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(54) **CONVENTIONALLY PRICED LIQUID CONTAINER WITH UNIQUE OPTICAL PROPERTIES**

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Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates to liquid containers having a lens or lens array formed in the sidewall of a container.

BACKGROUND OF THE INVENTION

[0002] Using lenticular effects is well known in the packaging industry, as are lenticular labels for fluid containers. The drawback to lenticular labels is the relative higher cost versus that of more conventional printing, and because the label must be thin, so do the lenses, necessitating a high lens count per inch, thus reducing the number of images which may be displayed and increasing problems for quality control.

[0003] Other lensing effects are known, such as in some liquor bottles, in order to be noticed behind a bar, the natural magnification of a curved bottle shows an inward facing image on a label on the opposite side. Many plastic water bottles have irregular surfaces so that the water within exhibits random lensing effects.

[0004] US Pat 5,494,445 to Sekiguchi et al discusses using a container assembly comprising an empty bottle with superimposed (combined) butterfly images on the back side wall and a grid on the opposite front side wall, having a printed transparent label as the grid, and another printed label on the back wall. However, this "grid" method suffers from the light loss inherent in such a "barrier strip" method.

[0005] US Pat 7,057,823B1 to Raymond discusses locating an image on one side of a container, which is imaged by, instead of a barrier strip, lenses molded into the opposite side. However, this requires extra glass or plastic to be used. For proper strength in a glass container, the thickness of the container, commonly on the order of 3/16" or more, must be at least as thick as the narrowest portion of the lenses, and the lenses, if covering a substantial portion of one side, add to the volume of material. Or, if the lenses are to be recessed to the same curved plane as the outside of the bottle, this requirement makes the whole bottle thicker. In plastic containers, which can be on the order of 5 or 6 thousandths of an inch, lenses would also require a substantial increase in the amount of plastic that is normally used, and would present fabrication problems in a blow-molded or injection-molded container, which require a uniform wall thickness.

[0006] There are disadvantages to both Sekiguchi's and Raymond's designs and methods. In Sekiguchi's method, the image is inferior to lenses, and in Raymond's technique, the manufacturing cost is higher than normal.

[0007] WO2011/014092 describes a method for obtaining optical (stereo and/or lenticular) effects in liquid media, and to a vessel for implementing said method. The method for producing a stereoscopic and/or lenticular image in a liquid contained in a vessel comprises form-

ing a stereo and/or lenticular template, which is placed on the wall of the vessel, and using an optical system for producing a stereo and/or lenticular image from the template when the latter is viewed through the liquid. The optical system comprises a lenticular lens-type raster and a liquid contained in a vessel. The lenticular lens-type raster is arranged on one wall of the vessel and the template on the opposite wall. The focal distance of each lens of the raster is calculated based on the location of the focus on the template.

SUMMARY OF THE INVENTION

[0008] The present invention provides an optimally clear and bright display, by means of shaping the container sides in the form of the surface of lenses or lens arrays, with a uniform thickness to the plastic or glass, which act in conjunction with the contained clear fluid to complete the lens effect. The manufacturing cost is no higher than that of an ordinary container and label allowing injection, blow molding, or other methods and does not require printing in register on lenticular, fly's eye, or other types of lenses. The shape of the contour of the surfaces of lenses or lens arrays is substantially more articulated than those of a rounded or curved bottle or container.

[0009] According to a first aspect of the invention, a clear-walled container for substantially transparent fluid is provided in accordance with claim 1. Optional or preferred features are set out in the dependent claims.

[0010] A first embodiment is a clear-sided container with at least two parallel sides, one of which is shaped as the surface of a lens or lens array, and whose focal plane lies at the back of an opposing, smooth, planar side. The opposing side may optionally have with a slightly indented area, to which is adhered a label, whose inner-facing side is printed with an image corresponding to the lens or lens array. Two such containers can be attached, planar sides together, to create a dual-display container, displaying images through both of its outer sides, and the combined indented areas may be made accessible from the bottom or side, allowing a double-sided image to be inserted, rather than first affixing a label to each container.

[0011] Such a dual-display container may also be formed as a single container, rather than putting two containers together, and made such that the clear fluid fills both halves, thus requiring only one mouth. In either the doubly, or singly formed, dual-display container, the indented section may have flat sides, or sides shaped in lens contours. If lens shaped, the indented section may be slightly enlarged, and the lenses have a focal plane at that of the inserted image, with the outer container sides being flat for viewing. If the hollow section's sides are flat, the outer sides of the container are formed as lens shapes whose focal length is at the plane of the inserted image.

[0012] In another embodiment the image is printed on

a thin, flexible sheet, which is inserted through the mouth of the container, and with the aid of spacers formed into either the image sheet or the container or itself, springs open to position itself parallel to, and at the focal plane of, the lenses created by the sides. The container and image may be plastic or any suitable material. The fluid may be tinted, carbonated, or viscous, so long as it is clear enough to exhibit optical properties necessary.

