

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
1 August 2002 (01.08.2002)

PCT

(10) International Publication Number  
WO 02/058518 A1

(51) International Patent Classification<sup>7</sup>: A47G 19/22, B65D 51/20

(21) International Application Number: PCT/US01/41995

(22) International Filing Date:  
4 September 2001 (04.09.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
09/764,386 22 January 2001 (22.01.2001) US

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(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

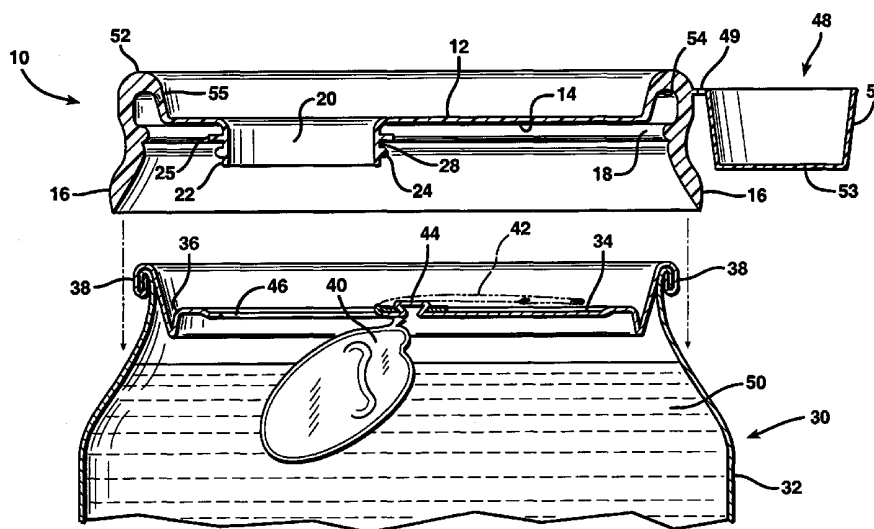
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

— as to the identity of the inventor (Rule 4.17(i)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO,

[Continued on next page]

(54) Title: HYGIENIC BEVERAGE CAN ATTACHMENT



(57) Abstract: A hygienic beverage can attachment is formed as a cap for a metal pop-top beverage can. The cap attachment is formed of a liquid-impervious, elastically resilient material that has a skirt with a radially inwardly directed lip at its outer periphery and with a drinking port defined completely through its structure. The drinking port is spaced radially inwardly from the periphery of the cap attachment for alignment with the drinking opening in the pop-top beverage can. A collar having a radially outwardly directed retaining flange is located on the underside of the cap coaxially about the drinking port. The cap fits onto the beverage can so that the lip of the skirt engages the bead at the top of the beverage can and so that the lower extremity of the collar projects through the drinking aperture in the top of the can. The retaining flange near the lower extremity of the collar engages the underside of the top of the beverage can at the drinking opening therethrough. The lips of the user thereby avoid direct contact with the metal can as the user consumes the beverage from the metal can.



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- NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations
- of inventorship (Rule 4.17(iv)) for US only

**Published:**

- with international search report  
— with amended claims and statement

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.

## HYGIENIC BEVERAGE CAN ATTACHMENT

### SPECIFICATION

#### BACKGROUND OF THE INVENTION

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##### Field of the Invention

The present invention relates to a device useful for attachment to the top of a beverage can to allow a person to hygienically drink from the can.

##### Description of the Prior Art

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Numerous different types of drinks are sold for human consumption in beverage cans. Literally millions of cans of soft drinks, beer, iced tea, fruit juices and other beverages are sold annually and are consumed by millions of different people. Conventional beverage cans are often formed of aluminum, steel or some other metal in a generally cylindrical configuration with substantially flat tops and

with a flat or slightly inwardly concave bottom. The beverage can top has a circular periphery which is rolled over the upper edge of the top of the cylindrical wall of the can. The periphery of the top and the upper edge of the wall of the can are rolled together and permanently deformed to form a peripheral bead about the  
5 top of the can.

In a conventional metal "pop-top" can an enclosed weakened area is formed in the top of the can a short distance in from the bead. The top of the can is equipped with an opening mechanism in the form of a lever attached to the center of the can at a fulcrum. The lever, when operated, presses the circumscribed,  
10 weakened area in the top of the can downwardly, thereby creating a drinking opening or aperture in the top of the can. This drinking opening is located a short distance in from the circumference of the can top.

In conventional practice a consumer lifts the beverage can to his or her lips once the opening in the top of the can has been created and drinks the beverage with  
15 his or her lips pressed against the area of the bead, a portion of the cylindrical can wall immediately adjacent thereto, and the top of the can adjacent to the drinking opening formed in the can top. While this is certainly an efficient and effective way to drink a beverage, this conventional practice has certain health hazards.

While originally manufactured and sealed under hygienic conditions, the  
20 exteriors of beverage cans are often exposed to dirt and unsanitary conditions from the time of manufacture until the beverage is actually consumed by the ultimate customer. Beverage cans are tightly sealed and the beverage therewithin is

protected from contamination by the structure of the walls and top and bottom of the can until the can is opened. However, at that time a consumer is exposed to dirt, germs, bacteria, contamination and substances merely having an unpleasant taste once the consumer places his or her lips against the surface of the can. This exposure can lead to a common cold or even a more serious illness at times.

