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(54) Improvements relating to couplings for the dispensing of fluids from containers.

(57) A coupling for the dispensing of liquids from sealed containers is provided and comprises a round plug which is adapted to be screwed into an opening in the container. The plug has an axial bore for receiving a dispensing body which is sealed to the plug by pushing same into said axial bore followed by twisting of the body. A bayonet type connection ensures that the body and plug remain sealingly connected. When they are connected, two independent and mutually isolated fluid passages are set up which extend from inside to outside of the container through the plug and body whereby for example liquid can be forced from the container by introducing a gas under pressure through one of the passages to force the liquid out of the other passage. This prevents undesired contact of the liquid with the atmosphere. The plug is provided with a threaded portion in the axial bore for receiving a closure cap to close the axial when the said body is uncoupled from the plug, for example when being stored. The plug may have a narrow projecting sleeve portion for receiving frictionally a dip tube, the bore of said sleeve forming part of said axial bore.

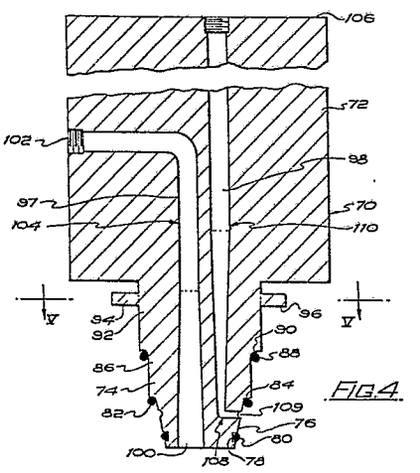

FIG.4

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Description

Improvements Relating to Couplings for the Dispensing of Fluids from Containers

This invention relates to a coupling for the dispensing of fluids from containers, in particular the dispensing of liquids from containers by the use of a pressurizing gas.

In the dispensing of liquids from containers, especially expensive liquids which must be kept as sterile as possible, the dispensing of the liquid must take place in a controlled fashion, and it is important to provide for effective sealing of the dispensing outlet to ensure that the liquid will not be exposed to atmospheric contamination. In some cases atmospheric contamination of a liquid can result in discard of the liquid at considerable expense.

The present invention provides a coupling for use in the dispensing of fluid from a container wherein the liquid can effectively be sealed from atmospheric contamination.

According to the invention there is provided a coupling for the dispensing of fluid from a container comprising first and second mating coupling parts which are adapted for connection and disconnection, the first mating coupling part comprising a plug adapted for connection to a container aperture and defining first and second fluid flow passages therein, and a body for sealing coupling to said plug and comprising third and fourth fluid flow passages therein, said plug and body having means adapting same to be sealingly coupled together whereby the first and third passages are in fluid communication, and are sealingly isolated from the second and fourth fluid passages which are also in fluid communication whereby, when the coupling is used with a container which is sealed apart from the aperture receiving the plug, fluid can be discharged from the container through either the first and third passages or the second and fourth passages by pressurizing or vacating the container through the others of said second and fourth and first and third passages.

The plug may be circular sectioned and may have on its outer surface a screw thread adapting it to be screw threaded to a threaded neck defining said container aperture.

Also, the plug may be provided with an axial bore, part of which defines said first passage, and the second passage is defined by one or more radial bores intersecting the axial bore, and lying to the side of the plug which is inserted into the container so that the radial bore or radial bores will lie inside the container when the plug is screwed thereto.

The plug and body preferably are constructed from synthetics plastics material, such as for example a low density polyethylene.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, wherein:-

Fig. 1 is a diagrammatic elevation of a container with a dispensing closure according to the invention connected thereto;

Fig. 2 is a sectional elevation of a plug portion of the closure shown in Fig. 1;

Fig. 3 is a plan view of the plug shown in Fig. 2;

Fig. 4 is a sectional elevation of a body portion of the closure shown in Fig. 1;

Fig. 5 is a sectional plan of the body shown in Fig. 4, the section being taken on the line V - V in Fig. 4;

Fig. 6 is a sectional elevation similar to Fig. 4, but showing an alternative form of the body; and

Fig. 7 is a plan view of the body shown in Fig. 6.