[0013] An additional embodiment relates to lenticular or other lens array displays rather than to conventional, practical containers. A flat or curved, substantially planar container, exhibiting the same properties as the above-described containers, may be made for image display only, with optionally much larger lenses than are normally used in lens arrays. In any case, cost would be substantially reduced both in the amount of plastic used, and shipping weight as well, since the lens may be shipped empty, and the clear liquid such as water may be filled on site. Such a display container would be especially economical in the case of very large, or very long focal length lenses, which would normally require more plastic because of their thickness, or lamination to a thick spacer. Such a liquid-filled display lens also allows insertion of a thin image disposed at the focal plane of the lenses, which by means of attached flotation devices, would be virtually weightless and easily moved by means of an attached ferrous metal piece, activated by an external magnet on a motor shaft or otherwise moved, creating a dramatic change in the image with no motion necessary on the part of the viewer. Additionally, a "cartesian diver" method of moving the image up and down by means of applying a slight pressure to the container and thereby changing the buoyancy of the floating image could create a novel toy or display. Such a liquid-filled lens would also be useful for outdoor displays, where sunlight would ordinarily heat the image, but whose heat would be dramatically reduced by the contained liquid.

[0014] Many different container shapes and configurations are possible including round, rectangular, oval, polygonal, and non-symmetric shapes as well, as long as the lens-shaped sides of the clear containers work in concert with the clear fluid contained to create the lens effect, beyond the natural effect produced by a rounded or curved bottle or container. Once used, the containers may be refilled with water or any clear liquid to display their images.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

Fig. 1 is a perspective view of an embodiment according to the invention;

Fig. 2 is a top view of an embodiment having double containers attached back to back, with each container having its own mouth and discrete interior region;

Fig. 3 is a top view of an embodiment also having double containers, but wherein the containers are joined internally and having a single mouth, and a perspective view of the same container;

Fig. 4 is another embodiment which has images spaced from the lens walls; and

Fig. 5 shows a schematic approximation of a single lens in a lens array, and the path taken by light rays when the container is filled with a clear liquid whose index of refraction is substantially the same as the container walls, compared to the path taken by light rays which travel through an empty container.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] Several embodiments of the invention will be described, but the invention is not limited to these embodiments.

[0017] Fig. 1 shows a perspective view of a substantially rectangular container "A", whose front, or first side 10 is formed in the shape of the surface of a lens array, which, acting in combination with the clear fluid 15 inside of it which completes its lens effect, has a focal plane at the outside surface of its rear, opposed or second side, at which plane is affixed a label E with a corresponding image. Optionally, an indent 20 may be provided for the label.

[0018] Fig. 2 shows a double-container A', made from two, attached containers A, whose labels E just fit in the combined, indented space between them, at the focal planes of the outer sides, which double container A' can hold two distinct liquids 15, such as oil and vinegar or shampoo and conditioner, wherein each of the two containers A are accessible only from its own container mouth 25. The indented spaces may be made in such a way as to allow either affixed labels, or a double-sided label, inserted after assembly.

[0019] Fig. 3 shows a single-formed version A" of the two attached containers A, wherein the interior spaces of the two containers A are joined together with facing indents 30 and having a single mouth 25 with a single, double-sided label E' inserted in the combined indents 30 as in the double container A' of Fig 2. The focal planes are at either side of the double sided label E'.

[0020] Fig. 4 shows a container A''' whose lensed sides focus within the container A''' at the plane 33 of an inserted image, printed on a flexible substrate 35, which is rolled or otherwise compressed, so as to be able to be inserted through the container mouth 25, and subsequently springs open, disposing itself at the focal plane 33 of the lensed sides, by means of spacers 40 formed into the flexible image or the container A'''. As for the containers A, A' and A" described above, the clear fluid 15 completes the lens effect.

[0021] Figure 5 shows an enlarged view of a single

lens element within an array, and the paths taken by light rays in a fluid-filled versus an empty container. The clear container wall "A*" is of a uniform thickness F, which, in a plastic bottle may be as thin as about 0.005". If the container, as shown in area "B", is empty, the light rays, "D" will pass through the wall with little deviation to their direction, since the change in refractive index of 1 from the outer air, to very approximately 1.5 of the glass or plastic (somewhat higher for PET plastic, commonly used in plastic bottles) is reversed when the rays pass from the wall back to air inside the container. The result is that the rays do not focus.

[0022] However, when the container is filled with a substantially index-matching liquid, as shown in area "C", the thin, curved surface of the container wall acts in conjunction with the contained fluid as a single lens, much like a "doublet" lens made of two types of glass, and the light rays focus as determined by the radius of curvature of the container surface. The container's label "E" on the side opposite the lens array, and whose image corresponds to the lens array and faces inward, lies at the array's focal plane. For the sake of the illustration the light rays D are shown traveling into the container, but of course travel in both directions and an observer on the array-side of the container will see label's inner image as an optical display showing three-dimensionality, motion, or any of those properties commonly associated with such lens arrays.

