A beverage container, comprising a casing and an outer holder included therein, wherein against the outside of the outer holder a cooling line is included, which is at least partly wound in contact with the outer holder and is included within the casing, wherein dispensing and filling means are provided on the outer holder, wherein at least a cover is provided which can seal off an opening of the casing and can cover the dispensing and filling means such that the dispensing and filling means are cooled during use.
FIG. 3

FIG. 3A
BEVERAGE CONTAINER WITH COOLING MEANS

[0001] The invention relates to a beverage container. In particular, the invention relates to a container for carbonated beverage, such as beer.

[0002] Beverage, in particular carbonated beverage, is typically stored in containers such as a keg or tank, which is designed for withstanding the pressure and, optionally, for being cooled. In particular tanks such as cellar beer tanks are cooled in order to bring to and maintain the beverage at a desired temperature.

[0003] From practice, a tank is known for beverage storage which is provided with a double-walled outer casing. At least one of these walls is manufactured from diamond plate, with the diamonds attached to the other one of the two plates, so that space between the two casings is obtained. Cooling means such as water is led between the two casings through said space, which effects cooling. Such a tank is relatively expensive and difficult to manufacture.

[0004] Further, from practice, a tank is known comprising a cooling line provided around an outer holder, while a casing, for instance an insulating casing, is provided thereunder. The cooling line is manufactured from copper line, wound around the outer holder, with a relatively large pitch and rather open winding. Owing to the copper, which offers good heat conductivity, such a tank is also relatively expensive in manufacture.

[0005] These known tanks have an opening in the casing in which opening dispensing and filling means are provided for introducing the beverage into the tank, drawing the beverage therefrom and, for instance, cleaning the beverage. During use, a line links up with the dispensing and filling means.

[0006] These tanks have as a drawback that the opening and the dispensing and filling means are not protected and covered, so that their temperature will differ from the rest of the tank. In particular it has appeared that precisely here, microbiological problems can occur.

[0007] The object of the invention is to provide a container for beverage, with which at least one of the problems of the known container is solved, or an alternative thereto is offered.

[0008] In a first aspect, a container comprises a casing and an outer holder included therein, wherein against the outside of the outer holder a cooling line is included which is at least partly wound in contact with the outside holder and is included within the casing, wherein dispensing and filling means are provided on the outer holder. At least one cover is provided which can seal off an opening of the outer holder and can cover the dispensing and filling means, such that during use, the dispensing and filling means are cooled.

[0009] Herein, sealing off is at least understood to include that the at least one cover can cover the opening and the dispensing and filling means.

[0010] In a second aspect, a container can have a cooling line which is manufactured from plastic or rubber hose.

[0011] Surprisingly, it has appeared that a relatively simple plastic or rubber hose, which is preferably wound tightly around the outside holder, in contact therewith, can provide sufficient cooling capacity for cooling the beverage in the container and keeping it cooled.

[0012] In a third aspect, a container can have a series of sensors on or in the outer holder, in a row, which row preferably extends substantially along an inner or outer surface of the outer container, preferably along an inner container included within the outer container, along which row, during use, the inner container will extend at least partly, which sensors are thermal sensors and are designed for determining the degree of filling of the inner container on the basis of temperature measurement. The inner container can also be indicated as bag or liner.

[0013] With the aid of the sensors, the degree of filling of the container, in particular of a flexible inner container, can be determined in a simple manner.

[0014] The invention will be described in further detail on the basis of the drawing. In the drawing:

[0015] FIG. 1 shows, in perspective view, a container according to the invention, with closed cover;

[0016] FIG. 2 shows the container according to FIG. 1, with opened flap;

[0017] FIG. 3 shows, in side view, a container with partly taken away outer casing and visible cooling line;

[0018] FIG. 3A shows, in cross-sectional front view, a part of a wound hose;

[0019] FIG. 4 shows, in partly cross-sectional side view, dispensing and filling means of a container;

[0020] FIG. 4A shows an alternative embodiment of dispensing and filling means; and

[0021] FIG. 5 schematically shows parts of a tapping device with two containers placed one on top of the other.

[0022] In this description, identical or corresponding parts have identical or corresponding reference numerals. In this description, containers will be described for storage of beverage. It should however be understood that they can also contain other beverages, in particular carbonated beverage.

[0023] In FIGS. 1-3, a container 1 is shown in the form of a cellar beer tank, which can be included in a customary and known manner in a line circuit of a cellar beer installation. In the continuation of this description, for the container, the term tank 1 will be used.

