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(54) **BOTTLE**

FLASCHE

BOUTEILLE

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(56) References cited:
**EP-A1- 1 749 459 WO-A1-03/055756
DE-U- 1 981 739 DE-U1- 29 622 585
FR-A7- 2 063 175 GB-A- 1 348 971
GB-A- 1 348 971 US-B1- 6 186 345
US-B1- 6 932 228**

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Description

OBJECT OF THE INVENTION

[0001] The object of the invention is a spherical bottle having, at least on one of its sides, a recess or a notch so that another bottle in the vicinity of the bottle can be located so close that at least portions of the other bottle are, directly or via a spacing piece, in the said recess.

PRIOR ART

[0002] When transporting and packing bottles in boxes or other transportation packages, bottles are generally not in contact with one another, leaving a great deal of empty space between the bottles. This is due both to the shape of bottles and often also to divider walls or similar structures between the bottles. Thus the package becomes unnecessarily large in relation to the volume of the bottles, which means that, uneconomically, a lot of empty space has to be transported.

[0003] Attempts have been made to solve this problem by shaping the bottles so as to pack them as tightly against one another as possible, using quadrangular and triangular shapes for the bottles. However, such forms are not very strong and durable, making it necessary to provide the bottles with uneconomically thick walls. A known solution is presented in the publication DE-299 07 258 U1, which presents a bottle with a recess for an adjacent bottle. Thus adjacent bottles can be packed closer to one another. The publication DE-296 00 051 U1 presents a bottle with a recess for the mouth and the cap of the bottle under it. These solutions are, however, not very advantageous.

[0004] FR 2063175 discloses a spherical bottle, as in the preamble of claim 1.

PURPOSE OF THE INVENTION

[0005] The purpose of this invention is to create a bottle which overcomes the above-mentioned drawbacks. A further purpose of this invention is to create a strong bottle shape enabling the packing of several bottles on top of one another.

CHARACTERISTICS OF THE INVENTION

[0006] A bottle according to the invention is characterised in that

- the recesses in three sides of the bottle are concave so that the spherical surface of a bottle in the vicinity of the said bottle can be fitted into the said recess, and
- the curvature radii of the three recesses in the bottle are equal to the curvature radius of the spherical surface of the bottle.

[0007] The packing density of such bottles can be very high. In other words, the total volume of the contents of the bottles is very high in relation to the space required for the multi-bottle package. Thanks to the invention, the bottle package can be made very small in terms of its external dimensions. This makes the raw material requirements for both the bottles and the package substantially smaller than in known solutions.

EMBODIMENTS OF THE INVENTION

[0008] The spherical shapes of the bottle according to the invention make the bottle very strong. Its wall thickness can be decreased without decreasing the strength, which reduces the required amount of raw materials. A spherical bottle is also very resistant to pressure. Furthermore, the concave recesses in combination with the spherical surface provide a shape that reflects light in a unique way, giving the bottle and its contents an advantageous appearance. A bottle according to the invention is therefore preferable also for retail consumer packages.

[0009] A preferred embodiment of the bottle according to the invention is characterised in that

- the neck portion of the bottle is directed obliquely to the side and upwards, and
- the said recesses in the side wall of the bottle are in the vicinity of the neck portion of the bottle, on both sides of the neck portion.

[0010] The spherical bottles according to the invention can be placed into a bottle package. The bottle package includes a stacking rack or a packing box, which is in an inclined position relative to the horizontal plane during the packing of bottles.

[0011] According to one preferred embodiment, the plane of the stacking rack is most preferably at an angle of 45° relative to the horizontal plane, and the bottles are put into place by hanging them on its neck.

EXAMPLES OF EMBODIMENTS

[0012] In the following, the invention is described using examples with reference to the appended drawings, in which

LIST OF FIGURES

[0013]

Figure 1 is a top view of an embodiment of the bottle according to the invention.

Figure 2 is a side view of the bottle in Fig. 1.

Figure 3 is a side view of the bottle in Fig. 1 from another side.

Figure 4 is a side view of the bottle in Fig. 1 from a third side.

Figure 5 is a section along the line V-V of Fig. 4.

Figure 6 shows bottles according to Fig. 1 placed adjacent to and on top of one another.

Figure 7 is a side view of the bottles in Fig. 6 from another side.

Figure 8 is a section along line VIII-VIII of Fig. 7.

Figure 9 is a top view of the bottles in Fig. 6.

Figure 10 is an oblique side and top view of the bottles in Fig. 6 shown axonometrically.

Figure 11 is a side and bottom view of the bottles in Fig. 6 shown axonometrically.

Figure 12 is a top view of another embodiment of the bottle according to the invention.

Figure 13 is a side view of the bottle in Fig. 12.

Figure 14 is a side view of the bottle in Fig. 12 from another side.

Figure 15 is a side view of the bottle in Fig. 12 from a third side.

Figure 16 is a section along the line XVI-XVI of Fig. 15.

Figure 17 shows bottles according to Fig. 12 placed adjacent to and on top of one another.

Figure 18 is a side view of the bottles in Fig. 12 from another side.

Figure 19 is a section along the line XiX-XiX of Fig. 18.

Figure 20 is a top view of the bottles in Fig. 12.

Figure 21 is an oblique side and top view of the bottles in Fig. 17 shown axonometrically.

Figure 22 is an oblique side and bottom view of the bottles in Fig. 17 shown axonometrically.

Figure 23 is a top view of a third embodiment of the bottle according to the invention.

Figure 24 is a section along the line XXIV-XXIV of Fig. 23.

Figure 25 is an oblique side and top view of the bottles according to Fig. 23 shown axonometrically.

Figure 26 is an oblique side and bottom view of the bottles according to Fig. 23 shown axonometrically.

Figure 27 is a sectional side view of the bottles according to Fig. 24 shown placed against one another.

Figure 28 is a schematic view of the bottles according to Fig. 23 shown placed in a packing box.

Figure 29 shows the bottles in Fig. 28 from another direction.

Figure 30 matches Fig. 27 and shows the bottles placed against one another so that there are packing divider sheets between the bottle layers.

Figure 31 is an oblique side and top view of the bottles and the packing divider sheets between them shown axonometrically.

Figure 32 is a sectional side view of the bottle according to Fig. 24 shown filled with liquid.

for a threaded cap, which is not shown in the figure. The bottle 10 in Fig. 1 is substantially spherical in shape; however, there are two concave recesses 20a and 20b in a spherical side surface 15 of the bottle 10. The curvature of the recesses 20a and 20b matches the curvature of the surface 15 in the bottle 10 so that spherical sides of similar bottles placed in the vicinity can be fitted into the recesses 20a and 20b. Furthermore, the bottle 10 also has a recess in its bottom, the recess being shown in greater detail in Fig. 5.

[0015] Figure 2 shows a side view of the bottle 10 in Fig. 1. Fig. 2 also shows one recess 20a of the spherical side wall 15 of the bottle 10 and the recess 21 in the bottom. The recess 21 is also concave and substantially matches the shape of the spherical surface 15. In this embodiment, however, the recess 21 also has a recess for the neck portion 11 of the bottle underneath, as shown in Fig. 5.

[0016] Figure 3 shows the bottle 10 in Fig. 1 as seen from another side. As the figure illustrates, the spherical side wall 15 of the bottle 10 has concave recesses 20a and 20b in two sides and a recess 21 in the bottom.

[0017] In Figure 4, the bottle 10 is shown with the recess 20a in the spherical side wall 15 of the bottle 10 towards the viewer.

[0018] The sectional view in Figure 5 shows that the concave recess 20a in the side wall 15 of the bottle 10 matches in shape the spherical side surface 15 of the bottle 10. An annular edge portion 21 a of the recess 21 in bottom of the bottle 10 also matches in shape the spherical surface of the bottle 10, so that the edge portion 21 a rests on the spherical surface around the neck portion 11 of a similar bottle located underneath. The recess 21 also includes a deeper mid portion 21 b, which provides sufficient space for the neck portion 11 and the threaded cap of a similar bottle underneath.

[0019] Figure 6 shows several bottles 10a-10d in accordance with Figures 1-5 placed adjacent to and on top of one another. In this example, one group contains eight bottles placed tightly against one another, but a bottle package or box can naturally contain any number of bottles. Figure 7 shows the group of bottles in Fig. 6 from another side.

[0020] Figure 8 is a sectional view of a group of bottles 10. As the sectional view shows, a side wall of each bottle 10 has a concave recess 20a, wherein the spherical side wall surface 15 of the adjacent bottle 10 fits and whereon it can rest. The bottom of the bottle 10 also has a recess 21, the annular edge portion 21 a of which recess rests on the spherical surface around the neck portion 11 of the bottle 10 located underneath. The neck portion 11 of the bottle 10 underneath is fitted into a deeper portion 21 b in the middle of the recess 21. Thus the bottles 10 rest with their side walls on the adjacent bottles and with their bottom portions, on the bottle underneath. This kind of packaging method for bottles is very stable because the bottles have support portions that fit well into one another. At the same time, the bottles in a way lock into one another.

DESCRIPTION OF THE FIGURES

[0014] Figure 1 is a top view of a bottle 10 according to the invention. In the usual way, the top portion of the bottle 10 comprises a neck portion 11 and a thread 12

other, which is advantageous for transportation of the bottles.