[0023] Although several embodiments have been described, the present invention is not limited to these embodiments, and other variations and modifications can be made as will occur to those in the art. The scope of the invention is defined only by way of the following claims.

Claims

1. A clear-walled container (A, A', A", A''') for a fluid (15), with thin first (10) and second parallel side walls of a uniform thickness, the first side wall (10) having an interior surface and an exterior surface each shaped in the contour of the surfaces of lenses and/or lens arrays, the exterior surface having a convex lens shape and the interior surface having a concave lens shape corresponding to the convex lens shape, the lens shapes substantially more articulated than those of a simply cylindrical or curved sided container, such that when the container is filled with a substantially transparent fluid (15) having a refractive index substantially similar to that of the walls, the outer curved surface of the first container wall (10), in conjunction with the contained fluid (15), acts as a single lens or lens array focusing light rays passing through the first side wall (10) and the contained fluid, at a focal plane on the second side wall.
2. The container (A, A', A", A''') according to claim 1, in

which at least one outer side of the container is shaped as a lens, or lens array whose focal plane is at the outer side of an opposite, smooth, planar side, where a label (E), bearing an image on its inner side, is affixed.

3. The container (A, A', A", A''') according to claim 2, in which sides of two containers are affixed together to form a dual container.

4. The container (A, A', A", A''') according to claim 3, in which:

(i) the sides are indented and contain a label (E), such that the label's outer side is on the same plane as the rest of the outer side of the container to facilitate affixing, and which container can hold two separate types of clear fluid (15), accessible through two separate container mouths (25); or

(ii) indented portions (30) are extended to reach one side to the container to define a thin cavity, such that a label (E') with an image on both sides may be inserted into the thin cavity, and optionally or preferably in which the walls of the indented areas (30) are lens-shaped so as to focus on the plane of the inserted label (E'), and whose opposite, outer sides are a smooth plane; or

(iii) the dual container is molded in a single piece such that the fluid (15) fills both halves and the container has only one mouth (25).

5. The container (A, A', A", A''') according to claim 1, in which:

(i) the outer sides of the container are shaped in the contour of the surfaces of lenses or lens arrays, whose lens effect is completed by the clear fluid (15) contained within, and whose focal plane lies within the volume of the fluid (15), and optionally or preferably in which an inserted image is printed with inks not soluble in the contained clear liquid (15), on a thin, flexible substrate (35), which, when inserted through the mouth (25) of the container, springs open outwardly into a shape which becomes disposed at the focal plane of the lens-shaped sides, with the help of spacers (40) formed into itself or the container sides; or

(ii) a flat or curved, substantially planar, liquid-filled container functions primarily as a display lens or lens array, rather than as an ordinary practical fluid container, being substantially thinner in respect to its width and height; or

(iii) the focal plane lies at an outer surface of an opposite, smooth, planar side; or

(iv) the focal plane lies within the container.

6. The container (A, A', A'', A''') according to claim 5 part (iv), in which an image is inserted into the clear fluid (15) at the focal plane of the lensed side, which image is provided with floatation devices, such that it can be moved, and optionally or preferably in which the image can be moved by at least one of magnetic or variable buoyancy means.
7. The container (A, A', A'', A''') according to claim 1, wherein the container defines a label location region for holding a label (E) with an image at the focus plane.
8. The container (A, A', A'', A''') according to claim 7:
- (i) wherein the focal plane is located at a second wall opposite from the first wall (10), wherein the label location region is located on the second wall; or
 - (ii) comprising two containers affixed together.
9. The container (A, A', A'', A''') according to claim 8 part (ii), wherein:
- (i) the two containers define discrete internal fluid containing regions which are not in fluid communication, and wherein the container has two mouths (25); or
 - (ii) the two containers define two internal fluid containing regions which are in fluid communication and wherein the container has one mouth (25); or
 - (iii) the label location region is located between the two containers, and optionally or preferably wherein the label location region holds a label (E') having images on both sides.
10. The container (A, A', A'', A''') according to claim 7, wherein the label location region is located within the container, spread from the first wall (10).
11. The container (A, A', A'', A''') according to claim 7, wherein the label location region is defined by an indented area (30) within the container.
12. The container (A, A', A'', A''') according to claim 10, wherein the label (E) contains an image printed with insoluble inks and wherein the label (e) is a thin flexible substrate (35) which is adapted to be inserted through a mouth (25) of the container.
13. The container (A, A', A'', A''') according to claim 12, wherein the substrate (35) is folded to be inserted through the container mouth (25), becomes unfolded after insertion to be essentially planar and dispersed at the focal plane, and optionally or preferably wherein the container has spacers (40) which locate the substrate (35) at the focal plane.
14. The container (A, A', A'', A''') according to claim 7, wherein:
- (i) the lenses with contained fluid (15) define a focal plane within the container; or
 - (ii) the distance between the first wall (10) and second wall is substantially less than the width and height of the container; or
 - (iii) the label location region is accessed from outside the container, to enable insertion of a label (E) after the container is formed; or
 - (iv) the lenses with contained fluid (15) define a focal plane at the outer surface of the second side; or
 - (v) the label location region is located within the container, and including a label (E), which floats within the container.
15. The container (A, A', A'', A''') according to claim 14 part (v):
- (i) wherein the label (E) has a magnetic property to enable movement of the label (E) by an exterior magnet; or
 - (ii) including a device to control the position of the label (E) within the label location region.