### SUMMARY OF THE INVENTION

The present invention involves a personal, hygienic beverage can attachment that can be carried by a consumer and placed atop a beverage can when the consumer desires to drink from the can. The beverage can attachment is designed primarily for use with a pop-top beverage can, but can also be used with beverage cans that are opened using a general purpose can opener. The attachment is small, very portable and may be manufactured as a reusable item that may easily be cleaned. Alternatively, the beverage can attachment may be manufactured as a discardable item. The hygienic attachment serves as a protective barrier interposed between the lips of the person drinking from the can, and the surface of the beverage can. By utilizing the hygienic attachment a consumer is not exposed to ingestion of unsanitary contaminants that can collect on the surface of the beverage can as it travels through its channels of distribution until ultimately consumed.

In one broad aspect of the present invention may be considered to be a hygienic beverage can attachment for use with a beverage can having a circular top with a peripheral bead and a rupturable region located radially inwardly from the bead delineating the area of a drinking aperture, comprising a generally disc-shaped

cap formed of an elastically resilient, liquid-impervious material and having a circular outer periphery with an annular depending skirt. The skirt terminates in an annular, radially inwardly directed bead engaging lip. A drinking port is defined through the cap at a location radially inset from its periphery. The drinking port is spaced radially inwardly from the periphery of the cap for alignment with the drinking aperture in the top of the beverage can.

The cap has an exposed upper side and an opposite underside. Preferably the cap has an annular collar projecting from its underside at the drinking port defined therethrough. The collar defines an interior circular opening therewithin. The drinking port forms a circular opening in the exposed upper side of the cap that is slightly larger than the interior diameter of the opening through the collar.

The collar has a retaining flange near its depending extremity and a neck that is located between the retaining flange and the underside of the cap. The retaining flange projects radially outwardly beyond the neck to define a gap at the neck of the collar. The beverage can collar also has a radially outwardly projecting backing flange at its neck. The backing flange is located between the retaining flange and the underside of the cap. Together the retaining flange and the backing flange are configured for gripping the top of the beverage can at the drinking aperture. The space between these flanges is of a width just sufficient to receive the edges of the top of the can adjacent the ruptured area that defines the drinking aperture in the top.

The cap of the invention is preferably formed of a nonporous plastic and is

comprised of a raised outer, annular rim that projects upwardly from the upper side of the cap at the periphery thereof. This rim serves as a low dam that prevents liquid from spilling off of the top of the cap while a beverage is being consumed.

Also, the cap of the invention preferably is manufactured with a detachable  
5 stopper formed of the same material as the cap and attached thereto by a frangible web that must be broken to detach the stopper from the cap. The stopper preferably has a cup shaped configuration with a slight draft so that it can fit down snugly into the drinking port and into the opening through the collar. The stopper is thereby releaseably engageable in the drinking port and forms a removable drinking port  
10 closure plug that is sealed in liquid-tight engagement in the opening through the collar.

In another broad aspect the invention may be considered to be a beverage can attachment for use with a beverage can having a circular top with a peripheral bead and a rupturable region located radially inwardly from the bead. The rupturable  
15 region delineates the area of a drinking aperture. The attachment is comprised of a water impervious, elastically deformable cap having a circular outer perimeter, an upper exposed side and an opposite, lower underside. The cap has a downwardly projecting, annular skirt at its circular, outer perimeter. The skirt has an annular, radially inwardly directed lip. A drinking opening is defined through the cap  
20 between its exposed side and its underside in alignment with the area of the drinking aperture of the top of the beverage can.

In still another aspect the invention may be described as a beverage can

attachment comprising a cap form of a liquid-impervious, elastically resilient material having a structure with an exposed side and an underside defining a circular perimeter. The cap includes an annular peripheral skirt on its underside at its perimeter. The skirt has a radially inwardly directed annular lip. A drinking  
5 port is defined completely through the structure and extends between the exposed side and the underside thereof. The drinking port is spaced radially inwardly from the circular perimeter of the structure for alignment with a drinking opening in the top of the metal beverage can.

The invention may be described with greater clarity and particularity by  
10 reference to the accompanying drawings.

#### DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a preferred embodiment of the beverage can attachment, as seen from the top.

Fig. 2 is a perspective view of a preferred embodiment of the beverage can  
15 attachment, as seen from the bottom.

Fig. 3 is a bottom plan view of the beverage can attachment of Figs. 1 and 2.

Fig. 4 is a sectional elevational view showing the beverage can attachment detached from a metal beverage can.

Fig. 5 is a sectional elevational view showing the beverage can attachment  
20 attached to a metal beverage can with a stopper ready for insertion.

Fig. 6 is a sectional elevational view showing the beverage can attachment attached to a metal beverage can with the cap drinking opening sealed by a stopper.



### DESCRIPTION OF THE EMBODIMENT

Fig. 1 illustrates a hygienic beverage can attachment 10 which is a structure formed as a generally disc-shaped cap from an elastically resilient, liquid-impervious material, which may be a nonporous thermoplastic or rubber. As best illustrated in Figs. 1, 3, and 4, the cap 10 has a circular perimeter with an exposed upper side 12 having a circular face and a downwardly facing lower underside 14. The underside 14 of the cap 10 also has a circular face.

The beverage can attachment 10 is designed for use with a beverage container 30 which is of the conventional type in which soft drinks, beer, iced tea and other beverages are widely packaged for consumption in this country and throughout the world. The beverage container 30 is formed of thin gauge steel or aluminum and has an upright generally cylindrical wall 32 that is necked in slightly at its upper extremity. The beverage can 30 has a generally flat, disc-shaped top 34 that extends across the upper end of the cylindrical wall 32. Near its outer periphery the top 34 is deformed downwardly in an annular ring to define an annular gutter 36 having a generally V-shaped cross section. From the gutter 36 the outer periphery of the beverage can top 34 rises upwardly and outwardly. The peripheral extremity of the beverage can top 34 meets the upper extremity of the beverage can wall 32. These extremities are rolled over together to form an upper, outer, peripheral annular bead 38.

