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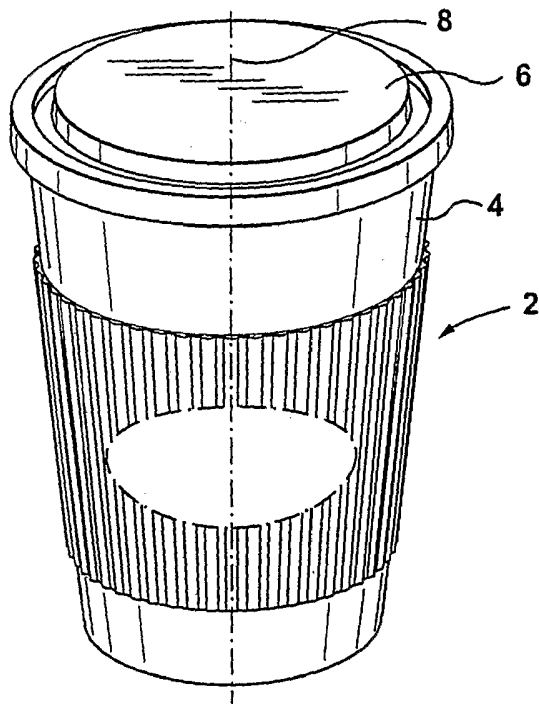
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CUP HOLDER

(57) Abstract: A holder for a cup comprising a foamed plastic pliable sleeve having an open top and bottom for receiving said cup.



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## CUP HOLDER

### Field of the Invention

This invention relates to cup holders and in particular relates to a sleeve adapted to receive a cup in one position and foldable in another position. The invention also relates to the method of producing the holder.

### Background of the Invention

Disposable paper board cups are routinely used in fast food and restaurants to contain hot drinks. Such cups are generally of standardized size normally frusto-conical or tapered. Such cups are generally thin walled and may be difficult to handle particularly when the cups include hot coffee, tea, soup or the like.

Furthermore cold drinks may also be served in standardized frusto-conical cups and may also be difficult to hold in view of the cold temperature. Such prior art cups may be comprised of very thin plastic having little strength.

Accordingly a number of prior art cup holders or sleeves have heretofore been designed in order to insulate the user's fingers against extreme hot or cold temperatures as well as to add structural strength to the cup.

For example, U.S. Patent No. 5, 205,473 relates to a corrugated beverage container and holders which provide fluted structures for containing insulating air.

Furthermore U.S. Patent No. 5,425,497 also relates to a cup holder in the form of a sheet with distal ends. A web is formed in one of the ends, and a corresponding slot is formed at the other end such that the ends interlock. The cup holder is assembled by rolling the sheet and interlocking the ends. The sheet can be an elongate band of pressed material preferably pressed paper pulp as preferably formed with multiple nubbins and depressions.

Yet another arrangement is shown in U.S. Patent No. 5,826,786 which relates to a cup holder sleeve formed in pre-assembled, flat-folded form by die cutting a flat elongated band from blank stock material so as to have top and bottom edges concentric to and parallel with each other, fold lines scored into the band at spaced

apart positions tapering toward each other, and side edges at opposite ends of the band.

Moreover U.S. Patent No. 5,842,633 relates to a sleeve provided for a frusto-conical beverage cup, configured to fit around the outside of the cup, thus protecting the fingers of the user from excessive temperatures in the case of hot drink, and to provide a measure of insulation for the contents of the cup.

It is an object of this invention to provide an improved cup holder which is easy to manufacture and produce.

It is an aspect of this invention to provide a holder for a cup comprising a foamed plastic sleeve having an open top and bottom for receiving said cup.

It is a further aspect of this invention to provide a holder for a tapered cup comprising an extruded foamed plastic sheet having spaced substantially concentric curved top and bottom and two opposite ends; said ends are overlapping and bonded to each other to define a sleeve; said extruded foam plastic sheet being pliable without breaking.

It is yet another aspect of this invention to provide a method of manufacturing a foamed polystyrene sleeve for a cup comprising extruding a sheet of foamed polystyrene; cutting said sheet to form spaced substantially concentric curved top and bottom and two opposite ends; forming at least two fold lines and a plurality of ribs to said cut sheet; folding said formed sheet so as to overlap and bond said ends together.

