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(54) **Cooling device for a collapsible beverage container**

(57) The present invention relates to a cooling device (10) for containing a collapsible beverage keg (12) to be cooled to a temperature of e.g. 5°-7° C. The cooling device comprises a thermally insulating container (14) comprising a housing having a base portion from which an outer wall (20) extends upwardly defining an upper open end and a movable lid (22) which provides access to the interior of the container when the lid is open and a waterproof sealing off of the container when the lid is closed. The container further defines a specific inner volume when the lid is closed. The keg is supported by the base portion and defines in a filled and non-collapsed state a specific beverage volume. A connector (24) is mounted to the container for connection to an external water hose (25) for receiving and introducing tap water into the interior of the container. A residual volume for receiving ice (28) as a cooling medium is defined as the difference between the specific inner volume and the specific beverage volume, the residual volume constituting preferably 17,6% of the specific inner volume. The beverage container communicates with an external tapping cock (26) for supply of a beverage from the collapsible beverage keg, the tap water being provided through the external water hose.

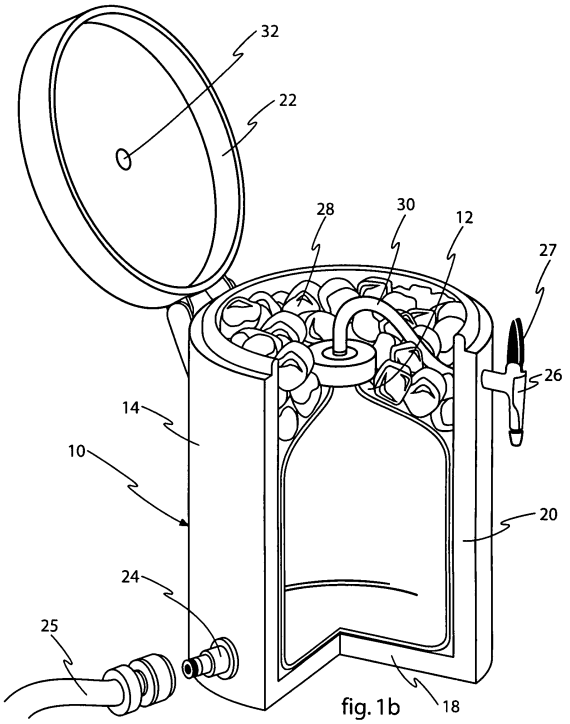

fig. 1b

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Description

[0001] The present invention relates to a cooling device, a keg in combination with the cooling device and a method of using the cooling device.

[0002] Within the field of systems for dispensing beverages into glasses, assemblies for dispensing beverages from kegs into glasses, e.g. draught beer dispensing assemblies at pubs or bars, are widely known and used.

[0003] Nowadays private persons also want to use a beer dispensing system with a replaceable keg from which the beer of course is to be dispensed at the right temperature outside the home and away and independently from any electrical power sources.

[0004] The applicant company produces and sells a professional draught beer system named DraughtMaster™ comprising a beverage dispensing system and a chill chamber in which the replaceable keg or pack containing carbonate beer is received. The keg or pack containing carbonated beer comprises a flexible bottle or bag, which is exposed to an elevated pressure from the outside for dispensing the beer. In order to provide the elevated pressure for the keg mains supply of 240 V AC need be supplied to an electrically powered compressor generating and maintaining the pressure. Moreover, the mains supply is needed to generate and provide cooling of the keg from the chill chamber. If the mains supply is lacking, an inefficient cooling of the keg with the beer may result in that beer being dispensed from the keg is served at a too high temperature, which may affect both the taste of the beer and the user satisfaction in a negative manner. Moreover if the mains supply is not present no power is present to maintain the pressure on the collapsible keg and no beer can be dispensed from the keg.

[0005] It is therefore an object of the present invention to provide a cooling device which operates independently of the main supply, i.e. to provide the cooling device which do no require any electrical supply to operate.

[0006] There are several different ways of cooling food and/or beverage containers. Self-chilling vessels are based mainly on two different principles, where the first principle uses a closed system separated from the product to be cooled and upon activation initiates an endothermic reaction, which cools the product. US Patent No. 6,266,879 and US Patent No. 6,178,753 describe containers based on this principle. The second principle is based on a closed two-chamber system separated from the product to be cooled, where one chamber comprises an evaporation unit and the second chamber comprises an absorbing unit. When a valve is opened between the two chambers a drop-in pressure causes fluid to evaporate from the evaporation chamber and thereby removing heat from the evaporator. A heat removing material in the second chamber absorbs heat of vaporisation. US Patent No. 6,829,902 describes a self-cooling can based on the phase-change principle.

[0007] A drawback related to self-chilling vessels designed according to the prior art is the need of specially designed containers which containers comprise the cooling elements inside. The need of specially made containers with certain pressurised cavities with specific materials inside makes the manufacturing process very expensive.

