



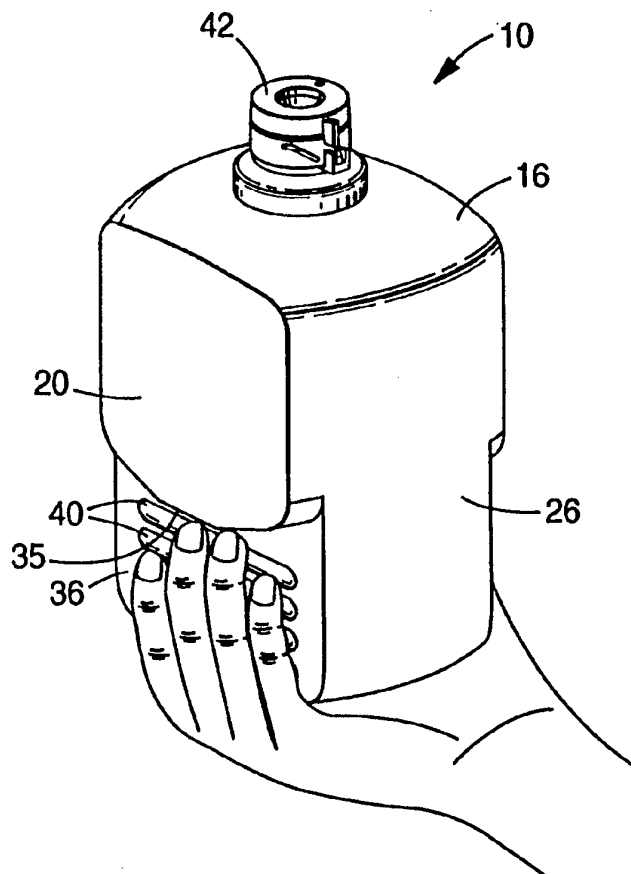
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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| <p>(51) International Patent Classification<sup>5</sup> :<br/><b>B65D 23/10, 1/02</b></p>  | <p><b>A1</b></p> | <p>(11) International Publication Number: <b>WO 94/24009</b></p> <p>(43) International Publication Date: 27 October 1994 (27.10.94)</p>   |
| <p>(21) International Application Number: PCT/US94/02066</p> <p>(22) International Filing Date: 17 February 1994 (17.02.94)</p> <p>(30) Priority Data:<br/>08/049,844                      20 April 1993 (20.04.93)                      US</p> <p>(71) Applicant: MINNESOTA MINING AND MANUFACTURING COMPANY [US/US]; 3M Center, P.O. Box 33427, Saint Paul, MN 55133-3427 (US).</p> <p>(72) Inventor: DYER, John, J.; P.O. Box 33427, Saint Paul, MN 55133-3427 (US).</p> <p>(74) Agents: SCHULTZ, Leland, D. et al.; Office of Intellectual Property Counsel, P.O. Box 33427, Saint Paul, MN 55133-3427 (US).</p> |                  | <p>(81) Designated States: AU, BR, CA, CN, JP, KR, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p><b>Published</b><br/><i>With international search report.</i></p> |

(54) Title: BOTTLE FOR CONTAINING A FLUID

(57) Abstract

Disclosed is a bottle (10) for containing a fluid and dispensing the fluid in conjunction with a fluid dispensing system. The bottle (10) includes means (35) to resist paneling during the dispensing of the fluid.



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## Bottle for Containing a Fluid

TECHNICAL FIELD

5 This invention relates generally to bottle for containing a fluid, and more particularly, to bottles for containing and dispensing the fluids in conjunction with a dispensing system.

BACKGROUND ART

10 Dispensing systems in the past have utilized bottles containing quantities of a fluid to be dispensed. In the gravity feed fluid dispensing systems to which the present invention is particularly directed, the bottles are stored in an upright position, then inverted for dispensing  
15 of the fluid from the bottle through the dispensing system.

It is important in many applications to accurately control the amount of the fluid that is dispensed. Frequently, such fluids are diluted prior to use, and it is desirable to accurately control the dilution  
20 rate, such of for reasons of economy or safety. This has been somewhat difficult to achieve with conventional bottle designs for dispensing systems.

