

DISPLAY AND METHOD FOR COOLING BEVERAGE CONTAINERS IN DISPLAY

BACKGROUND

The present disclosure relates to displays for displaying and cooling beverage containers, and more particularly to a display for cooling beverage containers and a method for cooling
5 beverage containers in such a display.

Beverage containers are often displayed and distributed in grocery stores and other types of shops and similar using refrigerating equipment, such as cabinet or basin type refrigerating equipment, wherein the equipment simultaneously aims to cool the entire space inside the equipment and content. Such refrigerating equipment typically consume
10 high amounts of electric energy as this type of cooling is not very efficient. The reason for this is that the air inside the equipment has to be cooled first and the cooling power has to be provided to the beverage containers via the air, which is not very efficient per se. In open refrigerating devices, which are often used for easy access for the consumer to the beverage containers, this may be an even bigger challenge, as the equipment not only has
15 to cool down the air within the cabinet or basin, but heat, or cold, also leaks to around and outside the equipment as well. Therefore, it has become more usual to provide especially cabinet type refrigerating equipment with a door or other closing means. However, a problem still remains that all the content and air inside the refrigerating equipment has to be cooled, which consumes a lot of energy.

There are also known solutions, where beverage containers are provided on a shelf connected to cooling means. A problem with such solutions is that when a beverage container is cooled through the bottom on the beverage container, volumes of beverage with different temperatures tend to layer on top of each other instead of the temperature being evenly distributed within the beverage container. This effect is based on the density
20 of water being different at different temperatures and highest at 4 degrees Celsius and may be called a thermocline. This leads to cooling beverage containers by such selves being both inefficient and ineffective.

BRIEF DESCRIPTION OF THE DISCLOSURE

An object of the present disclosure is to provide a new method and display for cooling
30 beverage containers.

The object of the disclosure is achieved by a method and an apparatus which are characterized by what is stated in the independent claims. Some embodiments of the disclosure are disclosed in the dependent claims.

The disclosure is based on the idea of providing a display for beverage containers, in which the beverage containers are simultaneously cooled down through both the bottom and a side of the beverage container.

5 An advantage of the method and arrangement of the disclosure is that the cooling power can be directed to the beverage container(s) to be served only, and it can be done effectively to save energy. In addition, a thermocline effect can be avoided, and the beverage container and its content can be cooled effectively and with considerably less energy than in conventional solutions.

BRIEF DESCRIPTION OF THE DRAWINGS

10 In the following the disclosure will be described in greater detail by means of preferred embodiments with reference to the accompanying drawings, in which

Figure 1 illustrates schematically a detail of a display according to an embodiment seen in a perspective;

15 Figure 2 illustrates schematically a detail of a display according to another embodiment seen in a perspective;

Figure 3 illustrates schematically a detail of a display according to a further embodiment seen from above;

Figure 4 illustrates schematically a detail of a display according to a further embodiment seen from above;

20 Figure 5 illustrates schematically a detail of a display according to a further embodiment seen from above;

Figure 6 illustrates schematically a detail of a display according to a further embodiment seen from above;

Figure 7 illustrates schematically a display according to an embodiment;

25 Figure 8 illustrates schematically an arrangement according to an embodiment;

Figure 9 illustrates schematically a method for cooling beverage containers in a display;

Figure 10 illustrates schematically a further embodiment of a display seen from front;

Figure 11 illustrates schematically a further embodiment of a display seen in perspective;

30 Figure 12 illustrates schematically a beverage container according to an embodiment seen in perspective; and

Figure 13 illustrates schematically a beverage container and a groove seen from above.

The figures are provided to schematically illustrate the disclosure only and are not provided to scale. For the sake of clarity, not all the features are shown in all figures and not all similar features are provided with reference numbers.

DETAILED DESCRIPTION OF THE DISCLOSURE

5 The disclosure relates to a display and a method for cooling beverage containers in a display.

In this description, a display refers to any kind of apparatus or equipment configured to receive a plurality of beverage containers and displaying them in such a manner that a consumer or the like may access one or more of the beverage containers. Such a display
10 may comprise a cabinet-type of a display, a basin-type of a display or another type of a display. Different types of such displays are known in the art and are, thus, not disclosed here in more detail. The display 1 may, thus, comprise any type of display, which is compatible with the features described.

