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(54) Title: STERILE APPARATUS FOR RAPID COOLING OF HOT WATER

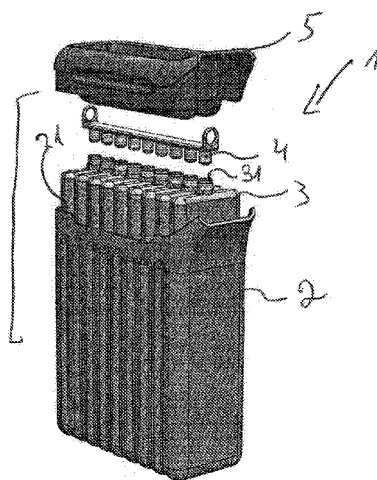


FIG 2

(57) Abstract: An apparatus for cooling liquids comprises an external tank and several internal cooling flasks. The external tank is shaped like a closed tank with a top opening. The internal cooling flasks are designed to be set inside the external tank in such a way that very narrow spaces are formed between the external walls of each cooling flask and the adjacent flasks, thus forming an internal cooling space, in a way that enables the user to pour of hot water into the internal cooling space, and the coolant in the cooling flasks adsorbs the heat of said hot water.

Sterile Apparatus for Rapid Cooling of Hot Water**Description****TECHNICAL FIELD**

5 The present invention refers to a sterile apparatus for the rapid cooling of hot water.

BACKGROUND ART

It is often necessary to boil liquids before using them in order to prevent contamination, and then cool them down to a temperature that is suitable for drinking. For example, when preparing milk substitutes for babies, the water must first be
10 boiled in order to prevent contamination, and then cooled down to a temperature that is suitable for feeding the baby. It is of course desirable that the procedure of cooling the water to the desired temperature be sterile. In general, it is commonly accepted that the parent pours the boiling water into the feeding bottle, and waits a relatively long time for the contents to cool. Sometimes the parent places the feeding bottle with
15 the boiled water in a vessel that is filled with tap water, in order to hasten the cooling, although this still requires a long period of time to cool the contents. The present invention offers a good and effective solution to the aforementioned problem, and for a variety of other cases in which there is a need for the rapid, sterile cooling of very hot liquids.

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U.S. patent application 2012/0312521 ("Application 521") discloses a beverage cooling device comprising relatively many parts including several cooling portions, which assembled one into the other. The structure of the device of Application 521 is cumbersome, expensive for manufacturing and not easy for cleaning, relatively to the
25 apparatus subject matter of the present invention.

DESCRIPTION OF THE DRAWINGS

The intention of the drawing attached to the application is not to limit the scope of the invention and its application. The drawing is intended only to illustrate
5 the invention and it constitutes only one of its many possible implementations.

FIG. 1 depicts the cooling apparatus (1) in its closed state, ready for use.

FIG. 2 presents an exploded view of the apparatus (1), showing the external tank (2) the internal flasks (3) the stoppers manifold (4), and the pouring receptacle (5).

FIG. 3 presents a sectioned side view of the apparatus (1), showing the internal
10 cooling space (6).

FIG. 4 depicts the way in which the pouring receptacle (5) is mounted on the stoppers manifold (4) that closes the flasks (3).

FIG. 5 presents a sectioned top view of the flasks (3), and the way in which they fit into the external tank (2).

15 **FIG. 6** is a sectioned side view of the external tank (2) into which the flasks are inserted (3) and closed by the stoppers manifold (4), and of the way in which the pouring receptacle (5) closes the external tank (2).

THE INVENTION

The main objective of the present invention is to provide an apparatus (1) that
20 enables to cool hot fluids within a relatively very short time. Another objective of the present invention is to provide an apparatus as mentioned that enables to cool liquids as mentioned while maintaining the sterility of the cooled liquids. For the sake of fluency of the text, the term "water" will refer to water as well as to a variety of other liquids, and the expression "boiled water" will also refer to hot water.

The apparatus for cooling hot water (1) consists of an external tank (2) and several internal cooling flasks (3). In addition, the apparatus (1) may include stoppers (4) or a stoppers manifold (4) and a pouring receptacle (5). Figure 1 depicts the apparatus (1) in its assembled state. Figure 2 presents an exploded view of the apparatus (1) and the way in which its components are integrated. Figure 3 presents a sectioned side view of the apparatus (1).

