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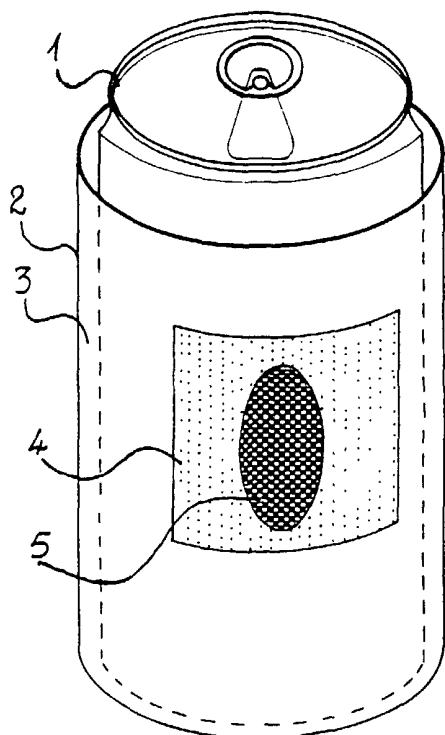
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: INSTANTANEOUS COOLING SYSTEM FOR CONTAINERS OF LIQUID



(57) Abstract: The invention relates to an instantaneous cooling system for containers (1) of liquids, characterised in that it comprises closed containment means (2), applied on the container, creating an interspace (3) for housing at least two chemical compounds, maintained separated by separation means (4) that can be eliminated by mechanical action or by breaking means (5), said compounds endo-thermally reaction and consequently cooling, thus subtracting heat from the liquid contained within the container.



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INSTANTANEOUS COOLING SYSTEM FOR CONTAINERS OF LIQUID

5 The present invention relates to an instantaneous cooling system for containers of liquids.

 More particularly, the invention concerns a system of the kind that can be directly applied on a single beverage container, to be preferably consumed cold.

10 At present, cooling of beverages to be consumed cold occurs storing beverages within the relevant containers within a controlled temperature environment, and maintaining the same under these conditions up to the consume, or just before.

 In case the beverage must be consumed in places where such cooled environments are not available, it is necessary to keep the same
15 within suitable thermal containers, realised to minimise the heat exchange with outside, thus extending the cooling effect. The problem involved in this kind of solution is due to the fact that said thermal containers, minimises the heat exchange with the environment, but cannot prevent the same. After a more or less long period, temperature of the beverage to be
20 kept cold unavoidably increases. Furthermore, often said containers are very bulky.

 A second kind of problems connected with the freezers employed for cooling and maintaining the temperature, is that it is necessary to cool and maintain cool the beverages for long periods, even
25 if they could be cooled just before their consume. In fact, hardly ever, this kind of products needs to be maintained cold, e.g. to preserve their hygienic or organoleptic properties.

 Thus, maintaining them for a long time at low temperatures involves a remarkable energy waste, since the energetic balance has not
30 been focused on the final use.

 On the other side, freezers normally used have rather low cooling time, due to the fact that the means by which they transfer the cold to the contents is air, said air having a very low thermal exchange coefficient.

35 The problem that the present invention aims to solve is the possibility of cooling a beverage contained within a can or similar container only when said cooling is really necessary.

The solution according to the invention is particularly advantageous mainly because is a system that allows to avoid useless wastes of electric power to maintain cold the beverage, when this feature is not necessary. Further, the solution according to the invention prevents that a beverage cooled and then maintained within a thermal container can in any case not be to a suitable temperature, as a consequence of the fact that after a rather long storing, some heating is practically unavoidable.

These and other problems are solved according to the invention, by suggesting an instantaneous cooling system for containers of liquid, directly provided on the same container, containing a chemical compound able to react and to cool when required.

The invention further proposes an instantaneous cooling system for containers of liquid, comprised of an envelope, within which the same container can be introduced, provided with an air interspace suitable to contain at least two chemical components able to react and generate cool when required. In this way, it is possible to preserve beverage containers at room temperature, cooling them when necessary, by the insertion within the envelope and making the chemical compounds reacting to generate cool.