[0008] In US Patent No. 6,141,969 a beverage vessel holder for use within a motor vehicle is described. The invention comprises a thermoelectric cooling device from which a wall assembly extends, said wall assembly being configured to retain a beverage in use.

[0009] With the solution mentioned above, it is possible to cool a standard beverage can without special measures. However, the need for electricity to supply the thermoelectric device with electrical power dramatically limits the use of such holder since either the electricity need be provided from a battery or from an external power supply source, e.g. a mains supply.

[0010] From DE 41 34 322 A1 a cooling device is known. The cooling device uses evaporation of a cooling fluid and has a cooling mantle fitting around the outside of a drinks container made of a material which material holds the cooling fluid. The cooling fluid is fed to the cooling mantle from a cooling fluid reservoir via flow openings in the mantle. The level and timing of the cooling is controlled via a dosing element which dosing element controls the transfer of the cooling fluid from the cooling reservoir to the cooling mantle. Preferably the cooling device has hangers which hangers allow the cooling device to be suspended in free air. With the device above, it is possible to cool a drinks container. However, the cooling device is constituted of many mechanical parts.

[0011] From DE 297 00 052 A1 a drinks container is known. The container is an evaporatively cooled drinks container especially for a motor cyclist, a runner or a mountain biker. The drinks container has a neoprene casing absorbing fluid for cooling and provides insulation for contents with colour change temperature indication.

[0012] However, the two cooling devices mentioned above do not provide an efficient cooling of the drinks container.

[0013] From US 2003/01322245 a dispensing device for dispensing carbonated beverages bottled in plastic or other flexible packaging material is known. The dispensing device has pump which pump applies fluid pressure to enable collapse of a flexible container when a valve is opened to dispense beverage from the container. However no efficient cooling of the carbonated beverages bottled in plastic be the case.

[0014] US 5240144 discloses an apparatus for dispensing of beverages contained in deformable bottles, particularly family-size conventional PET bottles of more than one brand or taste. The apparatus comprises a housing with one or more beverage dispensing valves at the outside, an openable lid, and one or more pressure vessels with openable lid(s) thereinside. Each pressure vessel is configured to receive one or more of the bottle (s) in an upright position. A fitting is mountable to the bottle(s), and is extended by a conduit leading to the re-

spective dispensing valve(s). Air pressure introduced into the vessel(s) cause the squeezing of the bottle(s) thereunder following discharge of the contents of the respective bottle(s) through the dispensing valve. However no efficient cooling of the bottles be the case.

[0015] Generally, it is preferred, in particular during a hot summer season, to have a beverage, such as beer and/or a soft drink, served in a glass at a temperature lower than the surrounding temperature of 20 - 25 degrees, typically the preferred temperature of the beer is 5°-7° C.

[0016] It is therefore an object of the invention that beer supplied from the keg received in the cooling device is cooled to the preferred temperature of 5°-7° C.

[0017] This accordingly calls for a cooling device which cooling device is able of cooling down the beer to a desired temperature of 5°-7° C and to maintain this temperature of the beer in the keg.

[0018] Such cooling device according to the invention provides the advantage that the beverage from the keg is dispensed at the desired temperature, and accordingly user satisfaction when drinking the beer is well.

[0019] A requirement in a competitive world is that such a cooling device need to be user friendly to operate and constituted of simple and easy manufactureable parts.

[0020] Further the cooling device should only be supplied with a fluid and/or elements for the cooling which is easy to buy or already present in the household or available in the neighbourhood area.

[0021] The cooling device should be applicable outside the home e.g. on a picnic or on other places outside the house, e.g. in the garden, on the terrace, on the beach or on a primitive camping site where any electrical supply is different to obtain but where there is access to tap water.

[0022] Therefore it is another requirement that the cooling device should be able to be operated as standalone equipment only with the need to continuously supply tap water, which is needed to maintain a pressure on a collapsible keg - with e.g. beer - received within the cooling device.

[0023] It is an object of the present invention to provide a cooling device, which is simple to manufacture with as few parts as possible.

[0024] It is a further object of the present invention to provide a cooling device, which is easy to operate and only consumes a fluid and or an element for the cooling which fluid is easy to buy or already is being used in the household, e.g. tap water, ice and/or slush ice.