Figure 1 illustrates schematically a detail of a display 1 according to an embodiment seen
15 in a perspective, Figure 2 illustrates schematically a detail of a display 1 according to another embodiment seen in a perspective, Figure 3 illustrates schematically a detail of a display 1 according to a further embodiment seen from above, Figure 4 illustrates schematically a detail of a display 1 according to a further embodiment seen from above, Figure 5 illustrates schematically a detail of a display 1 according to a further embodiment
20 seen from above, Figure 6 illustrates schematically a detail of a display according to a further embodiment seen from above, Figure 7 illustrates schematically a display 1 according to an embodiment, Figure 10 illustrates schematically a further embodiment of a display 1 seen from front, and Figure 11 illustrates schematically a further embodiment of a display 1 seen in perspective. Figure 12 illustrates schematically a beverage container
25 6a, 6b according to an embodiment.

A display 1 for beverage containers 6a, 6b, such as the display 1 of any one of the figures 1 – 7, 10, 11, and/or 13, comprises a first cooling member 2, a second cooling member 3 and a cooling apparatus 9 configured to cool the first cooling member and the second cooling member. The cooling apparatus 9 is not shown in all the figures. It is clear for a
30 person skilled in the art that such a display 1 may also comprise a plurality of other structural parts disclosed or not disclosed in this description and accompanying claims and drawings.

According to an embodiment, such as the embodiment of Figure 12, the beverage container 6a, 6b comprises an elongated shape. The elongated shape may comprise a

longitudinal axis 23. A direction, in which such a longitudinal axis 23 extends, may be called a longitudinal direction 18, more particularly a longitudinal direction 18 of the beverage container 6a, 6b in this disclosure.

5 Beverage containers 6a, 6b with an elongated shape are often stored in an upright position, as shown in Figure 12, wherein the longitudinal axis 23 of the beverage container 6a, 6b is provided in a vertical position, or in some cases a position closer to a vertical position than a horizontal position. Therefore, one end of the beverage container 6a, 6b in the longitudinal direction 18, often provided with opening means (not shown) for opening the beverage container 6a, 6b, is called a top 24 of the beverage container 6a, 6b, and the
10 opposite end is called the bottom 25 of the beverage container 6a, 6b.

The beverage container 6a, 6b may comprise a cylindrical, or substantially cylindrical, shape, such as in the embodiment of Figure 12, but it may also have a cross section of another shape than a circle and/or a cross section of a size varying along the longitudinal direction 18 of the beverage container 6a, 6b and, thus, a shape different from a cylindrical
15 shape.

In the context of this description, a cooling member refers to a structural part, which may be configured to change, more particularly to cool, a temperature of an object and/or a content of an object, such as a beverage container 6a, 6b and/or a liquid content of the beverage container. According to an embodiment, a cooling member according to this
20 disclosure may be configured to change a temperature of an object and/or a content of an object, such as a beverage container 6a, 6b and/or a liquid content of the beverage container, particularly effectively when brought into contact with the object.

According to an embodiment, the cooling member, such as the first cooling member 2 and/or the second cooling member 3, may be configured to actively cool, in other words to
25 lower its temperature to a temperature lower than the temperature of the surroundings of the cooling member. In other words, the cooling member itself may be connected to the cooling apparatus 9. According to another embodiment, the cooling member, such as the first cooling member 2 and/or the second cooling member 3, may be configured as a passive element, which is cooled, in other words its temperature is lowered to a
30 temperature lower than the temperature of the surroundings of the cooling member, indirectly, for instance by conducting the lower temperature to the cooling member by a separate structural part connected to the cooling apparatus 9.

In the display 1, the first cooling member 2 comprises a first cooling surface 4. The first cooling surface 4 is configured to be facing towards beverage containers 6a, 6b when the

beverage containers are provided on the display 1, or in the display 1. According to an embodiment, the display 1 may comprise an inside volume 14 defined by the first cooling member 2 and one or more further structural parts, such as one or more straight or curved side walls 22 connected to each other and/or to the first cooling member 2. In such an embodiment, the first cooling surface 4 may be directed towards the inside volume of the display 1. According to an embodiment, the inside volume 14 of the display 1 may also be partly defined by the second cooling member 3, such as in embodiments of Figures 10 and 11.