### **Summary of the Invention**

An object of one aspect of the present invention is to provide an improved insulating sleeve.

### **Brief Description of the Drawings**

A detailed description of the preferred embodiments are provided herein below by way of example only and with reference to the following drawings, in which:

Figure 1 is a perspective view of the cup holder or sleeve containing a cup.

Fig. 2 is a partial top plan view of an extruded sheet of foamed polystyrene.

Fig. 3 is a top plan view showing a cut and formed sheet.

Fig. 4 is a top plan view of a foamed extruded polystyrene sheet which has been cut and formed.

Fig. 5 is a cross-sectional view along the lines 5-5 of Fig. 4.

Fig. 6 illustrates a stacked array of cut formed sheets.

Fig. 7 illustrates the folding and gluing step.

Fig. 8 is a perspective view of the cup holder.

Fig. 9 is a top plan view of Fig. 8.

Fig. 10 is another embodiment of the invention.

Fig. 11 is another embodiment of the invention.

In the drawings, preferred embodiments of the invention are illustrated by way of example. It is to be expressly understood that the description and drawings are only for the purpose of illustration and as an aid to understanding, and are not intended as a definition of the limits of the invention.

### **Detailed Description of the Preferred Embodiment**

In the description which follows, like parts are marked throughout the specification and the drawings with the same respective reference numerals. The drawings are not necessarily to scale and in some instances proportions may have been exaggerated in order to more clearly depict certain features of the invention.

Fig. 1 illustrates the cup holder or sleeve 2 in combination with a cup 4 which may have a lid 6. The cup 4 can be comprised of a variety of materials but generally consists of a paper cup which is well known to those persons skilled in the art having little insulating value. The cup 4 is generally frusto-conical or tapered and is concentric about axis 8.

Fig. 8 generally illustrates the holder or sleeve 2 or cup which is comprised of a foamed plastic having an open top 10 and open bottom 12.

The foamed plastic is pliable and it is generally selected from the group of polystyrene, polypropylene and polyethylene. Generally speaking it has been thought that foamed polystyrene is not pliable, namely, that it will break when attempting to bend a flat sheet into a circular configuration. However, such foamed plastic has been found to be pliable when adding a plurality of depressions. More specifically by forming ribs into the foamed polystyrene it has been found that a pliable structure which can be manipulated into a sleeve without breakage. Alternatively in another embodiment, it is also been found that if the thickness of foamed polystyrene is selected to be thin enough to be pliable so as not to break when configured into a circular sleeve. A cup holder can be constructed, as described below.

The embodiment of the cup holder shown in Fig. 8 includes a plurality of ribs 14 which are disposed to extend between the open top 10 and open bottom 12 as shown. More particularly the plurality of ribs 14 may be disposed substantially in the same direction as the axis 8.

The embodiment shown in Fig. 8 can be constructed from a sheet of extruded foamed polystyrene as shown in Fig. 2. In one embodiment the sheet of extruded foamed polystyrene is extruded from the extruder (not shown) in the direction D of the extruded path. The extruded foam sheet may exit in the form of a continuous web which can by standard practise, be aged for three or four days to permit dissipation of foamed gases and the like. Thereafter the sheets of foamed polystyrene can be delivered to a cutting and thermo forming station (not shown) so as to cut the sheet 20 to produce a cut sheet having spaced substantially concentric curved top and bottom 12 and two opposite ends 22 and 24. The opposite ends 22 and 24 are adapted to be overlapped and bonded to one another so as to define the sleeve shown in Fig. 8.

During the thermo forming stage the sheet 20 of foamed polystyrene is embossed to produce a plurality of depressions (best seen in Fig. 5) to define a plurality of ribs 14. Although the embodiment shows a plurality of ribs 14 the sheet 20 can be embossed to form any textured surface such as stipples, waves or other patterns so long as the thickness of the foam sheet is "squeezed". It is believed that this forming or squeezing stage compresses the closed cell structure of the foamed polystyrene so as to improve its pliability.

Furthermore by forming the depressions 26 in the surface so as to produce the ribs 14 or other protrusions a natural air gap is produced between the surface of the depressions 26 and the ribs 14 so as to improve the insulating characteristics of the hot liquid contained in the cup 4. Moreover if any of the contents of the hot beverage in cup 4 is accidentally spilled over the surface of the cup holder the liquid will be naturally drained by gravity between the region bounded by the depressions 26 and protrusions or ribs 14.