[0021] Figure 9 is a top view of the group of bottles in Figures 6-8. As the figure shows, the bottles 10 are located tightly against one another, also as seen from this direction. Almost no empty space at all is left between the bottles 10, which gives a very high total volume relative to the volume of the entire package. Thus the packing density of bottles according to the invention is very high, and bottles according to the invention provide a highly efficient and advantageous solution for packaging and transporting liquids.

[0022] Figures 10 and 11 are axonometric views of the bottle group in Figures 6-9 from various sides. These figures also clearly show how well the bottles 10 can be fitted in a tight group against one another.

[0023] Figure 12 is a top view of a bottle 10 according to another embodiment of the invention. Similarly to the embodiments shown in Figures 1-11, this embodiment has concave recesses 20a and 20b in a spherical side wall 15 of the bottle 10. However, the bottle 10 in Fig. 12 differs from those presented above in that the neck portion 11 of the bottle 10 and the thread portion 12 belonging therein are directed obliquely to the side and upwards.

[0024] Thus the neck portion 11 is not in the middle of the bottle 10, directed vertically upwards, as in a conventional bottle.

[0025] The solution presented in Fig. 12 provides an adequate space in the small empty space between the bottles in the package or bottle group for the neck portion 11 of the bottle 10 and for the threaded cap thereon, which is not shown in the figure. As a result of this, no notch has to be made separately in the bottom of the bottle 10 for the neck portion 11 and cap of the bottom 10 underneath. The topmost bottle 10 can rest directly on the spherical surface 15 of the bottle 10 beneath because, in this embodiment, the bottom of the bottle 10 comprises a similar concave recess matching the spherical surface 15 as in the bottle's side wall. The shape of bottle according this embodiment is shown in greater detail in the following figures.

[0026] Figures 13-15 are side views of the bottle 10 in Fig. 12 as seen from three different sides. As the figures show, the spherical side wall 15 of the bottle 10 has two concave recesses 20a and 20b, and the neck portion 11 is located at a vertex between the recesses, directed obliquely to the side and upwards. The bottom of the bottle 10 is a part of the same spherical shape and surface 15 as the other walls of the bottle 10, but in this second embodiment the bottom of the bottle 10 has a concave recess 20c similar to the recesses 20a and 20b in the side walls. Thus the bottle 10 comprises three recesses 20a, 20b and 20c matching the concave, spherical surface, the recesses being located in a similar position relative to one another as three faces of a cube having a common vertex.

[0027] Figure 16 is a sectional view of the bottle 10 showing that the spherical surface 15 of the bottle 10 has

two similar concave recesses 20a and 20b in the side wall and one recess 20c in the bottom.

[0028] Figure 17 shows several bottles 10a-10d in accordance with Figures 12-16 placed adjacent to and on top of one another. In this example also, one group contains eight bottles placed tightly against one another, but a bottle package or box can naturally contain any number of bottles. Figure 18 shows the group of bottles in Fig. 17 from another side.

[0029] Figure 19 is a sectional view of a group of bottles 10. As the section shows, each bottle 10 has a concave recess 20a in its side wall, wherein the spherical side wall surface 15 of the adjacent bottle 10 fits and whereon it can rest. The side surface 15 of the bottle 10, beside the recess 20a, has another, similar recess 20b. The bottom of the bottle 10 also has a similar recess 20c, so that in this embodiment the spherical surface 15 of the bottle 10 has three concave recesses 20a, 20b and 20c. Figure 20 gives an additional top view of the group of bottles in Figures 17-19.

[0030] Figures 21 and 22 are axonometric views of the group of bottles in Figures 17-20 from various sides, with bottles 10 according to the second embodiment of the invention.

[0031] Figure 23 shows a third embodiment of the bottle 10 according to the invention, wherein an alignment recess 22 is arranged in the top portion of the spherical surface 15 of the bottle 10. The recess 22 is oval in shape.

[0032] Figure 24 is a sectional side view of the bottle 10 in Fig. 23. Opposite to the alignment recess 22 in the top portion of the spherical surface 15, below the sphere 10, there is an alignment protrusion 23, which is also oval in shape, as seen from below the sphere 10, so that the shape of the protrusion matches the alignment recess 22. When the bottles 10 are placed on top of one another, the alignment protrusion 23 in the bottom of the topmost bottle goes into the alignment recess 22 on top of the lowermost bottle. Thus bottles placed on top of one another are locked to one another so that they cannot slide or rotate relative to one another. It is specifically the elongated oval shape of the alignment protrusion 23 and the alignment recess 22 that prevents the rotation of bottles relative to one another. This shape can also be different, however, as long as it creates a similar locking effect.

[0033] Figures 25 and 26 are axonometrically presented oblique side views of the bottles 10 with an alignment protrusion 23 and an alignment recess 22 as shown in Figures 23 and 24.

[0034] Figure 27 is a sectional side view of the bottles 10 according to Fig. 24 shown placed against one another. This leaves very small spaces between the bottles 10, and the bottles 10 are locked in place by means of the alignment protrusions 23 and the alignment recesses 22.

[0035] Figure 28 shows bottles 10 placed on a stacking rack 30 or in a packing box, tightly against one another. In this figure, two walls of the stacking rack 30 are shown, whereby the position and location of the bottles 10 placed

in the box stand out clearly. Due to the shape of the bottles 10, it is most preferable to stack the bottles in the stacking rack 30 or in the packing box so that the tray or the packing box 30 is in an oblique position, as if having one of its corners downwards. In this way it is easy to place the bottles 10 in place, and they will settle tightly against one another. Figure 29 shows the packing arrangement in Fig. 28 as seen from another direction.

[0036] Figure 30 matches Fig. 27 and shows the bottles 10 placed against one another so that there are packing trays 31 between bottle layers. The packing trays 31 are shaped so that the bottles 10 will settle tightly also in this arrangement. The packing tray 31 also has matching shapes for the alignment protrusions 23 and the neck portions 11 of the bottles 10. Figure 31 is an oblique side view of the bottles 10 and the packing trays 31 between them.

[0037] Figure 32 is a sectional side view of a bottle 10 according to Fig. 24, with a cap 24 and shown filled with liquid 40. The surface 41 of the liquid 40 forms a circular pattern inside the spherical bottle 10. In this way the appearance of the bottle 10 filled with the liquid 40 is particularly attractive because, due to its shape, the bottle has circular details on several sides. The spherical surface of the bottle 10 functions as a lens, creating a magnified impression of an object behind the bottle. Similarly, the concave recesses, spherical and circular in shape, function as a lens that creates a diminishing impression of an object behind the bottle. The visual appearance is completed by the spherical shape created by the liquid surface.

ADDITIONAL NOTES

[0038] It is obvious to a person skilled in the art that the different embodiments of the invention may vary within the scope of the claims presented below. It is essential, however, that the bottles overlap one another by means of the recesses described above. Advantageously, the bottles described above are tightly against one another. In some cases, a spacing piece or padding, such as plastic foam, may be added between the bottles if required, for example when it is known that the bottles or their package will be subjected to exceptionally hard impacts or vibrations.

[0039] The spherical shape is particularly advantageous due to its resistance to high pressure. The outside surface of the bottle is substantially a sphere, and the recesses on the surface are also spherical surfaces directed inwards, the curvature radii of which are most preferably equal to the curvature radius of the spherical surface of the bottle. Shaped this way, the bottles can be packed more tightly than bottles of any other shape. In other words, the packing density, i.e. the relation of the total volume of the bottles to the volume of the entire package, is maximal.

[0040] The applicant has found that a conventional, 1200 mm x 1000 mm sized Europallet can accommodate

regular soft drink bottles in two layers, which gives a total volume of 200-230 litres. A unit of the same height can accommodate five layers of spherical bottles according to the invention giving a total volume of 300 litres.

[0041] Most preferably, the concave recesses in the spherical bottles are located in three sides, i.e. one in the bottom and two in the side walls. The section planes of the segments of the recesses are thus most preferably perpendicular to one another, i.e. their principal directions are perpendicular relative to the axes x, y and z in a three-dimensional rectangular coordinate system. In this way the bottles also lock well relative to one another in the package. During packaging, it is easier to place the bottles on top of one another when the bottles have the alignment recesses and alignment protrusions described above. No intermediate trays are necessarily needed between the bottles because the bottles settle tightly against one another. Shaped packing trays can be used, however, because they align the bottles well relative to one another.

[0042] A bottle according to the invention can be provided with a barcode for an automatic bottle collection machine. In this case, the barcode is most preferably located on the spherical side surface of the bottle because the collection machine will spin the bottle to recognise the bottle by means of the barcode.

[0043] For packaging and stacking, it is preferable to use a stacking rack with the surfaces at a 45° angle relative to the horizontal plane. In this way the bottles can be lowered into place by hanging them by the neck.