The first cooling surface 4 is configured to be large enough to receive at least three first beverage containers 6a, and to be in contact with at least a part of a bottom 25 of each first beverage container 6a, when the beverage containers 6a, 6b are provided on the display 1.

According to an embodiment, the first cooling surface 4 may comprise a flat structure. According to an embodiment, the flat structure may be smooth enough and large enough to enable sliding a first beverage container 6a along the first cooling surface 4 towards the second cooling member 3 and to receive at least one further beverage container, a second beverage container 6b. According to an embodiment, the first cooling member 2, such as flat structure of the first cooling member 2, may be configured to be in contact with at least a part of a bottom 25 of the first beverage container 6a and the second beverage container 6b, when said beverage containers are provided on the display 1. According to such an embodiment, at least four beverage containers, three first beverage containers 6a and the second beverage container 6b, may be provided on the first cooling surface 4 of such a display 1 side by side in such a manner that the sides 26 of the beverage containers 6a, 6b are in contact with each other over the entire longitudinal direction 18 or over at least 70 percent of the longitudinal direction of the beverage containers 6a, 6b.

In the display 1, the second cooling member 3 extends in a direction perpendicular to the first cooling member 2. In other words, the second cooling member 3 protrudes from a plane defined by the first cooling member 2, such as by the flat structure of the first cooling member 2, in a direction perpendicular to said plane.

In the display 1, the second cooling member 3 comprises a second cooling surface 5. The second cooling surface 5 is configured to extend in a direction perpendicular to the first cooling surface 4. The second cooling surface 5 comprises a plurality of grooves 11 shaped to conform, in each case, to a part of a shape of the beverage containers 6a, 6b in such a manner that each first beverage container 6a can be arranged to simultaneously be in contact with the first cooling surface 4 via its bottom 25 and with the groove 11 of the

second cooling surface 5 via its side 26. In other words, the groove 11 of the second cooling surface 5 may be configured to receive a beverage container, such as the first beverage container 6a, in such a manner that a side 26 of the beverage container is in contact with the groove 11 of the second cooling surface 5 and simultaneously the bottom 25 of the beverage container is at least partly in contact with the first cooling surface 4. According to an embodiment, the grooves 11 may be configured to conform to a shape, or more particularly a part of the shape, of a beverage container 6a of a standardized size as explained in this disclosure.

According to an embodiment, in the display 1, the first cooling member 2 and the second cooling member 3 may be formed to enable the second beverage container 6b to be arranged to simultaneously be in contact with the first cooling surface 4 via its bottom and with the first beverage container 6a via a side 26 of the second beverage container 6b. According to an embodiment, the first cooling surface 4 of the first cooling member 2 may be formed flat enough or otherwise to comprise a shape that enables the first beverage container 6a and the second beverage container 6b to be positioned side by side close enough to each other to enable a side 26 of the first beverage container 6a to be kept in a contact with a side 26 of the second beverage container 6b, while the bottoms of the first beverage container 6a and the second beverage container 6b are simultaneously in contact with the first cooling surface 4.

Thereby, according to an embodiment, the display 1 may be configured to cool the first beverage container 6a provided on the first cooling surface 4 and in contact with a groove 11 of the second cooling surface 5 simultaneously from a side 26 of the beverage container by the second cooling member 3 and from the bottom 25 of the beverage container by the first cooling member 2. Simultaneously, the display 1 may be configured to cool the second beverage container 6b provided on the first cooling surface 4 and in contact with the first beverage container 6a simultaneously from a side 26 of the beverage container by the first beverage container 6a, thus cooled in its turn by the second cooling member 3, and from the bottom 25 of the beverage container by the first cooling member 2.