Said interspace can further be emptied from the reaction products, to replace them with new reacting compounds.

It is therefore specific object of the present invention an instantaneous cooling system for containers of liquids, comprising closed containment means, applied on the container, creating a interspace for housing at least two chemical compounds, maintained separated by separation means that can be eliminated by mechanical action or by breaking means, said compounds endo-thermally reacting and consequently cooling, thus subtracting heat from the liquid contained within the container.

The invention further relates to an instantaneous cooling system for containers of liquids, comprised of an envelope made up of a material substantially having a shape for the introduction of the container, said envelope comprising an interspace for the introduction, the housing and/or the replacement of a combination of at least two chemical compounds, said compounds being kept separated by separation means that can be eliminated by mechanical action or by breaking means, said

compounds endo-thermally reacting and consequently cooling, thus subtracting heat from the liquid contained within the container.

More specific details of the innovative features will be described in the dependent claims.

5 The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

figure 1 shows a perspective view of a beverage can;

10 figure 2 is a perspective view of the same can of figure 1, to which the interspace has been applied;

figure 3 is a perspective view of the same can of figure 1, wherein it is possible to observe some inner particulars;

figure 4 is a perspective view of the same can of figure 4, to which an insert to eliminate said separation means is applied;

15 figure 5 is a perspective view of a bottle, to which the solution according to the invention has been applied;

figure 6 is a front view of the same bottle of figure 5;

figure 7 is a lateral view of the same bottle of figure 5;

20 figure 8 is a perspective view of a tetrapack container, to which the solution according to the invention has been applied;

figure 9 is a front view of the same container of figure 8;

figure 10 is a lateral view of the same container of figure 8;

25 figure 11 is a perspective view of a cylindrical envelope according to the present invention, wherein it is possible to observe some inner particulars;

figure 12 is a perspective view of the same can of figure 11, within which a can is introduced;

figure 13 is a perspective view of an envelope according to the present invention, wherein a bottle has been introduced;

30 figure 14 is a front view of the same solution of figure 13;

figure 15 is a lateral view of the same solution of figure 13;

figure 16 is a perspective view of a parallelepiped envelope according to the present invention, wherein a tetrapack container has been introduced;

35 figure 17 is a front view of the same solution of figure 16; and

figure 18 shows a lateral view of the same solution of figure 16.

Making first reference to figures 1 and 2, it is evident that the solution according to the present invention allows to maintain the dimensions of the beverage container, provided with the solution according to the present invention, within dimension just bigger than the standard container.

Particularly, figure 3 shows a can 1, on the lateral surface of which a skirt 2 is applied in such a way to create an interspace 3 between the can and the skirt. Inside the interspace 3 a first chemical compound reagent is inserted. A second reagent is contained within a bag 4, placed within the same interspace. Said bag 4 physically separates the two reagents, that can be in contact only as a consequence of a breaking of the same.

Once the two reagents are in contact, they react, thus originating an amount of cold varying in function of the kind of the same reagents and of their amount.

To make the opening of the bag 4 easier, a fracture element 5 is provided on the surface of the skirt 2 and in correspondence of the same bag, said fracture element being comprised of flexible material, by which it is possible to exert a pressure on the bag 4, said action breaking the same bag.

Making reference to figures 5, 6 and 7, it is shown a second embodiment of the system according to the invention.

The system shown in the figure is applied on a bottle 6. Particularly, in figure 7, the bag 4 and the fracture element 5 are shown, in such a way to make it possible to observe the correspondence between the first and the second one.

Finally, figures 8, 9 and 10 show a third embodiment of the system according to the invention, with reference to a tetrapack container 7.

Making now reference to figure 11, it is evident that the solution according to the present invention has, with respect to similar containers that are realised only to minimise the thermal exchange, the fracture element 11, used to directly act on the bag 12, included within the interspace 13. Bag 12 could also be contained within a replacement cartridge (not shown), along with the compound reacting with the compound contained within the bag.