Furthermore the foamed polystyrene is a naturally good insulating material and will insulate the user's fingers from the hot beverages contained in the cup 4.

Although it is possible that the cup holders 2 could be stacked one inside the other for shipment at least two fold lines 30, as seen in Fig. 3 are applied during the thermo forming stage so as to permit the sleeve to be collapsed into a flat position for storing and transporting and be thereafter opened to defined a substantially frusto-conical sleeve having an open top 10 and bottom 12 adapted to receive the cup in the open position.

Furthermore the ribs shown in Fig. 1 are formed on the exterior surface of the sleeve 2, but could just as easily be formed on the interior surface of the sleeve 2 particularly when used to hold cold drinks which tend to form condensate on the outside of the cup to permit drainage by gravity without wetting the fingers of the user. In other words the ribs 14 are disposed on the inside of the sleeve to allow condensation to run off a cup filled with cold drinks.

Fig. 6 illustrates a stacked array of cut formed sheets showing the fold lines 30. In this case two pairs of fold lines 30 are provided. Each cut sheet is then advanced to the folding and adhesive station shown in Fig. 7 whereby the cut sheets 20 are sequentially advanced by any number of means including rollers (not shown) so as to upturn the edges 22 and 24 towards one another so as to thereby apply a suitable adhesive such as a hot melt adhesive to at least one of the overlapping edges 22 and 24 so that by the time the folded sleeve reaches the end of the folding station as shown in Fig. 7 the sleeve is substantially flat as shown and glued together. Any means of gluing or adhesive can be used.

Optionally during the thermo forming stage indicia 40 may be added, as seen in Fig. 8 to include a company logo, trademark or the like so as to improve the appearance of the cup holder.

Fig. 11 shows another embodiment of the invention whereby the sleeve is comprised of a loop of cut foamed polystyrene which is adhesively bonded as previously described to form a closed loop sleeve. By controlling the thickness of the foamed polystyrene it has been found that sleeves are pliable or bendable without breaking. In one embodiment of the invention it has been found that if the thickness of foamed polystyrene is selected to be up to approximately 25 thousandths of an inch a plastic sleeve can be constructed. However the invention should not be limited to up to 25 thousandths of an inch as greater thicknesses could be used within the spirit of the invention. The sleeves shown in Fig. 2 can be stacked one within the other as shown in Fig. 10 or alternatively as shown in Fig. 11 the sleeves can include a plurality of fold lines as previously described and flattened again as previously described. In the embodiment shown in Figs. 10 and 11 the depressions or ribs have been removed. Alternatively, however, the ribs may be added. Moreover any other texture apart from ribs such as stippling or the like which have embossed so as to improve the pliability characteristics of polystyrene can also be used.

The invention described herein illustrates a method of manufacturing a foamed polystyrene sleeve for a cup comprising:

- (a) extruding a sheet of foamed polystyrene;
- (b) cutting the sheet to form spaced substantially concentric curved top and bottom and two opposite ends;
- (c) forming at least two fold lines and a plurality of ribs to said cut sheet;
- (d) folding the formed sheet so as to overlap and bond the ends together.

Furthermore the spacing of the ribs are accurately calculated so that even though the ribs fan out as shown in Fig. 3 i.e. are placed radially substantially parallel to one another once the sleeve is formed the ribs tend to be disposed along the length of the cup 4.

Furthermore the polystyrene has an improved co-efficient of friction as compared to a typically prior art sleeves so as to improve the gripping characteristics.

Also the sleeve adds structural strength to a flimsy cup as manufacturers of cups try to reduce their costs.

Various embodiments of the invention have now been described in detail. Since changes in and/or additions to the above-described best mode may be made without departing from the nature, spirit or scope of the invention, the invention is not to be limited to said details.

