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A Collapsible Container

This invention relates to a collapsible container, and, in particular, such a container which is adapted to be cooled to a low temperature, for the purpose of keeping contents in the container at a low temperature.

Background of the Invention

There are in existence containers which are designed for keeping the contents cold. A conventional container includes a casing made of a plastics material, in which ice may be placed for keeping the contents, e.g. soft drinks or beers, at a low temperature, e.g. below 10°C. In order to enhance the insulating function of the container, the casing may have a vacuum layer or a layer of air trapped between an outer plastics wall and an inner plastics wall. A shortcoming of such a container is that the contents in the container may be damaged or ruined when the ice melts to liquid water.

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In another conventional arrangement, instead of ice, one or more reusable coolable components are provided. When not in use, the coolable components are placed in a refrigerator so as to be brought to a low temperature, e.g. about or below 0°C. When required, the coolable components are retrieved from the refrigerators and placed in a container for keeping the contents therein at a low temperature. Such an arrangement suffers from the problem that the coolable components (which act as the cooling component when placed in the container) are separate from the container, and is thus not convenient in use. In addition, the coolable components usually contain chemicals which may be brought to a low temperature. Such chemicals may include toxic ingredients. Breaking of the coolable components may thus pose a danger to the users.

It is thus an object of the present invention to provide a container in which the aforesaid shortcomings are mitigated.

5 It is also an object of the present invention to provide a container which is compact and convenient to use, and can keep contents at a low temperature for a significant period of time.

10 It is a further object of the present invention to provide a container which is safe to use, and will not pose any risk to the users.

Summary of the Invention

15 According to a first aspect of the present invention, there is provided a collapsible container with a plurality of wall members, wherein said wall members are movable relative to one another between a collapsed configuration in which at least a respective outer major surface of at least two said wall members abut each other, and an expanded configuration in which said wall members
20 define a cavity adapted to receive an article, and wherein at least one said wall member contains a coolable agent.

25 According to a second aspect of the present invention, there is provided a collapsible container with a plurality of wall members, wherein said wall members are movable relative to one another between a collapsed configuration in which at least a respective major surface of at least two said wall members are in contact with each other, and an expanded configuration in which said wall members define a cavity adapted to receive an article,
30 wherein at least one said wall member contains a coolable agent, and wherein said at least one said wall member includes an outer layer of an air permeable synthetic material, a middle layer of an air impermeable synthetic material, and an inner layer of an

air permeable synthetic material.

Brief Description of the Drawings

5 A preferred embodiment of the present invention will be described, by way of example only, and with reference to the accompanying drawings, in which:

Figs. 1A to 1G show the procedure whereby a collapsible container according to the present invention may be moved from an expanded
10 configuration to a collapsed configuration;

Fig. 2 shows a longitudinal sectional view of the container shown in Fig. 1A;

Fig. 3 shows a sectional view of the container taken along the line N-N in Fig. 2;

15 Fig. 4A shows a perspective view of the casing shown in Fig. 2 for containing cooling agent;

Fig. 4B shows a front view of the casing shown in Fig. 4A; and

Fig. 4C shows a side view of the casing shown in Fig. 4A.

Detailed Description of the Preferred Embodiment

20 A collapsible container according to a preferred embodiment of the present invention is shown in Fig. 1A in a fully expanded configuration, and generally designated as 10.

25 As can be seen in Fig. 1A, the container 10, when in the fully expanded configuration, includes four upstanding side walls 12a, 12b, 12c, 12d joined with one another, and with their lower ends joined with a bottom wall 12e (see Fig. 2). When at the expanded
30 configuration, the side walls 12a and 12c are opposite to each other, and the side walls 12b and 12d are opposite to each other. Joined with the upper end of the side wall 12c is a longer top flap 14. Joined with the upper end of each of the side walls 12b, 12d is

a respective shorter side flap 16b, 16d. The longer top flap 14 is soft and is movable about the rest of the container 10 about where it is joined with the side wall 12c. The shorter side flap 16b is soft and is movable about the rest of the container 10 about where it is joined with the side wall 12b. Similarly, the shorter side flap 16d is soft and is movable about the rest of the container 10 about where it is joined with the side wall 12d.