Patentansprüche

1. Klarwandiger Behälter (A, A', A'', A''') für ein Fluid (15) mit dünnen ersten (10) und zweiten parallelen Seitenwänden mit gleichförmiger Dicke, wobei die erste Seitenwand (10) eine interne Oberfläche und eine externen Oberfläche aufweist, die jeweils in der Kontur der Oberflächen von Linsen und/oder Linsengruppierungen geformt sind, wobei die externe Oberfläche eine konvexe Linsenform aufweist und die interne Oberfläche eine konkave Linsenform aufweist, die der konvexen Linsenform entspricht, wobei die Linsenformen im Wesentlichen stärker gegliedert als jene eines einfach zylindrischen oder gekrümmtseitigen Behälters sind, so dass, wenn der Behälter mit einem im Wesentlichen transparenten Fluid (15) mit einem Brechungsindex gefüllt wird, der im Wesentlichen demjenigen der Wände ähnlich ist, die gekrümmte Außenoberfläche der ersten Behälterwand (10) zusammenwirkend mit dem enthaltenen Fluid (15) als einzelne Linse oder Linsengruppierung wirkt, die Lichtstrahlen, die durch die erste Seitenwand (10) und das enthaltende Fluid hindurch passieren, an einer Brennebene auf der zweiten Seitenwand fokussiert.
2. Behälter (A, A', A'', A''') nach Anspruch 1, wobei mindestens eine Außenseite des Behälters als Linse oder Linsengruppierung geformt ist, deren Brennebene auf der Außenseite einer gegenüberliegenden

glatten planaren Seite ist, wo ein Etikett (E), das ein Bild auf seiner Innenseite trägt, angebracht ist.

3. Behälter (A, A', A'', A''') nach Anspruch 2, wobei Seiten der beiden Behälter aneinander angebracht sind, um einen Doppelbehälter zu bilden.

4. Behälter (A, A', A'', A''') nach Anspruch 3, wobei

(i) die Seiten eingebuchtet sind und ein Etikett (E) enthalten, so dass die Außenseite des Etiketts auf derselben Ebene wie der Rest der Außenseite des Behälters liegt, um das Anbringen zu erleichtern, und wobei der Behälter zwei separate Typen von transparentem Fluid (15) halten kann, die durch zwei separate Behälterhälse (25) zugänglich sind; oder

(ii) eingebuchtete Abschnitte (30) sich so erstrecken, dass sie eine Seite des Behälters erreichen, um einen dünnen Hohlraum zu definieren, so dass ein Etikett (E') mit einem Bild auf beiden Seiten in den dünnen Hohlraum eingesetzt werden kann, und wobei gegebenenfalls oder vorzugsweise die Wände der eingebuchteten Bereiche (30) linsenförmig sind, um so auf die Ebene des eingesetzten Etiketts (E') zu fokussieren, und dessen gegenüberliegende Außenseiten eine glatte Ebene sind; oder

(iii) der Doppelbehälter einstückig geformt ist, so dass das Fluid (15) beide Hälften füllt und der Behälter nur einen Hals (25) aufweist.

5. Behälter (A, A', A'', A''') nach Anspruch 1, wobei:

(i) die Außenseiten des Behälters in der Kontur der Oberflächen von Linsen oder Linsengruppierungen geformt sind, deren Linseneffekt durch das darin enthaltene transparente Fluid (15) komplettiert wird, und deren Brennebene innerhalb des Volumens des Fluids (15) liegt, und wobei gegebenenfalls oder bevorzugt ein eingesetztes Bild mit Tinten, die in der enthaltenen klaren Flüssigkeit (15) nicht löslich sind, auf einem dünnen flexiblen Substrat (35) gedruckt ist, das, wenn es durch den Hals (25) des Behälters eingesetzt wird, auswärts in eine Formgebung aufspringt, die mithilfe von Distanzstücken (40), die eigenständig oder in den Behälterseiten gebildet sind, an der Brennebene der linsenförmigen Seiten angeordnet wird; oder

(ii) ein flacher oder gekrümmter, im Wesentlichen planarer, flüssigkeitsgefüllter Behälter vorwiegend als Anzeigelinse oder Linsengruppierung fungiert, statt als gewöhnlicher nützlicher Fluidbehälter, und in Bezug auf seine Breite und Höhe wesentlich dünner ist; oder

(iii) die Brennebene außerhalb einer Außenoberfläche einer gegenüberliegenden, glatten,

planaren Seite liegt; oder

(iv) die Brennebene innerhalb des Behälters liegt.