LIST OF REFERENCE NUMBERS

[0044]

10	Bottle
11	Neck portion
12	Thread
15	Spherical surface
20	Recess in the side wall
21	Recess in the bottom
22	Alignment recess
23	Alignment protrusion
24	Cap
30	Stacking rack or packing box ,
31	Packing tray
40	Liquid
41	Liquid surface

Claims

1. A spherical bottle (10) having, in at least one side (15), a recess (20) or a notch so that another bottle in the vicinity of the bottle can be located so close that at least portions of the other bottle are, directly or via a spacing piece, in the said recess, **characterised in that**

- the recesses (20, 21) in three sides of the bottle (10) are concave so that the spherical surface (15) of a bottle in the vicinity of the said bottle can be fitted into the said recess, and
 - the curvature radii of the three recesses (20, 21) in the bottle (10) are equal to the curvature radius of the spherical surface (15) of the bottle.
2. A bottle (10) according to claim 1, **characterised in that**
- the neck portion (11) of the bottle (10) is directed obliquely to the side and upwards, and
 - the said recesses (20a, 20b) in the side wall (15) of the bottle (10) are in the vicinity of the neck portion (11) of the bottle, on both sides of the neck portion.
3. A bottle (10) according to claim 1 or 2, **characterised in that** the concave recesses in three sides of the bottle (10) are located so that the section planes of the segments of the recesses are perpendicular to one another, i.e. their principal directions are perpendicular relative to the axes x, y and z in a three-dimensional rectangular coordinate system.
4. A bottle (10) according to claim 1, 2 or 3, **characterised in that** there is a barcode on the spherical surface of the bottle (10).
5. A bottle (10) according to any one of claims 1-4, **characterised in**
- **that** an alignment recess (22) is arranged in the spherical surface (15) of the bottle (10) and on the opposite side of the bottle an alignment protrusion (23) is arranged, and
 - when the bottles (10) are placed on top of one another, the alignment protrusion (23) in the bottom of the topmost bottle goes into the alignment recess (22) on top of the lowermost bottle locking said bottles in place.
- Patentansprüche**
1. Eine kugelförmige Flasche (10), die auf mindestens einer Seite (15) eine Aussparung (20) oder Einbuchtung aufweist, so dass eine andere Flasche in der Nachbarschaft der Flasche so nahe platziert werden kann, dass sich zumindest Teile der anderen Flasche, entweder direkt oder mittels eines Abstandhalters, in der besagten Aussparung befinden, **dadurch gekennzeichnet, dass**
- die Aussparungen (20, 21) auf drei Seiten der Flasche (10) konkav sind, so dass die kugelförmige Oberfläche (15) einer Flasche in der Nachbarschaft der besagten Flasche in die besagte Aussparung eingepasst werden kann, und
 - die Krümmungsradien der drei Aussparungen (20, 21) in der Flasche (10) dem Krümmungsradius der kugelförmigen Oberfläche (15) der Flasche gleich sind.
2. Eine Flasche (10) gemäß Patentanspruch 1, **dadurch gekennzeichnet, dass**
- die Halspartie (11) der Flasche (10) schräg seitlich und nach oben ausgerichtet ist, und
 - die besagten Aussparungen (20a, 20b) in der Seitenwand (15) der Flasche (10) sich in der Nachbarschaft der Halspartie (11) der Flasche befinden, auf beiden Seiten der Halspartie
3. Eine Flasche (10) gemäß Patentanspruch 1 oder 2, **dadurch gekennzeichnet, dass** die konkaven Aussparungen auf den drei Seiten der Flasche (10) so platziert sind, dass die Schnittebenen der Aussparungssegmente senkrecht zueinander stehen, d. h. dass ihre Hauptrichtungen in einem dreidimensionalen rechtwinkligen Koordinatensystem senkrecht zu den Achsen x, y und z stehen.
4. Eine Flasche (10) gemäß Patentanspruch 1, 2 oder 3, **dadurch gekennzeichnet, dass** sich auf der kugelförmigen Oberfläche der Flasche (10) ein Strichcode befindet.
5. Eine Flasche (10) gemäß Patentanspruch 1-4, **dadurch gekennzeichnet, dass**
- in der kugelförmigen Oberfläche (15) der Flasche (10) eine Ausrichtungsvertiefung (22) und auf der entgegengesetzten Seite der Flasche ein Ausrichtungsvorsprung (23) angebracht ist, und
 - wenn die Flaschen (10) aufeinander platziert werden, der Ausrichtungsvorsprung (23) im Boden der oberen Flasche in die Ausrichtungsvertiefung (22) an der Oberseite der unteren Flasche hineingeht und die besagten Flaschen in ihrer Position arretiert.
- Revendications**
1. Une bouteille sphérique (10) comportant, dans au moins un côté (15), une encoche (20) ou un cran de façon à permettre de placer une autre bouteille à la proximité de la bouteille si près qu'au moins des portions de l'autre bouteille se trouvent, directement ou par l'intermédiaire d'une pièce d'espacement, dans ladite encoche, **caractérisée** en ce que
- les encoches (20, 21) dans trois côtés de la

bouteille (10) sont concaves de façon à permettre d'insérer la surface sphérique (15) d'une bouteille à la proximité de ladite bouteille dans ladite encoche, et

- les rayons de courbure des trois encoches (20, 21) dans la bouteille (10) sont égaux au rayon de courbure de la surface sphérique (15) de la bouteille. 5

2. Une bouteille (10) selon la revendication 1, **caractérisée** en ce que 10

- la portion du col (11) de la bouteille (10) est dirigée obliquement vers le côté et vers le haut, et 15

- lesdites encoches (20a, 20b) dans la paroi latérale (15) de la bouteille (10) sont à la proximité de la portion du col (11) de la bouteille, des deux côtés de la portion du col. 20

3. Une bouteille (10) selon la revendication 1 ou 2, **caractérisée** en ce que les encoches concaves dans trois côtés de la bouteille (10) sont placées de façon à ce que les plans de coupe des segments des encoches soient perpendiculaires l'un par rapport à l'autre, c.-à-d. que leurs directions principales soient perpendiculaires par rapport aux axes x, y et z dans un système de coordonnées rectangulaire tridimensionnel. 25

4. Une bouteille (10) selon la revendication 1, 2 ou 3, **caractérisée** en ce qu'il y a un code à barres sur la surface sphérique de la bouteille (10). 30

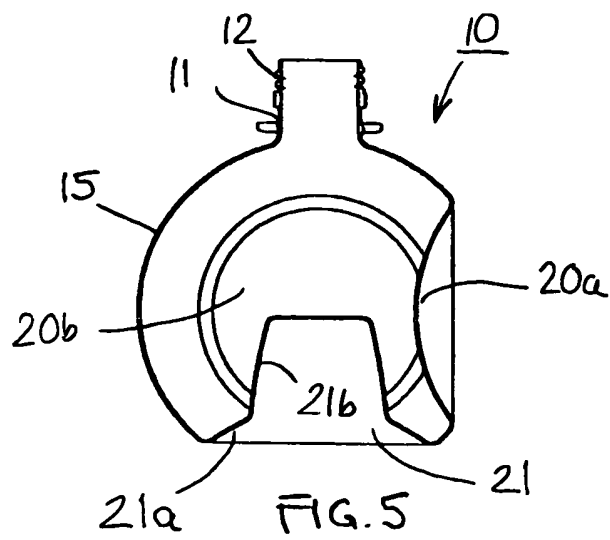
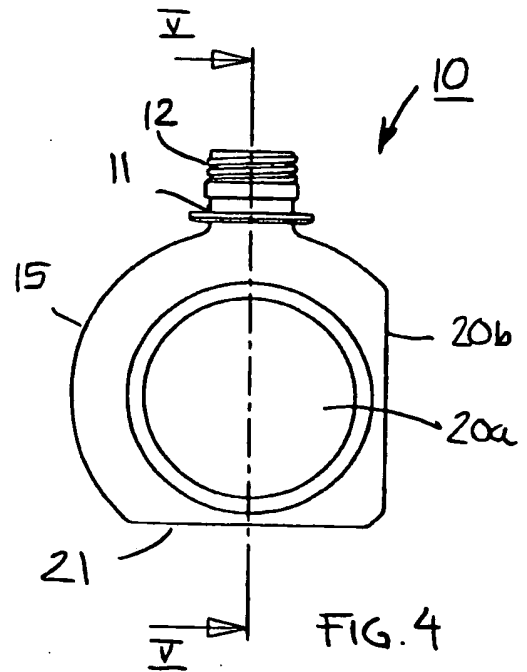
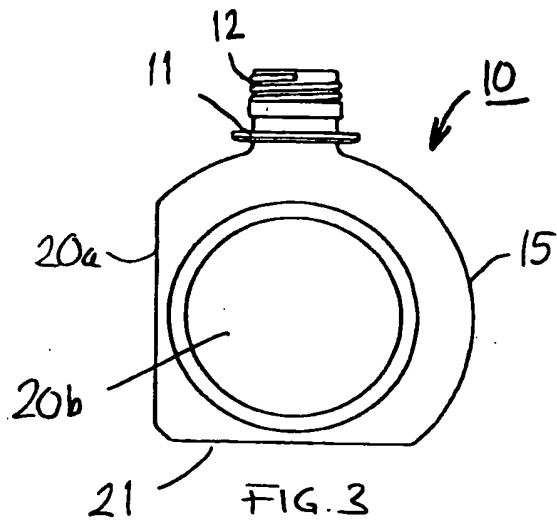
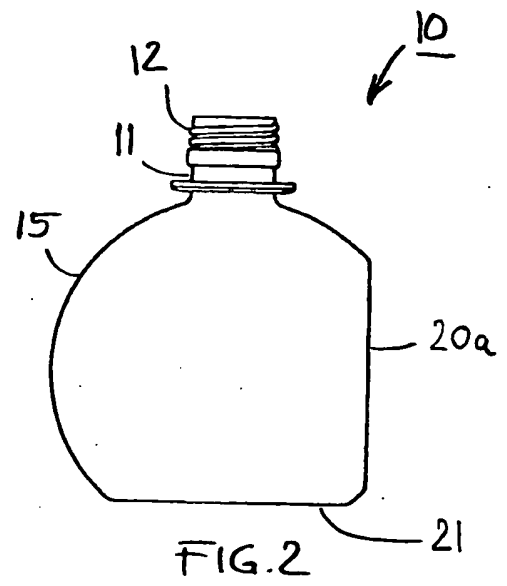
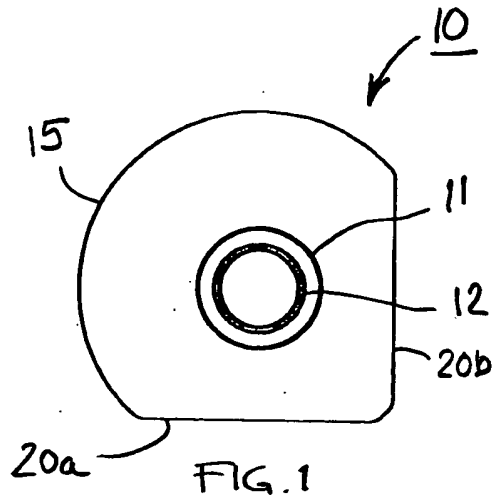
5. Une bouteille (10) selon l'une quelconque des revendications 1-4, **caractérisée** en ce 35