Referring to the drawings, in Fig. 1 is shown a container 10 holding for example a sterile and valuable liquid 12 which is required periodically to be dispensed from the container 10 to an outlet pipe 14. The method of dispensing is to supply gas under pressure through a supply pipe 16 as indicated by arrow 18, so that the fluid is dispensed as indicated by arrow 20. The gas under pressure is supplied through a coupling 22 according to the present invention which has an outlet permitting the flow of gas under pressure as indicated by arrow 24 into the head space 26 above the liquid 12, and a dip tube 28 dips into the liquid and extends to the base of the container, the dip tube serving as a feed means enabling the flow of liquid up the dip tube and through the coupling 22 and eventually to pipe 14.

The present invention resides in the design and construction of the coupling 22, and reference is now made to Figs. 2 to 5 which show respectively in Figs. 2 and 3 a plug portion of the coupling, and in Figs. 4 and 5 a body portion. The plug portion shown in Figs. 2 and 3 forms a female part, whilst the body portion forms a male part which is adapted to be inserted into the plug to establish sealing connection therewith.

Referring now to Figs. 2 and 3 in detail, the plug which is indicated generally by reference numeral 30 is a one-piece plastics moulding of circular cross-section, and is provided with an axial bore 32 which has sections of different configuration and, from the bottom upwards in Fig. 2 comprises a first cylindrical section 34 which is threaded, a frustoconical sealing section 36 which increases in diameter in an upwards direction, a cylindrical closure cap section 38 which is threaded in order to receive a closure cap 40 for the closing of the bore when the coupling parts are disconnected, and the contents of the container 10 have to be protected, and a frustoconical section 42 which increases in diameter to the upper end face 44 of the plug.

In the frustoconical section 42 as shown clearly in Fig. 3 there are inwardly directed ribs 46, 48, and each of the ribs 46 and 48 is provided with a slot 50, 52 open at one side only of each rib for the receipt of tongues on the body of Figs. 4 and 5 for the coupling together of the plug and body as will be described hereinafter.

In the lower threaded section 34 is received a nipple sleeve 54 of which the outer surface is

provided with barb rings 56 so as to retain in position on the sleeve 56 the flexible dip tube 28 which is frictionally engaged thereby when the dip tube is pushed over the sleeve 56.

It will be noted that the interior 58 forms an extension of the axial bore 32 so that in use the displaced fluid can travel up the inside of the sleeve 54 and into the axial bore 32.

On the outside, the plug 30 is provided with screw threads 60 enabling the plug to be screw threaded into a neck 62 defining the aperture in the container 10 (see Fig. 1). When the plug is screwed into the neck 62, it sealingly engages same preventing the ingress of atmosphere into the container between the plug and neck.

As described hereinbefore, when the body of Figs. 4 and 5 is disconnected from the plug 30, the cap 40 is screwed sealingly into engagement with the threaded bore portion 38 in order to seal off the bore 32 and prevent any contact between the liquid inside the container and the atmosphere.

Turning now to Figs. 4 and 5, the body 70 is a block of plastics material which is similar in nature to the material used for the plug 30. The body is of circular cross-section and comprises a main portion 72 and a cylindrical projecting portion 74 of reduced diameter which fits into the bore 32.

The portion 74 in an upwards direction in Fig. 4 comprises a frustoconical end 76 having a lower groove 78 which receives an O-ring seal 80 defining a sealing surface, and a second O-ring 82 seats on a shoulder 84 at the other end of the frustoconical end 76 where a cylindrical portion 86 meets the frustoconical end 76.

A further O-ring seal 88 may be provided on a shoulder 90 between the cylindrical portion 76 and a further but increased diameter cylindrical portion 92 which connects with the main body part 72. Cylindrical portion 92 has a pair of diametrically opposite locking tongues 94, 96 which are spaced from the main body portion 72 so as to be capable of engaging in the slots 50 and 52 as described hereinbefore.