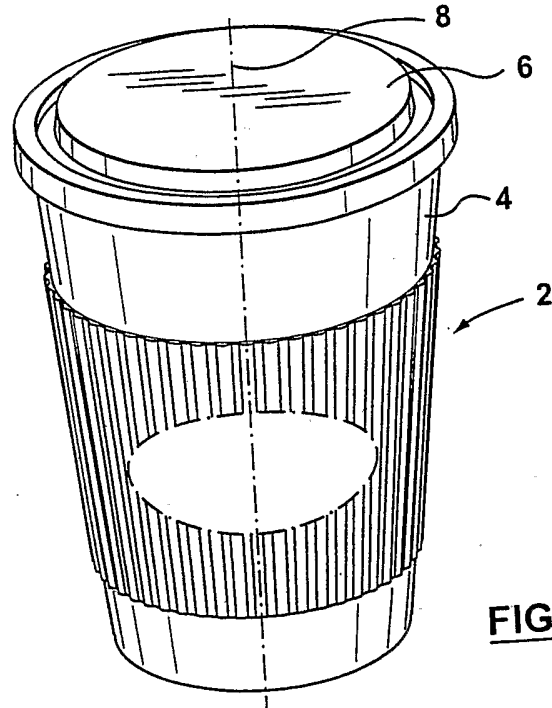
**CLAIMS**

## I CLAIM:

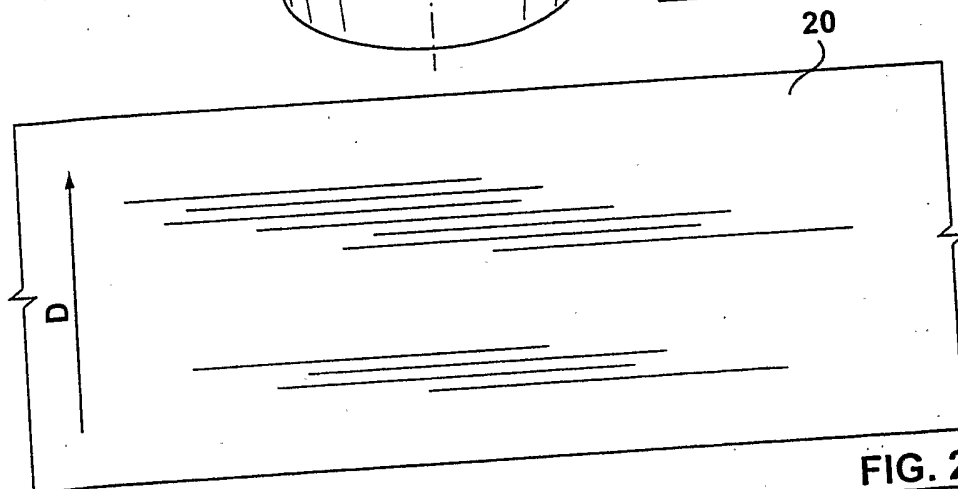
1. A holder for a cup comprising a foamed thermoplastic sleeve having an open top and bottom for receiving said cup.
2. A holder as claimed in claim 1 wherein said plastic is selected from the group of polystyrene, polypropylene, or polyethylene or other thermoplastic material.
3. A holder as claimed in claim 1 wherein the thickness of said foamed thermoplastic sleeve is selected to be pliable when formed in a loop.
4. A holder as claimed in claim 1 wherein said foamed plastic sleeve comprises foamed polystyrene having a plurality of ribs disposed between said top and bottom opening.
5. A holder as claimed in claim 4 wherein said sleeve includes at least two fold lines for flattening said sleeve.
6. A holder as claimed in claim 5 having a curved top and bottom opening.
7. A holder as claimed in claim 6 wherein said sleeve is pliable.
8. A holder as claimed in claim 7 wherein said sleeve includes two overlapping adhesively bonded ends.
9. A holder for a tapered cup comprising:
  - (a) an extruded foamed plastic sheet having:
    - (i) spaced substantially concentric curved top and bottom and two opposite ends;
    - (ii) said ends are overlapping and bonded to each other to define a sleeve;
  - (b) said extruded foam plastic sheet being pliable without breaking.
10. A holder as claimed in claim 9 wherein said extruded foamed plastic comprises foamed polystyrene.