6. Behälter (A, A', A'', A''') nach Anspruch 5, Teil (iv), wobei ein Bild an der Brennebene der linsenhaltigen Seite in das transparente Fluid (15) eingesetzt wird, wobei das Bild mit Schwebevorrichtungen ausgestattet ist, so dass es bewegt werden kann, und wobei das Bild gegebenenfalls oder vorzugsweise durch mindestens eines von magnetischen oder variablen Auftriebsmitteln bewegt werden kann.

7. Behälter (A, A', A'', A''') nach Anspruch 1, wobei der Behälter eine Etikettanordnungsregion zum Halten eines Etiketts (E) mit einem Bild auf der Brennebene definiert.

8. Behälter (A, A', A'', A''') nach Anspruch 7:

(i) wobei die Brennebene sich an einer zweiten Wand gegenüber der ersten Wand (10) befindet, wobei die Etikettanordnungsregion sich auf der zweiten Wand befindet; oder

(ii) der zwei aneinander angebrachte Behälter umfasst.

9. Behälter (A, A', A'', A''') nach Anspruch 8, Teil (ii), wobei:

(i) die beiden Behälter diskrete innere fluidhaltige Regionen definieren, die nicht in fließtechnischer Kommunikation sind, und wobei der Behälter zwei Hälse (25) aufweist; oder

(ii) die beiden Behälter zwei interne fluidhaltige Regionen definieren, die in fließtechnischer Kommunikation sind, und wobei der Behälter einen Hals (25) aufweist; oder

(iii) die Etikettanordnungsregion sich zwischen den beiden Behältern befindet, und wobei gegebenenfalls oder vorzugsweise die Etikettanordnungsregion ein Etikett (E') mit Bildern auf beiden Seiten hält.

10. Behälter (A, A', A'', A''') nach Anspruch 7, wobei die Etikettanordnungsregion sich innerhalb des Behälters von der ersten Wand (10) beabstandet befindet.

11. Behälter (A, A', A'', A''') nach Anspruch 7, wobei die Etikettanordnungsregion durch einen eingebuchteten Bereich (30) innerhalb des Behälters definiert ist.

12. Behälter (A, A', A'', A''') nach Anspruch 10, wobei das Etikett (E) ein Bild enthält, das mit unlöslichen Tinten gedruckt ist, und wobei das Etikett (e) ein dünnes flexibles Substrat (35) ist, das geeignet ist, um durch einen Hals (25) des Behälters eingesetzt zu werden.

13. Behälter (A, A', A", A''') nach Anspruch 12, wobei das Substrat (35) gefaltet wird, um durch den Behälterhals (25) eingesetzt zu werden, sich nach Einsetzen entfaltet, um im Wesentlichen planar zu sein und an der Brennebene verteilt zu werden, und wobei der Behälter gegebenenfalls oder vorzugsweise Distanzstücke (40) aufweist, die das Substrat (35) an der Brennebene anordnen.

14. Behälter (A, A', A", A''') nach Anspruch 7, wobei:

(i) die Linsen mit enthaltenem Fluid (15) eine Brennebene innerhalb des Behälters definieren; oder

(ii) der Abstand zwischen der ersten Wand (10) und der zweiten Wand im Wesentlichen kleiner als die Breite und Höhe des Behälters ist; oder

(iii) auf die Etikettanordnungsregion von außerhalb des Behälters zugegriffen wird, um Einsetzen eines Etiketts (E) zu ermöglichen, nachdem der Behälter gebildet worden ist; oder

(iv) die Linsen mit enthaltenem Fluid (15) eine Brennebene an der Außenoberfläche der zweiten Seite definieren; oder

(v) die Etikettanordnungsregion innerhalb des Behälters angeordnet ist und ein Etikett (E) einschließt, das innerhalb des Behälters schwebt.

15. Behälter (A, A', A", A''') nach Anspruch 14, Teil (v) :

(i) wobei das Etikett (E) eine magnetische Eigenschaft aufweist, um Bewegung des Etiketts (E) durch einen externen Magneten zu ermöglichen; oder

(ii) einschließlich einer Vorrichtung zur Steuerung der Position des Etiketts (E) innerhalb der Etikettanordnungsregion.

Revendications

1. Récipient à parois transparentes (A, A', A", A''') pour un fluide (15), comportant des première (10) et seconde parois latérales fines d'épaisseur uniforme, la première paroi latérale (10) ayant une surface intérieure et une surface extérieure chacune présentant la forme du contour des surfaces de lentilles et/ou de réseaux de lentilles, la surface extérieure présentant une forme de lentille convexe et la surface intérieure présentant une forme de lentille concave correspondant à la forme de lentille convexe, les formes de lentilles étant sensiblement plus articulées que celles d'un récipient à côtés simplement cylindriques ou courbes, de sorte que lorsque le récipient est rempli d'un fluide sensiblement transparent (15) présentant un indice de réfraction sensiblement similaire à celui des parois, la surface extérieure courbe de la première paroi (10) du récipient, en conjonction avec

le fluide contenu (15), joue le rôle de lentille ou de réseau de lentilles unique focalisant les rayons de lumière passant à travers la première paroi latérale (10) et le fluide contenu, à un plan focal sur la seconde paroi latérale.