The body is provided with through passageways 96, 98, the passage 96 leading from the end face of end 76 as indicated by reference 100 and passes axially through the body 70 until it turns at right angles and leads to a side outlet 102. The passageway 96 is of reducing diameter from the outlet 100 to the region 104 and from region 104 to outlet 102 it is of constant diameter.

The passageway 98 leads axially through the body from the top surface 106 thereof until it turns at right angles as indicated at 108 and exits at outlet 109 between the O-ring seals 80 and 84 in the frustoconical wall of end 76. The passageway 98 is of constant diameter until it reaches region 110 when it is of constantly reducing diameter until it reaches the right angled portion 108.

In order to couple the body and cap, it is simply a matter of inserting the projecting portion 74 into the bore 32 until the O-ring seals 80 and 84 engage the sealing bore portion 36 followed by the twisting of the body 72 until the tongues 94 and 96 engage the slots 50 and 52 thereby holding the coupling parts in sealing engagement. When the body and plug are so sealingly coupled, it will be seen that there are established two fluid flow routes between exteriorly of the container 10 and interiorly of the container. The first route for the flow of gas under pressure is through passageway 98 in the body outlet 109, and radial ports 55, and the second flow route is through the sleeve 54 and the axial bore 32 and finally through the passageway 96 in the body. It will of course be appreciated that the cap 40 must be removed in order to permit the sealed coupling of the body and plug. The outlet 102 therefore having regard to the arrangement of Fig. 1 will be connected to the pipe 14, whilst pipe 16 will be connected to the top of passage 98.

The two flow passages are mutually sealed one relative to the other, insofar as the sealing rings 80 and 84 engage the sealing surface 36 on opposite sides of the radial bores 55.

An effective and simple sealing arrangement results.

The flow passages connecting the interior of the container and the exterior of the container can be used in opposite fashion. In other words gas under pressure can be passed through the pipe 14, for the discharge of liquid through the pipe 18, but in this connection it may be necessary to provide for a dip tube connection to the ports 55.

Additionally, liquid can be sucked from the interior of the container through pipe 14 as long as pipe 16 is coupled to the supply of gas to replace the liquid withdrawn from the container 10. The gas which is used for contacting the liquid for propelling same from the container or for making up the space created by withdrawal of the liquid from the container may be of a type which does not react with or contaminate the liquid in the container 10.

The embodiment of the body shown in Figs. 6 and 7 is essentially similar to that shown in Figs. 4 and 5 except that the main portion 72 of the body is hollowed out as indicated at 112 in order to save material, and this means that the discharge outlet 102 is located at a lower position in the body. Other parts already described in relation to Figs. 4 and 5 which are also present in the Figs. 6 and 7 arrangement have similar reference numerals.

Fig. 7 shows that the exterior of the main body part 72 is provided with ribs 114 to facilitate the rotation of the body by hand.

Claims

1. A coupling for the dispensing of fluid from a container comprising first and second mating coupling parts which are adapted for connection and disconnection, the first mating coupling part comprising a plug adapted for connection to a container aperture and defining first and second fluid flow passages therein, and a body for sealing coupling to said plug and comprising third and fourth fluid flow passages therein, said plug and body having means adapting same to be sealingly coupled together whereby the first and third passages are in fluid

communication, and are sealingly isolated from the second and fourth fluid passages which are also in fluid communication whereby, when the coupling is used with a container which is sealed apart from the aperture receiving the plug, fluid can be discharged from the container through either the first and third passages or the second and fourth passages by pressurizing or vacating the container through the others of said second and fourth and first and third passages.

2. A coupling according to Claim 1, wherein said plug is circular sectioned and has on its outer surface a screw thread adapting it to be screw threaded to a threaded neck defining said container aperture.