11. A holder as claimed in claim 9 wherein said sheet includes a plurality of ribs on at least one surface thereof.
12. A holder as claimed in claim 11 wherein said sleeve includes at least two fold lines for:
  - (a) flattening said sleeve in one position, and
  - (b) opening said sleeve to define a substantially frusto-conical sleeve having open top and bottom adapted to receive said cup in another position.
13. A holder as claimed in claim 9 including a plurality of depressions.
14. A holder as claimed in claim 13 wherein said depressions define a plurality of ribs.
15. A holder as claimed in claim 14 wherein said plurality of ribs are disposed on an exterior surface of said sheet.
16. A method of manufacturing a foamed polystyrene sleeve for a cup comprising:
  - (a) extruding a sheet of foamed polystyrene;
  - (b) cutting said sheet to form spaced substantially concentric curved top and bottom and two opposite ends;
  - (c) forming at least two fold lines and a plurality of ribs to said cut sheet;
  - (d) folding said formed sheet so as to overlap and bond said ends together.
17. A method as claimed in claim 16 wherein said forming comprises thermo forming at approximately 140°C and 250 bar.
18. A method as claimed in claim 17 wherein said sheet is extruded by an extruder in the extruded direction, and said ribs are formed generally parallel to said extruded direction.
19. A method as claimed in claim 18 wherein said thermo forming embosses said ribs, fold lines and indicia to said cup holder.

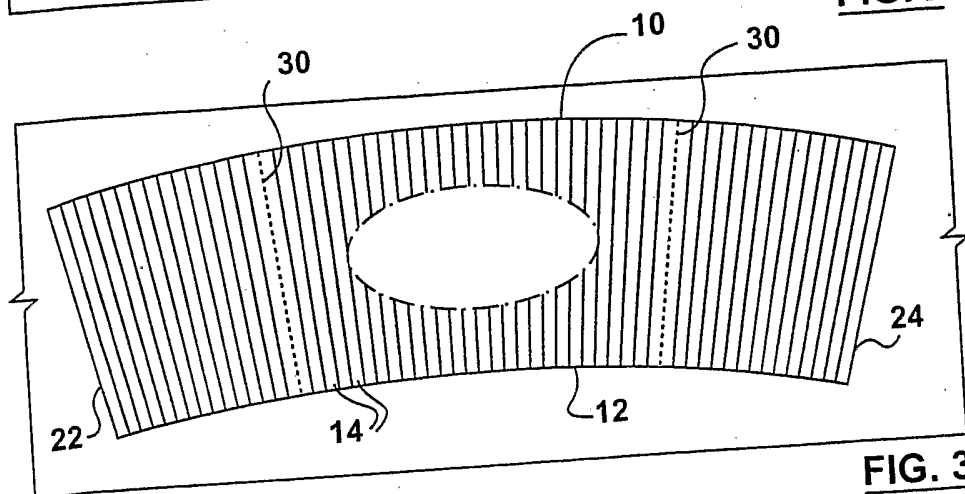
20. A method as claimed in claim 19 wherein said depth of said embossed ribs are selected to control the pliability of said sleeve.