The breaking of the bag 12 causes the outflow of its contents, reacting with the compound present within the interspace.

Once the two reagents are brought in contact, they react, thus originating an amount of cold varying in function of the kind of reagents, and of their amount.

Making reference to the following figures 12 – 18, different embodiments of the system according to the invention are shown.

The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

6

CLAIMS

1. Instantaneous cooling system for containers (1) of liquids, characterised in that it comprises closed containment means (2), applied
5 on the container, creating an interspace (3) for housing at least two chemical compounds, maintained separated by separation means (4) that can be eliminated by mechanical action or by breaking means (5), said compounds endo-thermally reacting and consequently cooling, thus subtracting heat from the liquid contained within the container.

10 2. System according to claim 1, characterised in that said containment means are comprised of a skirt (2) applied on the lateral wall of the container of the liquids to be cooled and reproducing its shape.

3. System according to claim 1, characterised in that said containment means are comprised of a cap applied on the base of the
15 container.

4. System according to claim 1, characterised in that said containment means are provided both on the lateral wall and on the base of the container.

5. Instantaneous cooling system for containers of liquids, characterised in that it is comprised of an envelope made up of a material
20 substantially having a shape for the introduction of the container, said envelope comprising an interspace for the introduction, the housing and/or the replacement of a combination of at least two chemical compounds, said compounds being kept separated by separation means that can be
25 eliminated by mechanical action or by breaking means, said compounds endo-thermally reacting and consequently cooling, thus subtracting heat from the liquid contained within the container.

6. System according to claim 1, characterised in that said envelope is realised according to different shapes to house different kind
30 of beverage containers.

7. System according to claim 5 and 6, characterised in that said envelope is comprised of a material able to further conform to the shape of the container.

8. System according to one of the preceding claims 5 - 7,
35 characterised in that the envelope is provided with means to eliminate the reaction products and replace them with new reagent compounds.

9. System according to claim 8, characterised in that said means comprises pre-packaged cartridges containing the two separated reagents.

5 10. System according to one of the preceding claims, characterised in that the envelope is provided with thermal insulation means on the outer surface.

11. System according to one of the preceding claims, characterised in that said separation means are comprised of a bag within which only one of the reagent compounds is included.

10 12. System according to one of the preceding claims 1 - 10, characterised in that said separation means are comprised of a separation septum dividing the interspace into at least two different zones.

15 13. System according to one of the preceding claims 1 - 10 and 12, characterised in that said at least one separation septum is provided along the circular perimeter all around the interspace.

14. System according to one of the preceding claims 1 - 10 and 12, characterised in that it provides at least two separation septums radially provided within the interspace.

20 15. System according to one of the preceding claims, characterised in that said breaking means comprises a flexible material fracture element, obtained on the surface of said containment means, by which a mechanical pressure action on the same is exerted.

25 16. System according to one of the preceding claims, characterised in that said combination of reagent chemical compounds comprises ammonium nitrate and water, or ammonium chloride and urea.

17. System according to claim 16, characterised in that it comprises at least a buffer agent.

30 18. System according to one of the preceding claims, characterised in that the absolute amounts of the reagent contained within the interspace with respect to the amount of the material to be cooled and those relevant to a reagent with respect to the other one, must be determined calculating that the amount of heat that must be exchanged must be sufficient to cool the content of the container up to a temperature between 3 and 10 °C in function of the nature of the same content, taking
35 also into consideration the heat losses toward outside.

19. System according to one of the preceding claims, characterised in that the ratio in weight between the reagent compounds varies within the range 1:3 and 3:1.

5 20. System according to one of the preceding claims, characterised in that between 0.5 and 5 g of the compound combination are used for each centilitre of beverage.