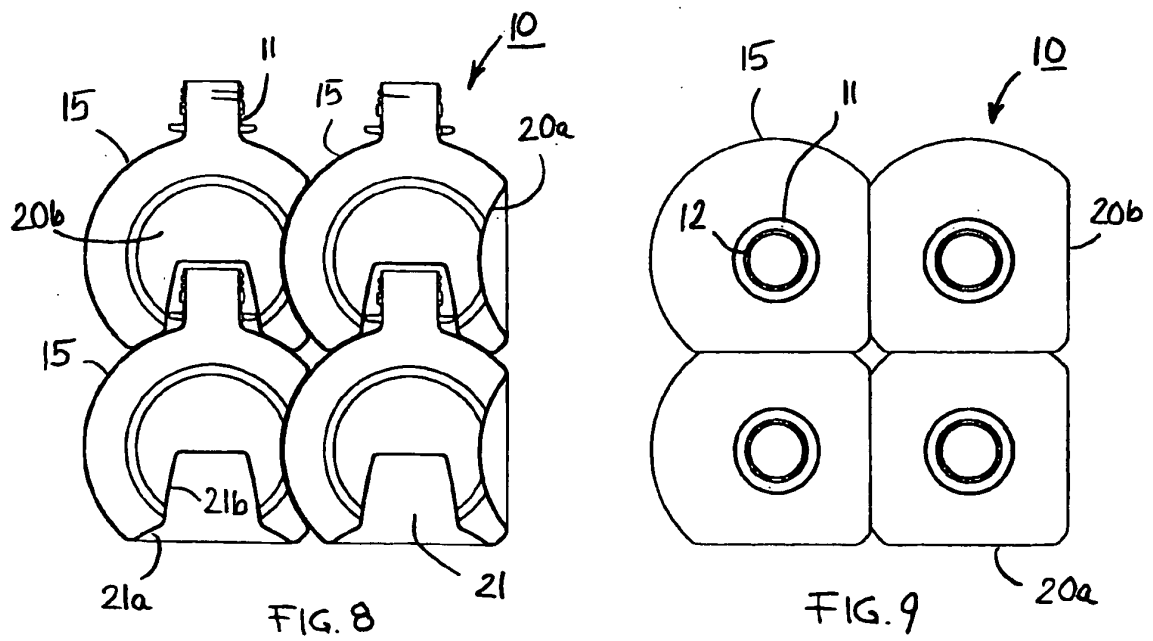
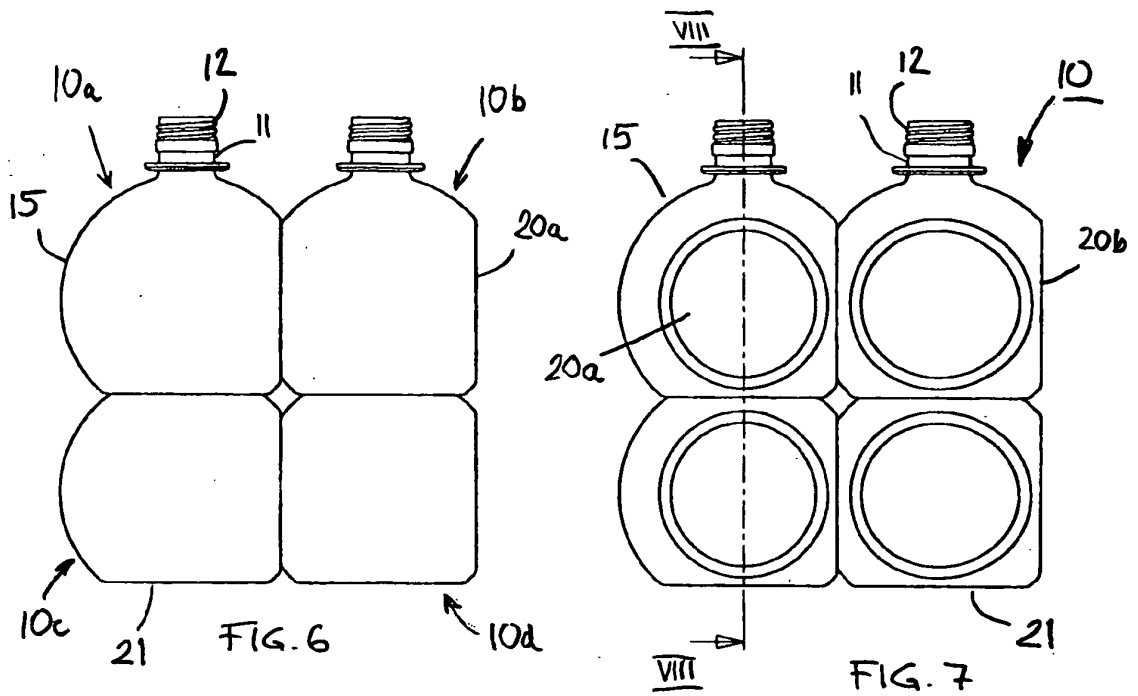
- qu'une encoche d'alignement (22) est prévue dans la surface sphérique (15) de la bouteille (10) et que sur le côté opposé de la bouteille, une saillie d'alignement (23) est prévue, et 40

- quand les bouteilles (10) sont placées l'une sur l'autre, la saillie d'alignement (23) au fond de la bouteille supérieure entre dans l'encoche d'alignement (22) sur le dessus de la bouteille inférieure, verrouillant lesdites bouteilles à leur place. 45

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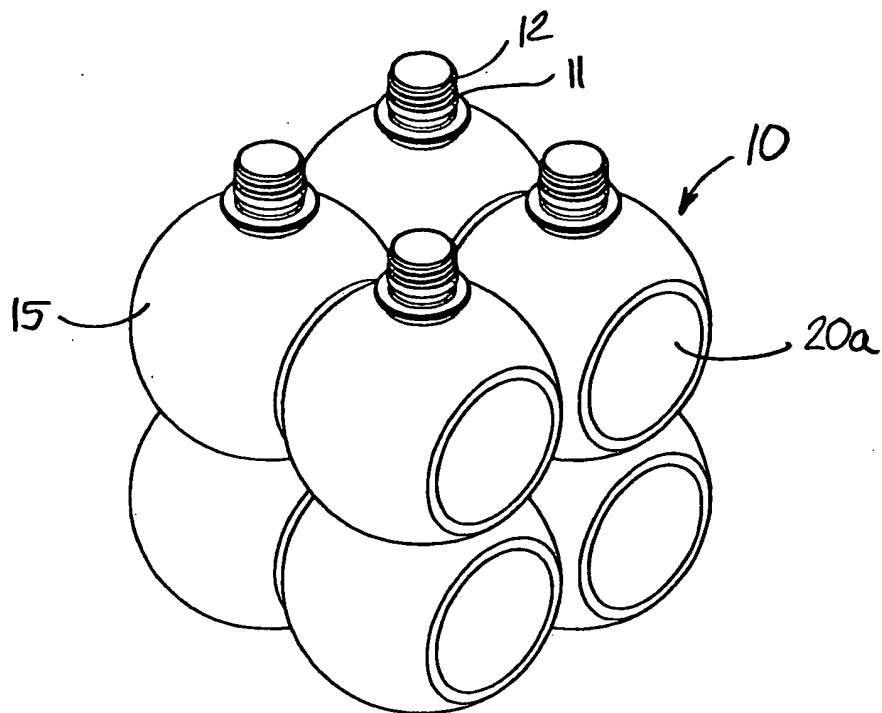