[0025] The above object, the above advantage, and the above features together with numerous other objects, advantages and features, which will be evident from the below detailed description of the present invention, are in accordance with the teaching of the present invention obtained by a cooling device for containing a collapsible beverage keg to be cooled to a temperature of e.g. 5°-7° C, the cooling device comprising:

a thermally insulating container comprising a housing having a base portion from which an outer wall extends upwardly defining an upper open end and a lid movable between an open state and a closed state and providing access to the interior of the container when the lid is in the open state and providing a waterproof sealing off of the container when the lid is in its closed state,

the container defining a specific inner volume when the lid is in its closed state,

the keg being supported by the base portion when received in the container, the keg defining in a filled and non-collapsed state a specific beverage volume, such as 5 litres,

a connector mounted to the container for connection to an external water hose for receiving tap water and for introducing the tap water into the interior of the container,

a residual volume for receiving ice as a cooling medium being defined as the difference between the specific inner volume and the specific beverage volume, the residual volume constituting less than 20%, such as 17-20%, e.g. 17-19%, such as 17,5-18%, preferably 17,6% of the specific inner volume, and

the beverage container communicating with an external tapping cock for supply of a beverage from the collapsible beverage keg, the tap water provided through the external water hose acting as a pressure medium on the collapsible beverage keg for discharging the beverage from the collapsible beverage keg through the tapping cock.

[0026] In an aspect of the cooling device it is further being provided with a one-way release valve type for releasing any captured air from within the cooling device, the valve being positioned at the container.

[0027] In an aspect of the cooling device, the thermally insulating container being made of double walls, alternatively of a foamed lightweight material.

[0028] In a preferred embodiment of the cooling device, the keg being a plastic bag, preferably made of polypropylene and/or polyethylene.

[0029] In an aspect of the cooling device, the lid being connected to the housing through a hinged connection or through a bayonet coupling and optionally the connector comprising a quick release snap fit connector and/or a valve for controlling the tap water.

[0030] In a preferred embodiment of the cooling device, the beverage in the keg comprises beer such as carbonised beer.

[0031] The above object, the above advantage, and the above features together with numerous other objects, advantages and features, which will be evident from the below detailed description of the present invention, are in accordance with the teaching of the present invention obtained by a keg used in connection with the above mentioned cooling device, when the keg has a collapsible configuration.

[0032] The above object, the above advantage, and the above features together with numerous other objects, advantages and features, which will be evident from the below detailed description of the present invention, are in accordance with the teaching of the present invention obtained by a method of cooling a keg using a cooling device for containing a collapsible beverage keg to be cooled to a temperature of e.g. 5°-7° C, the cooling device comprising:

a thermally insulating container comprising a housing having a base portion from which an outer wall extends upwardly defining an upper open end and a lid movable between an open state and a closed state and providing access to the interior of the container when the lid is in the open state and providing a waterproof sealing off of the container when the lid is in its closed state,
the container defining a specific inner volume when the lid is in its closed state,
the keg being supported by the base portion when received in the container, the keg defining in a filled and non-collapsed state a specific beverage volume, such as 5 litres,
a connector mounted to the container for connection to an external water hose for receiving tap water and for introducing the tap water into the interior of the container,
a residual volume for receiving ice as a cooling medium being defined as the difference between the specific inner volume and the specific beverage volume, the residual volume constituting less than 20%, such as 17-20%, e.g. 17-19%, such as 17,5-18%, preferably 17,6% of the specific inner volume, and
the beverage container communicating with an external tapping cock for supply of a beverage from the collapsible beverage keg, the tap water provided through the external water hose acting as a pressure medium on the collapsible beverage keg for discharging the beverage from the collapsible beverage keg through the tapping cock, the method comprising the steps of:

(I) opening the lid of the cooling device,
(II) positioning the keg in the non-collapsed state filled with beverage within the cooling device,
(III) filling the residual volume partly or entirely with the ice or slush ice,
(IV) closing the lid of the cooling device, and
(V) supplying the tap water to the container.

[0033] Further, the method of cooling the keg may comprise the step of

(VI) discharging cooled beer at a temperature of e.g. 5°-7° C from the collapsible beverage keg through the tapping cock.

[0034] The cooling device can be produced at a low cost and requires no hazardous substances in order to operate, i.e. only ice or slush ice and tap water are consumed which make the cooling device environmentally friendly and suitable for disposable systems, since no hazardous substance are left over in the interior, i.e. on the inner surfaces of the cooling device.

[0035] The invention is further to be described with reference to the drawings in which:

Fig. 1a is a cross sectional view of the cooling device according to a first embodiment of the invention prior to use,

Fig. 1b is a cross sectional view similar to the view of Fig. 1 a of the cooling device according to a first embodiment of the invention when supplied with ice,

Fig. 1c is a cross sectional view similar to the view of Figs. 1 a and 1 b of the cooling device according to a first embodiment of the invention in operation, and

Fig. 2 is a cross sectional view of the cooling device according to a second embodiment of the invention.

[0036] Throughout the below description and in the drawings, identical components or elements present in different figures of the drawings are designated the same reference numerals, and components or elements differing from a previously described component or element, respectively, however serving basically the same functional purpose as the previously described component or element, respectively, are designated the same reference numerals as the previously described components or elements, respectively, however added a marking for indicating the geometrical difference from the previously described components or elements, respectively.