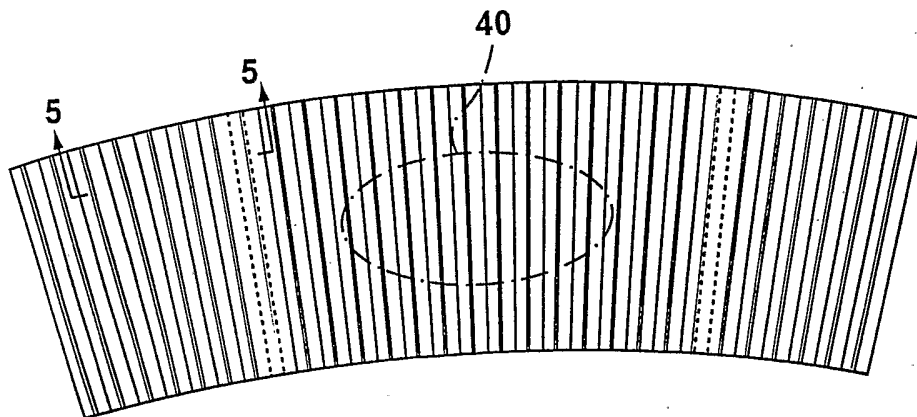
**FIG. 1**



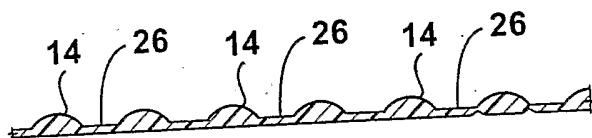
**FIG. 2**



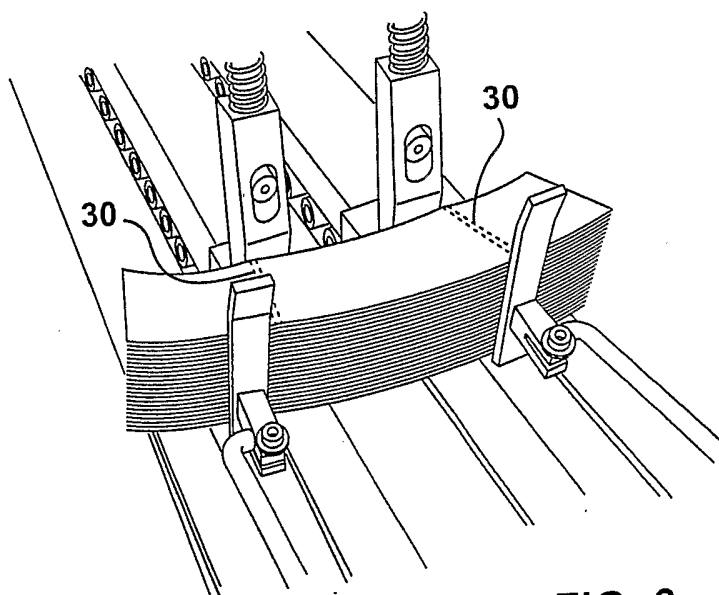
**FIG. 3**



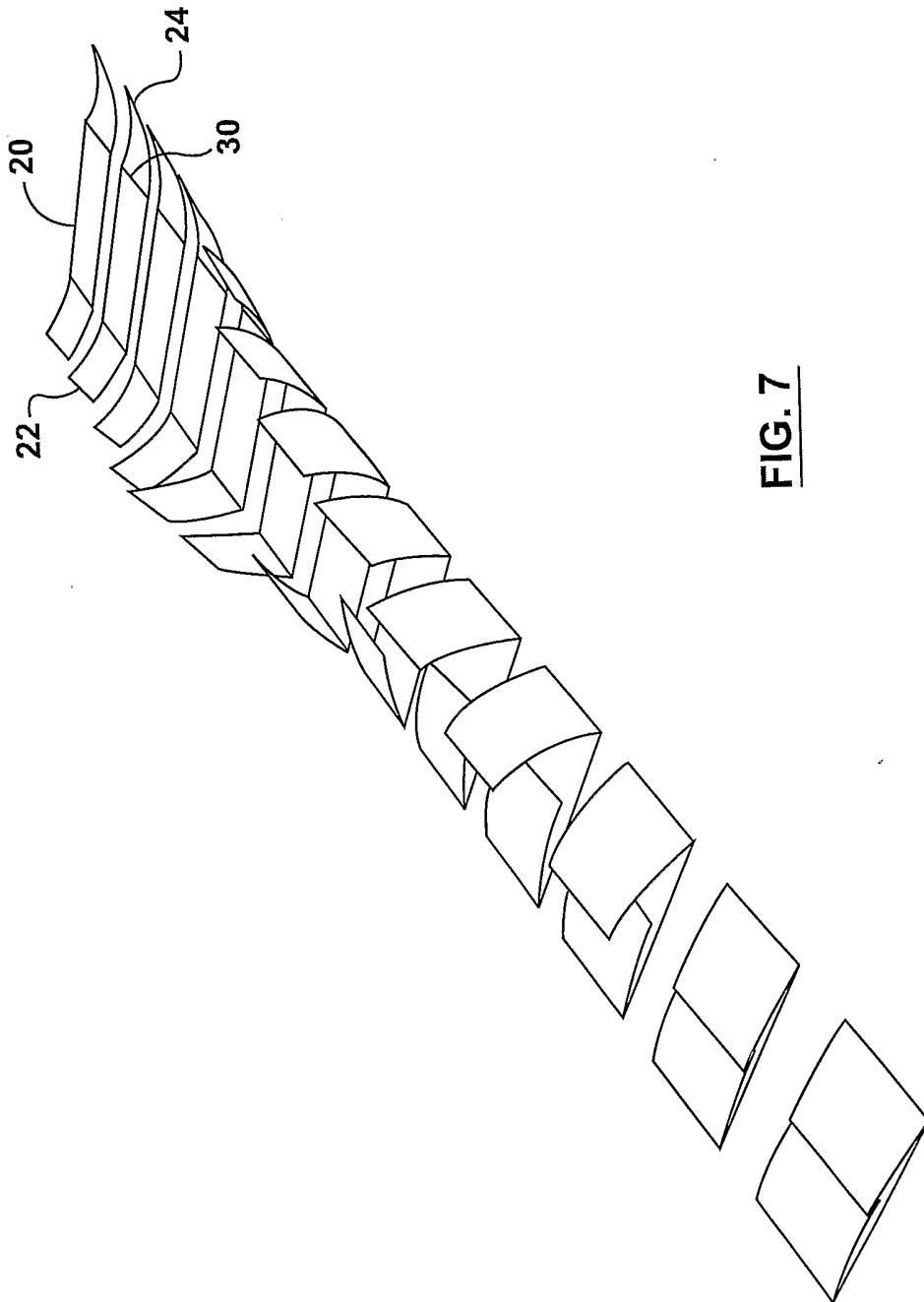
**FIG. 4**



**FIG. 5**

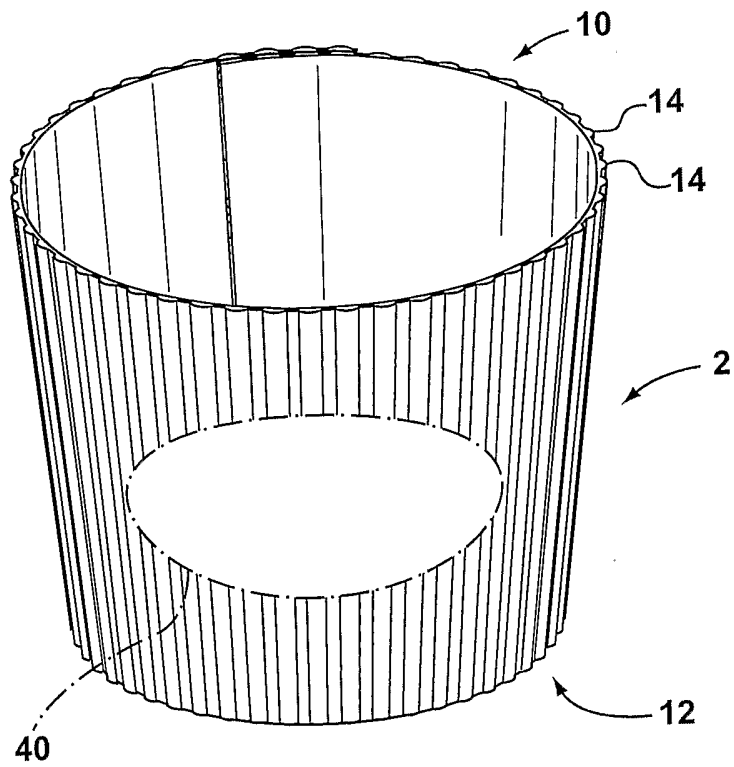


**FIG. 6**

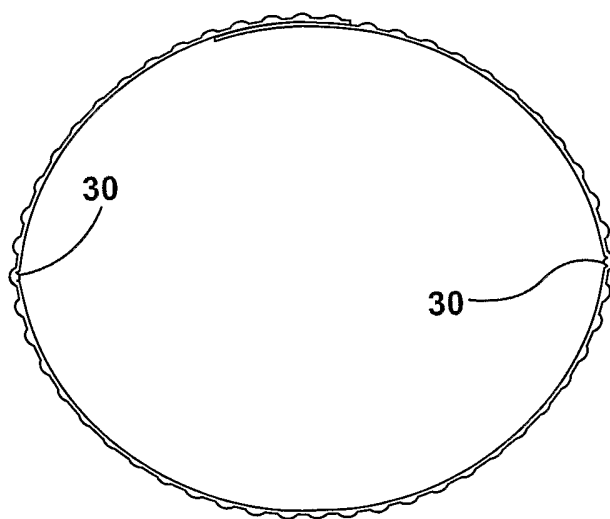


**FIG. 7**

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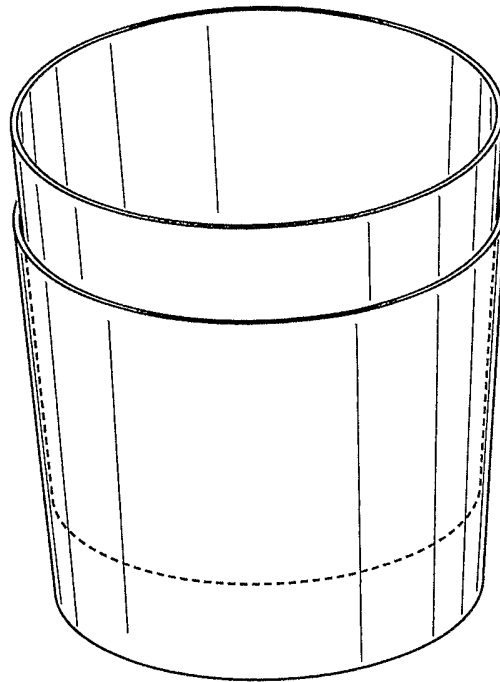


**FIG. 8**

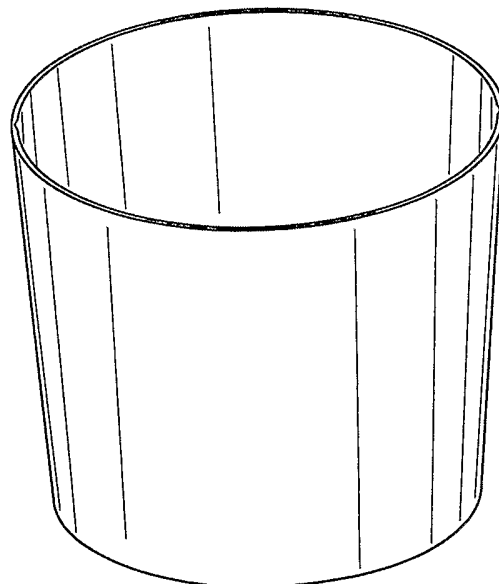


**FIG. 9**

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**FIG. 10**



**FIG. 11**

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2005/000414

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC(7): A47G 23/02, B29C 47/00, C08J 9/228, B65D 25/00

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(7): A47G 23/02, B29C 47/00, C08J 9/228, B65D 25/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
 ECLA: B65D 81/38K, K1; A47G 23/02Q4B, US Class:220/403, 220/738, 739; 428/\*  
 IPC(7) : B65D 81/38