FIG. 10

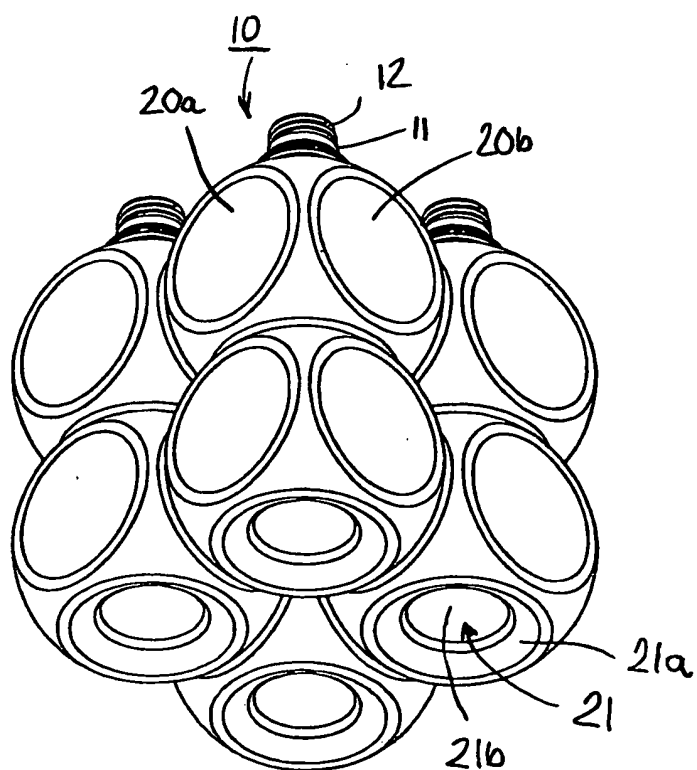


FIG. 11

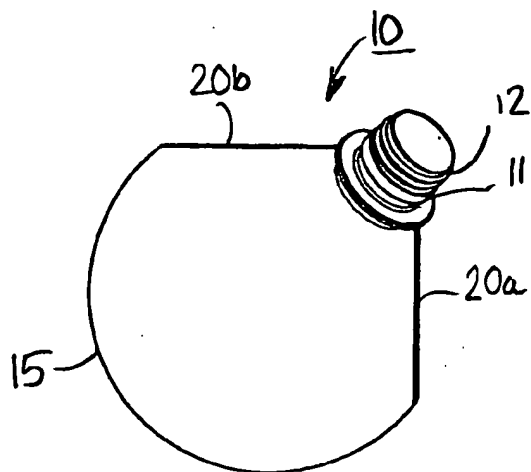


FIG. 12

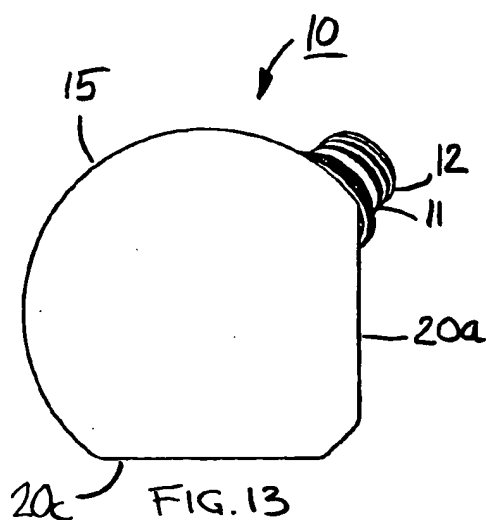


FIG. 13

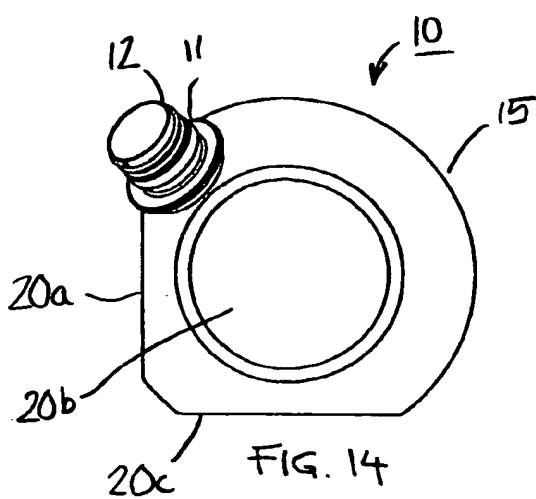


FIG. 14

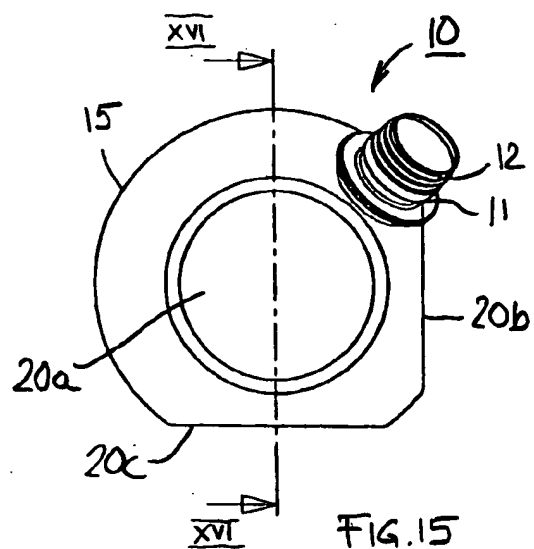


FIG. 15

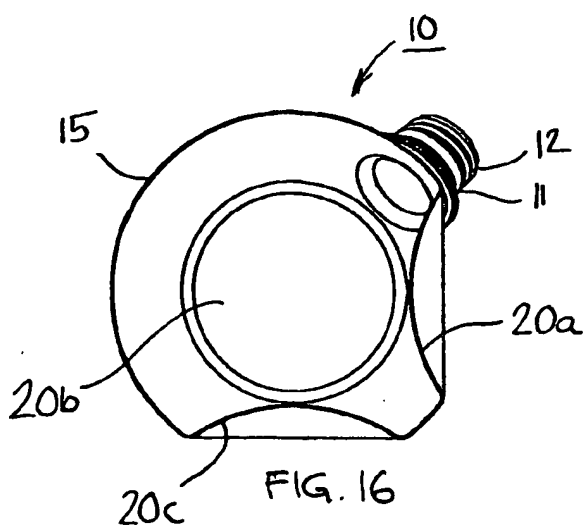
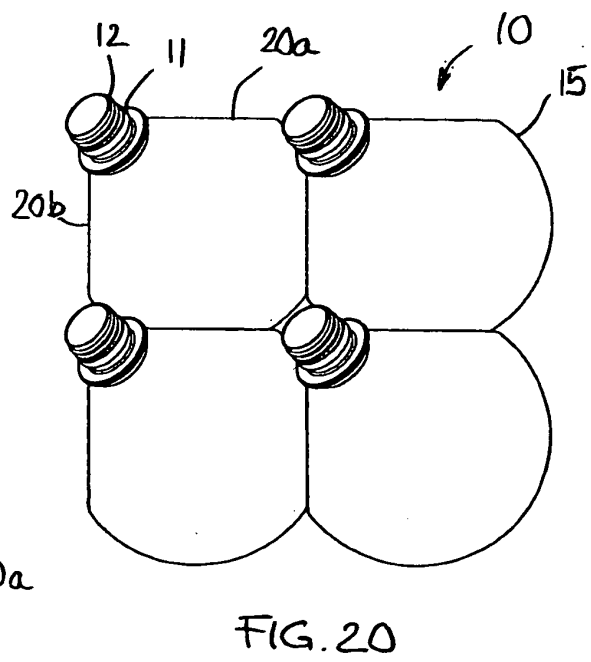
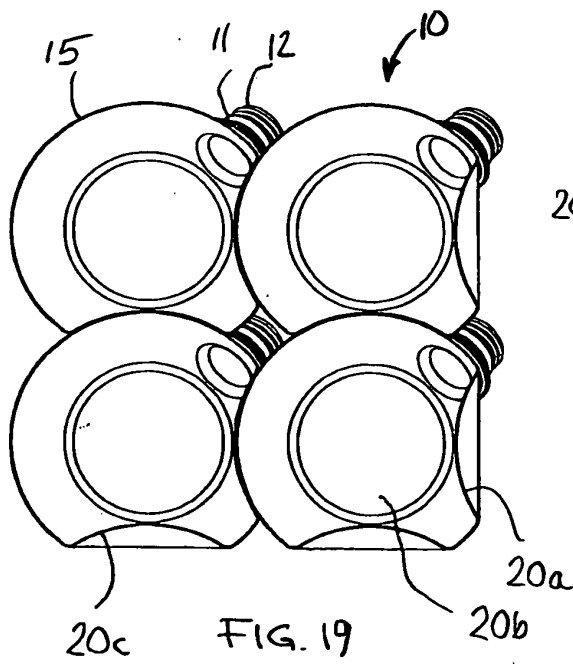
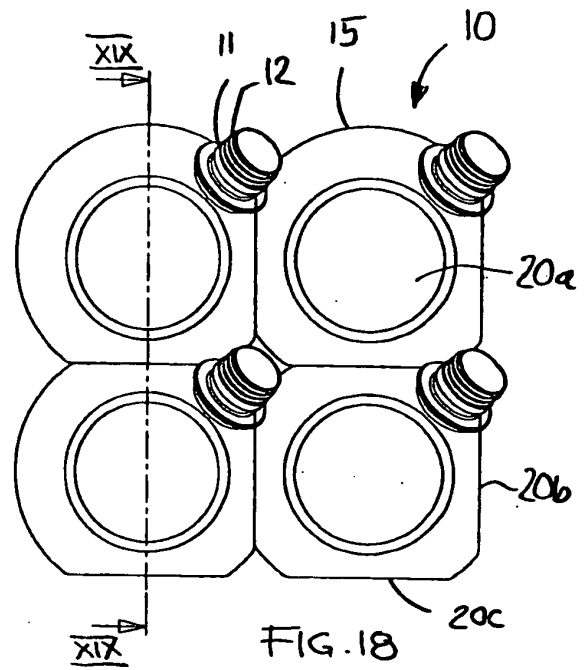
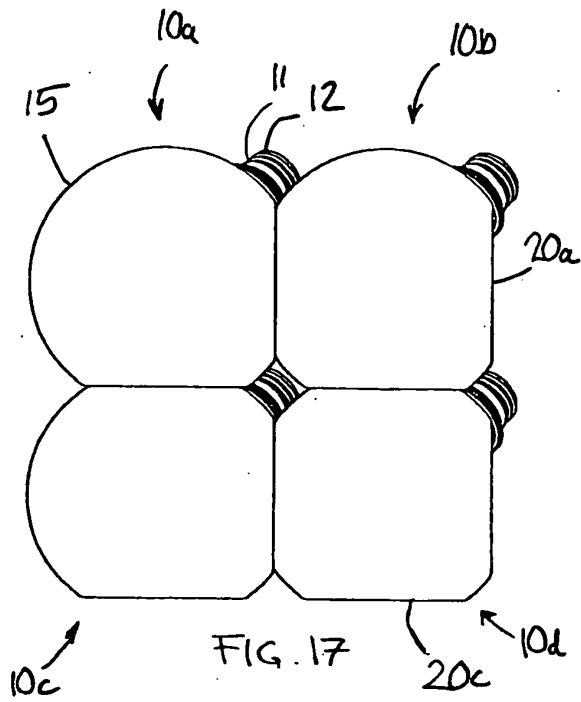