When in the expanded configuration, the walls 12a, 12b, 12c, 12d and 12e collectively define a cavity 18 suitable for receiving such contents as cans or bottles of soft drinks or beers. The two side flaps 16b, 16d may then be folded inwardly, in the direction indicated by the two arrows in Fig. 1A, to cover the cavity 18 from above. The top flap 14 may then be folded downwardly so that a releasable engagement mechanism 14a, e.g. one traded under the trade mark VELCRO®, sewn on an inner surface of the top flap 14 bears on and releasably engages with a similar engagement mechanism 12f sewn on an outer surface of the side wall 12a. Because of the materials with which the container 10 is made and other structures to be discussed below, the contents in the cavity 18 of the container 10 may be kept at a low temperature for a significant period of time.

To convert the container 10 to the collapsed configuration, the two side flaps 16b, 16d are folded further downwardly, as shown by the two arrows in Fig. 1B, to bear on the inner surface of the side walls 12b, 12d. The side walls 12a, 12b are pushed inwardly, in the direction indicated by the arrow in Fig. 1C, and at the same time the side walls 12c, 12d are folded towards each other, in the direction of the two smaller arrows in Fig. 1D, until the inner surface of the side wall 12b contacts and bears on the inner surface of the side wall 12c, and the inner surface of the side wall 12a contacts and bears on the inner surface of the side wall 12d.

The top flap 14 is then wrapped around the side wall 12d, in the direction indicated by the arrow in Fig. 1E, through the configuration shown in Fig. 1F, until the releasable engagement mechanism 14a bears on and engages with a similar releasable engagement mechanism 12g sewn on an outer surface of the wall 12c, so as to bring the container 10 to the fully collapsed configuration, as shown in Fig. 1G. It can be seen that, when at the fully collapsed configuration as shown in Fig. 1G, the outer major surfaces of the walls 12a, 12b are in contact and abut each other. Also, in this configuration, the inner major surfaces of the walls 12a, 12d are in contact and abut each other, and the inner major surfaces of the walls 12b, 12c are also in contact with and abut each other. It can of course also be appreciated that, by going through the steps in reverse, the container 10 may be moved from the fully collapsed configuration back to the expanded configuration.

Figs. 2 and 3 show, respectively, a longitudinal cross sectional view of the container 10, and a transverse sectional view of the container 10 taken along the line N-N in Fig. 2. As the structure of the side walls 12a, 12b, 12c, 12d is the same, only the structure of the side wall 12a will be discussed below. The side wall 12a has an outer layer of an air permeable material 20, e.g. a synthetic material traded under the trade name "210D OXFORD nylon", a middle layer of an air impermeable material 22, e.g. a synthetic material traded under the trade name "210T coated nylon", and an inner layer of an air permeable material 24, e.g. a synthetic material traded under the trade name "190T polyester". Provided within a cavity between the outer layer of air permeable material 20 and the middle layer of air impermeable material 22 is a piece of sponge 26, which acts as an heat insulating material, of a thickness of around 5mm. Provided within a cavity between the middle layer of air impermeable material 22 and the inner layer

of air permeable material 24 is a casing 28, the function and structure of which will be discussed below.

As to the bottom wall 12e, such has an outer layer of an air permeable material 30, e.g. the synthetic material traded under the trade name "210D OXFORD nylon", and an inner layer of an air impermeable material 32, e.g. the synthetic material traded under the trade name "210T coated nylon". Provided within a cavity between the outer layer of air permeable material 30 and the inner layer of air impermeable material 32 is a piece of sponge 34, which acts as an heat insulating material, of a thickness of around 5mm. An additional layer of an air permeable material, e.g. the synthetic material traded under the trade name "210D OXFORD nylon", may be provided on top of the inner layer of air impermeable material 32.

Turning to the top flap 14, such has an outer layer of an air permeable material 40, e.g. the synthetic material traded under the trade name "210D OXFORD nylon", and an inner layer of an air impermeable material 42, e.g. the synthetic material traded under the trade name "210T coated nylon". Provided within a cavity between the layer of air permeable material 40 and the layer of air impermeable material 42 is a piece of sponge 44, which acts as a heat insulating material, of a thickness of around 5mm. The side flaps 16b, 16d are of the same structure and made of the same materials as the top flap 14.