An exemplar bottle is disclosed in U.S. Design Patent No. 298,514 entitled "Syrup Container or Similar  
25 Article". A bottle according to this design patent is available from Soda-Mate Enterprises of Trumbull, Connecticut for use with its Model 100 gravity feed fluid dispenser system and has a capacity of .667 liters. Such bottles are injection/blow molded from a suitable polymeric  
30 material, such as high density polyethylene and typically have a wall thickness of 0.46 millimeters. Bottles of this type, although functional, are somewhat limiting during use since their limited capacity requires replacement or refilling at relatively frequent intervals.

35 Bottles having larger capacities may be employed. However, in conventional bottles having a larger capacity, the ratio of the wall thickness to the volume is reduced to the point where "paneling" occurs when the bottle is

inverted and the fluid contained therein is being dispensed.

For purposes of this invention, the term "paneling" refers to inward and outward deflection in the walls of a bottle in a manner that induces fluctuations in the rate at which fluids are dispensed from a bottle. Paneling typically occurs with a bottle inverted and as the fluid is being dispensed. As the fluid level in the inverted bottle is reduced, a partial vacuum is gradually created in the "headspace" above the level of the fluid within the bottle. The walls of the bottle are gradually deflected inwardly under the influence of the partial vacuum. This deflection acts to retard the flow of the fluid from the bottle. The deflection increases until a point is reached where a quantity of the fluid is rapidly dispensed from the bottle and the walls quickly flex outwardly, whereby the pressure in the head space is equalized with the ambient pressure.

The fluctuation of the flow of fluid from the bottle due to paneling prevents accurate metering of the dispensing of the fluid from the bottle. Furthermore, paneling may be exacerbated if the bottle is manually engaged and squeezed. Paneling is particularly a problem if the bottle is to be used in conjunction with a dispensing system for dispensing the fluid from the bottle in a controlled manner, and also for diluting the fluid with one or more other fluids.

Alternatively, the wall thickness of the larger capacity bottle may be increased to resist paneling. However, this may not be completely successful, and increases the weight and expense of the bottle.

Conventional dispensing systems and bottles for use therewith do not provide a bottle with adequate capacity that avoids the problem of paneling and subsequent inaccurate dispensing of fluids from the bottles.

#### DISCLOSURE OF INVENTION

Disclosed is a bottle for containing a fluid including a body having a cavity for receipt of a quantity

of a fluid and an orifice communicating between the cavity and exteriorly of the bottle body. Means are provided to resist paneling when the bottle is in the inverted position and the fluid is being dispensed through the orifice. The  
5 bottle also includes a pair of spaced gripping surfaces adapted for manual engagement for manipulating the bottle between an upright position with the orifice directed upwardly, and an inverted position with the orifice directed downwardly.

10 In one embodiment of the invention, the means for resisting paneling includes a shoulder formed in the bottle body between each of the gripping surfaces and the orifice, wherein the shoulders stiffen the bottle body to resist paneling when the bottle body is inverted and the fluid is  
15 being dispensed.

The bottle may additionally include a plurality of ribs projecting from each of the gripping surfaces, to facilitate manual grasping and manipulation of the bottle.

#### 20 BRIEF DESCRIPTION OF DRAWINGS

The present invention will be further described with reference to the accompanying drawing wherein like reference numerals refer to like parts in the several views, and wherein:

25 Figure 1 is an isometric view of a bottle according to the present invention in an upright position and including a valve cap;

Figure 2 is an isometric view of the bottle of Figure 1 in an inverted position and including a valve cap;

30 Figure 3 is a front view of the bottle of Figure 1 without a valve cap in an upright position;

Figure 4 is a side view of the bottle of Figure 1 without a valve cap; and

35 Figure 5 is a top view of the bottle of Figure 1 without a valve cap.

#### DETAILED DESCRIPTION

Referring now to Figures 1-5, there is shown a bottle 10 according to the present invention. The bottle

includes an orifice 12 in neck 14 on an upper side 16 communicating interiorly of the bottle for passage of fluid between the interior cavity 18 of the bottle and exteriorly of the bottle. Although the bottle may be constructed  
5 generally with any suitable configuration, such as cylindrical, in the illustrated embodiment of the invention, the bottle is generally rectangular in shape, including first and second sides 20, 22 and ends 24,26, as well as bottom 30.