The external tank (2) is closed on the bottom and on its circumferential sides, and has a top opening (21). **The cooling flasks (3)** are relatively narrow containers with a top opening (31). The apparatus (1) comprises several cooling flasks (3) positioned very close to one another within the external tank (2), as depicted, for instance, in Figures 2 and 3. The cooling flasks (3) should contain coolant, which can be either regular tap water or any other coolant.

The top openings (31) of the flasks (3) may be permanently closed after being filled with coolant. Alternatively, the openings (31) may be closed with stoppers (4) in a way that enables the user to fill and empty the coolant contents. Stoppers (4) may be individual such that each stopper closes one opening (31) or they can comprise a stoppers manifold (4) that closes all of the openings (31) at once, as depicted for example in the drawings. As mentioned, the apparatus (1) may be equipped with a pouring receptacle (5) that can be designed as a kind of basin with a bottom opening (51). The pouring receptacle may also serve as a top cover for the external tank (2). In principle, the apparatus (1) does not have to be equipped with a pouring receptacle.

The spaces between one internal cooling flask (3) and another constitute a fundamental element of the invention, subject of the present patent application. The internal cooling flasks (3) are set within the external tank (2) in such a way that a very narrow space is left between each cooling flask (3) and the next cooling flask (3) adjacent to it. Thus, almost the entire volume of the external tank (2) is occupied by the volume of internal cooling flasks (3). Figures 2-5 illustrate the way in which the cooling flasks (3) can be positioned within the external tank (2). The spaces between flasks (3) range from 1.5 mm to 2.5 mm in width, although the invention covers both larger and smaller dimensions as well.

Internal cooling space (6): Setting the internal cooling flasks (3) in the external tank (2) according to the aforementioned structure leaves very narrow spaces between the flasks (3). These narrow spaces constitute an internal cooling space (6). A variety of fixing means may be used (22) (33) to fix the cooling flasks (3) in the external tank (2) so that very narrow spaces exist between them, thus forming the inner space (6). The fixing means may be, for example, as depicted in the drawings, whereby the inner wall of the external tank (2) has internal recesses (22) that match the rounded side (33) of the flasks (3). The said spaces between the flasks (3) create a single space that constitutes the internal space (6), which may either be closed and have a top opening, or be completely open on top.

The internal cooling space (6) constitutes a space for quick and effective cooling, since its surface area is relatively very large. The structure of the internal cooling space (6) enables the coolant fluid in the cooling flasks (3) to quickly adsorb the heat.

Thus, a relatively small volume of boiled water is poured into the inner space, filling the very narrow spaces between the cooling flasks. The large contact area between the boiled water and the walls of the cooling flasks (3) leads to rapid cooling of the boiled water. After boiled water is poured into the apparatus (1), its temperature plummets to the desired temperature within a very short period of time.

Using the apparatus (1): If the apparatus (1) is equipped with stoppers (4) that enable the user to fill it with coolant such as tap water, and a pouring receptacle (5), as described above, then the apparatus (1) is used in the following way: the cooling flasks (3) are filled with tap water or another coolant, and are then closed with the stoppers (4). The tank (2) is then covered with the pouring receptacle (5). The boiled water is poured into the pouring receptacle (5) and flows into the internal cooling space (6). After a very short period of time, the water in the internal space (6) may be poured out, simply by tilting the apparatus (1). The water that is cooled in the apparatus (1) is stationary during the cooling process and does not have to be circulated.

The structure of the apparatus components enables quick access to all component parts for quick and easy cleaning and disinfection, a very important aspect in the preparation of baby food. The apparatus components can be made from a wide variety of materials, even materials that are not especially good conductors of heat. For example, components may be manufactured from polypropylene, which meets strict standards with regard to food and beverage containers. The apparatus may come in a variety of sizes. For example, an apparatus designed for cooling boiled water used in the preparation of milk substitutes for babies may include an internal cooling space (6) with a volume in the order of 200 ml.

Figure 1 depicts the cooling apparatus (1) in its closed state, ready for use. Figure 2 presents an exploded view of the apparatus (1) that shows the external tank (2), the internal flasks (3), the stoppers manifold (4) and the pouring receptacle (5), and the way in which they are integrated. Figure 3 presents a sectioned side view of the apparatus (1) showing the internal cooling space (6). Figure 4 depicts the way in which the pouring receptacle (5) is mounted on the stoppers manifold (4) that closes the cooling flasks (3). Figure 5 presents a sectioned top view of the cooling flasks (3), and the way in which they fit into the external tank (2). Figure 6 is a sectioned side view of the external tank (2) into which the flasks are inserted (3) and closed by the stoppers manifold (4), and of the way in which the pouring receptacle (5) closes the external tank (2).