2. Récipient (A, A', A", A''') selon la revendication 1, dans lequel au moins un côté extérieur du récipient est en forme de lentille ou de réseau de lentilles dont le plan focal est sur le côté extérieur d'un côté planaire lisse opposé, où est fixée une étiquette (E) portant une image sur son côté intérieur.

3. Récipient (A, A', A", A''') selon la revendication 2, dans lequel les côtés de deux récipients sont fixés ensemble pour former un récipient double.

4. Récipient (A, A', A", A''') selon la revendication 3, dans lequel :

(i) les côtés sont en zig-zag et contiennent une étiquette (E), de sorte que le côté extérieur de l'étiquette est sur le même plan que le reste du côté extérieur du récipient pour faciliter la fixation, et lequel récipient peut contenir deux types séparés de fluide transparent (15), accessibles par l'intermédiaire de deux embouchures de récipient séparées (25) ; ou

(ii) des parties en zig-zag (30) sont étendues pour atteindre un côté sur le récipient pour définir une cavité mince, de sorte qu'une étiquette (E') avec une image sur les deux côtés peut être insérée dans la cavité fine, et en option ou de préférence dans lequel les parois des zones en zig-zag (30) sont en forme de lentille de façon à focaliser sur le plan de l'étiquette insérée (E'), et dont les côtés extérieurs opposés sont un plan lisse ; ou

(iii) le récipient double est moulé en une seule pièce de sorte que le fluide (15) remplit les deux moitiés et le récipient a une seule embouchure (25).

5. Récipient (A, A', A", A''') selon la revendication 1, dans lequel :

(i) les côtés extérieurs du récipient sont formés dans le contour des surfaces des lentilles ou réseaux de lentilles, dont l'effet de lentille est complété par le fluide transparent (15) contenu à l'intérieur, et dont le plan focal se trouve à l'intérieur du volume du fluide (15), et en option ou de préférence dans lequel une image insérée est imprimée avec des encres non solubles dans le liquide transparent contenu (15), sur un substrat flexible fin (35) qui, lorsqu'il est inséré à travers l'embouchure (25) du récipient, ressort vers l'extérieur en une forme qui devient disposée sur le

- plan focal des côtés en forme de lentille, à l'aide d'espaceurs (40) formés en lui-même ou sur les côtés du récipient ; ou
- (ii) un récipient plat ou courbe sensiblement planaire rempli de liquide fonctionne principalement comme une lentille ou un réseau de lentilles d'affichage, plutôt que comme un récipient de fluide pratique ordinaire, étant sensiblement plus fin relativement à sa largeur et sa hauteur ; ou
- (iii) le plan focal se trouve sur une surface extérieure d'un côté planaire lisse opposé ; ou
- (iv) le plan focal se trouve dans le récipient.
6. Récipient (A, A', A'', A''') selon la revendication 5 partie (iv), dans lequel une image est insérée dans le fluide transparent (15) sur le plan focal du côté lentille, laquelle image est munie de dispositifs de flottaison, de sorte qu'elle peut être déplacée, et en option ou de préférence dans lequel l'image peut être déplacée par au moins l'un de moyens magnétiques et de moyens de flottaison variable.
7. Récipient (A, A', A'', A''') selon la revendication 1, dans lequel le récipient définit une région d'emplacement d'étiquette destinée à contenir une étiquette (E) avec une image sur le plan focal.
8. Récipient (A, A', A'', A''') selon la revendication 7 :
- (i) dans lequel le plan focal est situé sur une seconde paroi opposée à la première paroi (10), dans lequel la région d'emplacement d'étiquette est située sur la seconde paroi ; ou
- (ii) comprenant deux récipients fixés ensemble.
9. Récipient (A, A', A'', A''') selon la revendication 8 partie (ii), dans lequel :
- (i) les deux récipients définissent des régions discrètes internes contenant le fluide qui ne sont pas en communication fluide, et dans lequel le récipient a deux embouchures (25) ; ou
- (ii) les deux récipients définissent deux régions internes contenant le fluide qui sont en communication fluide et dans lequel le récipient a une embouchure (25) ; ou
- (iii) la région d'emplacement d'étiquette est située entre les deux récipients, et en option ou de préférence dans lequel la région d'emplacement d'étiquette contient une étiquette (E') ayant des images sur les deux côtés.
10. Récipient (A, A', A'', A''') selon la revendication 7, dans lequel la région d'emplacement d'étiquette est située à l'intérieur du récipient, s'étendant depuis la première paroi (10).
11. Récipient (A, A', A'', A''') selon la revendication 7, dans lequel la région d'emplacement d'étiquette est définie par une zone en zig-zag (30) à l'intérieur du récipient.
12. Récipient (A, A', A'', A''') selon la revendication 10, dans lequel l'étiquette (E) contient une image imprimée avec des encres insolubles et dans lequel l'étiquette (E) est un substrat flexible fin (35) qui est conçu pour être inséré à travers une embouchure (25) du récipient.
13. Récipient (A, A', A'', A''') selon la revendication 12, dans lequel le substrat (35) est plié pour être inséré à travers l'embouchure (25) du récipient, se déplie après l'insertion pour devenir essentiellement planaire et dispersé sur le plan focal, et en option ou de préférence dans lequel le récipient a des espaceurs (40) qui placent le substrat (35) sur le plan focal.
14. Récipient (A, A', A'', A''') selon la revendication 7, dans lequel :
- (i) les lentilles avec le fluide contenu (15) définissent un plan focal à l'intérieur du récipient ; ou
- (ii) la distance entre la première paroi (10) et la seconde paroi est sensiblement inférieure à la largeur et la hauteur du récipient ; ou
- (iii) la région d'emplacement d'étiquette est accessible depuis l'extérieur du récipient, pour permettre l'insertion d'une étiquette (E) après que le conteneur a été formé ; ou
- (iv) les lentilles avec le fluide contenu (15) définissent un plan focal sur la surface extérieure du second côté ; ou
- (v) la région d'emplacement d'étiquette est située à l'intérieur du récipient, et inclut une étiquette (E) qui flotte à l'intérieur du récipient.
15. Récipient (A, A', A'', A''') selon la revendication 14 partie (v) :
- (i) dans lequel l'étiquette (E) possède une propriété magnétique pour permettre le déplacement de l'étiquette (E) au moyen d'un aimant extérieur ; ou
- (ii) incluant un dispositif de commande de la position de l'étiquette (E) à l'intérieur de la région d'emplacement d'étiquette.