FIG. 16



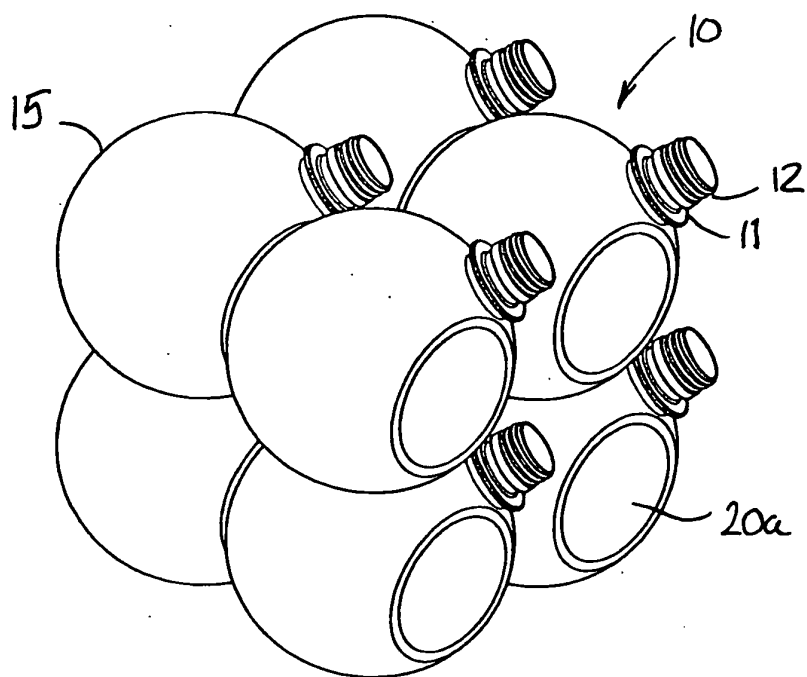


FIG. 21

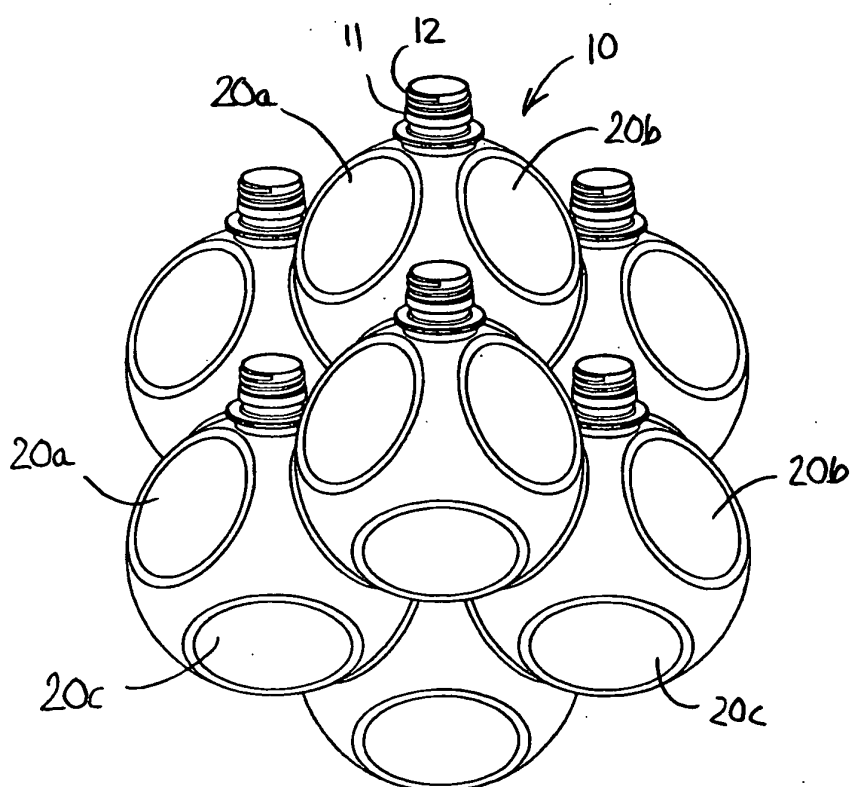


FIG. 22

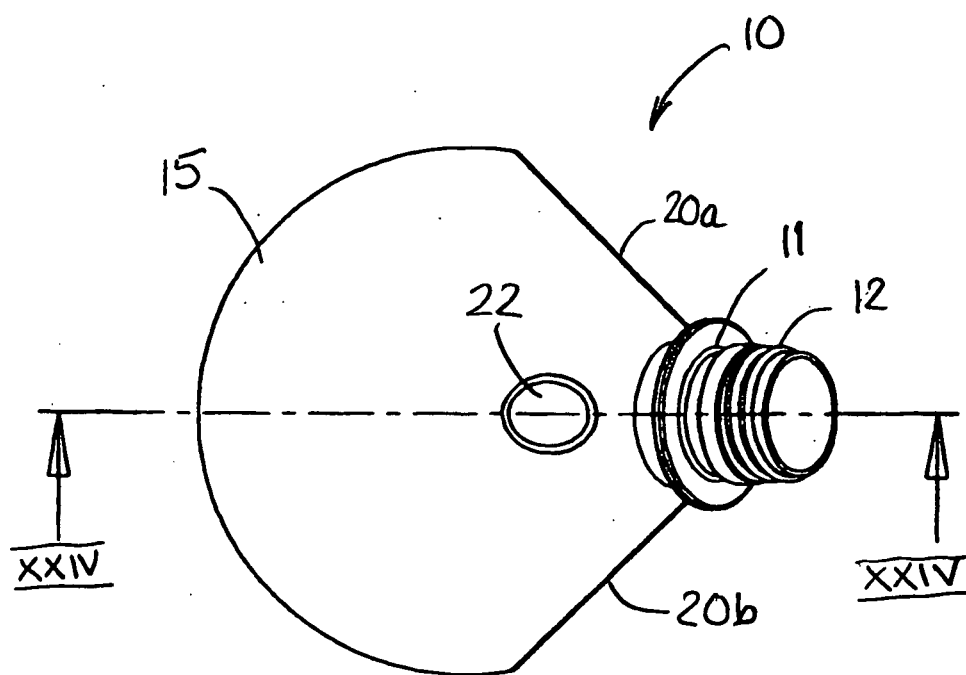


FIG. 23

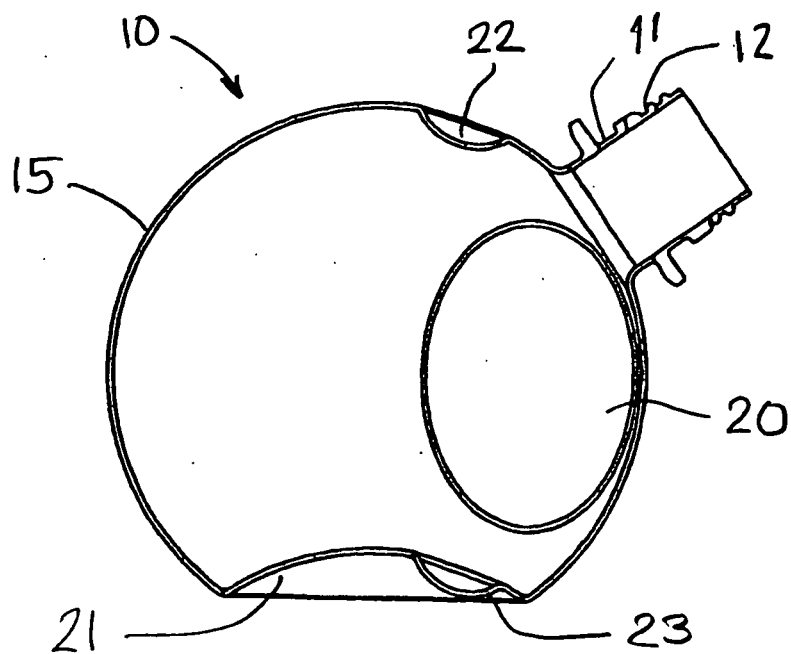


FIG. 24