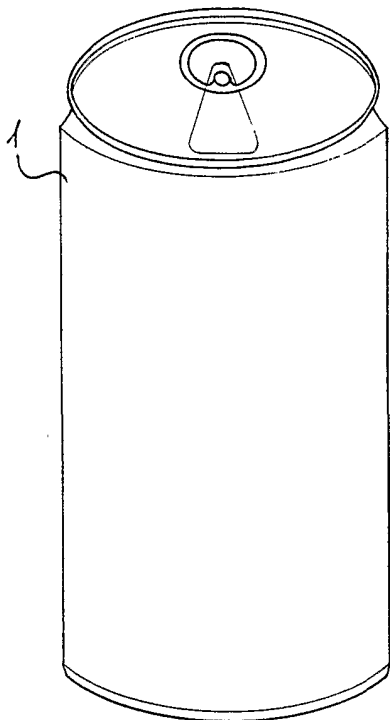


FIG. 1

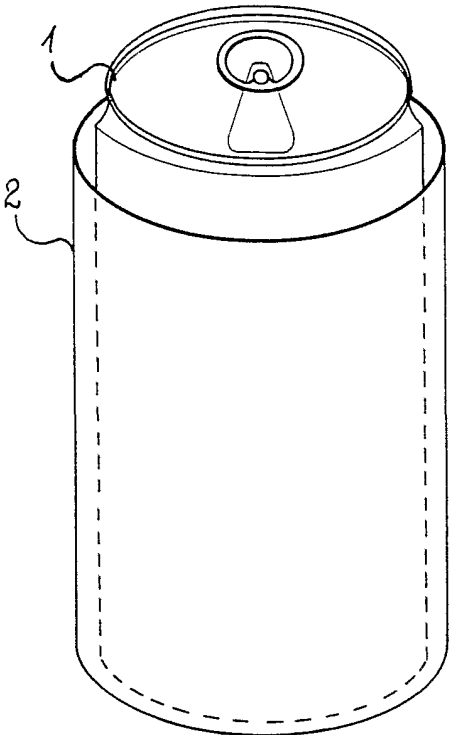


FIG. 2

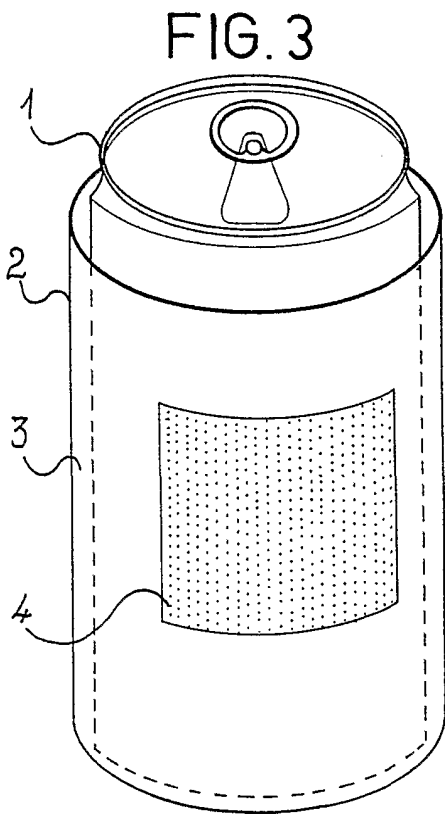


FIG. 3

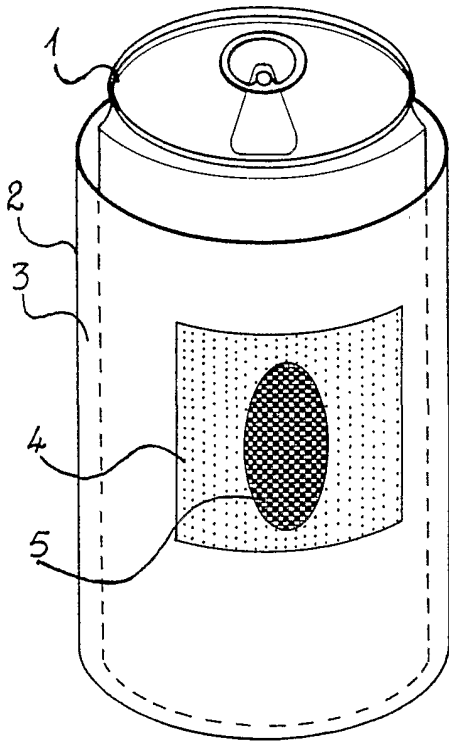


FIG. 4

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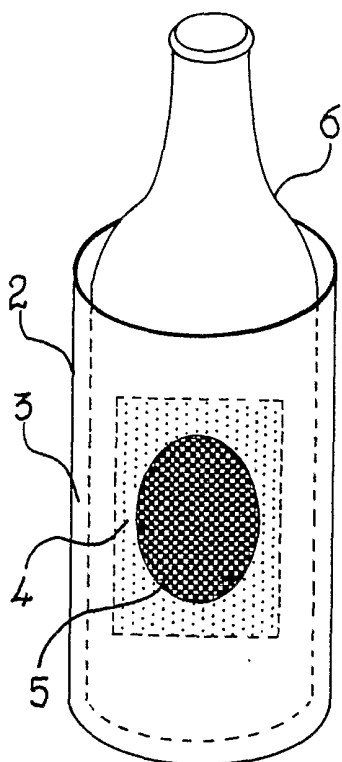