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)  
 Delphion, Canadian Patents Database, esp@cenet  
 Foam, polystyrene, slit, rib, sleeve, bend, bendable.

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 3,473,682 (STUDEN) 21 October 1969 (21-10-1969) *col 1 lines 56-58, col 2 lines 9-14, 25-32, col 3 lines 6-10, 18-21*	1-3 4-20
X Y	US 6,464,100 B2 (CANFIELD) 15 October 2002 (15-10-2002) *col 2 lines 52-59*	1-3 4-10
X Y	US 2004/007 022 A1 (WONG) 15 April 2004 (15-04-2004) *entire document, fig. 2*	1-3 9-16
Y	US 4,255,110 (OTSUKA) 10 March 1981(10-03-1981) *col 1 lines 12-16*	16-20
X	US 2004/0084460 A1 (SCHEETZ II et al.) 6 May 2004 (06-05-2004) *entire document*	1-3
X Y	DE 19,743,820 (REIKENBRAUK) 8 April 1999 (08-04-1999) *abstract, drawings*	1-3 4-15

Further documents are listed in the continuation of Box C.       See patent family annex.

* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "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 "&" document member of the same patent family
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Date of the actual completion of the international search 14 June 2005 (14-06-2005)	Date of mailing of the international search report 22 June 2005 (22-06-2005)
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Name and mailing address of the ISA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001(819)953-2476	Authorized officer J. Czaban (819) 994-6505
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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2005/000414

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,181,765 (HARMONY) 1 January 1980 (01-01-1980) *col 2 lines 28-36*	1-3
A	WO 200404040535 (AKITA) 13 May 2004 (13-05-2004) *abstract*	1-3, 13, 16-20
A	US 6,601,728 B1 (NEWKIRK et al) 5 August 2003 (05-08-2003) *entire document*	6-7, 9, 11, 13-14, 16

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Information on patent family members

International application No.  
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