A generally oval shaped rupturable region 40 is delineated in the beverage can top 34 and extends radially to within a distance of between about one-quarter

and one-half of an inch from the bead 38. The rupturable region 40 is originally formed by a die stamp that creates a weakened demarcation that nearly encircles the region 40 and delineates it from the surrounding structure of the beverage can top 34. The can top 34 is initially equipped with a pop-top tab lever 42 that is secured  
5 near one of its ends by an upwardly projecting protrusion 44 in the beverage can top 34. This protrusion 44 is forced through an opening in the pop-top tab 42 and flattened to form a conventional post to which the tab lever 42 is fastened. The protrusion 44 serves as a fulcrum for the tab lever 42.

When the beverage can top 34 is originally sealed over the beverage 50  
10 within the can 30 the pop-top tab lever 42 is initially in the position indicated in phantom in Fig. 4. It remains in this position until the beverage can 30 is to be opened for consumption of the beverage 50 located therewithin. The free end of the pop-top tab lever 42 is then lifted and rotated in a counterclockwise direction from the position illustrated in Fig. 4. The shorter end of the pop-top tab lever 42  
15 located close to the fulcrum post 44 is then forced downwardly against the weakened region of 40 of the beverage can top 34. The weakened region 40 is then punched out of the plane of the remaining structure of the beverage can top 34 downwardly into the interior of the can 30, as illustrated in Fig. 4. The rupture in the structure of the beverage can top 34 creates and delineates a drinking opening or  
20 aperture 46 once the weakened region 40 has been forced downwardly to the position illustrated in Fig. 4. The structure and opening mechanism for the beverage container 30 is conventional, and need not be described in great detail.

The cap 10 has a downwardly depending annular skirt 16 at its outer circular perimeter. The skirt 16 surrounds the body of the cap 10 and above its lower extremity defines an annular, radially inwardly directed, bead engaging lip 18. A drinking port 20 is defined through the structure of the cap 10 at a location radially inset from the periphery of the cap 10, between one-half and one inch from the skirt 16. The drinking port 20 is completely surrounded by the structure of the body of the cap 10.

An annular collar 22 is defined at the underside 14 of the beverage can attachment 10 and projects downwardly from the underside 14 at the drinking port 20. Near the lower end of its downwardly projecting extremity the collar 22 forms a retaining flange 24 projecting radially outwardly therefrom throughout its circumference. Above the retaining flange 24 the outer circumference of the collar 22 narrows to a neck 28. The portion of the collar 22 forming the neck 28 has an outer diameter smaller than that of the flange 24. Just above the neck 28 the collar 22 forms another radially outwardly projecting backing flange 25. The backing flange 25 extends radially outwardly from the collar 22 a greater distance than the retaining flange 24 so that it will not pass through the drinking opening 46 of the beverage can 30.

With the formation of the neck 28 a narrow gap of about 1/32 of an inch is defined between the retaining flange 22 and the backing flange 25. This gap is no wider than the thickness of the gauge of a conventional aluminum top cop beverage can, such as the beverage can 30 illustrated in Fig. 4. The collar 20 is thereby

configured for gripping the beverage can top 34 between the retaining flange 24 and the backing flange 25 near the underside 14 of the cap 10 at the drinking opening 46 defined in the beverage can top 34. The retaining flange 24 and the backing flange 25 form a liquid-tight seal about the periphery of the drinking aperture 46 of the beverage can 30.

The drinking port or opening 20 formed in the hygienic beverage attachment 10 is aligned with the area of the drinking aperture 46 formed in the beverage can top 34. The drinking port 20 is slightly larger in cross-sectional area at the exposed side 12 of the cap 10 than within the collar 22 at the underside 14 of the cap structure 10. The drinking port 20 in the cap 10 thereby has a rounded entrance at the upper surface 12, as illustrated in Figs. 4 and 5. Therefore, the circular opening formed in the upper side 12 of the cap 10 of the port 20 is larger in diameter than the interior diameter of the collar 22 projecting from the underside 14 of the cap 10.

As illustrated in Figs. 1 through 4, the cap 10 is initially formed with a cup shaped stopper 48 attached to its outer periphery by a frangible web 49. As best illustrated in Fig. 4, the upright wall 51 thereof has a slightly frustoconical configuration. The floor 53 of the stopper 48 is circular in shape and closes the lower end of the stopper 48. When the article is manufactured, the cup shaped stopper 48 projects radially outwardly from the cap 10 as illustrated in Fig. 4 and initially occupies the position indicated in phantom at 48' in Fig. 5.

The beverage can attachment 10 also includes a raised, outer, annular rim 52

that projects upwardly from the skirt 16 at the periphery of the beverage can attachment 10 where the skirt 16 meets the wall 55. The upper extremity of the rim 52 is rounded for comfort on the lips of the consumer. The rim 52 serves as a low barrier or dam that prevents any liquid that may reach the upper surface 12 of the cap 10 from spilling when the cap 10 is engaged in position for drinking the beverage 50 as illustrated in Fig. 5. Liquid atop the upper surface 12 might otherwise spill out onto the face or clothing of the consumer as the beverage can 30 is tilted toward the consumer for consumption of the beverage 50.

The structure of the cap 10 defines an annular peripheral groove 54 directly beneath the rim 52. The groove 54 faces downwardly and has an outer boundary delineated by the skirt 16 and an inner boundary delineated by the upright peripheral wall 55 rising from the edge of the exposed, upper surface 12 of the cap 10.