[0037] Figs. 1a, 1b and 1c show a first embodiment of a cooling device according to the present invention in various stages during its operation from an initial situation to the cooling device in operation for dispensing beer at the desired temperature.

[0038] Fig. 1a is a cross sectional view of the cooling device designated the reference numeral 10 prior to use. The cooling device 10 serves the purpose of cooling any beer present in a keg 12 to a temperature of e.g. 5°-7° C.

[0039] The cooling device 10 comprises a thermally insulating container 14, which container 14 comprises a bottom wall 18 as a base portion on which the keg 12 is positioned. The thermally insulating container 14 is preferably made of a foamed lightweight material. An outer wall 20 extends upwardly from the bottom wall 18 and surrounds the keg 12 and defines an upper open end of the container 14. A lid 22 is mounted on top of the upper open end of the container 14 and is sealed to the container 14 by means of a hinge 23.. Alternatively the lid 22 is mounted to the container 14 by means of a bayonet

coupling or a threaded connection.

[0040] When the lid 22 is sealed to the container 14 a waterproof sealing is provided. However, the waterproof sealing between the lid 22 and the container 14 may allow any air under pressure to escape from the interior of the cooling device 10. Furthermore, in order to vent any air included in the interior of the cooling device 10, an air-escape valve 32 is provided in the lid 22.

[0041] The keg 12 is initially, i.e. prior to use, filled with a beverage, preferably carbonised beer and contains a specific beverage volume such as 5 litres of beer. The keg 12 is initially in a non-collapsed state.

[0042] The cooling device 10 is provided with a connector 24 mounted in the outer wall 20 of the container 14. An external water hose 25 shown in Figs. 1 a and 1 b is connectable to the connector 24. Accordingly, through the connector 24 tap water may be introduced into the interior of the container 14.

[0043] The tap water, which acts as a pressure medium - when the water is supplied to the container 14 and when the lid 22 is closed and sealed - sets the collapsible keg 12 under pressure and in turn sets the beer contained in the keg 12 under pressure. The beer under pressure is then deliverable out of the keg 12 and may be discharged through means of an external tapping cock 26 as is per se well known in the art.

[0044] The tapping cock 26 is provided with a tapping handle 27. The tapping cock 26 is connected to one end of a dispensing line 30. The other end of the dispensing line 30 is connected to the keg 12. When operating the tapping handle 27 from the closed position shown in Fig. 1 to an open position, the keg 12 delivers beer through the dispensing line 30 out of the tapping cock 26.

[0045] Fig. 1b is a cross sectional view of the cooling device according to a first embodiment of the invention when supplied with ice. After the keg 12 has been positioned within the cooling device 10 as shown in Fig. 1 a ice 28 or slush ice or a combination thereof is poured into the cooling device 10 through the upper open end of the container 14 as shown in Fig. 1 b. Accordingly, any free space available within the cooling device, i.e. the space between the keg 12 and the outer wall 20 and the space between the keg 12 and the upper open end of the container 14 is partly or preferably entirely filled with the ice 28, ice cubes and/or the slush ice. Subsequently the lid 22 is closed whereby the lid 22 seals off the container 14.

[0046] The applicant company has by experiments surprisingly discovered that the above mentioned 'free space available within the cooling device', i.e. a residual volume for receiving the ice 28 as the cooling medium being the difference between a specific inner volume of the container 14 when no keg 12 is present and the already mentioned specific beverage volume, constitutes less than 20% of the specific inner volume. With this relative low amount of the ice a sufficient and effective cooling of the beer inside the keg 12 is achieved.

[0047] As an example, in a preferred embodiment of the invention, the specific beverage volume, i.e. the volume of the beer inside the keg 12 - when completely filled and delivered to the consumer - is 5 litres and the volume of the ice (to be poured in the residual volume) is 0,88 litres giving the ratio between the residual volume, i.e. the volume of ice, and the beverage volume of 5 litres equals 0,88 litres divided with 5 litres which is 17.6 %.

[0048] Fig. 1c is a cross sectional view of the cooling device according to a first embodiment of the invention in operation. In this state of the cooling device 10, the lid 22 is closed and seals off the container 14, and tap water, e.g. from a water tap with a municipal water supply outlet, is supplied to the container 14 by means of the water hose 25. The tap water is typically delivered with a pressure between 3 - 5 bar and causes the ice 28 as illustrated in Fig. 1c to float on top of the water filling out the above described residual volume by water and ice. Further, the ice slowly melts to water and the volumetric reduction through the melting of ice to water is replaced by tap water.

[0049] Hereby during the slow melting of the ice it is possible to discharge cold beer from the beer keg 12, since the collapsible beer keg 12 and the beer therein is under pressure from the mixture of the pressurised tap water and the ice 28 when the container 14 is filled with the mixture of ice and water, and the keg 12 and the beer therein have been cooled down by the mixture of the ice and the water.