As it is understood from the above explanations and the drawings the apparatus for cooling liquids (1) comprises an external tank (2) and several internal cooling flasks (3). The apparatus (1) includes at least three internal cooling flasks (3). The internal flasks (3) are similar to each other in their structure; and each of them has two longitudinal walls (32) and two lateral walls (33). The internal flasks are designed to contain coolant material, which may be tap water for example. The external tank is shaped like a closed container with a top opening (21), having two longitudinal walls (24) and two lateral walls (23). Each said longitudinal wall (24) of said external tank (2) has internal recesses (22). These internal recesses (22) match the size of the lateral walls (33) of the internal cooling flasks.

These internal recesses (22) constitute in fact a means for fixing the cooling flasks inside of the external tank, wherein said lateral walls of said internal cooling flasks constitute a means for fixing said cooling flasks inside of said external tank. The internal cooling flasks are designed to be set within the external tank in such a way that very narrow spaces are formed between the external walls of each cooling flask and the adjacent flasks, creating an internal cooling space. The user may pour hot water into said internal cooling space and the coolant material within said internal cooling flasks will adsorb heat from said hot water.

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The Claim

What is claimed is:

1. An apparatus for cooling liquids, comprising: an external tank and at least
5 three internal cooling flasks;

wherein said internal flasks are similar to each other in their structure; wherein said internal flasks have two longitudinal walls and two lateral walls; wherein said internal flasks are designed to contain coolant material;

- wherein the external tank is shaped like a closed container with a top opening;
10 wherein said external tank has two longitudinal walls and two lateral walls; wherein each said longitudinal wall of said external tank has internal recesses; wherein said internal recesses match the size of said lateral walls of said internal cooling flasks;

- wherein said internal recesses constitute a means for fixing said cooling flasks inside of said external tank; wherein said lateral walls of said internal cooling flasks
15 constitute a means for fixing said cooling flasks inside of said external tank;

- wherein the internal cooling flasks are designed to be set within the external tank in such a way that very narrow spaces are formed between the external walls of each cooling flask and the adjacent flasks, creating an internal cooling space; wherein a user may pour hot water into said internal cooling space and the coolant material
20 within said internal cooling flasks will adsorb heat from said hot water.

