frame comprising a base supporting at least one mold, the mold including an opening to the interior of the mold, a pulp material feeding device configured to reciprocally enter the mold via the opening, a pulp reservoir in communication with the pulp material feeding device, the pulp reservoir configured to hold a pulp material, a pulp pressure reservoir configured to provide pressure so as to deliver the pulp material from the pulp reservoir via the pulp material feeding device to the at least one mold, 45 50 55
- the method comprising the steps of:
- operating the apparatus by supplying pressure from the pulp pressure reservoir so as to dispose the pulp material from the pulp reservoir via the pulp material feeding device to the interior of the at least one mold, and applying a vacuum pressure to the mold so that the pulp material is distributed in the mold.
4. The method according to claim 3, wherein the apparatus further comprises a pressure application device configured to be inserted into the mold and apply pressure to pulp material within the mold.
5. The method according to claim 4, wherein the pressure application device is a flexible device configured to expand so as to provide the mentioned pressure to the pulp material within the mold, the method comprising supplying a pressure application device pressure to the pressure application device.
6. A method of configuring a product by using an apparatus comprising:
- a mold having a cavity defining a geometry, a storage device for storing a molding material product for constituting part of the product, a molding material product delivery device configured for spraying the molding material product into the cavity, a pressure transfer device configured to be inserted into the cavity for transferring pressure to a part of the inside surface of the product, the method including:
- spraying the molding material product into the mold, and applying pressure to the part of the inside surface of the product via the pressure transfer device.
7. The method according to claim 6, wherein the apparatus further comprises a curing device, the method further comprising: curing the product in the curing device.
8. The method according to claim 7, wherein the step of applying pressure to the part of the inside surface of the product via the pressure transfer device is performed at the curing station.
9. The method according to any one of the claims 6-8, wherein the pressure transfer device is an inflatable device and the application of pressure includes supplying gas at a pressure being higher than the sur-

rounding air pressure.

10. The method according to any one of the claims 6-9, wherein the molding material product is a pulp material and the method comprises drying the pulp material after spraying the molding material product into the mold. 5
11. The method according to any one of the claims 3-10, further comprising applying a coating to the interior of the container. 10
12. The method according to any one of the claims 3-11, further comprising applying a coating to the exterior of the container. 15
13. A container having a container body defining a longitudinal axis, the container body defining a maximum diameter at a point on the container body, the container body defining a first end and an opposite second end, the first end and the second end being disposed in the longitudinal axis orientation, the first end being closed, the second end including an opening being smaller than the maximum diameter, and 20
the container body being formed from a pulp material. 25
14. The container according to claim 13, further comprising a liquid impermeable coating at an interior surface therefor allowing the container to store a liquid. 30
15. The container according to claim 13 or 14, further comprising a liquid impermeable coating at an exterior surface thereof providing protection of the pulp material in the container when exposed to liquids from external sources. 35