The casing 28 is shown in more details in Figs. 4A to 4C. The casing 28 has a body 28a made of a plastic material, e.g. polyurethane. The body 28a has a mouth (not shown) to which a cap 28b may be secured. The cap 28b may be made of such plastic material as polypropylene. Through the mouth, purified water and common salt (sodium chloride) may be added into the body 28a of the casing

28. Generally, the ratio of the weight of salt to the weight of purified water introduced into the body 28a is roughly 1 to 1000.

In the present invention, the casing 28, with salt and water inside, acts as both a coolable agent and a cooling agent. As the casing 28 is built in within the side walls 12a, 12b, 12c, 12d of the container 10, when the container 10 is moved to the collapsed configuration, it can be conveniently and easily placed within, e.g. the freezer of a refrigerator, so that the casing 28 and the saline water inside are brought to a low temperature, e.g. close to or below 0°C. Because the container 10 is compact and occupies only a small space when in the collapsed configuration, a large number of such collapsed containers 10 may be stored in a refrigerator.

When required, the container 10 is retrieved from the refrigerator, manipulated to assume the expanded configuration, so as to enable articles to be placed within the cavity 18 and thus stored within the container 10. By way of the arrangement discussed above, the container 10 is very effective in heat-insulating the contents in the cavity 18 from the ambient temperature, so that the container 10 can cool the contents in the cavity 18 down to a low temperature and/or maintain the contents in the cavity 18 at a low temperature.

It can be readily seen from the foregoing discussion that a collapsible container according to the present invention is convenient to use, since the coolable agent is built in with the container 10. In addition, since the cooling agent includes purified water and salt only, such would pose no danger to the user even if the casing 28 is broken.

It should be understood that the above only illustrates an

example whereby the present invention may be carried out, and that various modifications and/or alterations may be made thereto without departing from the spirit of the invention. It should also be understood that certain features of the invention which are now,
5 for brevity, described in the context of a single embodiment, may be provided separately or in any appropriate sub-combinations.

What is claimed is:-

1. A collapsible container with a plurality of wall members, wherein said wall members are movable relative to one another between a collapsed configuration in which at least a
5 respective outer major surface of at least two said wall members abut each other, and an expanded configuration in which said wall members define a cavity adapted to receive an article, and wherein at least one said wall member contains a coolable agent.
- 10 2. A collapsible container according to Claim 1 wherein when said wall members are in said collapsed configuration, at least a respective inner major surface of at least two said wall members abut each other.
- 15 3. A collapsible container according to Claim 2 wherein when said wall members are in said collapsed configuration, the inner major surfaces of at least two pairs of wall members abut each other.
4. A container according to Claim 1 wherein said coolable agent comprises at least water and common salt.
- 20 5. A container according to Claim 1 wherein said coolable agent is contained within a plastic housing.
6. A container according to Claim 5 wherein said housing is made at least principally of polyurethane.
7. A container according to Claim 1 wherein at least a flap is
25 joined with an edge of one of said wall members and movable relative thereto.
8. A container according to Claim 7 wherein a respective flap is joined with a respective edge of two said wall members which are opposite to each other when said wall members are in said
30 expanded position.
9. A collapsible container with a plurality of wall members, wherein said wall members are movable relative to one another between a collapsed configuration in which at least a

respective major surface of at least two said wall members are in contact with each other, and an expanded configuration in which said wall members define a cavity adapted to receive an article, wherein at least one said wall member contains a coolable agent, and wherein said at least one said wall member includes an outer layer of an air permeable synthetic material, a middle layer of an air impermeable synthetic material, and an inner layer of an air permeable synthetic material.

10. A container according to Claim 9 wherein said outer layer of air permeable synthetic material, said middle layer of air impermeable synthetic material, and said inner layer of air permeable synthetic material collectively define at least two cavities.

11. A container according to Claim 10 wherein at least one of said two cavities contains said cooling agent, and at least one of said two cavities contains a heat insulating material.

12. A container according to Claim 11 wherein said heat insulating material is sponge.