[0024] The tank 1 as shown is designed as a bag-in-container type tank, comprising an outer container 2, an at least partly flexible inner container 3 included therein and a casing 4 enclosing the outer container. The casing may be provided with a thermal insulation layer 12, as shown in FIG. 3. Here, the tank 1 shown is substantially cylindrical, with a longitudinal axis 1, extending horizontally, wherein on a front side an opening 5 is provided in the casing 4. In this opening 5, filling and dispensing means 6 are represented which will be discussed in further detail on the basis of FIGS. 4 and 4A. Above the filling and dispensing means 6, in the opening 5, a hatch 7 is visible, that can be opened in order to remove an inner container 3 from the outer container and place a new one.

[0025] Over the opening 5 a cover 8 is provided, hingedly connected to the casing 4 by a pivot 9 above the opening. As shown in FIGS. 1 and 2, the cover 8 can cover the opening 5 completely in a closed position and release it completely in an opened position (represented in FIG. 3 in interrupted lines). A spring V, in particular a gas spring, is provided for maintaining the cover in the opened position, for instance when the filling and dispensing means are to be approached or when the inner container is to be replaced. As the cover 8 can cover the opening completely, influence from the outside of the tank 1 is reduced to a minimum.

[0026] As shown in FIG. 3, around the outer container, a cooling line 10 is wound. The cooling line 10 is included in a cooling circuit 11, so that cooling agent such as cold water can be led through the cooling line. In FIG. 3, the cooling circuit
is schematically represented with an inline cooler $K$ with which, for instance, also a tapping line can be cooled. In the embodiment shown, the cooling line 10 is manufactured from hose 33, in particular plastic hose, which is wound relatively tightly and closely. In FIG. 3, a number of windings 34 of the hose 33 are shown in interrupted lines, wherein the hose 33 also extends in the space 15 under the cover, for additional cooling. Herein, relatively tightly is at least understood to include so tightly around the outer container 2 that the hose is in close contact with the outer surface thereof. Optionally, in the outer surface a groove can be provided in which the hose can be wound, for enlarging the contact surface. Starting from a hose with a round cross-section, herein, tightly can also include in a manner such that the round cross-section is pressed to a somewhat oval shape, as shown in FIG. 3A, so that the contact surface is even further enlarged. Incidentally, the starting point can also be a hose with a different cross-section, for instance oval, flat oval, semi-circular, rectangular or the like. The cooling line is preferably manufactured from plastic but may also be manufactured from rubber. Herein, relatively closely is understood to include that windings of the hose 33 are located around the outer container 2 at a mutually small distance from or against each other. This may be understood as windings with a small pitch. The intermediate distance $D$ of the windings 34 may for instance be smaller than the cross-section of the hose 33. In the exemplary embodiment shown, the hose 33 is wound such that the windings 34 abut against each other on at least a part of the outer container 2, more particularly on virtually the entire outer container 2. The hose 33 can be rather inexpensive when compared to, for instance, copper, with a relatively poor heat conductivity compared to copper. Owing to the tight and/or close winding, still, sufficient cooling capacity can be obtained with the same cooling rate.

The thermal insulation 12 may be a foam layer which covers the hose 33 and the front side 13 around the opening and the rear side 14. In the example shown, the cooling line 10 runs along the rear side 14 and the front side 13 of the tank, at least of the outer container 2, so that these surfaces too are cooled. However, this can be omitted and the insulation 12 can be held at some distance from the front and rear side, at least partly, so that cool air can flow therealong from the line 10. In the exemplary embodiment shown, the space 15 enclosed by the cover 8, when this is closed, is cooled as a result of the cooling of the outer container 2 and an insulating action of the cover 8. To that end, the cover 8 can be provided with an insulating layer. With it, the filling and dispensing device 6 and the hatch 7 are cooled. Owing to this cooling to, for instance, a few degrees above zero, for instance between 0 and 10 degrees Centigrade, more particularly between 2 and 6 degrees Centigrade, a favourable microclimate is created and maintained, so that bacterial growth is largely prevented. As a result, the installation needs to be cleaned less frequently, which is advantageous to management of the apparatus. Furthermore, the risk of contamination of the beverage is considerably reduced. Further, it is of energetic advantage.

As schematically shown in FIG. 3, in the cooling circuit 11 an inline cooler $K$ is included, for cooling beverage that is discharged from the tank. This is a manner known per se for cooling beverage (further). With a tank according to the invention, preferably, the cooling line 10 is included in the cooling circuit 11 of the inline cooler, which further simplifies the installation. However, also, a separate cooling for the cooling means can be provided in the cooling line 10, for instance a separate inline cooler $K$ or a different cooling device known per se.

In FIG. 5 it is shown that two or more tanks can be placed side by side and one above the other, which can all be included in the same cooling circuit. To that end, the tanks 1 and in particular the casing 4 are provided with at least standing means 35, such as legs, and a top side 36 suitable for carrying a tank 1 of the same type in filled condition. To that end, the top side 36 is preferably partly of flat design. By stacking the tanks 1, the advantage is achieved that less floor space is occupied. The tanks 1 can have standard sizes or at least all have the same sizes, but can also have different volumes. In FIG. 5, further, kegs F, draw-off taps 37, a cooling unit 38 and a regulator unit 39 are shown, as well as a control device 40 with touch screen 41.