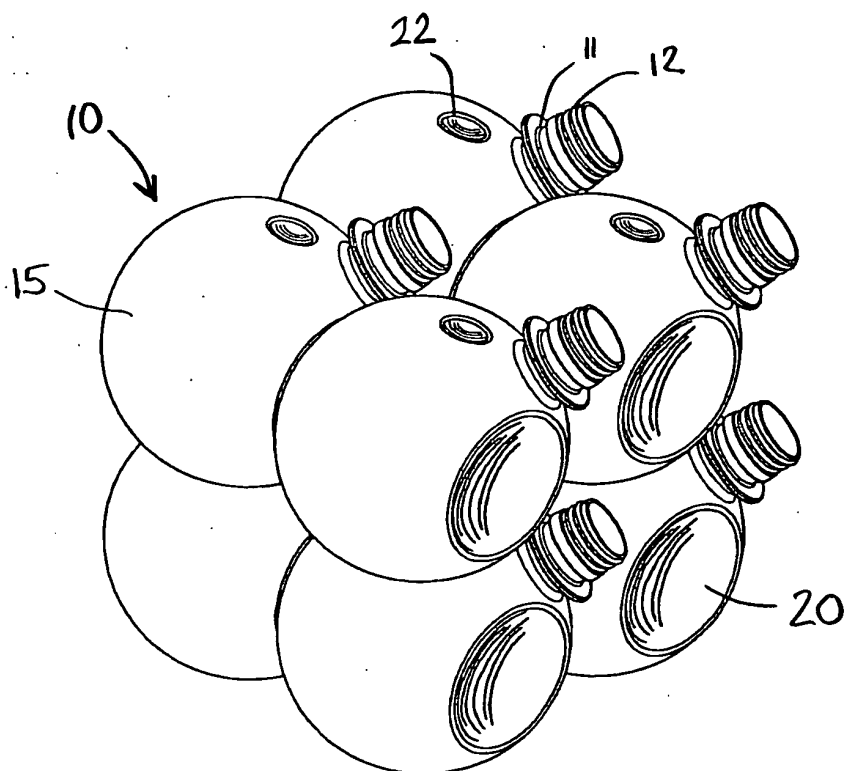


FIG. 25

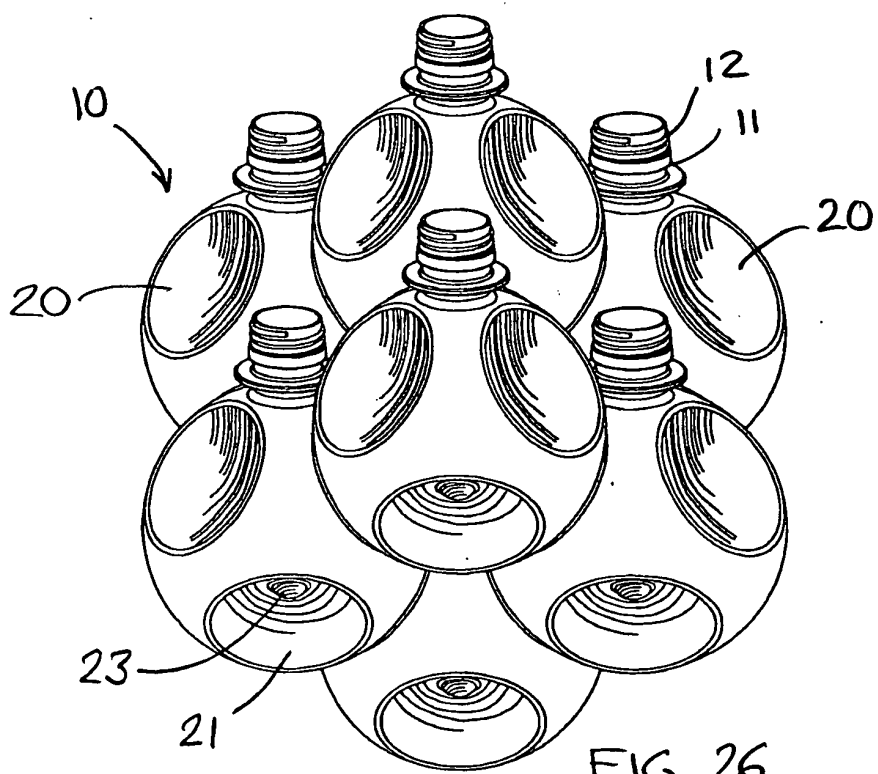
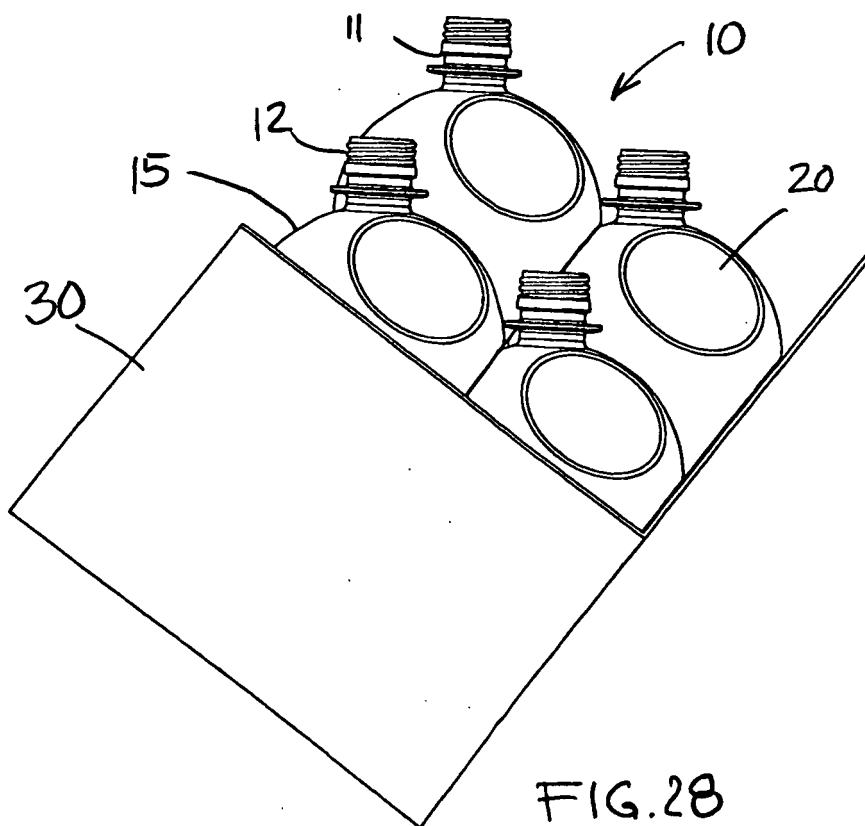
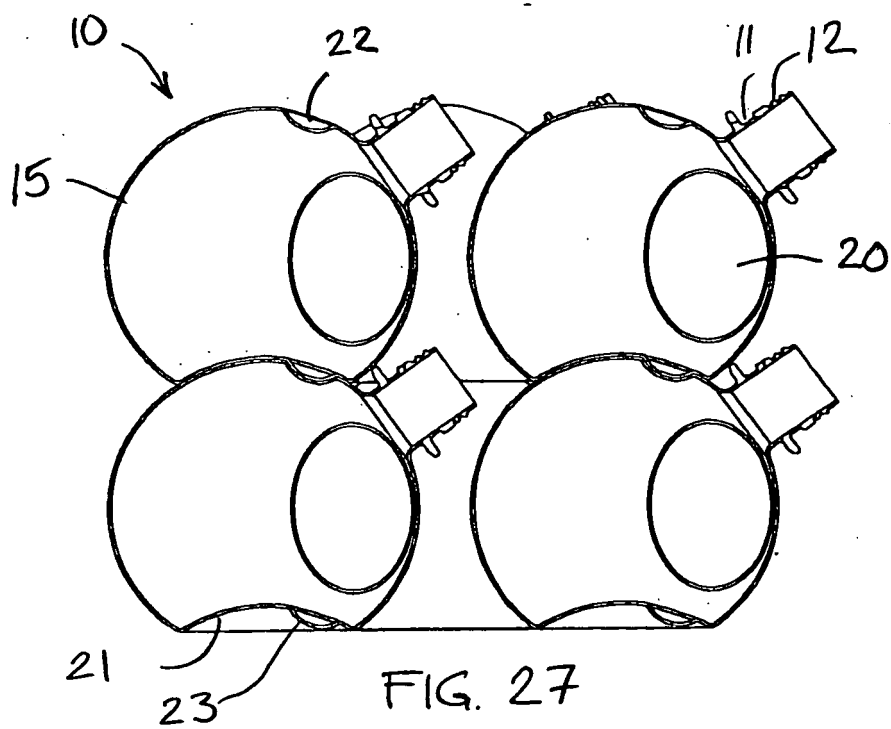
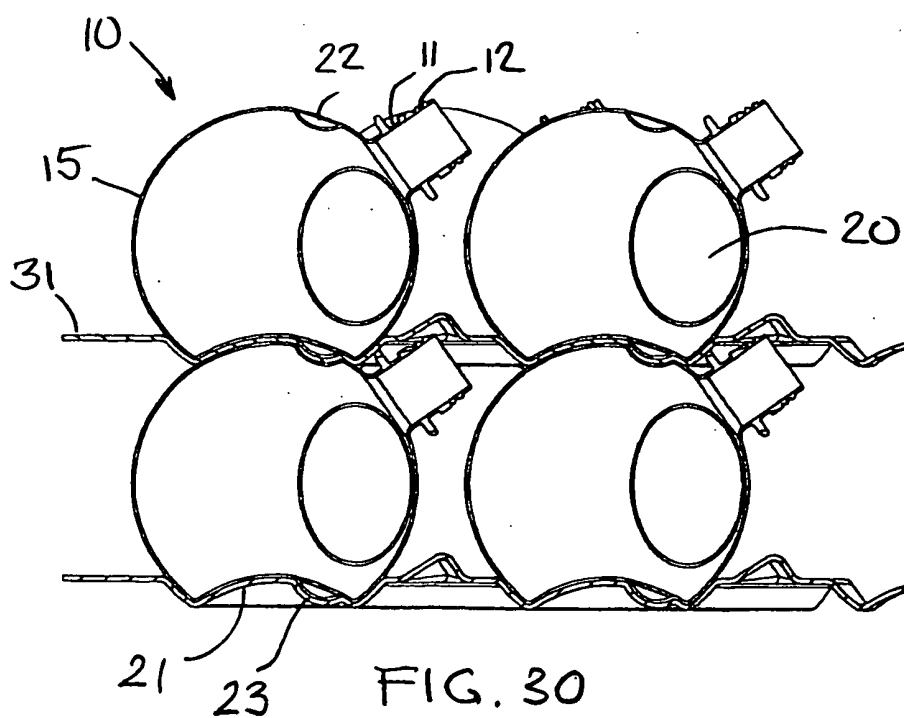
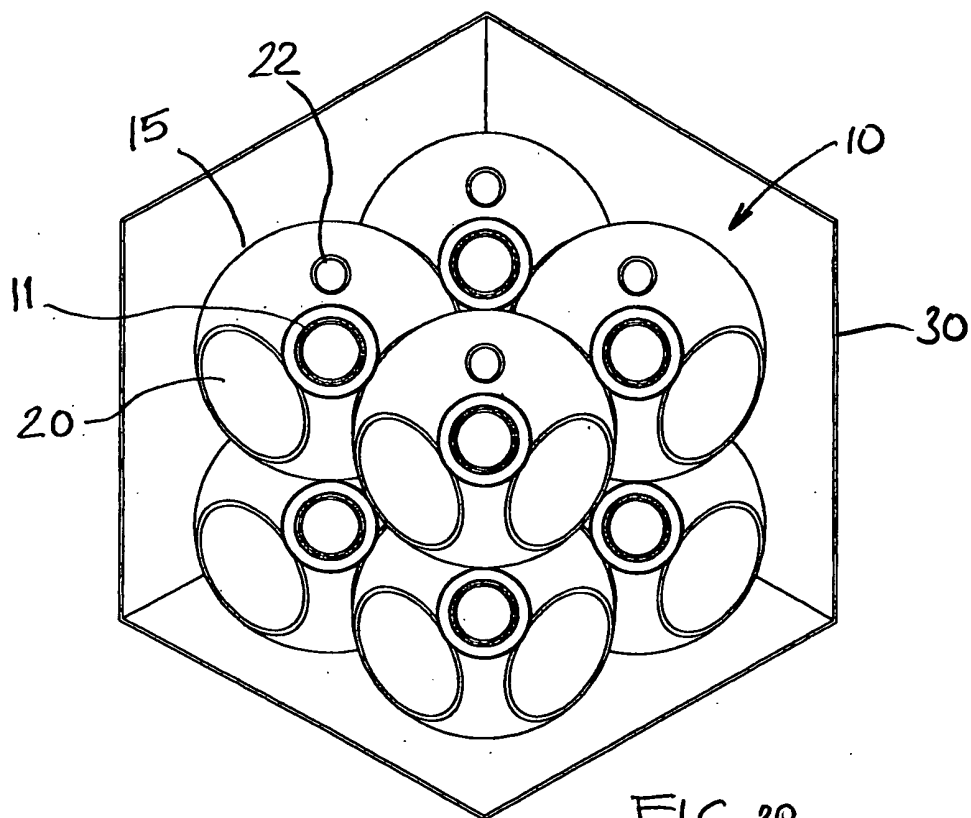