Content of a beverage container comprises a liquid typically comprising water possibly along with other substances. Thereby, cooling a beverage container 6a, 6b, and more particularly the content of the beverage container 6a, 6b, simultaneously via the side 26 and the bottom 25 is not only more effective due to the larger area of contact between the beverage container 6a, 6b and a cooling member 2, 3, but also beneficial, as this creates an internal flow of volumes of liquid with different temperatures inside the beverage container, as the cooler liquid with higher density close to the side 26 of the beverage

container being cooled tends to fall downwards in the beverage container 6a, 6b, thus mixing the volumes of liquid with different temperatures and preventing volumes of liquid with different temperatures from layering on top of each other, which happens, if the beverage container is only cooled from a bottom 25. This leads to the temperature of the content of the beverage container being more evenly distributed and avoiding the thermocline effect. Cooling the beverage containers by conducting heat, or cold, more particularly by direct contact between the beverage container 6a and the cooling elements 2, 3, via materials with high heat conductivity is also considerably more efficient than cooling beverage containers via cool air surrounding the beverage containers, as the air does not need to be cooled down first. Furthermore, the solutions of this disclosure are scalable, as further beverage containers, second beverage containers 6b, can be provided in contact with the sides 26 of the first beverage containers 6a and/or other second beverage containers 6b, whereby they also benefit from cooling effect of the sides 26 of the already cooled beverage containers thus cooling these further beverage containers. Thereby, the disclosed solutions are not limited to one or two beverage containers but are scalable to sufficient amounts of beverage containers for the needs of shops and other retailers.

According to an embodiment, in a use position of the display 1, the first cooling surface 4 is arranged to extend in a horizontal direction and the second cooling surface 5 is arranged to extend in a vertical direction. According to another embodiment, in a use position of the display 1, the first cooling surface 4 may be arranged to extend in an angled manner with respect to a horizontal direction and the second cooling surface 5 may be arranged to extend in direction perpendicular to the direction of the first cooling surface 4. According to an embodiment, the first cooling surface 4 may be arranged to extend at an angle of maximum 30 degrees, preferably a maximum of 15 degrees, and most preferably a maximum of 10 degrees, with respect to a horizontal direction.

According to an embodiment, the first cooling surface 4 and the second cooling surface 5 are configured to be in contact with each other at least at one point of the first cooling surface 4 and the second cooling surface 5. According to an embodiment, the first cooling surface 4 and the second cooling surface 5 may be configured to be in contact with each other to form a heat bridge conducting the heat, or cool, from the first cooling surface 4 to the second cooling surface 5 and vice versa. In such embodiments, the first cooling surface 4 and the second cooling surface 5 may be cooled by a cooling apparatus 9 comprising one Peltier element. According to a further embodiment, the first cooling element 2 and the second cooling element 3 and, thus, the first cooling surface 4 and the second cooling

surface 5 maybe spaced from each other and cooled separately, for instance by separate Peltier units.

5 According to an embodiment, the second cooling surface 5 comprises a plurality of grooves 11 shaped to conform, in each case, to a part of a shape of the beverage containers 6a, 6b in such a manner that a plurality of first beverage containers 6a can be arranged to simultaneously be in contact with the first cooling surface 3 via their bottoms 25 and, in each case, with one of the grooves 11 of the second cooling surface 5 via their side 26, such as in the embodiments of Figures 1 – 6 and 11. According to an embodiment, the grooves 11 in the second cooling surface 5 are positioned with respect to each other
10 is such a manner that at least two first beverage containers 6a can be arranged to simultaneously further be in contact with each other via their side 26 at a point different from the point in contact with the groove 11, such as in the embodiments of Figures 1 – 6 and 11, and particularly shown in Figures 3 – 6 and 11. According to an embodiment, the first cooling member 2 and the second cooling member 3 are formed to enable each first
15 beverage container 6a to simultaneously further be in contact with at least one second beverage container 6b by its side 26 at a point different from the point in contact with the groove 11, such as in the embodiments of Figures 1 – 6, and particularly shown in Figures 3 – 6.