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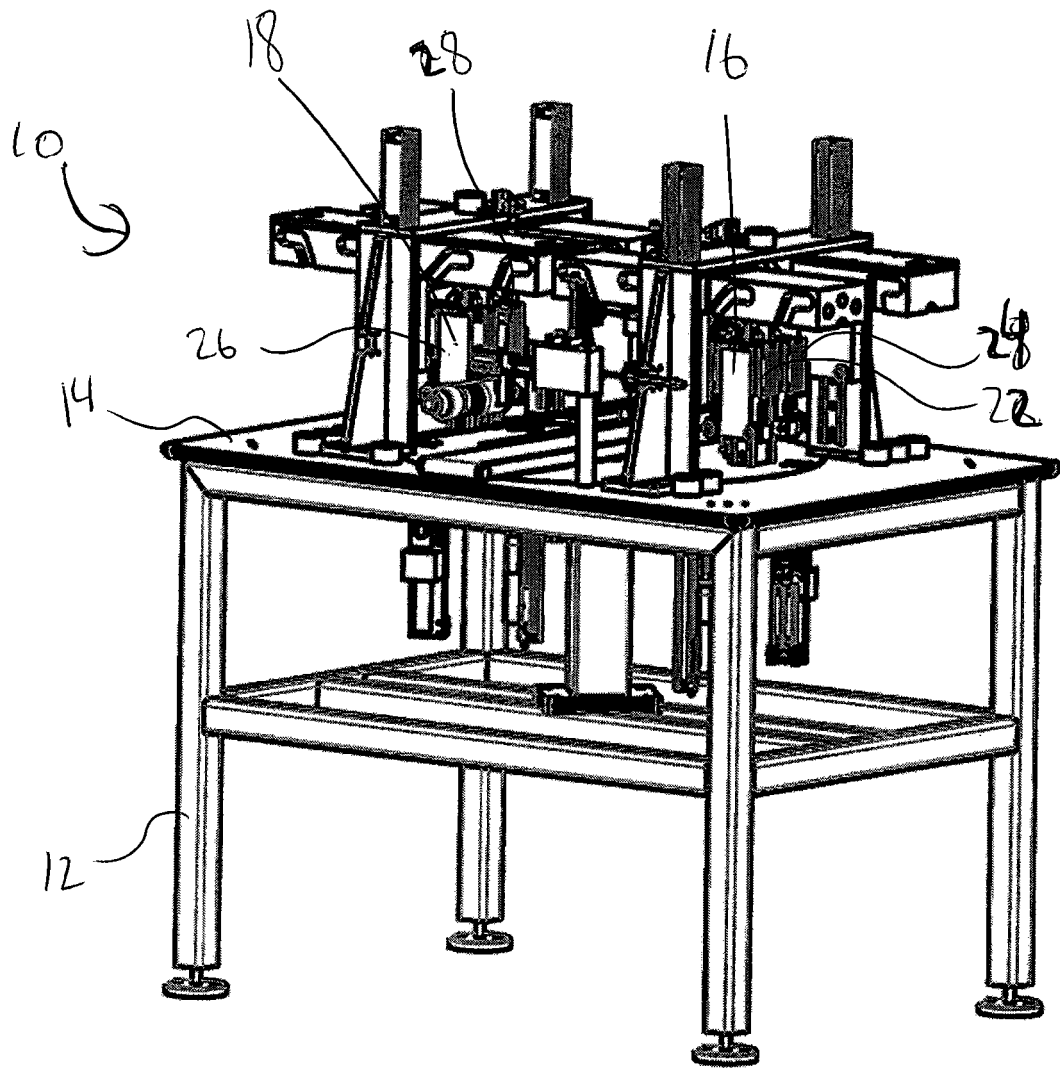