[0050] Fig. 2 is a cross sectional view of the cooling device according to a second embodiment of the invention.

[0051] The cooling device 10' according to the second embodiment of the invention also serves the purpose of discharging cold beer at a temperature of e.g. 5°-7° C from the collapsible beer keg 12' and utilises the same principle of working as discussed above in the three foregoing figures.

[0052] In the second embodiment of the cooling device the water hose 25' is connectable to the cooling device 10' by means of a connector 24' mounted in the lid 22'.

[0053] As in Figs. 1a, 1b and 1c the collapsible beer keg 12' and the beer therein is also under pressure from the mixture of water and ice 28' since the lid 22' is closed and sealed as the water hose 25' is connected to the cooling device 10' in order to supply water under pressure to the above described residual volume.

[0054] In this second embodiment of the cooling device 10' the container 14' has an outer wall 20' and the cooling device 10' utilises a principle known from a thermos, since the keg 12' is positioned initially within an inner thermally insulating container 21 having a double wall, i.e. a wall 21 a and a wall 21 b separated from one another by means of air. Alternatively, vacuum or an isolating material separates the walls 21 a and 21 b.

[0055] From the Figs. 1a, 1b, 1c and 2 it appears that the following steps basically are applied to operate the cooling devices 10 and 10':

(1) opening the lid of the cooling device, whereby

access to the interior of the cooling device is possible
(II) positioning the keg 100 % filled with beverage at the base portion of the cooling device,
(III) filling the free volume inside the cooling device partly or entirely with ice and/or slush ice,
(IV) closing the lid of the cooling device to allow any pressure inside the cooling device to be build up and to be maintained,
(V) supplying tap water to the container, whereby the tap water and the ice are mixed and contacts the beer keg,
(VI) discharging the cooled beer at a temperature of e.g. 5°-7° C from the tapping cock, when operating the handle of the tapping cock to an open position, since the beer keg and accordingly the beer is under pressure from the tap water and the beer in the beer keg has been cooled down by the mixture of the tap water and ice.

Claims

1. A cooling device for containing a collapsible beverage keg to be cooled to a temperature of e.g. 5°-7° C, said cooling device comprising:

a thermally insulating container comprising a housing having a base portion from which an outer wall extends upwardly defining an upper open end and a lid movable between an open state and a closed state and providing access to the interior of said container when said lid is in said open state and providing a waterproof sealing off of said container when said lid is in its closed state,
said container defining a specific inner volume when said lid is in its closed state,
said keg being supported by said base portion when received in said container, said keg defining in a filled and non-collapsed state a specific beverage volume, such as 5 litres,
a connector mounted to said container for connection to an external water hose for receiving tap water and for introducing said tap water into the interior of said container,
a residual volume for receiving ice as a cooling medium being defined as the difference between said specific inner volume and said specific beverage volume, said residual volume constituting less than 20%, such as 17-20%, e.g. 17-19%, such as 17,5-18%, preferably 17,6% of said specific inner volume, and
said beverage container communicating with an external tapping cock for supply of a beverage from said collapsible beverage keg, said tap water provided through said external water hose acting as a pressure medium on said collapsible beverage keg for discharging said beverage from said collapsible beverage keg through said tapping cock.

2. The cooling device according to claim 1 further being provided with a one-way release valve type for releasing any captured air from within said cooling device, said valve being positioned at said container.

3. The cooling device according to claim 1 or 2, said thermally insulating container being made of double walls.

4. The cooling device according to claim 1 or 2, said thermally insulating container being made of a foamed lightweight material.

5. The cooling device according to any of the preceding claims, said keg being a plastic bag, preferably made of polypropylene and/or polyethylene.

6. The cooling device according to any of the preceding claims, said lid being connected to said housing through a hinged connection or through a bayonet coupling.

7. The cooling device according to any of the preceding claims, said connector comprising a quick release snap fit connector.

8. The cooling device according to claim 7, said connector further comprising a valve for controlling said tap water.

9. The cooling device according to any of the preceding claims, said beverage comprises a liquid product, e.g. beer or carbonised beer.

10. A keg to be used in combination with the cooling device according to any of the claims 1-9 and having a collapsible configuration.