20 According to an embodiment, each groove 11 provided in the second cooling member 3 for receiving a first beverage container 6a is configured to have a shape of a surface. According to an embodiment, each groove 11 provided in the second cooling member 3 for receiving a first beverage container 6a is configured to have a shape of a curved surface. According to an embodiment, each groove 11 provided in the second cooling member 3 for receiving a first beverage container 6a is configured to have a shape of a
25 segment 19, or part, of an outer surface of a cylinder. According to an embodiment, a central angle 20 of the segment 19 is lower than or equal to 180 degrees. The central angle 20 refers to the angle between the radiuses defining the edges of the contact surface of the groove 11, namely the edges of the segment of the outer surface of the cylinder, as shown in Figure 13. In other words, the surface of the groove 11 may be configured to be
30 in contact with 50 percent or less of the outer surface of the side 26 of the beverage container 6a, 6b, when the beverage container 6a, 6b is provided in the groove. Thereby, the display 1 is designed to enable the beverage container 6a, 6b being removed from the groove 11 by a horizontal move, or a move in a direction parallel to the first cooling surface 4 instead of a vertical or perpendicular movement only. This enables more possibilities for
35 the overall design of the display 1 and easy access both when providing beverage

containers 6a, 6b in the display and when removing them from the display 1. According to an embodiment, the central angle 20 of the segment 19 is higher than or equal to 30 degrees. According to an embodiment, a central angle 20 of the segment 19 is in the range of 30 to 180 degrees, preferably in the range of 60 to 180 degrees. An advantage of such
5 embodiments is that it provides a simultaneous and effective cooling of the first beverage containers 6a from both a side 26 and from a bottom 25, while the first beverage containers 6a may be easily provided in the grooves 11, namely brought into contact in each case with one of the grooves 11 for cooling, and easily removed from the groove 11, for instance by a consumer. According to an embodiment, the diameter of the cylinder is equal to or at
10 most 10 percent larger, preferably at most 5 percent larger, than the diameter 21 of a beverage container 6a of a standardized size as disclosed in this disclosure.

According to an embodiment, each groove 11 configured to receive one of the first beverage containers 6a is configured to be, in each case, in contact with first beverage container 6a over the entire longitudinal direction or over at least 50 percent, preferably at
15 least 70 percent, of the longitudinal direction of the first beverage container 6a. In other words, the height of each groove 11 is larger than or equal to 50 percent, preferably 70 percent, of the height of the first beverage container 6a, and most preferably larger than or equal to the height of the first beverage container 6a.

According to an embodiment, the contact between at least one first beverage container 6a and at least one second beverage container 6b, provided in the display 1, is configured to have a shape of a line.
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Figure 10 illustrates schematically a further embodiment of a display 1. According to an embodiment, such as the embodiment of Figure 10, the first cooling member 2 may form a shelf or a part of a shelf of a cabinet type display. According to such an embodiment, the
25 display 1 may comprise a cabinet type of display that can be accessed from the side, such as from a front side of the display 1. Such a display 1 may or may not comprise a door or a similar structure for accessing the inside volume 14 of the display.

Figure 11 illustrates schematically a further embodiment of a display 1. According to another embodiment, such as the embodiment of Figure 11, the first cooling member 2
30 may form a bottom or a part of a bottom of a basin type display. The bottom refers to a bottom surface of a basin type display. According to such an embodiment, the display 1 may comprise a basin type display that can be accessed from a side and/or from above. The basin type display may, for instance comprise a side wall 22 lower than the beverage containers 6a, 6b and/or the second cooling member 3, which enables access from both
35 the side and above the display 1. According to a further embodiment, a basin type display

may also comprise a removable or non-removable top cover (not shown) covering the display 1 from above, whereby the beverage containers 6a, 6b may be mainly configured to be accessed from a side. In case of both cabinet and basin types of embodiments, a consumer may, thus, be freely select any one of the beverage containers in the display.

5 According to an embodiment, the display 1 is configured to cool beverage containers only via the contact to the first cooling member 2 and via the contact to at least one of the second cooling member 3 and another one of the beverage containers 6a, 6b. In other words, such a display 1 does not comprise equipment for cooling for example the air within the inside volume 14 of the display 1 to cool the beverage containers 6a, 6b.