The cap 10 is especially configured to releaseably engage the upper end of the beverage can 30 in sealing engagement therewith, as illustrated in Figs. 4 - 6. To engage the cap 10 on the beverage can 30, the cap 10 is oriented in a disposition parallel to the beverage can top 34 and pressed downwardly from the position illustrated in Fig. 4 to the position illustrated in Fig. 5. The surface of the lip 18 is rounded so that a cam action occurs that flexes the skirt 16 radially outwardly to elastically deform as the undersurface of the lip 18 meets the bead 38. Once the upper edge of the lip 18 clears the bead 36, the resiliency of the structure forming the beverage can attachment 10 allows the skirt 16 to elastically return to its

original configuration forming a liquid-tight seal at the bead 38.

The annular collar 22 is configured to elastically flex radially inwardly to permit the retaining flange 24 to pass through the drinking opening 46 as the cap 10 is pressed downwardly toward the beverage can top 34. The lower extremity of the retaining flange 24 is rounded so that it readily deflects elastically radially inwardly to pass through the drinking opening 46 as the skirt 16 is concurrently being elastically flexed outwardly to clear the bead 38. The collar 22 is thereby pressed downwardly through the beverage can drinking aperture 46 until the backing flange 25 meets the upper surface of the top 34 of the can 30 surrounding the drinking aperture 46.

The top 34 of the beverage can 30 is surrounded by the raised bead 38. The bead 38 fits into the annular groove 54 in sealing engagement therewith. As the annular groove 54 formed between the skirt 16 and the ring 48 engages the bead 38, the retaining flange 24 clears the undersurface of the beverage can top 34 at the drinking opening 46 therethrough so as to resiliently engage the beverage can top 34 from beneath when inserted into the drinking opening 46. The gap formed at the neck 28 of the collar 22 between the retaining flange 24 and the backing flange 25 is narrow enough so that the sheet metal forming the beverage can top 34 is gripped between the flanges 24 and 25 at the underside 14 of the body of the attachment 10.

The retaining flange 24 and the backing flange 25 form a liquid-tight seal at the edges of the drinking aperture 46 once the collar 22 has been inserted through the drinking aperture 46 and engaged with the top 34 of the beverage can 30. The

collar 22 thereby holds the annular area of the lower face of the backing flange 25 surrounding the drinking port 20 compressed against the top 34 of the metal can 30 to form a liquid-tight seal about the drinking opening 46 in the beverage can top 34 when the collar 22 is inserted into the drinking aperture 46.

5           The beverage can attachment 10 thereby forms a hygienic shield between the mouth of a user and the metal beverage can 30, which may have contaminants on its exposed surfaces. Also, by providing the beverage can attachment 10 with the detachable stopper 48 the user can plug the drinking port 20 when desired. The stopper 48 is merely removed from the beverage can attachment 10 by breaking the  
10           frangible web 49 with a slight twisting action. The stopper 48 is thereby detached from the structure of the beverage can attachment 10 as illustrated in Fig. 5. The stopper 48 is easily inserted into the drinking port 20 by pressing it downwardly from above as illustrated in Figs. 5 and 6. The stopper 49 may be easily gripped by the remnant portion 49' of the frangible web 49 and pulled free from the beverage  
15           can attachment 10 to temporarily or permanently unplug the drinking port 20

          The configuration of the skirt 16, the lip 18 and the flanges 24 and 25 is such that the generally disc-shaped body of the cap 10 is held in leakproof engagement with the metal beverage can 30. Preferably, there is a sufficient clearance between the undersurface 14 of the cap 10 and the upper surface of the beverage can top 34  
20           so that the pop-top tab 42 does not have to be removed from the beverage can top 34 prior to engagement of the cap 10 upon the beverage can 30. Rather, once the region 40 has been ruptured and forced downwardly, the pop top tab lever is

counter-rotated back into contact with the beverage can top 34, as illustrated in Fig. 5.

It can be seen that the beverage container accessory 10 forms a personalized, hygienic attachment that a consumer can releaseably engage on a conventional beverage can 30 to prevent the imbibation of contaminants that may reside upon the can 30. Once the user has finished consuming the beverage from the can 30 the attachment 10 can be removed by distending the skirt 16 at a selected location along the bead 38, preferably at a location diametrically opposite the drinking aperture 46. The attachment 10 can be pulled free from the can 30 using the portion of the bead 38 located diametrically opposite the distended portion of the skirt 16 as a fulcrum. The rounded upper surface of the retaining flange 24 allows the collar 22 to be drawn back out of the drinking aperture 46. The user can then wash or otherwise clean the beverage can attachment 10 for reuse at his or her convenience, or discard it as desired.

Undoubtedly, numerous variations and modifications of the invention will become readily apparent to those familiar with beverage packaging. For example, the beverage can attachment may be formed of compressible polyurethane foam having an exterior skin or it can be formed of an incompressible substance. It may also be formed with or without a collar and with or without a detachable stopper. Accordingly, the scope of the invention should not be construed as limited to the specific embodiment depicted and described, but rather is defined in the claims appended hereto.



I CLAIM

1. A hygienic beverage can attachment for use with a beverage can having a circular top with a peripheral bead and a rupturable region located radially inwardly from said bead delineating the area of a drinking aperture, comprising a generally disc-shaped cap formed of an elastically resilient, liquid-impervious material and having a circular outer periphery with an annular depending skirt that has an annular, radially inwardly directed bead engaging lip, and a drinking port is defined through said cap at a location radially inset from said periphery thereof, wherein said drinking port is spaced radially inwardly from said periphery for alignment with said drinking aperture in said top of said beverage can.

2. A beverage can attachment according to Claim 1 wherein said cap has an exposed upper side and an opposite underside and further comprising an annular collar projecting from said underside of said cap at said drinking port therethrough.