FIG. 5

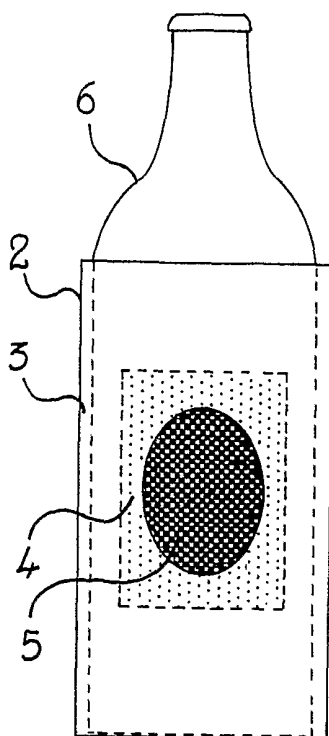


FIG. 6

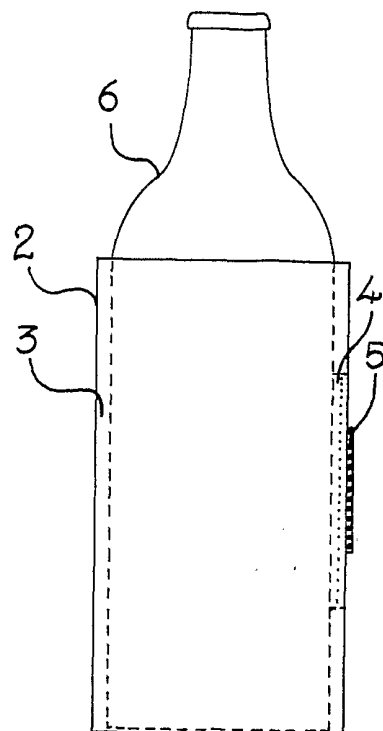


FIG. 7

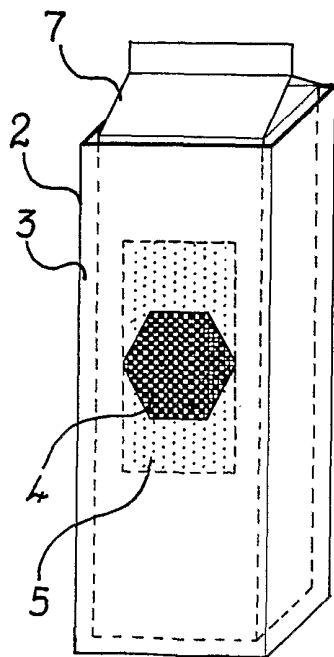


FIG. 8

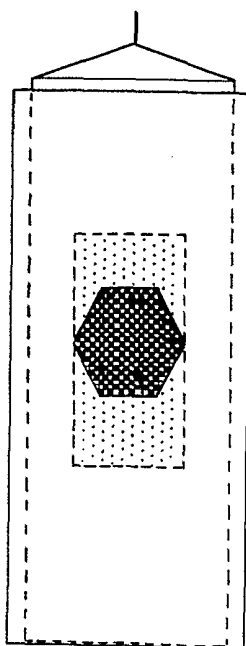


FIG. 9