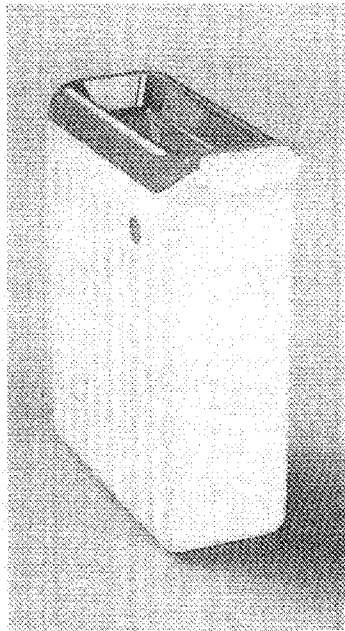


FIG 1

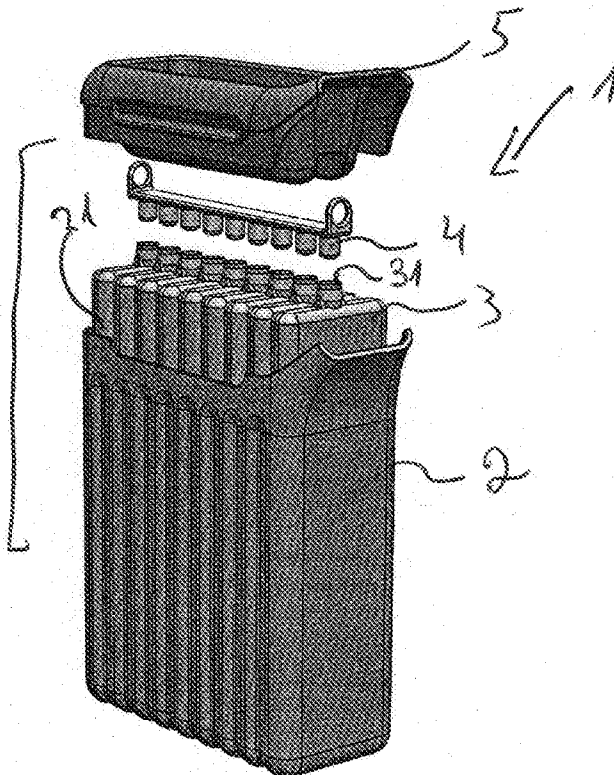
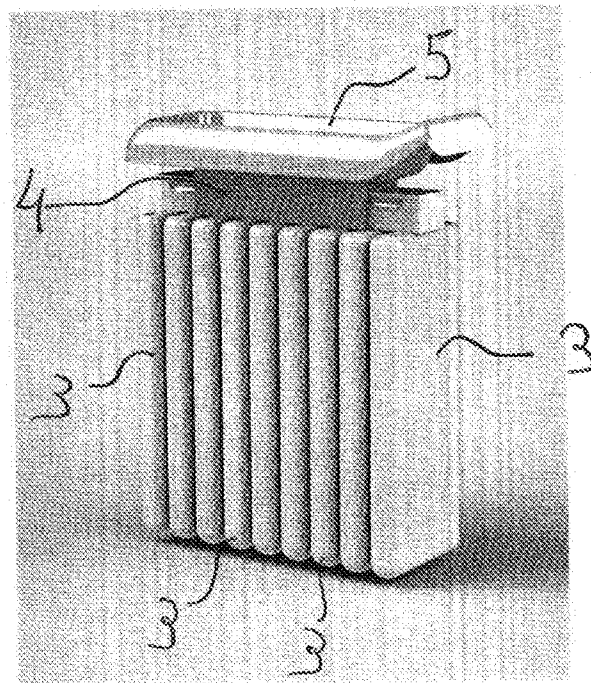
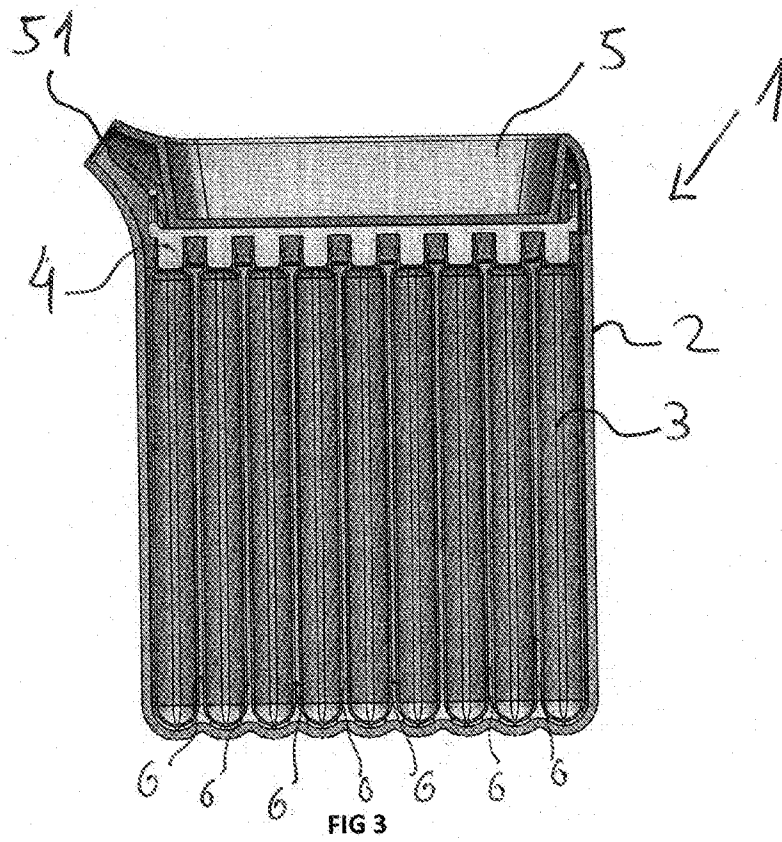