3. A beverage can attachment according to Claim 2 wherein said collar has a retaining flange near its lower extremity and a neck located between said retaining flange and said underside of said cap, and said retaining flange projects radially outwardly beyond said neck.

4. A beverage can attachment according to Claim 3 wherein said collar has a radially outwardly projecting backing flange above said neck and said backing flange is located between said retaining flange and said underside of said cap so that together said flanges are configured for gripping said top of said beverage can at said drinking aperture.

5 5. A beverage can attachment according to Claim 1 wherein said cap has an exposed upper side and an opposite underside, and further comprising a radially flanged collar that surrounds said drinking port on said underside of said cap structure, and said collar is configured to elastically flex radially inwardly to pass through said drinking aperture of said metal beverage can so as to releaseably engage said top of said metal beverage can from beneath when inserted into said drinking aperture.

6. A beverage can attachment according to Claim 5 wherein said collar defines an interior circular opening therewithin and said drinking port forms a circular opening in said exposed upper side of said cap that is larger than the interior diameter of said opening defined within said collar.

7. A beverage can attachment according to Claim 2 further comprising a raised, outer, annular rim projecting upwardly from said upper side of said cap at said periphery thereof.

8. A beverage can attachment according to Claim 1 further comprising a stopper formed of the same material as said cap, and said stopper is releaseably engageable in said drinking port to form a removable drinking port closure plug.

9. A beverage can attachment according to Claim 8 wherein said stopper has a cup shaped configuration and is initially attached to said cap by a frangible web that is broken to detach said stopper from said cap.

10. A beverage can attachment according to Claim 1 wherein said cap is comprised of a nonporous plastic.

**AMENDED CLAIMS**

[received by the International Bureau on 22 March 2002 (22.03.02);  
original claims 1-10 replaced by new claims 1-8 (2 pages)]

1. A hygienic beverage can attachment comprising a generally disc-shaped cap formed of an elastically resilient, liquid-impervious material and having a periphery with an annular depending skirt that terminates in an annular, radially inwardly directed bead engaging lip, and a drinking port is defined through said cap at a location radially inset  
5 from said periphery thereof and further comprising an annular collar projecting from said underside of said cap at said drinking port therethrough wherein said collar has a flange at its extremity and a neck located between said flange and said underside of said cap, and said flange projects radially outwardly beyond said neck, whereby a gap is defined between said flange and said underside of said cap.

2. A beverage can attachment according to Claim 1 further comprising a raised, outer, annular rim projecting upwardly from said skirt at said periphery of said cap.

3. A beverage can attachment according to Claim 1 wherein said cap is comprised of a nonporous plastic.

4. A beverage can attachment according to Claim 1 wherein said collar has a radially outwardly projecting backing flange above said neck and said backing flange is located between said retaining flange and said underside of said cap so that together said flanges are configured for gripping said top of said beverage can at said drinking aperture.

5. A beverage can attachment according to Claim 1 wherein said collar is radially flanged and surrounds said drinking port on said underside of said cap structure, and said collar is configured to elastically flex radially inwardly to pass through said drinking aperture of said metal beverage can so as to releaseably engage said top of said metal beverage can from beneath when inserted into said drinking aperture.

6. A beverage can attachment according to Claim 5 wherein said collar defines an interior circular opening therewithin and said drinking port forms a circular opening in said exposed upper side of said cap that is larger than the interior diameter of said opening defined within said collar.

7. A beverage can attachment according to Claim 1 further comprising a stopper formed of the same material as said cap, and said stopper is releaseably engageable in said drinking port to form a removable drinking port closure plug.

8. A beverage can attachment according to Claim 8 wherein said stopper has a cup shaped configuration and is initially attached to said cap by a frangible web that is broken to detach said stopper from said cap.

## STATEMENT UNDER ARTICLE 19(1)

The claims have been amended to cancel Claims 1 and 2 of the application as originally filed, which the Examiner indicated could not be considered to involve an inventive step over U.S. Patent No. 4,054,205. Original Claim 3 was originally dependent upon Claim 2, that in turn was dependent upon Claim 1. Original Claim 3 has been rewritten as a new independent replacement Claim 1 which incorporates all of the limitations of original Claims 1, 2, and 3. Claim 7, which was originally dependent upon the original Claim 1, has been made dependent upon the new replacement Claim 1, formerly Claim 3. Original Claim 7 has now been renumbered as a new replacement Claim

2. Similarly, original Claim 10 which was originally dependent upon the original Claim 1 has been rewritten to be dependent upon the new replacement Claim 1, formerly Claim 3, and has been renumbered as new replacement Claim 3. Claim 4 remains largely unchanged but is now dependent upon new replacement Claim 1. Claim 5 remains unchanged in scope but has been reworded for consistency with new replacement Claim 1. Claim 6 is unchanged. Original Claims 8 and 9 have been renumbered as replacement Claims 7 and 8 and are now dependent upon replacement Claim 1 rather than original Claim 1.

To summarize, Applicant has made all claims in the application dependent upon a new replacement Claim 1, which was originally Claim 3, but which has been rewritten in independent form.

A replacement page for the Abstract is submitted to provide the amended Abstract indicated in the International Search Report.