11. A method of cooling a keg using a cooling device for containing a collapsible beverage keg to be cooled to a temperature of e.g. 5°-7° C, said cooling device comprising:

a thermally insulating container comprising a housing having a base portion from which an outer wall extends upwardly defining an upper open end and a lid movable between an open state and a closed state and providing access to the interior of said container when said lid is in said open state and providing a waterproof sealing off of said container when said lid is in its closed state,
said container defining a specific inner volume when said lid is in its closed state,
said keg being supported by said base portion

when received in said container, said keg defining in a filled and non-collapsed state a specific beverage volume, such as 5 litres,
a connector mounted to said container for connection to an external water hose for receiving tap water and for introducing said tap water into the interior of said container,
a residual volume for receiving ice as a cooling medium being defined as the difference between said specific inner volume and said specific beverage volume, said residual volume constituting less than 20%, such as 17-20%, e.g. 17-19%, such as 17,5-18%, preferably 17,6% of said specific inner volume, and
said beverage container communicating with an external tapping cock for supply of a beverage from said collapsible beverage keg, said tap water provided through said external water hose acting as a pressure medium on said collapsible beverage keg for discharging said beverage from said collapsible beverage keg through said tapping cock, said method comprising the steps of:

(I) opening said lid of said cooling device,
(II) positioning said keg in said non-collapsed state filled with beverage within said cooling device,
(III) filling said residual volume partly or entirely with said ice or slush ice,
(IV) closing said lid of said cooling device, and
(V) supplying said tap water to said container.

12. The method according to claim 11 comprising the further step of

(VI) discharging cooled beverage such as beer at a temperature of e.g. 5°-7° C from said collapsible beverage keg through said tapping cock.