10 Means are provided as part of this invention to resist paneling, as previously defined herein. By "resist", it is meant that paneling is reduced or eliminated when the bottle is inverted and the fluid is being dispensed. In the illustrated embodiment to the invention, the paneling  
15 control means takes the form of a shoulder 35 separating upper portions 20a,22a of the first and second sides 20,22 from a pair of parallel, laterally spaced gripping surfaces 36,38. The upper portions 20a,22a are spaced from each other a greater distance than the spacing of the gripping  
20 surfaces 36,38. The shoulder 35, or any like sharp change in the shape or geometric configuration of the bottle, acts to strengthen the sides of the bottle to resist paneling. As can be seen from Figures 1,2 and 3, the shoulder need not be entirely linear (e.g. the middle portion is  
25 transverse, but opposite end portions are inclined upwardly), but extends in a generally transverse manner across the first and second sides between the gripping surfaces 36,38 and the orifice 14 of the bottle.

The degree of paneling resistance required is  
30 determined by the construction factors (including, but not limited to, material, wall thickness, and capacity) of the bottle. Thus, the wall thickness, weight and expense of the bottle 10 of the present invention may be reduced from what it might otherwise have to be in order to resist paneling.  
35 As previously discussed herein, conventional bottles for dispensing systems must either reduce the capacity of the bottle, or increase the wall thickness, and consequently the weight and expense of the bottle to avoid paneling, and

even then may be not be completely successful in providing effective resistance to paneling.

Gripping surfaces 36,38 are adapted for manual engagement and manipulation of the bottle. As shown particularly in Figures 1 and 2, the gripping surfaces 36,38 facilitate the manual grasping and manipulation of the bottle 10. The bottle of the present invention may be used manually to dispense fluids, or may be employed with other types of dispensing systems, such as positive displacement systems or venturi effect fluid dispensing systems. In the preferred embodiment of the invention, the bottle is employed in conjunction with the dispensing system described and claimed in co-pending United States patent application entitled "Gravity Feed Fluid Dispensing System", filed of even date herewith, the contents of which are incorporated herein by reference.

Most conveniently, the gripping surfaces 36,38 include a plurality of parallel, transverse ribs 40, as shown particularly in Figures 3 and 4. The ribs 40 are sized, constructed and located in a manner to most advantageously enhance the ability to manually grasp the bottle to perform the inversion (as shown in sequence in Figures 1 and 2) and installation of the bottle with respect to a dispensing system. Alternatively, the surface of the gripping surfaces 36,38 may be otherwise adapted to enhance the grasping of the bottle, such as by knurling or roughening of the surface.

It will be understood that the ribs 40 may also be constructed in a manner that assists shoulder 35 in resisting paneling in the gripping surfaces 36,38, and thus form part of the means to resist paneling. Such resistance to paneling would be exhibited if, for instance, the ribs were formed on the inner side of the gripping surfaces (e.g. within cavity 18) and other means were provided on the exterior surface of the gripping surface to enhance manual engagement and manipulation of the bottle, as previously described herein. The means for resisting paneling, which most preferably includes ribs 40, thus acts to resist the paneling that occurs when the bottle is

squeezed while being manually grasped, such as to invert the bottle or to engage the bottle with a dispensing system.

The bottle 10 of the present invention may be  
5 constructed in any suitable manner and of any suitable material, but is most advantageously constructed of a polymeric material, such as high density polyethylene, low density polyethylene, polyethylene, polyvinyl chloride, polystyrene or the like. It will be recognized that the  
10 material selected to construct the bottle must be compatible with the fluid to the bottle is to receive and dispense. Preferably, the bottle is a unitary molded body, formed such as by blow molding, injection molding, or injection/blow molding, or any other suitable process  
15 known in the art.

By way of an example, the conventional SodaMate brand bottle for use with the Model 100 fluid dispensing system previously described herein has a capacity of 0.667 liters, is made of high density polyethylene and has a wall  
20 thickness of 0.46 millimeter. A bottle according to the present invention made of high density polyethylene may be constructed having a capacity of 2.0 liters with a wall thickness of between 0.46 and 6.6 millimeters. It is believed that a conventional bottle having a 2.0 liter  
25 capacity made of high density polyethylene would require a wall thickness of at least 1.0 millimeter to be useable and even then may not be as resistant to paneling as the bottle of the present invention.