3. A coupling according to Claim 2, wherein the plug is provided with an axial bore, part of which defines said first passage, and the second passage is defined by one or more radial bores intersecting the axial bore, and lying to the side of the plug which is inserted into the container so that the radial bore or radial bores will lie inside the container when the plug is screwed thereto.

4. A coupling according to Claim 3, wherein the axial bore has a frustoconical seal section into which the radial bore or radial bores opens or open.

5. A coupling according to Claim 3 or 4, wherein the plug has a pair of axially extended ribs which are diametrically opposite and are located in the axial bore, each of said ribs having a slot, and said body being provided with tongues which respectively engage in said slots for the coupling of the coupling plug and body when the body is inserted in the axial bore of the plug and then is twisted relative thereto, for extablishing said sealing coupling.

6. A coupling according to Claims 3, 4 or 5, wherein said axial bore has a threaded portion for receiving a threaded cap to close the axial bore when the bgody is disconnected from the plug.

7. A coupling according to Claims 3, 4, 5 or 6, wherein said plug has a sleeve extension of which the interior forms part of said axial bore said sleeve extension being adapted to receive on the outside thereof by push fitting, a flexible dip tube.

8. A coupling according to any of Claims 3 to 7, wherein said body is circular sectioned for receipt in said axial bore of the first coupling part, said body defining a frustoconical end part which is adapted to sealingly locate in said frustoconical seal section of the axial bore so that between said frustoconical seal section and frustoconical end there are defined spaced sealing surfaces, said radial bore or radial bores opening into said frustoconical seal section between said sealing surfaces, and the fourth passage passing through said block and opening into said frustoconical end between said sealing surfaces, the third passage being isolated from the fourth passage, and opening into the end face of the frustoconical end, the third and fourth passages also defining inlet and outlet connections at locations externally of the container when the body is sealingly connected to the plug and the plug is connected to the container.

9. A coupling according to Claim 8, wherein said spaced sealing surfaces are defined by O-ring seals mounted on the said frustoconical end.

10. A coupling according to any of Claims 1 to 9, wherein one or each of the plug and the body is a one piece plastics moulding.