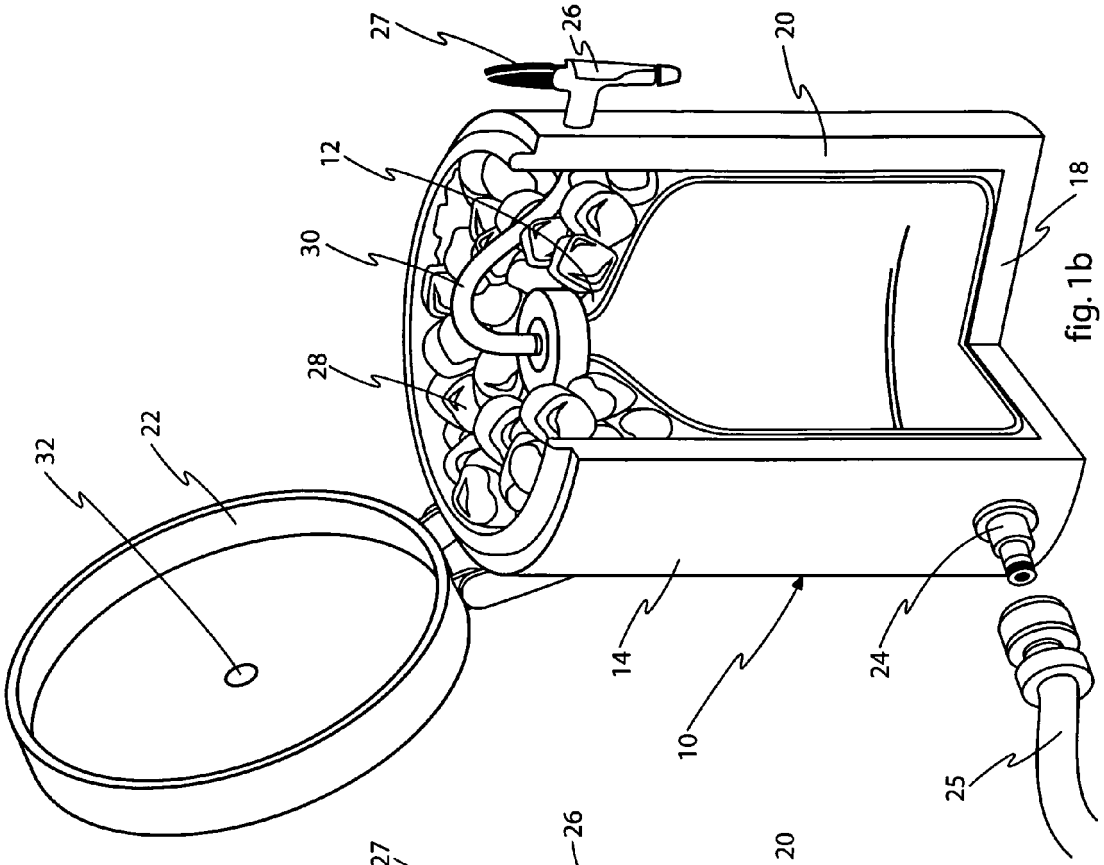


fig. 1b

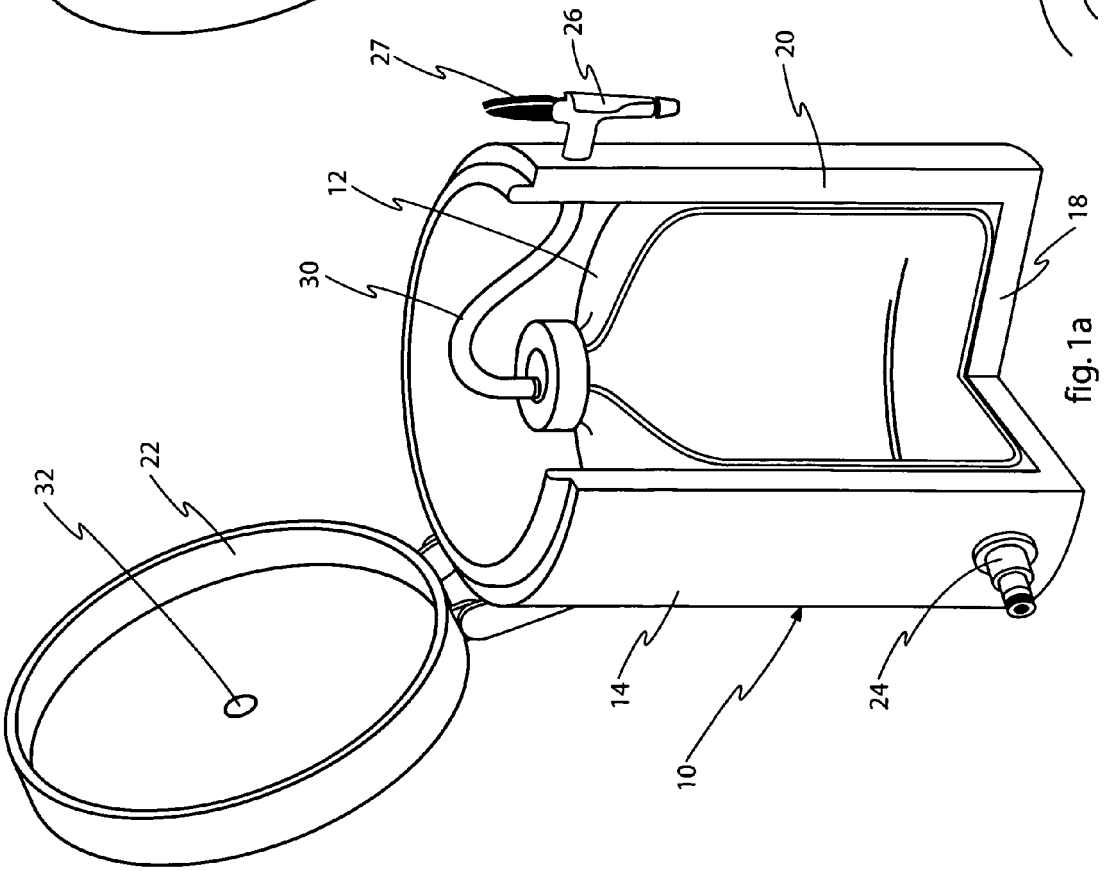
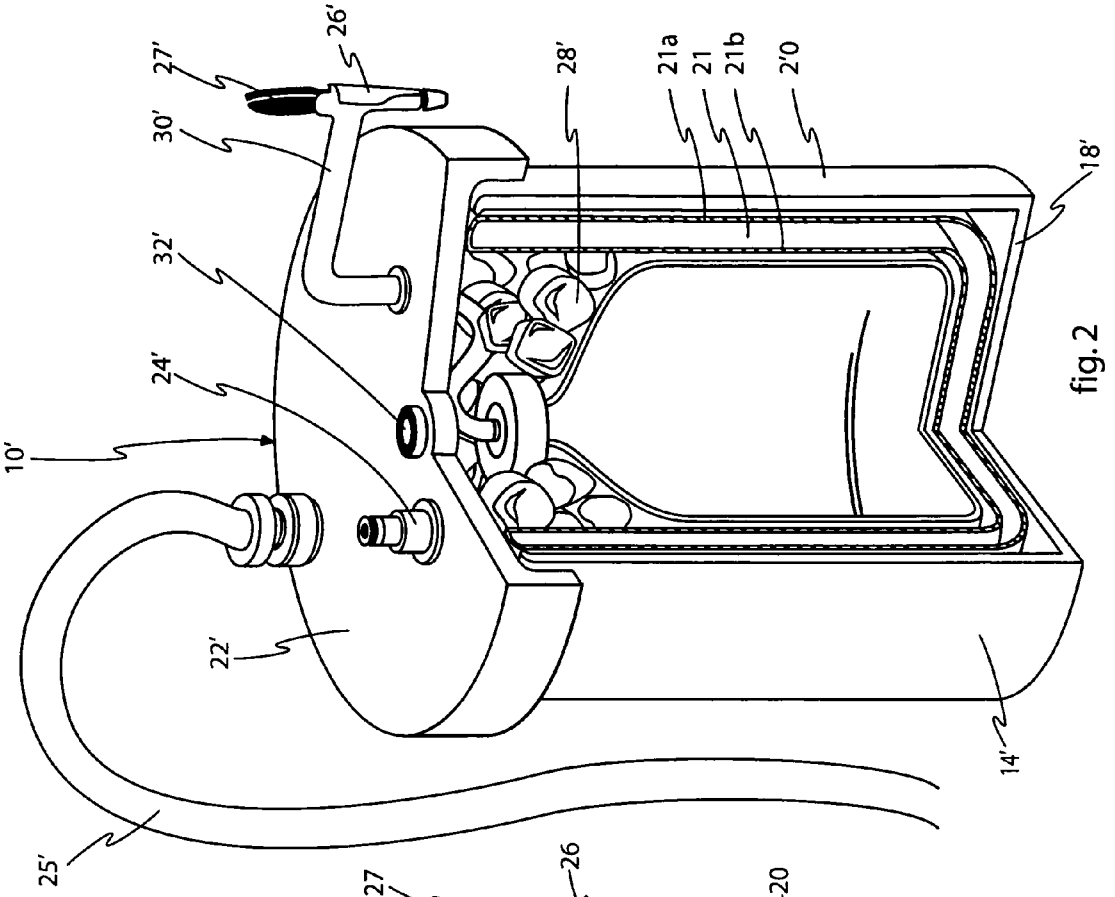