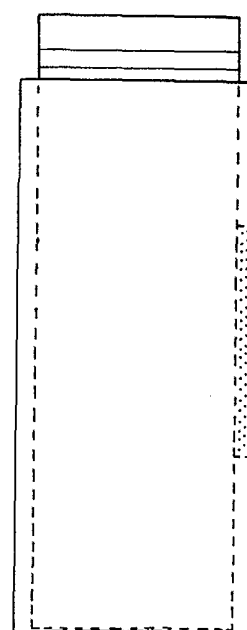


FIG. 10

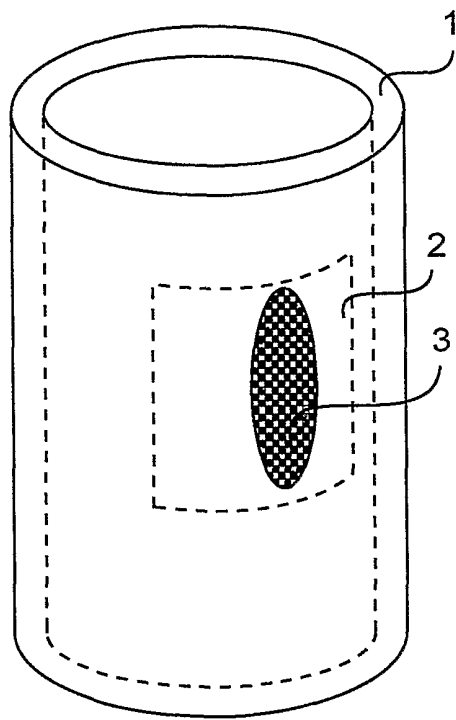


Fig. 11

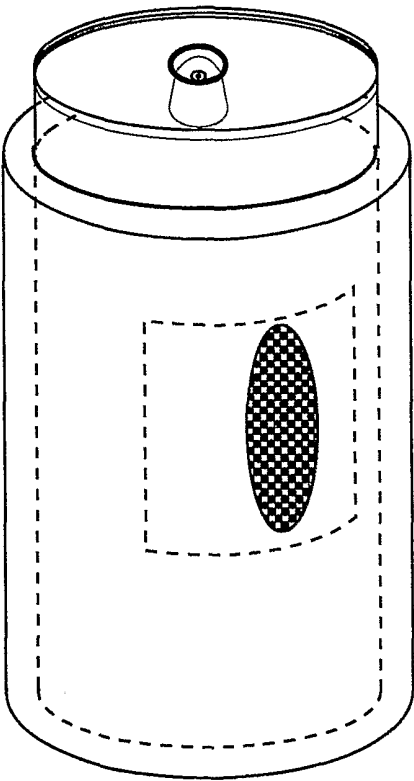


Fig. 12

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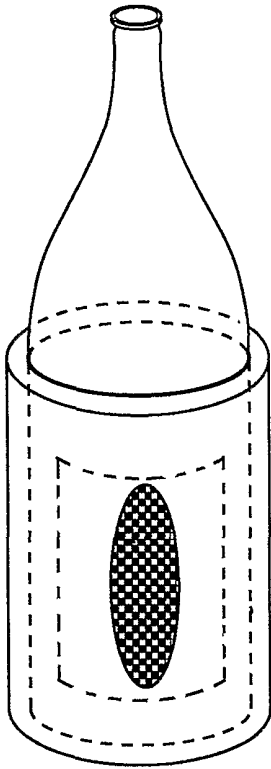