The bottle of the present invention is designed  
30 for use in conjunction with a device for controlling the flow of fluid through the orifice, such as valve cap 42. The valve cap 42 may be secured in a fluid tight manner to the bottle by a snap closure that includes annular rings 44 in a manner known in the art. Alternatively, the valve cap  
35 42 may threadedly secured to the bottle, or by any other suitable fluid tight arrangement.

Valve cap 42 may be of any suitable design, but is preferably as disclosed in U.S. Patent No. 4,408,701, entitled "Liquid Dispensing Valve", the contents of which

entitled "Liquid Dispensing Valve", the contents of which are incorporated herein by reference. Such caps include one portion mounted on the bottle over the orifice and another portion rotatably mounted on the first portion. The valve cap is shiftable between open and closed position for dispensing fluid by relative rotation of the first and second portions. Preferably, the valve cap is constructed in a manner so as to meter the flow of fluid from the bottle.

The present invention has now been described with reference to multiple embodiments thereof. It will be apparent to those skilled in the art that many changes can be made in the embodiments described without departing from the scope of the present invention. For instance, as is disclosed in the co-pending United States patent application entitled "Gravity Feed Fluid Dispensing System", filed of even date herewith, the bottle of the present invention may include a camming collar (not shown herein) integrally formed therewith in order to actuate the dispensing system, when the bottle is engaged therewith. Further, although a shoulder 35 is illustrated as being formed being both of the gripping surfaces and the orifice, it is within the spirit and scope of the present invention to provide a bottle with a shoulder formed between only one of the gripping surfaces and the orifice. Thus, the scope of the present invention should not be limited to the structures described in this application, but only by structures described by the language of the claims and the equivalents of those structures.

30

## WHAT IS CLAIMED:

1. A bottle for use with a fluid dispensing system, comprising:

5

a bottle body having

a cavity for receipt of a quantity of the fluid,

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an orifice communicating between said cavity and exteriorly of the bottle body,

15

means to resist paneling when said bottle is in said inverted position and the fluid is being dispensed through said orifice, and

20

a pair of spaced gripping surfaces adapted for manual engagement for manipulating the bottle between an upright position with said orifice directed upwardly, and an inverted position with said orifice directed downwardly.