In FIG. 4, schematically, a view is shown of a portion of a tank 1 with filling and dispensing means 6 (also indicated as connecting means) and a portion of a line circuit 11. Above the filling and dispensing means 6, schematically, a hatch 7 is shown, and the cover 8 in open condition. The inner container 3 has a neck 18 inserted through an opening 19 into the outer container 2. Around the opening 19, an attachment means 20, such as screw thread or a first part of a bayonet catch is provided. A flange 21 of the neck 18 abuts against an outside of the opening 19. On the attachment means 20, a counter attachment means 22 is fixed, which is provided on a shutoff 23. Here, the flange 21 is sealingly confined between the attachment means 20 and the counter attachment means 22. The shutoff 23, for instance a ball valve without empty spaces, with a straight passage, is provided on the opposite side with a coupling means 24 on which either a filling line of, for instance, a tanker can be connected for filling the tank, in particular the inner container 3, with beverage such as beer, or, as shown, a three-way valve 25 of a tapping circuit. The three-way valve 25 is preferably, as shown, remotely controllable between a first and a second position. To that end, it is for instance of electric or preferably of pneumatic design with actuator 42. To the three-way valve 25 are further connected a beverage dispensing line 27 and a supply line 28. The supply line 28 may be a changeover line which connects the tank to another tank, or a rinsing line for supply of rinsing means, such as water or another cleaning agent, for cleaning the tapping circuit. In the first position, the three-way valve 25 connects the shutoff 23 to the beverage dispensing line 27 and in the second position the supply line 28 to the beverage dispensing line 27. Therefore, in the first position, beverage can be dispensed from the tank, in the second position, the tapping circuit can be rinsed or beverage can be dispensed from a tank connected upstream to the line circuit or another container and be lead into the tapping circuit. As the three-way valve 25 is remotely controllable, switching between the first and the second position can be carried out simply with the device 40 without a user having to proceed physically to the tank and without the cover 8 needing to be opened.

As appears from FIG. 4, the counter attachment means 22 is provided with a pipe 30 which projects into the inner container 3 or at least in the neck thereof, for a good connection. As the shutoff and the pipe are relatively straight and have no hollow spaces, cleaning them is particularly simple. As a result, the hygiene is improved further. As the space 15 is cooled, the advantage is achieved that the filling and dispensing means 6 are and remain cooled, so that they
need to be cleaned less frequently than customary tanks. Furthermore, with this, switching tanks as described is possible without cleaning between times being required.

[0032] In the embodiment shown in FIG. 4, the cooling line 10 is led through a part of the cover 8, so that this is actively cooled which is advantageous, in particular also when the outer container is manufactured from plastic. However, indirect cooling as earlier described is also possible. Also, for instance a cooled sleeve can be provided over the connecting device, for instance slid or folded. In FIG. 3, schematically, a series of sensors 31 is shown, which extend in a vertical row along an inside of the outer container 2, for instance regularly spaced apart. The sensors 31 are thermal sensors with which, through conductivity, heat or temperature and temperature differences can be recorded. With it, the rest volume of beverage in the container can be determined, as the beverage will give a different temperature and/or heat capacity than air in the inner space. With this, the liquid level in the inner container can be determined and hence the rest volume. To that end, the sensors are provided with a heater element with which, locally, the temperature can be increased. Depending on the heat capacity of the adjoining medium, air of beverage, heating will proceed quicker or slower, whereby the nature of the medium can be determined. The sensors 31 are provided on, for instance, a strip 32 provided against the inner or outer container. They preferably lie against the outside of the outer container, in or under the insulating casing 12. A strap 31A can be provided tightly over the sensors with the aid of the spring or through elasticity, so that they are in close contact with the container. Preferably, contact paste is provided between the container and the sensors for good heat conductivity. The sensors may be included in a flexible watertight housing, for instance potted, in order to ensure a good action. The sensors can be connected in series and/or parallel in a manner directly clear to the skilled person. The strip 32 with sensors 31 may have been manufactured in far greater length than necessary for a tank, after which, with the production of the tanks, each time the desired length of the strip can be cut off and processed. The sensors are connected to a control unit 42 in which, on the basis of the sensors, the degree of filling the container can be determined. To that end, during use, when it is completely filled, the inner container abuts against all sensors 31 on the strip. Here, the sensors will all measure the same temperature. According as the container 3 empties, it is pressed loose further from the inside of the outer container 2, so that some sensors 31 will lose contact with the inner container 3. Therefore, different sensors 31 will measure different temperatures, on the basis of which the degree of filling can be determined relatively accurately.