10 According to an embodiment, only a part of the shelf or shelves of the display 1, or only a part of the bottom of the display 1 may be covered by the first cooling member 2, whereby only the beverage containers 6a, 6b provided in contact of the first cooling surface 5 may be cooled down, while other beverage containers or other products may be kept in the room temperature or another temperature different from that provided by the first cooling member 2 and the second cooling member 3. An example of such an embodiment is shown in Figure 10, where further shelves 15 are provided on lower levels of the display 1 than the shelves provided with first cooling members 2. The top shelves may comprise, for instance, cooling members 2, 3 similar to those in the embodiment of Figure 1. In other embodiments, the shelves with cooling members 2 and the further shelves 15 may, of course, be arranged in a different order and/or side by side depending on the embodiment.

20 According to an embodiment, the cooling apparatus 9, namely the cooling apparatus for cooling the first cooling member 2 and the second cooling member 3, comprises at least one Peltier unit. The Peltier unit may form a cooling member, such as the first cooling member 2 and/or the second cooling member 3. The operating principle of Peltier units, also called Peltier cooling elements, and use of Peltier units for cooling is known as such and is, thus, not explained here in more detail. An advantage of using a Peltier unit to cool the beverage containers 6a, 6b is that the Peltier unit can be made relatively small and operated using a low voltage electric power source 16. A Peltier unit is also a practically silent way of cooling. According to an embodiment, one or more separate Peltier units may be provided for cooling the first cooling member 2 and the second cooling member 3. According to an embodiment, the first cooling member 2 and/or the second cooling member 3 may comprise one or more fans.

30 According to an embodiment, the first cooling member 2 and the second cooling member 3 are thermally connected to one another. According to an embodiment, the first cooling

member 2 and the second cooling member 3 are thermally connected to one another via a heat bridge, as explained in an earlier embodiment of this disclosure.

According to an embodiment, the first cooling member 2 and the second cooling member 3 are formed of a heat conducting material. According to an embodiment, the heat
5 conducting material comprises aluminium.

According to an embodiment, the display 1 is configured to receive the beverage containers 6a, 6b in a position, where the longitudinal directions 18 of each beverage container is perpendicular to the direction of the first cooling surface 4 and parallel to the direction of the second cooling surface 5.

10 According to an embodiment, the display 1 further comprises a detector 12 for detecting at least a temperature of at least one beverage container 6a, 6b provided in the display 1 and/or the temperature of at least one of the first cooling member 2 and the second cooling member 2. Different types of detectors 12 for detecting a temperature, both in contact or without a contact, are known as such and are, therefore, not explained here in more detail.

15 According to an embodiment, the display 1 further comprises a controller 13 for controlling the cooling power of the cooling apparatus 9 on the basis of the temperature detected by the detector 12. Such embodiments may enable optimizing power supply to the cooling apparatus 9. This may help decreasing energy consumption, while providing beverage containers 6a, 6b having a desired temperature to a consumer. The controller 13 may
20 comprise a programmable logic or other suitable type of a controller. Such controllers are known as such and are, therefore, not explained here in more detail.

According to an embodiment, the display 1, more particularly the first cooling member 2 and the second cooling member 3, may be configured to receive a plurality of rows 7a, 7b, 7c and/or a plurality of columns 8a, 8b, 8c of beverage containers 6a, 6b. In such
25 embodiments, all beverage containers may be arranged to be in contact with the first cooling surface 4 via the bottoms 25 of the beverage containers, at least one beverage container, the first beverage container 6a, preferably multiple first beverage containers 6a, may be arranged to be in contact with the second cooling surface 5 via its side 26, and the rest of the beverage containers provided on the first cooling surface 4, the second
30 beverage containers 6b, may be arranged to be in contact with a first beverage container 6a or a further second beverage container 6b via its side 26. According to an embodiment, a maximum capacity of the display 1 regarding number of beverage containers 6a, 6b is not more than 6 times, preferably not more than 4 times the number of grooves 11 in the second cooling surface(s) 5.

According to an embodiment, such as the embodiments of Figures 5 and 6, the display 1 may comprise two or more second cooling members 3. The second cooling members 3 may in such embodiments be placed opposite to each other, such as in the embodiment of Figure 5, or adjacent to each other, for instance provided at an angle, such as at a right angle, with respect to each other, such as in the embodiment of Figure 6.