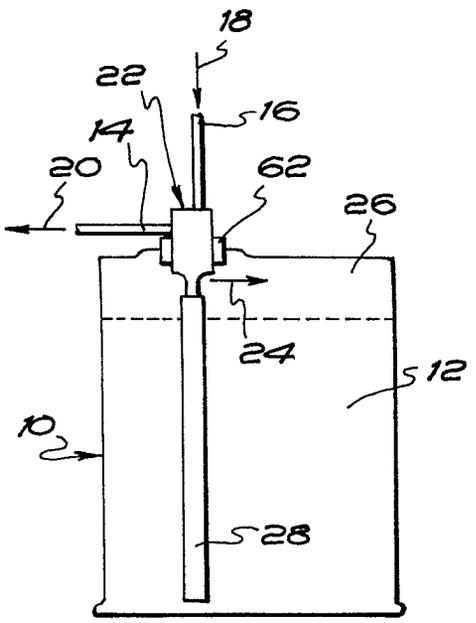


FIG. 1

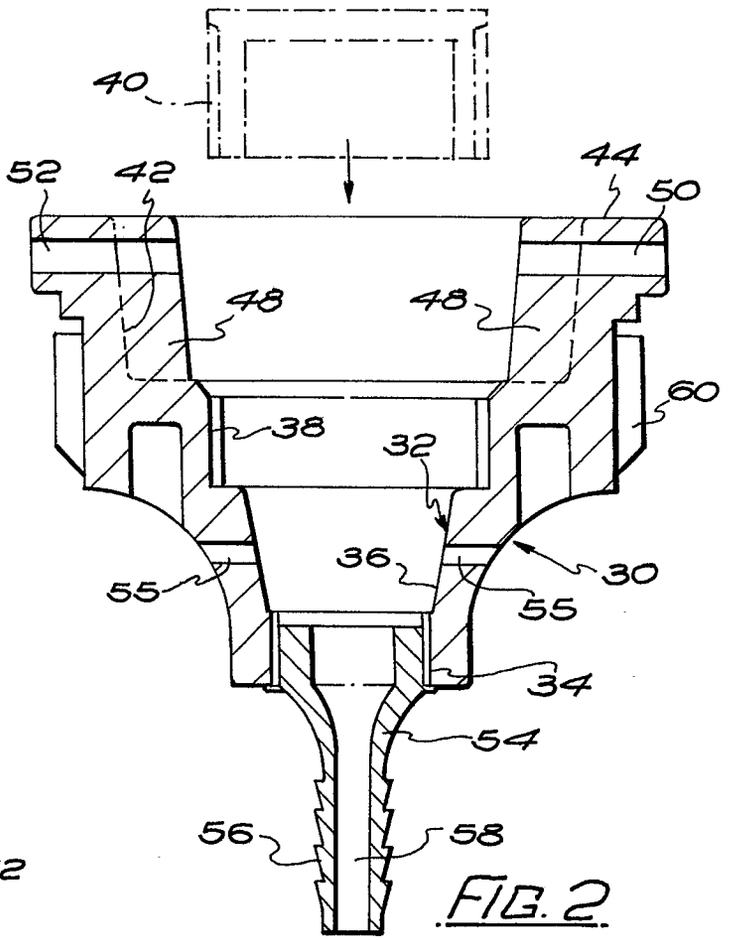


FIG. 2

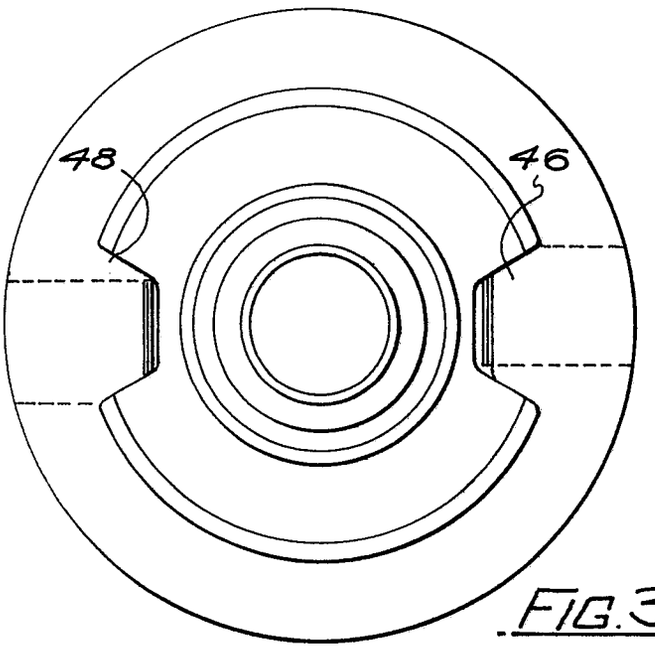


FIG. 3