Fig. 13

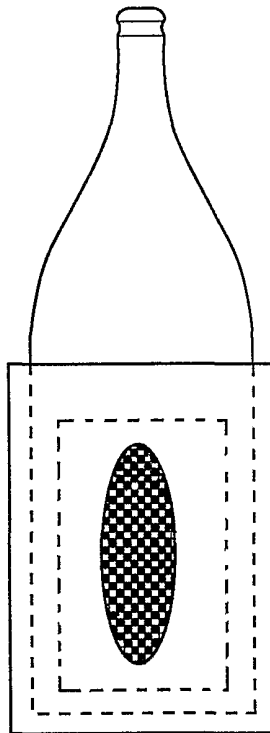


Fig. 14

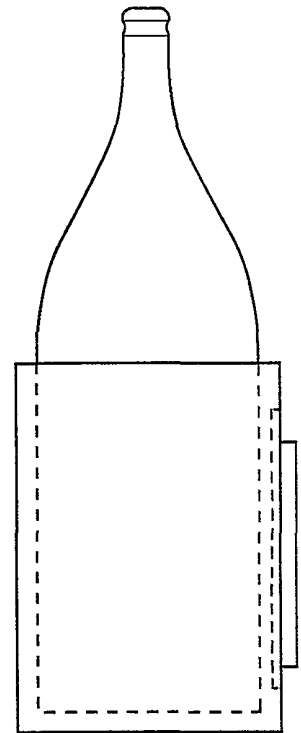


Fig. 15

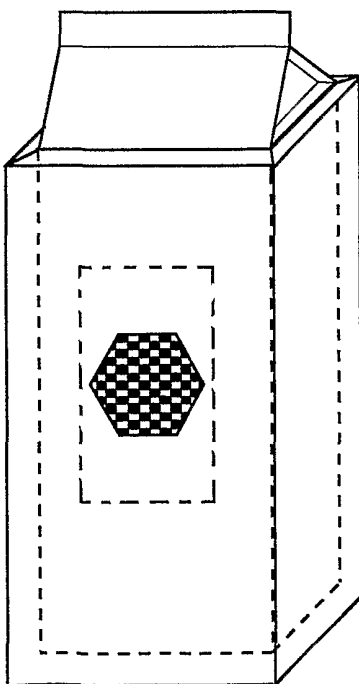


Fig. 16

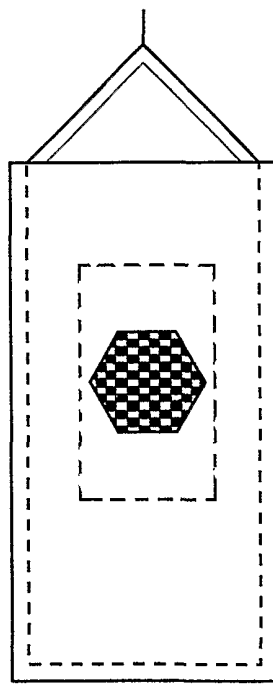


Fig. 17

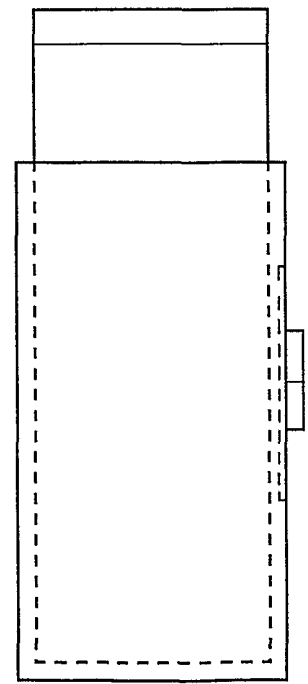


Fig. 18

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IT 01/00423

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F25D5/02 C09K5/16 B65D81/32

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 7 F25D C09K

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 practical, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X A	GB 2 316 159 A (BASS PLC) 18 February 1998 (1998-02-18) page 11, line 6 -page 20, line 8; figures 1-13	1,2,5-7, 10,16,18 19
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

2 November 2001

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INTERNATIONAL SEARCH REPORT

International Application No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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