[0033] FIG. 4a shows an alternative embodiment of a connecting device 6, in which reference numerals from FIG. 4 are used, to which reference is made. With this embodiment, the shutoff 23 is designed as a ball valve without empty spaces and with a passage running straight which links up tightly with both the three-way valve 25 and the pipe 30. As a result, cleaning is possible in a simple manner, if desired and/or necessary. A for instance pneumatic or electric actuator 42 is provided with which a valve body 43 can be rotated between the positions shown in FIG. 4a, wherein the discharge line 27 is connected to the supply line 28, or a second position wherein the inner container 3 is connected to the discharge line 27. Here too, the actuator 42 can preferably be operated remotely, for instance from the bar with the operating unit 40.

[0034] The casing 3 is preferably built up from dish parts, which can be relatively easily removed and replaced. As a result, maintenance to the tanks is possible in a simple manner and the appearance of the tanks can simply be adapted to, for instance, the beverage in the tank, the brewer, the accommodation, a particular event and the like.

[0035] The invention is not limited in any manner to the embodiments represented in the drawing and the description. Many variations thereon are possible within the framework of the invention as outlined by the claims. A container according to the invention can, for instance, have a different position, for instance a longitudinal axis extending approximately vertically instead of horizontally, wherein the filling and dispensing device, the opening and/or the cover may be provided in a circumferential wall. Furthermore, the container can be designed without inner container, for instance as a keg.

1. A beverage container, comprising a casing and an outer holder included therein, wherein against the outside of the outer holder a cooling line is included, which is at least partly wound in contact with the outer holder and is included within the casing, wherein dispensing and filling means are provided on the outer holder, wherein at least a cover is provided which can seal off an opening of the casing and can cover the dispensing and filling means, such that during use, the dispensing and filling means are cooled.

2. A beverage container according to claim 1, wherein the cooling line extends to near and preferably around the dispensing and filling means.

3. A beverage container according to claim 1 or 2, wherein between at least a part of the casing and the outer holder a space is confined which is in communication with a space that can be enclosed by the cover around the dispensing and filling means, for cooling with the cover closed.

4. A beverage container according to any one of the preceding claims, wherein in the outer holder an at least partly flexible inner container is provided in which beverage is includable, which inner container reaches with a filling opening through an opening in the outer holder, to which filling opening the dispensing and filling means are connectable, such that they project outside the outer holder.

5. A beverage container according to claim 4, wherein a hatch is provided in the outer holder, through which the inner container can be brought into and out of the outer holder, which hatch, when the cover is closed, is included under the cover in said cooled space.

6. A beverage container according to any one of claims 4 or 5, wherein the dispensing and filling means comprise a connecting piece which comprises a substantially straight channel, which connecting piece, during use, reaches into the filling opening of the inner container and holds this against an edge of the opening in the outer holder, wherein the dispensing and filling means link up with said channel and are fixable on the outer holder and/or the casing.

7. A beverage container according to claim 6, wherein the connecting piece is provided with a flange extending outwards to be included between the inner container and the dispensing and filling means.

8. A beverage container according to any one of the preceding claims, wherein the cooling line is manufactured from plastic or rubber hose.

9. A beverage container according to claim 8, wherein the cooling line is wound against the outside of the outer holder,
such that in at least a number of windings the cooling line has a somewhat flattened form, in particular somewhat oval, flat oval, semi-circular or flat.

10. A beverage container according to claim 8 or 9, wherein the cooling line extends to around the dispensing and filling means and/or into the cover.

11. A beverage container according to any one of the preceding claims, wherein the casing is at least substantially built up from dish parts.

12. A beverage container according to any one of the preceding claims, wherein the outer holder has a substantially cylindrical shape with an end wall and front wall, wherein, during use, the front wall faces a front side and the dispensing and filling means and the cover are provided on the front side, wherein the casing is provided at an underside with standing means and on an opposite, top end with support means, such that a comparable holder with standing means can be set on the support means, for stacking holders.

13. A beverage container according to any one of the preceding claims, wherein the dispensing and filling means comprise a shutoff and a three-way valve device, which are mutually detachably connected and wherein during use the shutoff is included between the holder, in particular an inner container, and the three-way valve.

14. A beverage container according to claim 13, wherein the three-way valve is provided with drive means for remote control of the three-way valve, in particular pneumatic drive means.

15. A beverage container according to any one of the preceding claims, wherein on or in the outer holder a series of sensors is provided in a row, which row extends substantially along an inner container included within the outer holder, along which, during use, the inner container will extend at least partly, which sensors are thermal sensors and are designed for determining the degree of filling of the inner container on the basis of temperature measurement.

16. A beverage container according to any one of the preceding claims, wherein the cooling line is connectable to an inline cooler.

* * * * *