Figure 8 illustrates schematically an arrangement 10 according to an embodiment. According to an embodiment, the arrangement 10 comprises a display 1 according to an embodiment or a combination of embodiments disclosed in this description and/or accompanying claims and drawings, at least three first beverage containers 6a, and a power source 14, wherein the power source 14 is connected to the cooling apparatus 9 of the display 1 for cooling the first cooling member 2 and the second cooling member 3 of the display 1. The power source 14 may comprise a mains power supply, a battery or other energy storing type of a power source or another suitable power source. According to an embodiment, the arrangement further comprises at least one second beverage container 6b.

According to an embodiment, one, more than one, or all of the first beverage container(s) 6a and/or the second beverage container(s) 6b may comprise a beverage can, also called a drink can. Such beverage cans typically comprise a cylindrical shape, and opening means of beverage cans typically comprise a so-called stay-tab opening mechanism. Beverage cans comprise material(s) with high heat conductivity, typically aluminium or tin-plated steel. According to an embodiment, the display 1 may be designed to receive beverage containers 6a, 6b in the form of beverage cans.

According to another embodiment, one, more than one, or all of the first beverage container(s) 6a and/or the second beverage container(s) 6b may comprise a bottle. Bottles typically comprise a cylindrical portion at a lower part of the bottle, and the shape may be tapered towards the top 24 of the bottle, and bottles often comprise glass or plastic. Opening means of a bottle typically comprise a cap or a cork. According to an embodiment, the display 1 may be designed to receive beverage containers 6a, 6b in the form of bottles or, more preferably, both in the form of beverage cans and glass bottles. According to such an embodiment, the cylindrical portion of the bottle(s) may comprise a similar diameter 21 as the beverage can(s), or grooves 11 of different sizes may be provided on the second cooling member 3. The solutions disclosed in this disclosure are more beneficial for cooling beverage containers comprising bottles and their content than conventional displays, but they are even more beneficial in connection for cooling beverage containers comprising beverage cans, as the beverage cans are typically made of materials with high heat

conductivity further enhancing the cooling results of the disclosed solutions. In some cases, it might be beneficial if both bottles and beverage cans can be provided in a same display 1, for instance if less space is available for displaying beverage containers 6a, 6b.

5 Beverage containers 6a, 6b of standardized sizes are widely known. This applies to both bottles and beverage cans. According to an embodiment, at least the first beverage containers 6a are configured to be of such standardized sizes, such as one of sizes of the following embodiments, which are standardized at least in connection of beverage containers 6a, 6b in the form of beverage cans. According to an embodiment, a height of a first beverage container 6a in the longitudinal direction 18 is 133 mm and the width of the first beverage container 6a is 53 mm. According to another embodiment, a height of a first beverage container 6a in the longitudinal direction 18 is 115.2 mm and the width of the first beverage container 6a is 66,3 mm. According to a further embodiment, a height of a first beverage container 6a in the longitudinal direction 18 is 145,4 mm and the width of the first beverage container 6a is 58 mm. Beverage containers 6a, 6b of a standardized size are typically of a cylinder-like shape and have a round cross section, whereby the width of the beverage container 6a, 6b may be equal to the diameter of the beverage container 6a, 6b.

Figure 9 illustrates schematically a method for cooling beverage containers in a display. A method for displaying beverage containers, such as the method according to Figure 9, comprises displaying beverage containers by a display according to an embodiment or a combination of embodiments disclosed in this description and/or accompanying claims and drawings.

According to an embodiment, the method further comprises cooling 91 the beverage containers in the display by the first cooling member and the second cooling member directly or indirectly via other beverage containers in the display.

According to an embodiment, the method further comprises detecting at least a temperature of at least one of at least one beverage container 6a, 6b, the first cooling member 2 and the second cooling member 3 by a detector 12. According to an embodiment, the method further comprises controlling the cooling power of the cooling apparatus 9 on the basis of the temperature detected by the detector 12.