FIG 2



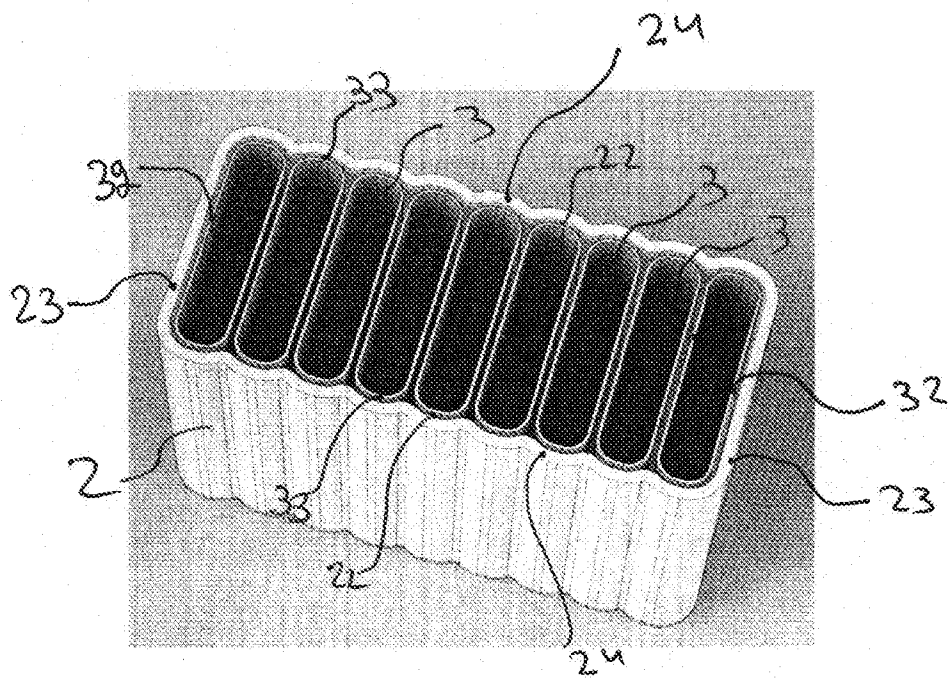


FIG 5

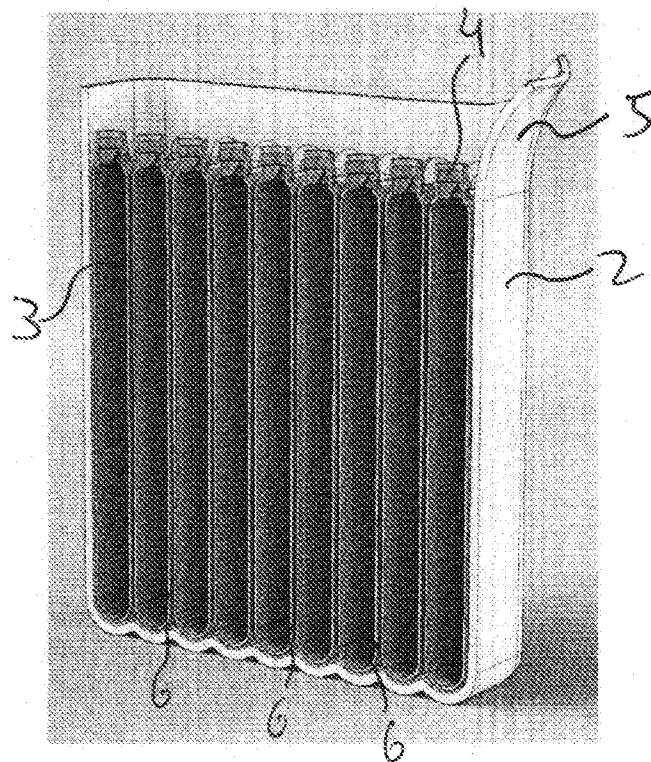


FIG 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL2016/050446

A. CLASSIFICATION OF SUBJECT MATTER IPC (2016.01) F28D 15/00, F28F 27/00, G05D 23/00 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC (2016.01) F28D 15/00, F28F 27/00, G05D 23/00 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Databases consulted: THOMSON INNOVATION, Google Patents Search terms used: radiate baby infant formula boil chill cool exchange conduct		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2012312521 A1 ZEBUHR WILLIAM H?[US]; DUSSAULT DAVID?[US]; ICECOLDNOW INC? 13 Dec 2012 (2012/12/13) the whole document	1
A	US 2002124576 A1 LOIBL GREGORY H, SIDEBOTHAM GEORGE, ;THE COOPER UNION FOR THE ADVANCEMENT OF SCIENCE & ART 12 Sep 2002 (2002/09/12) the whole document	1
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
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Date of the actual completion of the international search 24 Aug 2016		Date of mailing of the international search report 28 Aug 2016
Name and mailing address of the ISA: Israel Patent Office Technology Park, Bldg.5, Malcha, Jerusalem, 9695101, Israel Facsimile No. 972-2-5651616		Authorized officer KATZ Itay Telephone No. 972-2-5657814

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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