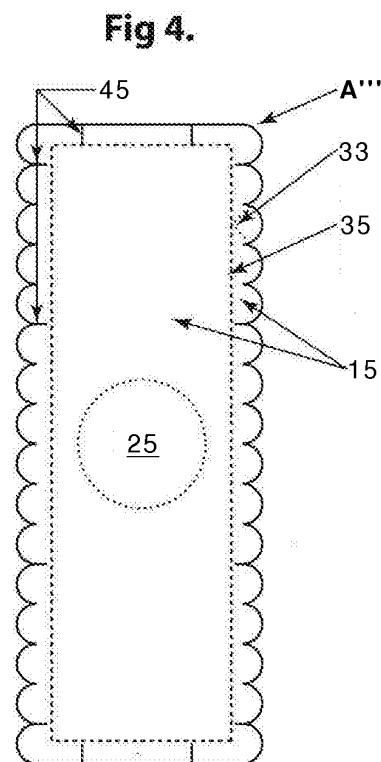
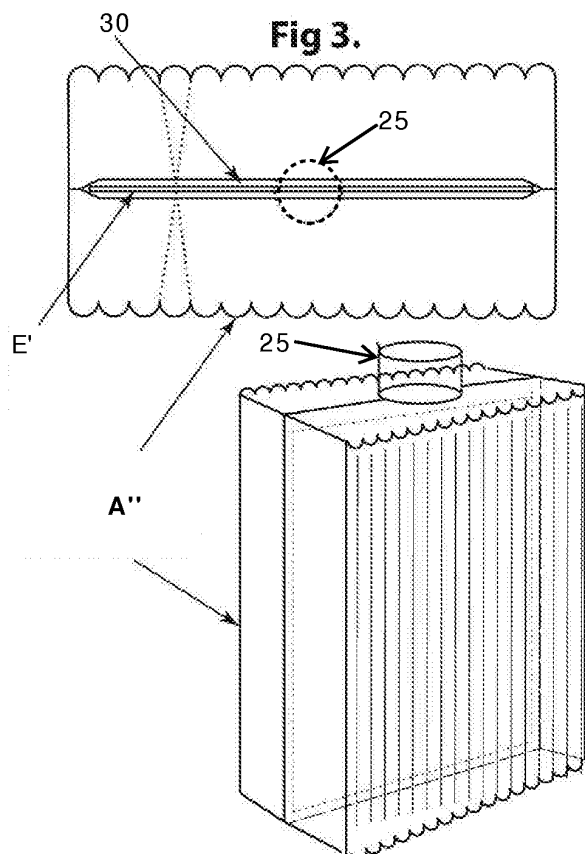
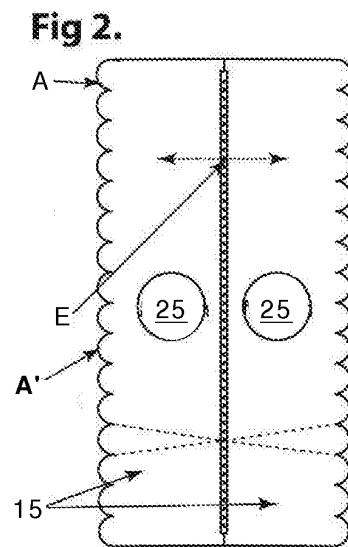
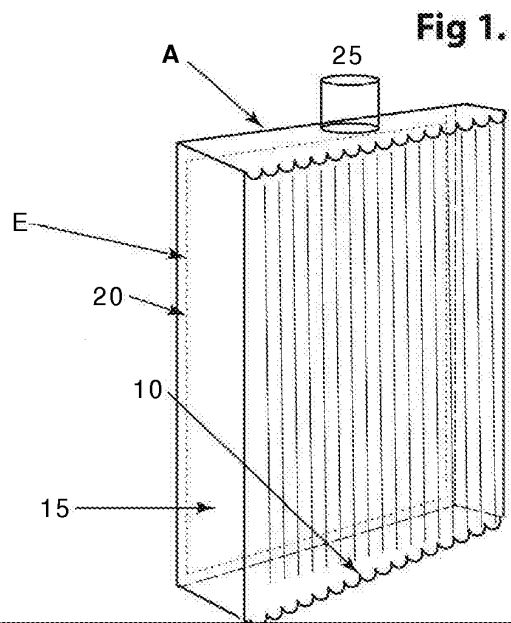