CLAIMS

1. A display (1) for beverage containers (6a, 6b), **characterized in** that the display (1) comprises
 - a first cooling member (2),
 - 5 a second cooling member (3) extending in a direction perpendicular to the first cooling member (2), and
 - a cooling apparatus (9) configured to cool the first cooling member (2) and the second cooling member (3);wherein the first cooling member (2) comprises a first cooling surface (4), which first
10 cooling surface (4) is configured to be facing towards beverage containers (6a, 6b) when provided on the display (1), to be large enough to receive at least three first beverage containers (6a), and to be in contact with at least a part of a bottom of each first beverage container (6a), when said beverage containers are provided on the display (1);
15 wherein the second cooling member (3) comprises a second cooling surface (5), which second cooling surface (5) is configured to extend in a direction perpendicular to the first cooling surface (4) and comprises a plurality of grooves (11) shaped to conform, in each case, to a part of a shape of the beverage containers (6a, 6b) in such a manner that each first beverage container (6a) can be arranged to simultaneously
20 be in contact with the first cooling surface (4) via its bottom and with one of the grooves (11) of the second cooling surface (5) via its side (26); and wherein each groove (11) provided in the second cooling member (3) for receiving a first beverage container (6a) is configured to have a shape of a segment (19) of an outer surface of a cylinder;
25 wherein the central angle (20) of the segment (19) is in the range of 30 to 180 degrees; and wherein the first cooling member (2) forms a shelf or a part of a shelf of a cabinet type display, or wherein the first cooling member (2) forms a bottom or a part of a bottom of a basin type display.
- 30 2. A display (1) according to claim 1, wherein, in a use position of the display (1), the first cooling surface (4) is arranged to extend in a horizontal direction and the second cooling surface is arranged to extend in a vertical direction.
3. A display (1) according to claim 1 or 2, wherein the first cooling member (2) and the second cooling member (3) are formed to enable each first beverage container (6a)

to simultaneously further be in contact with at least one second beverage container (6b) by its side (26) at a point different from the point in contact with the groove (11); and

5 wherein the first cooling member (2) is formed to enable at least one second beverage container (6b) to be arranged, in each case, to simultaneously be in contact with the first cooling surface (4) via its bottom (25) and with the first beverage container (6a) via a side (26) of the second beverage container (6b).

4. A display (1) according to any one of claims 1 – 3, wherein the cooling apparatus (9) comprises a Peltier unit.

10 5. A display (1) according to any one of claims 1 – 4, wherein the first cooling member (2) and the second cooling member (3) are thermally connected to one another.

6. A display (1) according to any one of claims 1 – 5, wherein the first cooling member (2) and the second cooling member (3) are formed of a heat conducting material.

15 7. A display (1) according to claim 6, wherein the heat conducting material comprises aluminium.

8. A display (1) according to any one of claims 1 – 7, wherein the display (1) further comprises a detector (12) for detecting at least a temperature of at least one beverage container (6a, 6b) provided in the display (1) and/or the temperature of at least one of the first cooling member (2) and the second cooling member (3), and a controller (13)
20 for controlling the cooling power of the cooling apparatus (9) on the basis of the temperature detected by the detector (12).

9. An arrangement (10), wherein the arrangement (10) comprises a display (1) according to any one of claims 1 – 8, at least three first beverage containers (6a), and a power source (16),
25 wherein the power source (16) is connected to the cooling apparatus (9) of the display (1) for cooling the first cooling member (2) and the second cooling member (3) of the display (1).

10. A method for displaying beverage containers (6a, 6b), wherein the method comprises displaying beverage containers (6a, 6b) by a display (1) according to any one of claims
30 1 – 8.

11. A method according to claim 10, wherein the method further comprises cooling the beverage containers (6a, 6b) in the display (1) by the first cooling member (2) and the second cooling member (3) directly or indirectly via other beverage containers (6a, 6b) in the display (1).
- 5 12. A method according to claim 10 or 11, wherein the method further comprises detecting at least a temperature of at least one of at least one beverage container (6a, 6b), the first cooling member (2) and the second cooling member (3) by a detector (12).
- 10 13. A method according to claim 12, wherein the method further comprises controlling the cooling power of the cooling apparatus (9) on the basis of the temperature detected by the detector (12).