FIG. 1

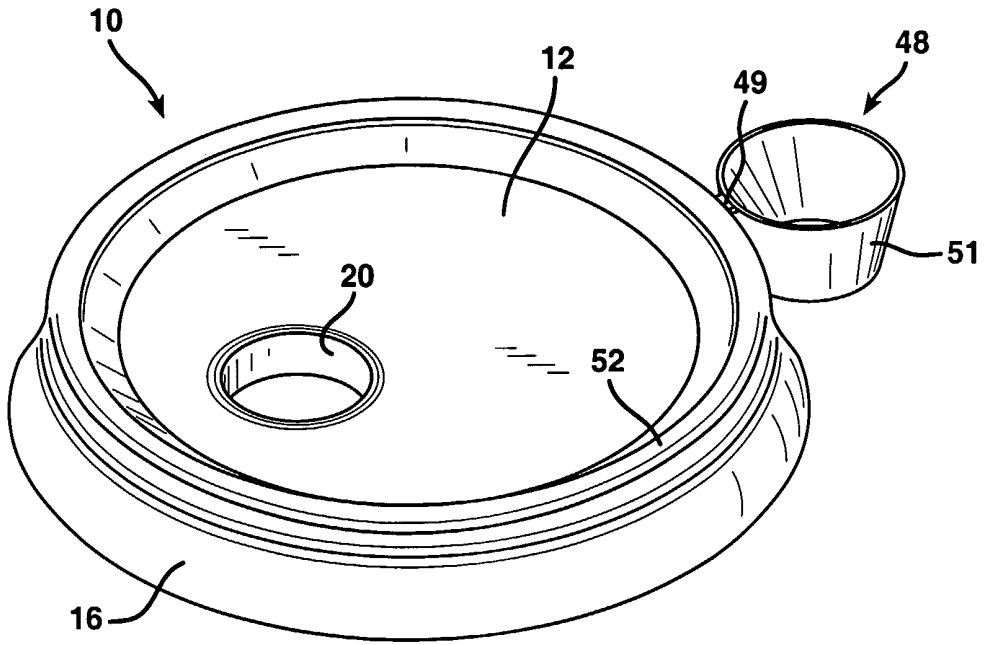
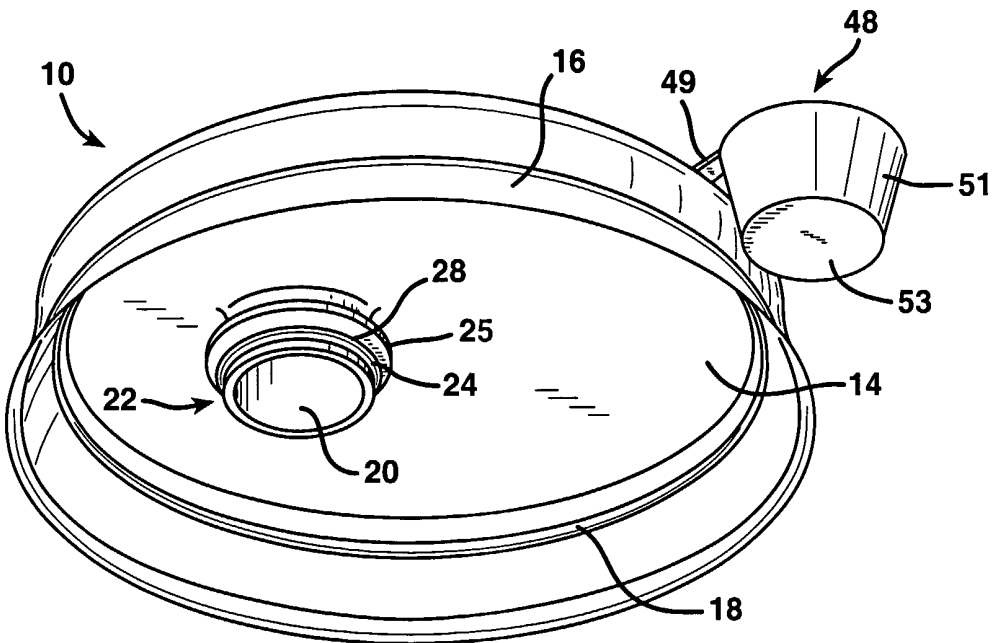