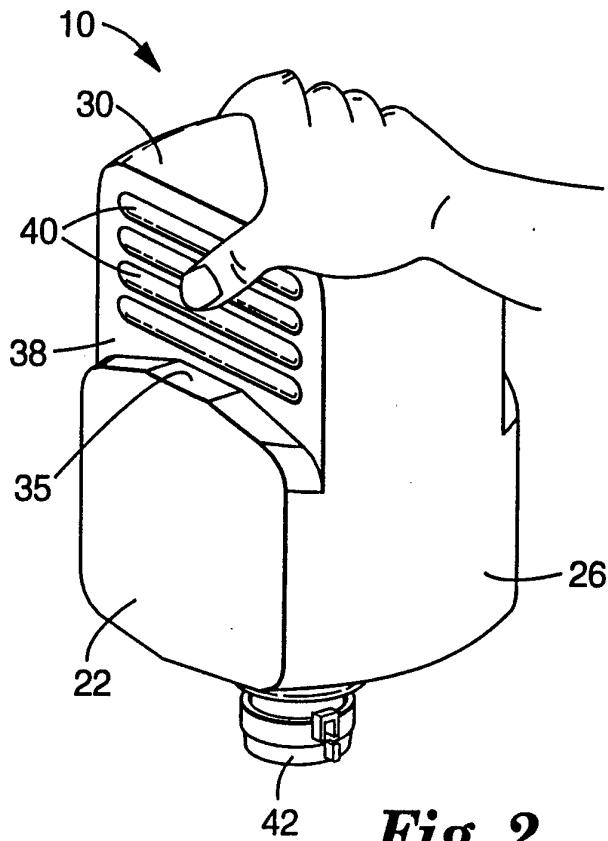
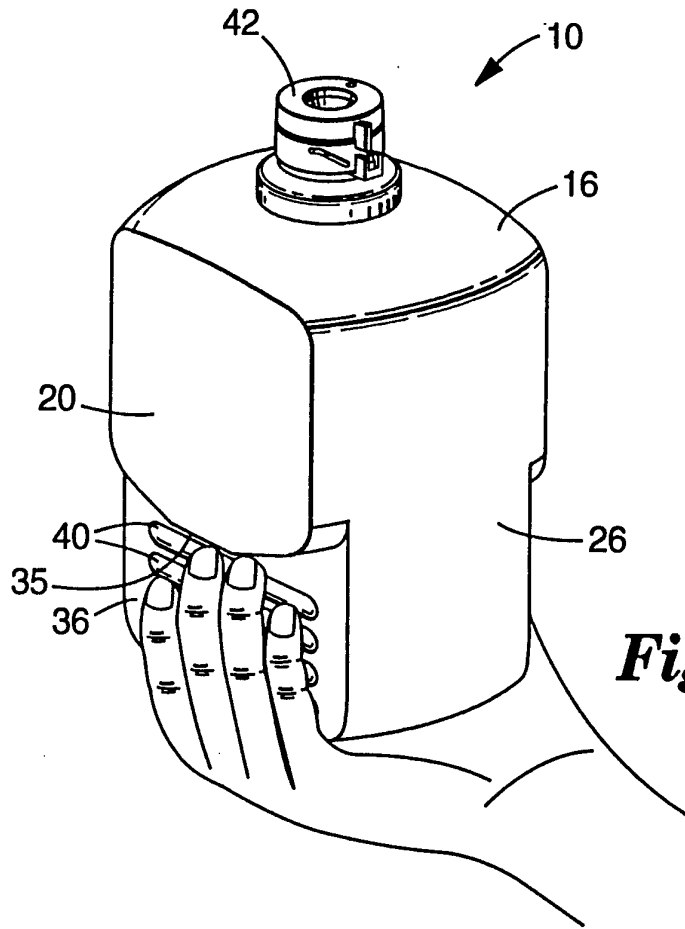
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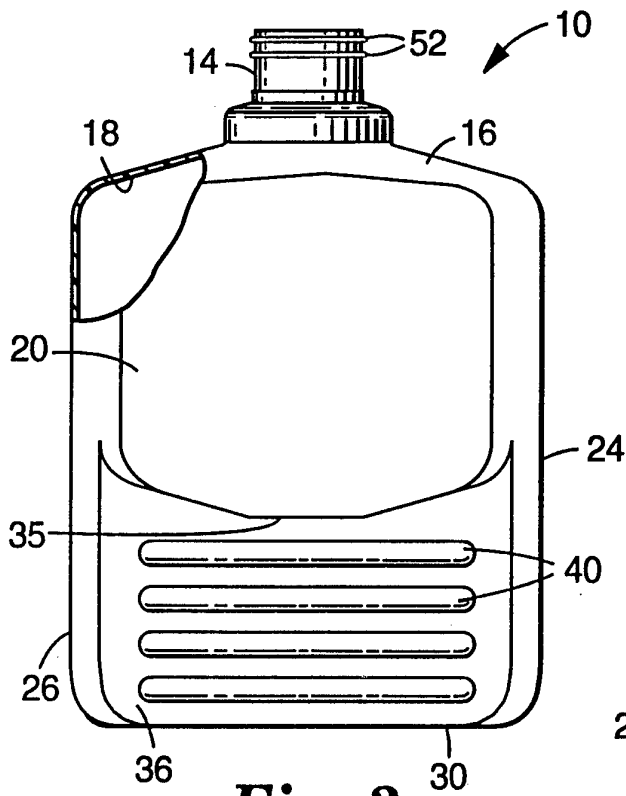
2. The bottle of claim 1, wherein said paneling resistance means includes a shoulder formed in said bottle body between at least one of said gripping surfaces and said orifice, wherein said at least one shoulder stiffens said bottle body to resist paneling when said bottle body is inverted and the fluid is being dispensed.