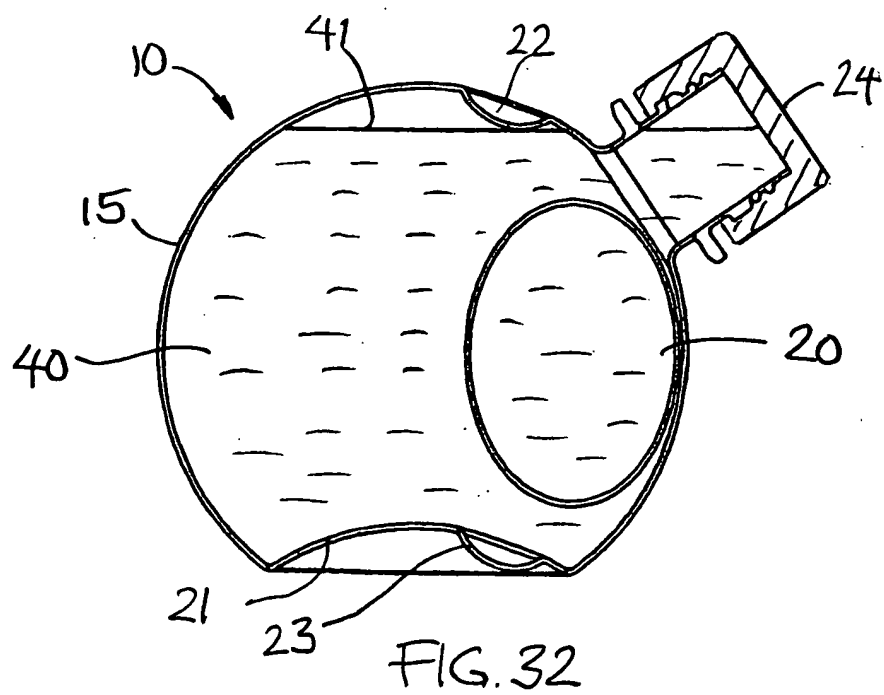
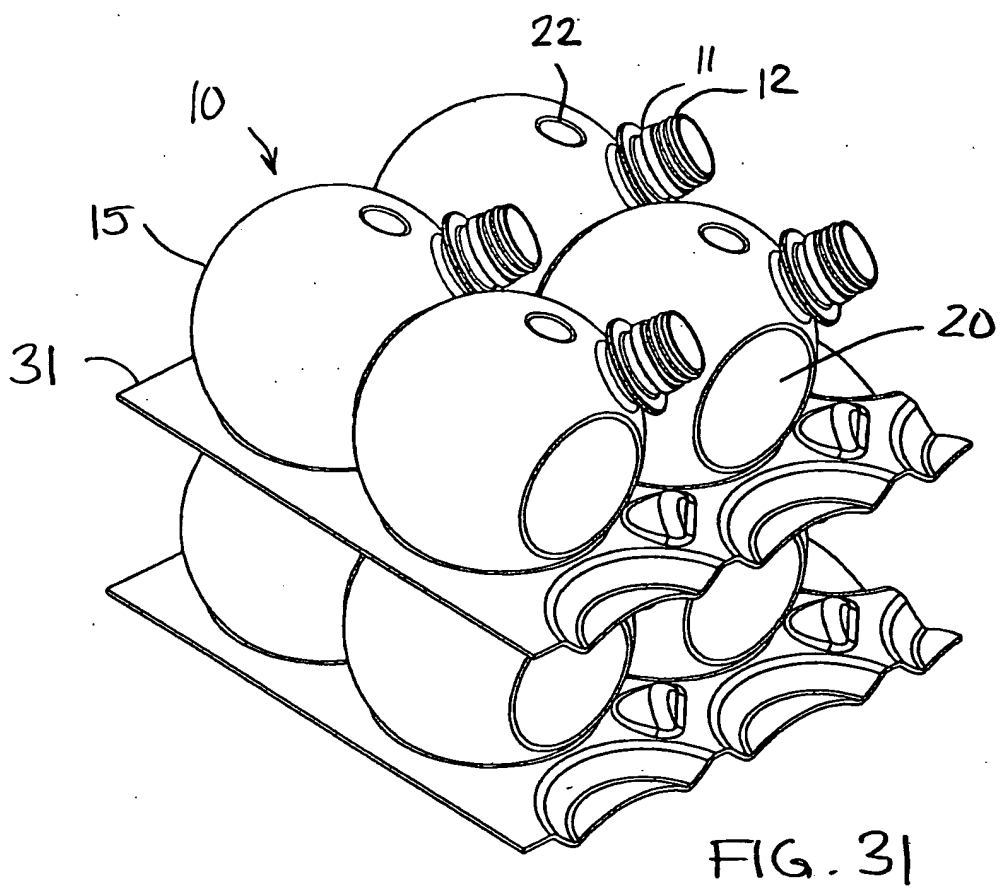


FIG. 26







REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 29907258 U1 [0003]
- DE 29600051 U1 [0003]
- FR 2063175 [0004]