Fig. 1

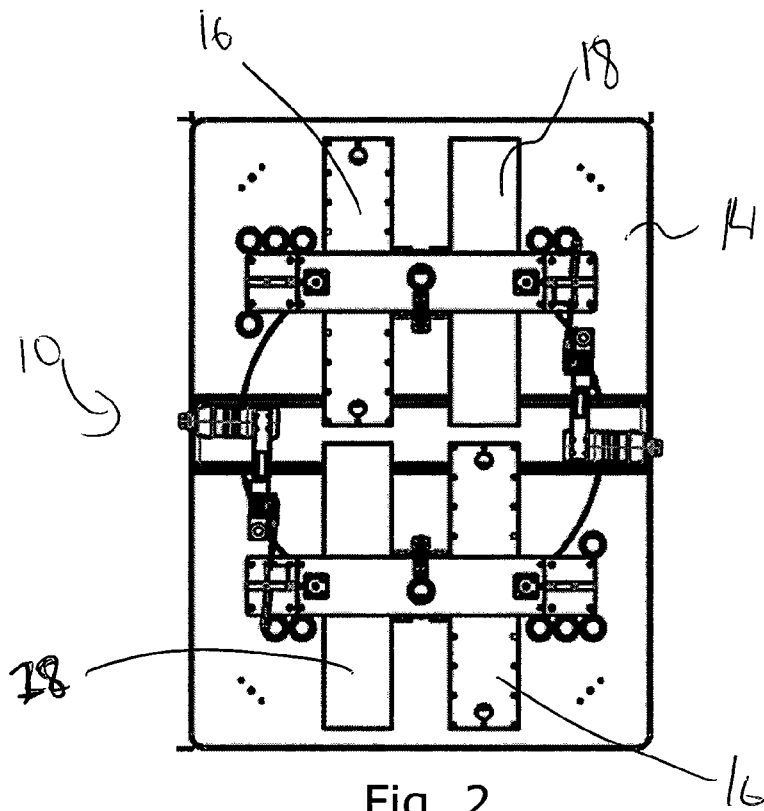


Fig. 2

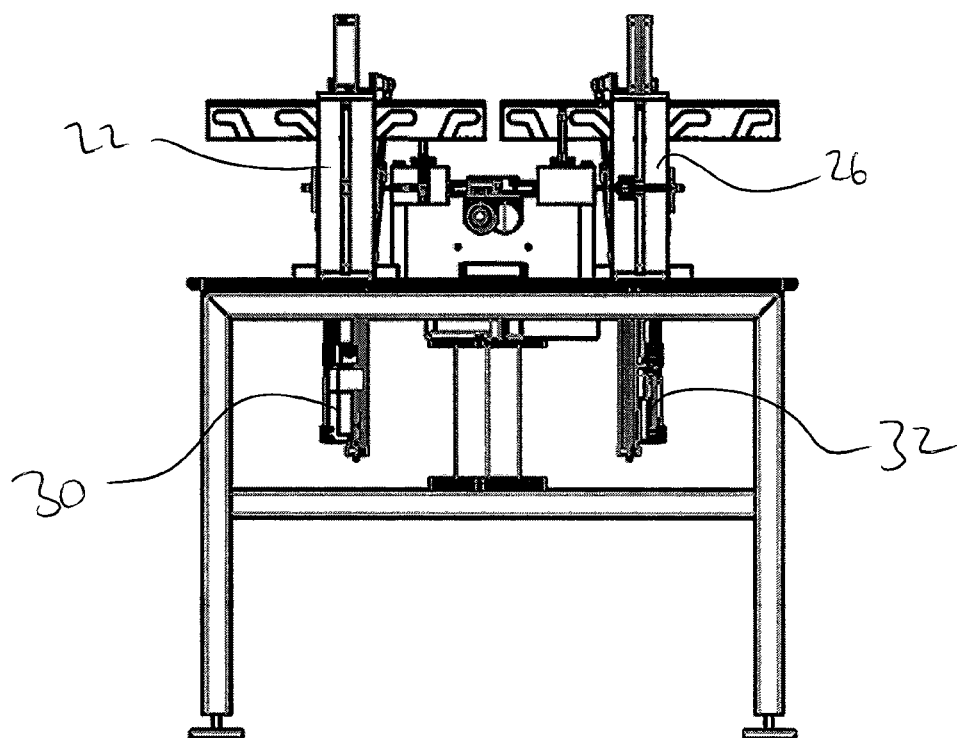


Fig. 3

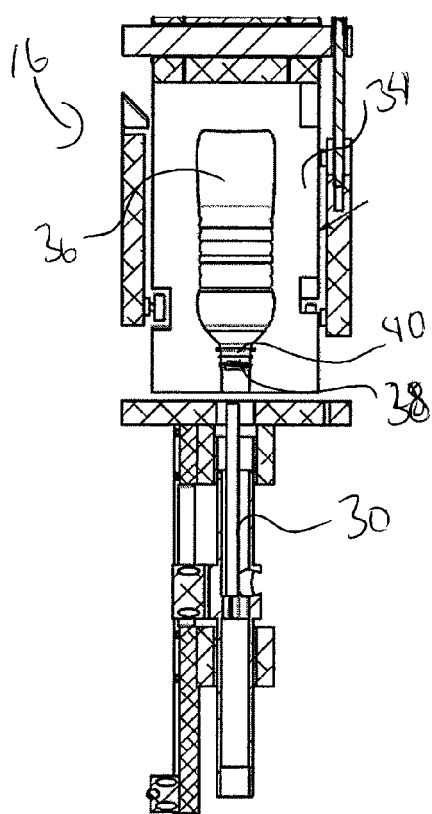


Fig. 4

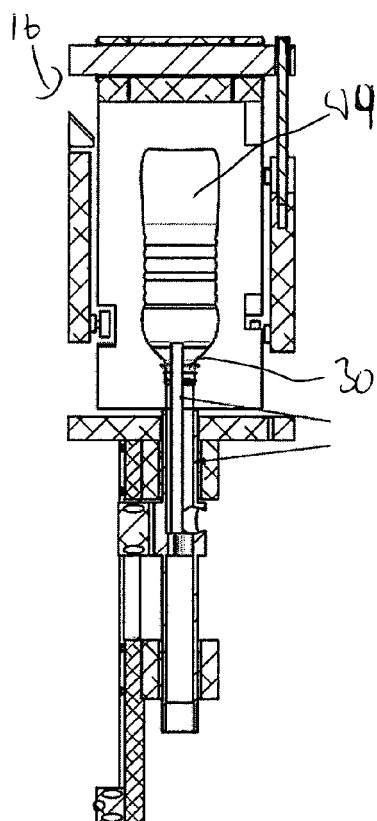


Fig. 6

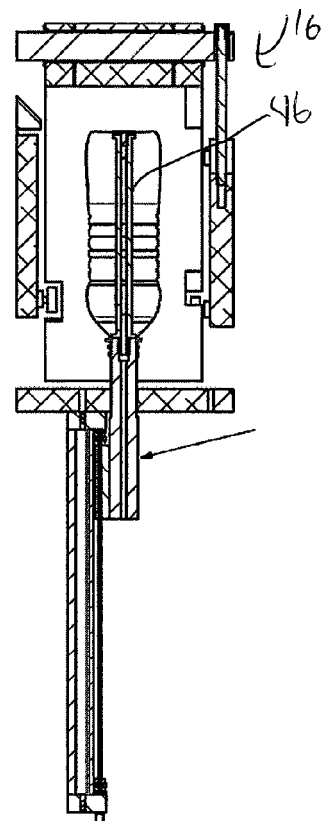


Fig. 7

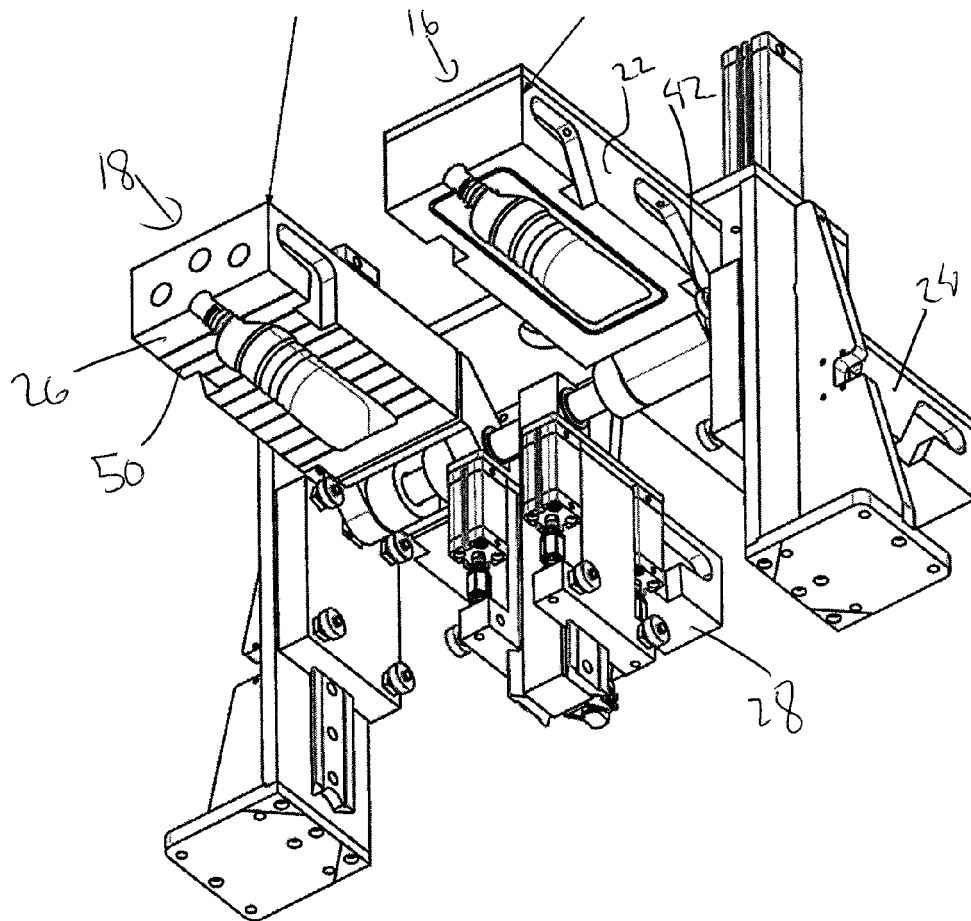


Fig. 5

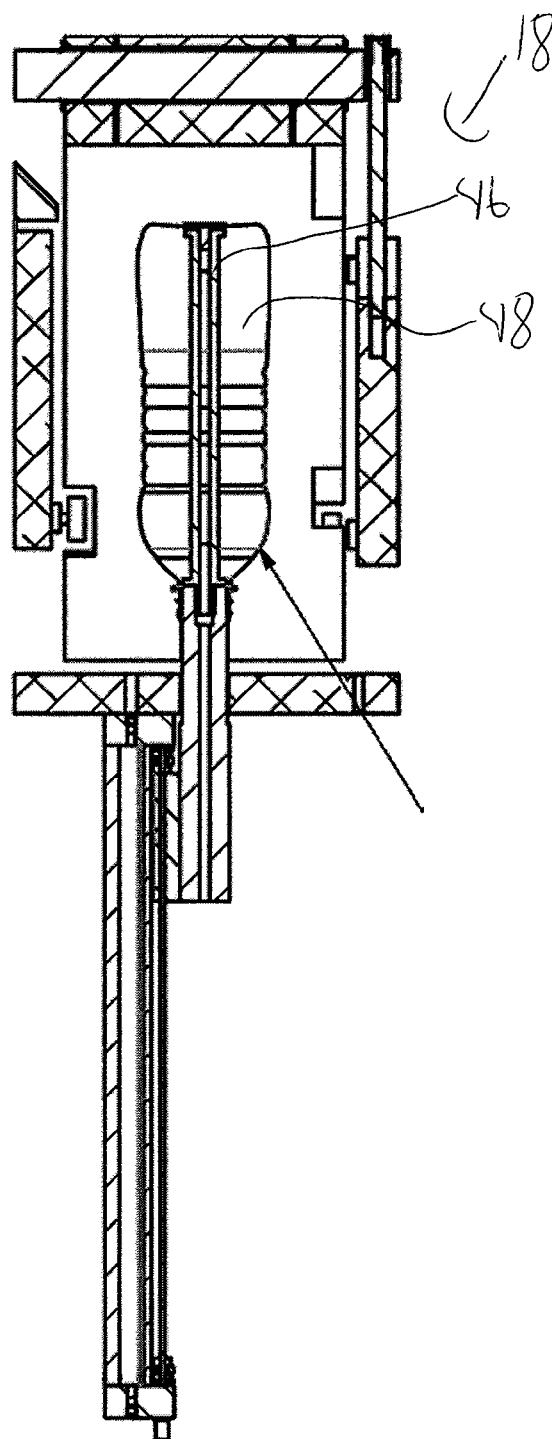


Fig. 8



EUROPEAN SEARCH REPORT

Application Number
EP 11 16 5671

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 325 983 A1 (KA0 CORP [JP]) 9 July 2003 (2003-07-09) * paragraphs [0050] - [0052], [0070] - [0081] * * figures *	1-15	INV. D21J3/10 D21J7/00 B65D1/02
X	US 2004/014305 A1 (HASELDEN BARBARA A [US] ET AL) 22 January 2004 (2004-01-22) * paragraphs [0019] - [0021] * * figures *	1-15	
X,D	US 2003/029591 A1 (OTANI KENICHI [JP] ET AL) 13 February 2003 (2003-02-13) * abstract * * paragraphs [0048] - [0050] * * figures *	13	
			TECHNICAL FIELDS SEARCHED (IPC)
			D21J B65D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 October 2011	Examiner Pregetter, Mario
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

1
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ON EUROPEAN PATENT APPLICATION NO.**

EP 11 16 5671

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The members are as contained in the European Patent Office EDP file on
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05-10-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1325983	A1	09-07-2003	CN 1458997 A 26-11-2003
			WO 0222954 A1 21-03-2002
			US 2004043168 A1 04-03-2004
US 2004014305	A1	22-01-2004	TW 1226086 B 01-01-2005
			US 2004175955 A1 09-09-2004
US 2003029591	A1	13-02-2003	NONE

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 7077933 B [0004]
- US 5356518 A [0004]
- GB 501224 A [0004]
- GB 461372 A [0004]