FIG. 2



2/5

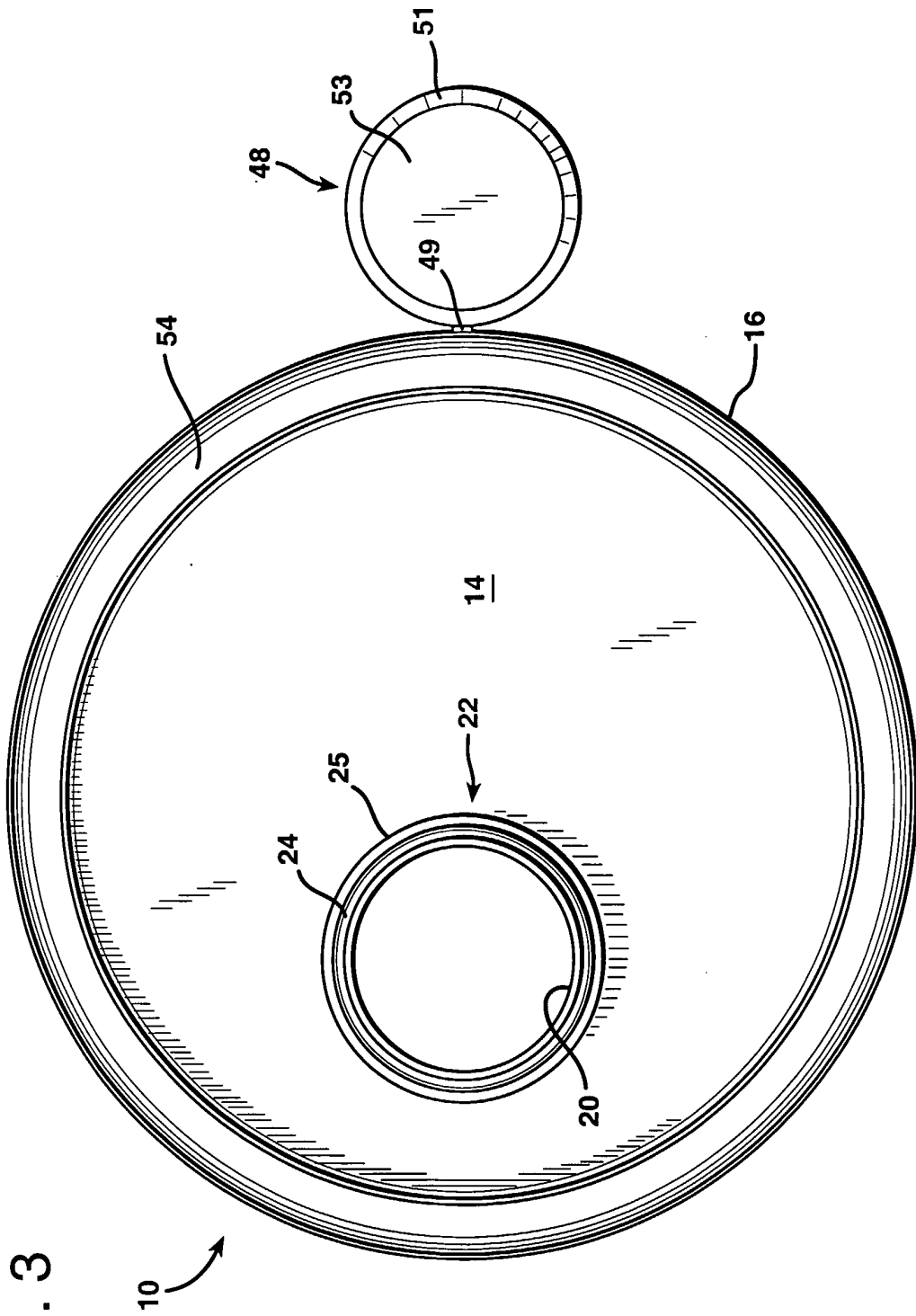


FIG. 3

FIG. 4

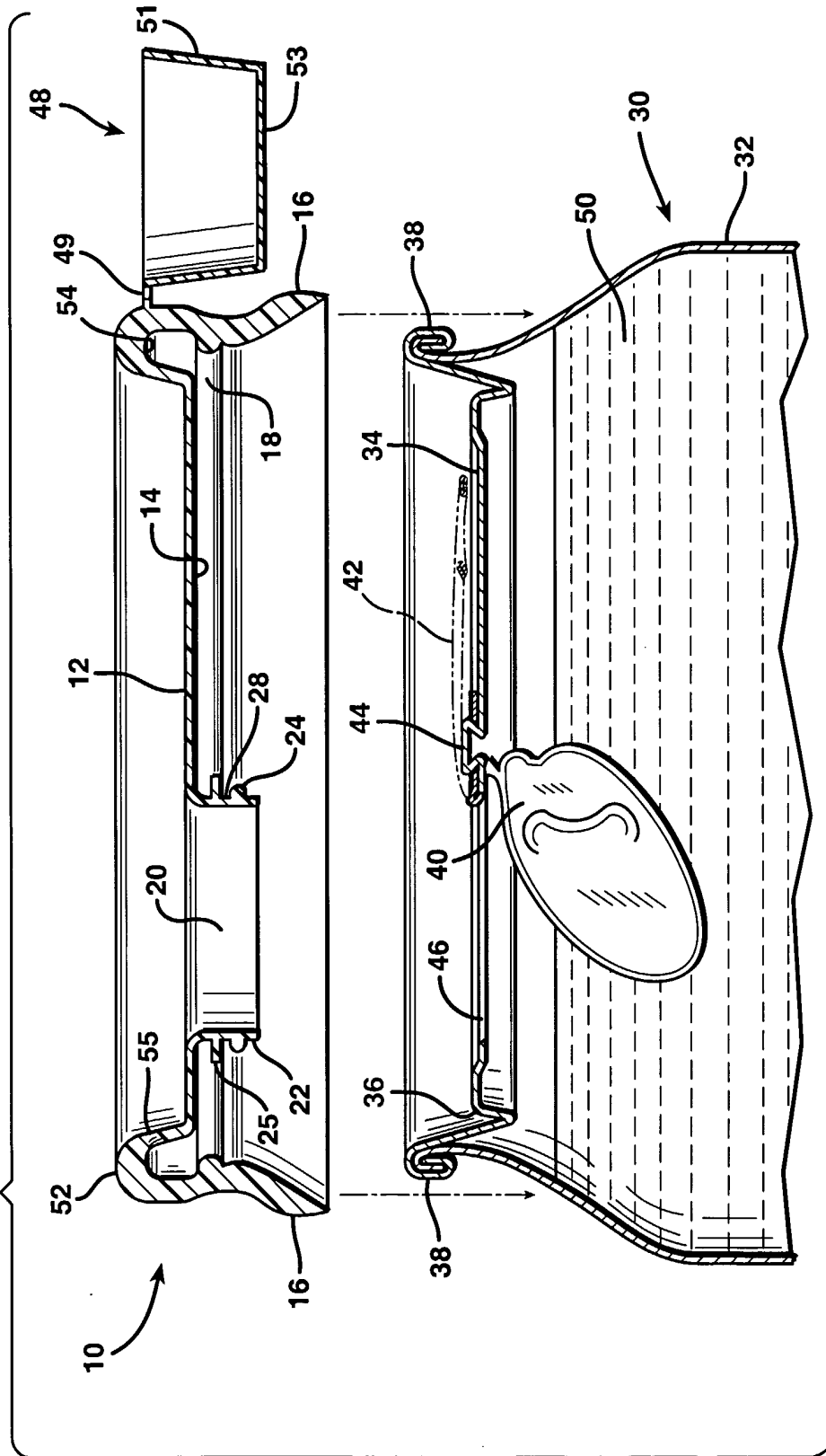
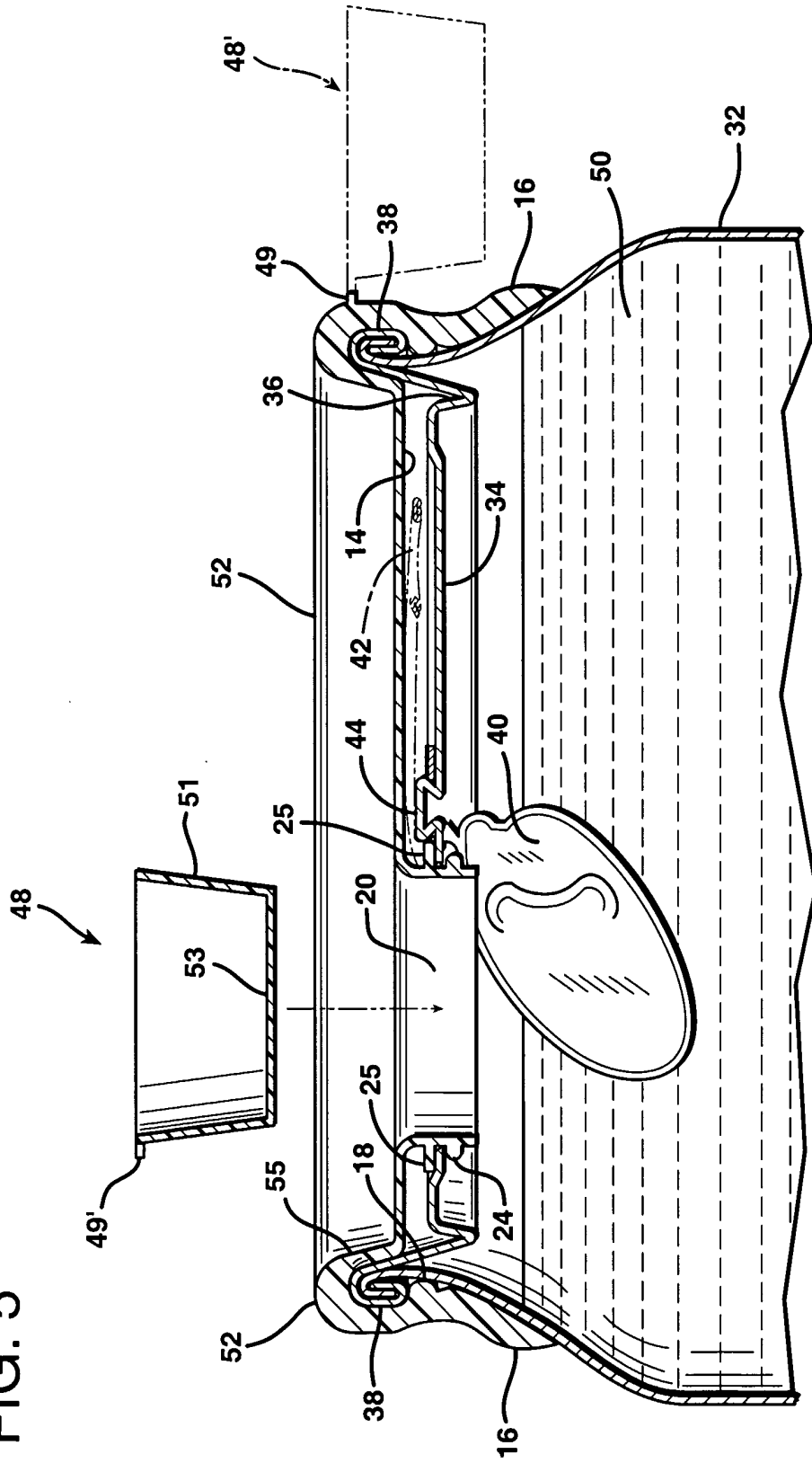




FIG. 5





# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/41995

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC(7) : A47G 19/22; B65D 51/20  
 US CL : 220/254, 258, 713, 716  
 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)  
 U.S. : 220/254, 256, 258, 703, 705, 711, 713, 716, 729, 730, 731, 906

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---	US 4,054,205 A (BLOW Jr. et al) 18 October 1977, see entire document.	1-2,7,10
Y		8
X ---	US 4,752,016 A (EADS) 21 June 1988, see entire document.	1-2,10
Y		8
X ---	US 6,073,797 A (BAROUS) 13 June 2000, see entire document.	1-2,7,10
Y		8
Y	US 4,679,702 A (MACCARONE et al) 14 July 1987, see entire document.	8
A	US 4,790,444 A (TERZI) 13 December 1988, see entire document.	1-10
A	US 4,703,873 A (GEREN) 03 November 1987, see entire document.	1-10

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

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"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		

Date of the actual completion of the international search 29 November 2001 (29.11.2001)	Date of mailing of the international search report <b>23 JAN 2002</b>
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Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Nathan J. Newhouse Telephone No. (703)-308-1000 <i>Sheila Vandy</i> <i>Paralegal Specialist</i> <i>Technology Center 3700</i>
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**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US01/41995

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

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3,197,089 A (MICHAEL) 27 July 1965, see entire document.	1-10