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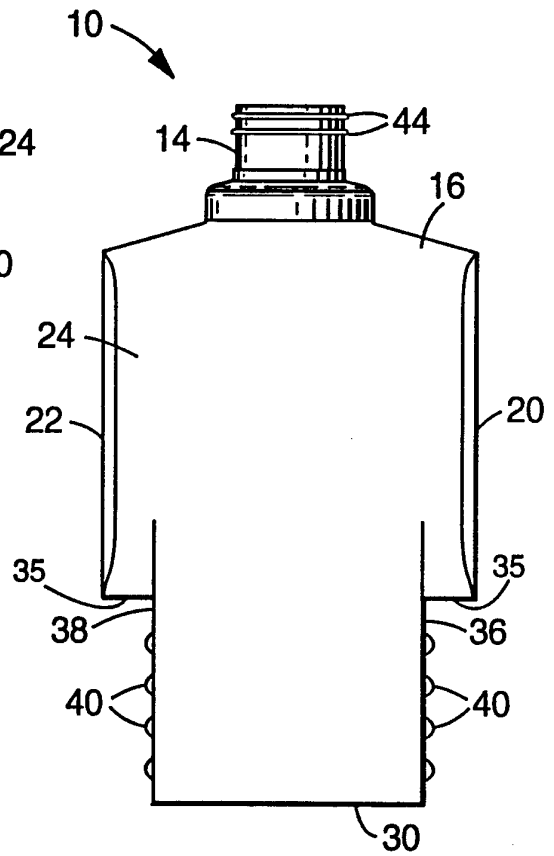
3. The bottle of claim 1, wherein said gripping surfaces each includes a plurality of ribs projecting from each of said gripping surfaces, to facilitate manual grasping and manipulation of the bottle.

4. The bottle of claim 3, wherein said ribs resist paneling in said gripping surfaces when said bottle body is inverted and the fluid is being dispensed.

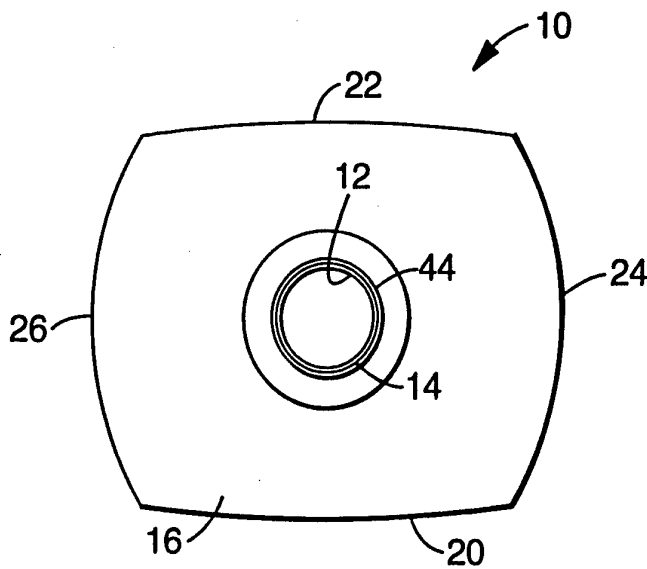




**Fig. 3**



**Fig. 4**



**Fig. 5**

INTERNATIONAL SEARCH REPORT

Intern: 1 Application No  
PCT/US 94/02066

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 5 B65D23/10 B65D1/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 5 B65D

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

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|------------|--|-----------------------|
| X          | EP,A,0 356 829 (YOSHINO KOGYOSHO CO. LTD.)<br>7 March 1990<br>see column 2, line 15 - column 3, line 42;<br>figures 1,2<br>--- | 1-4                   |
| X          | US,A,4 993 565 (OTA) 19 February 1991<br>see column 1, line 53 - column 3, line 38;<br>figures 1-8<br>---                      | 1-4                   |
| X          | US,A,3 536 500 (CLEEREMAN) 27 October 1970<br>see column 2, line 17 - line 48; figures<br>1,2<br>---                           | 1-4                   |
| X          | US,A,4 691 822 (MALANCON JR.) 8 September<br>1987<br>see figures 1,2<br>---  | 1,2                   |
|            | -/--   |                       |

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search  
**22 June 1994**

Date of mailing of the international search report  
**22. 07. 94**

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European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+ 31-70) 340-3016

Authorized officer  
**Berrington, N**

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| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT |   |                       |
|--|---|-----------------------|
| Category *   | Citation of document, with indication, where appropriate, of the relevant passages    | Relevant to claim No. |
| A  | GB,A,797 340 (HAGEN) 2 July 1958<br>see page 2, line 3 - line 8; figures 3,4<br>----- | 1,2                   |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern: International Application No

PCT/US 94/02066

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