fig. 1a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21b
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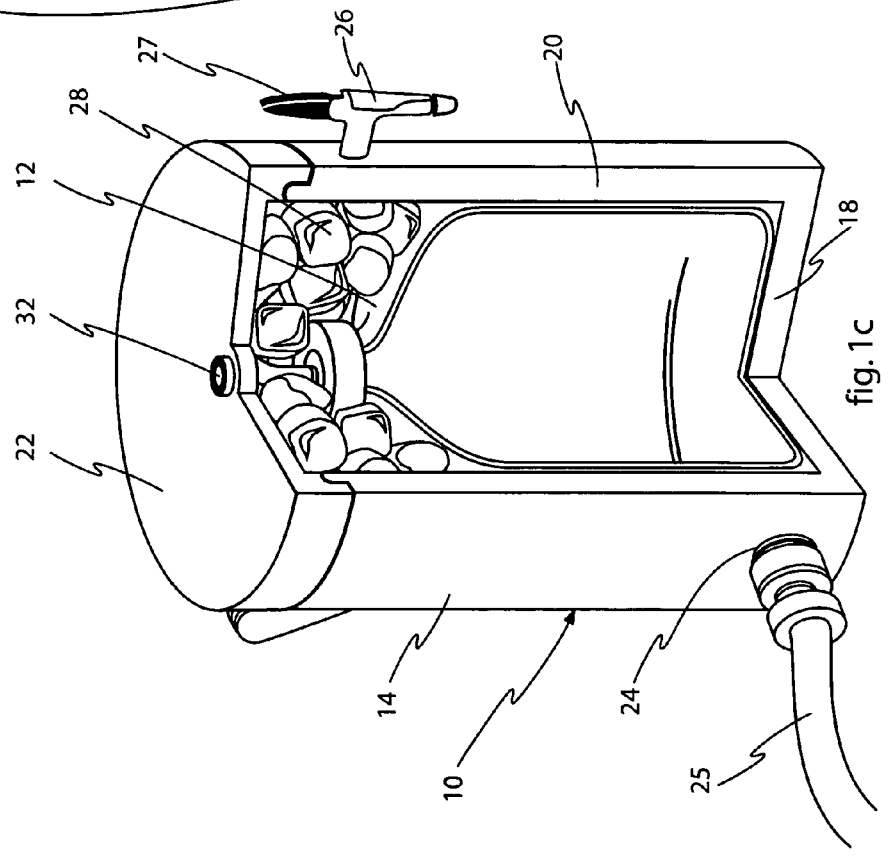
fig.2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EUROPEAN SEARCH REPORT

Application Number
EP 08 01 4098

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 2004/099060 A (CARLSBERG BREWERIES AS [DK]; RASMUSSEN JAN NOERAGER [DK]) 18 November 2004 (2004-11-18) * page 13, line 9 - page 14, line 3 *	1-10	INV. B67D1/00 B67D1/08
Y	US 2 116 622 A (EISENMENGER CARL H) 10 May 1938 (1938-05-10) * claim 1; figure 1 *	1-10	
Y	US 5 240 144 A (FELDMAN JOSEPH [IL]) 31 August 1993 (1993-08-31) * column 5, line 10 - line 25; figure 6 *	1-12	
Y	US 2003/132245 A1 (LEVEEN LINDSAY [US]) 17 July 2003 (2003-07-17) * paragraph [0007] *	1-12	
			TECHNICAL FIELDS SEARCHED (IPC) B67D F25D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 January 2009	Desittere, Michiel

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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.....
& : member of the same patent family, corresponding document

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