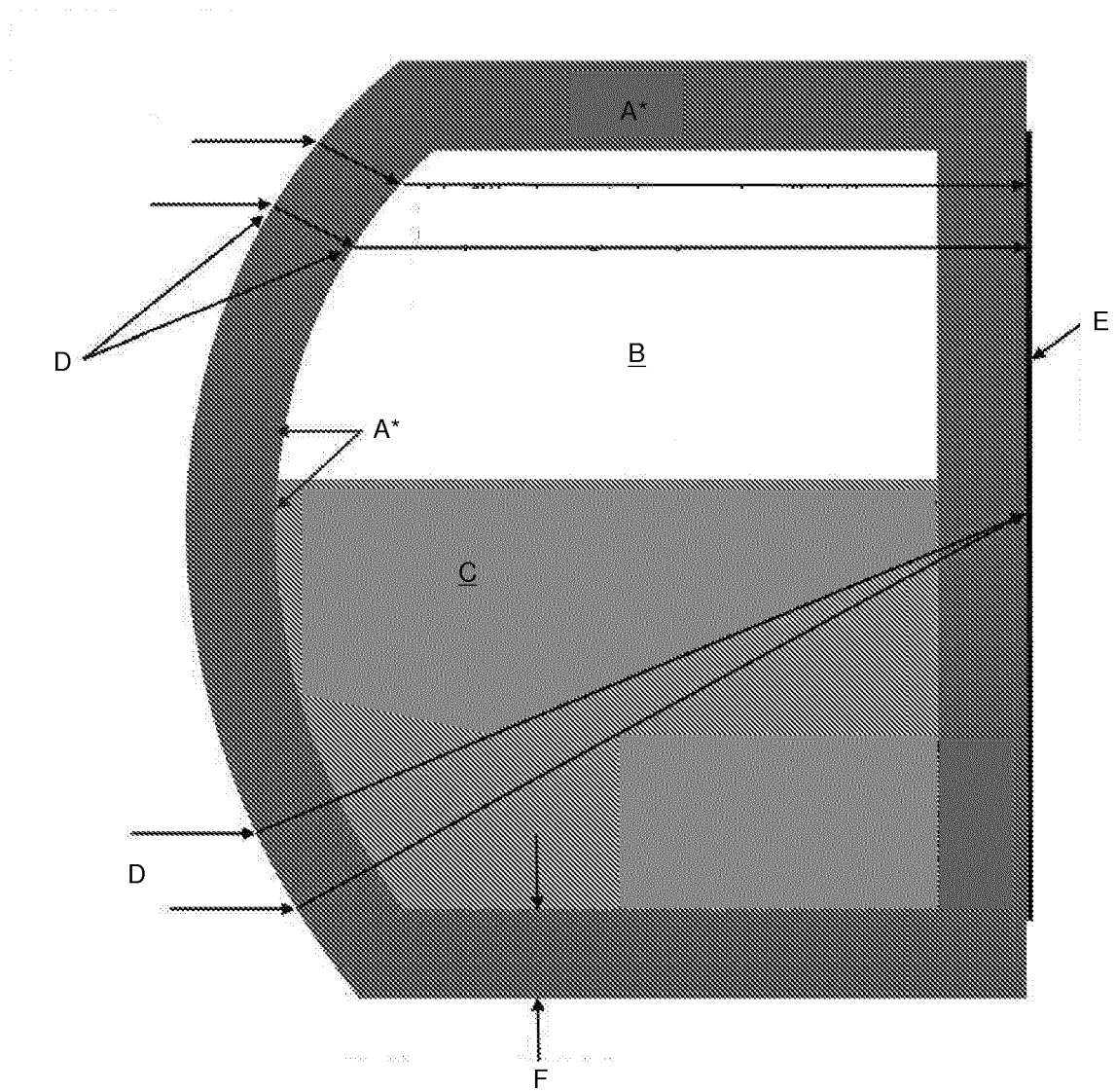


Fig. 5



REFERENCES CITED IN THE DESCRIPTION

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