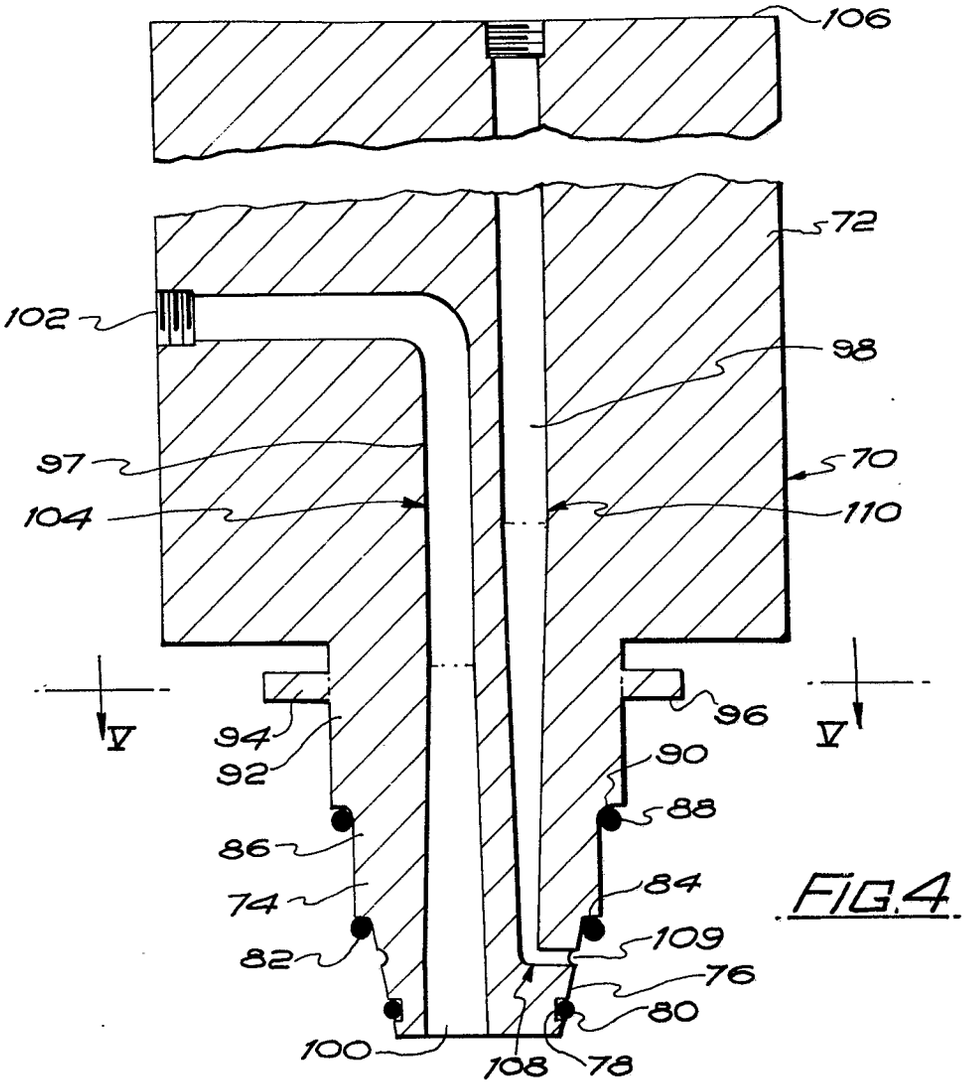

106
72
102
98
97
70
104
110
V
V
96
94
92
90
88
86
84
74
109
82
76
80
100
108
78

FIG.4

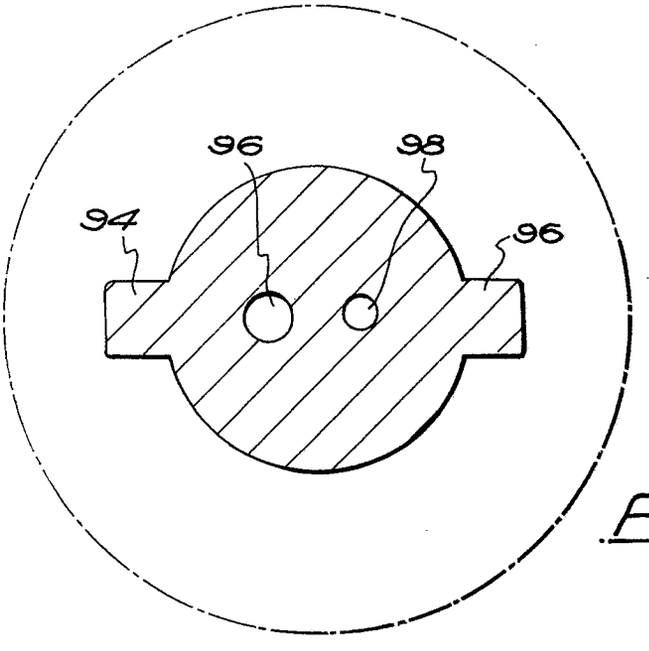
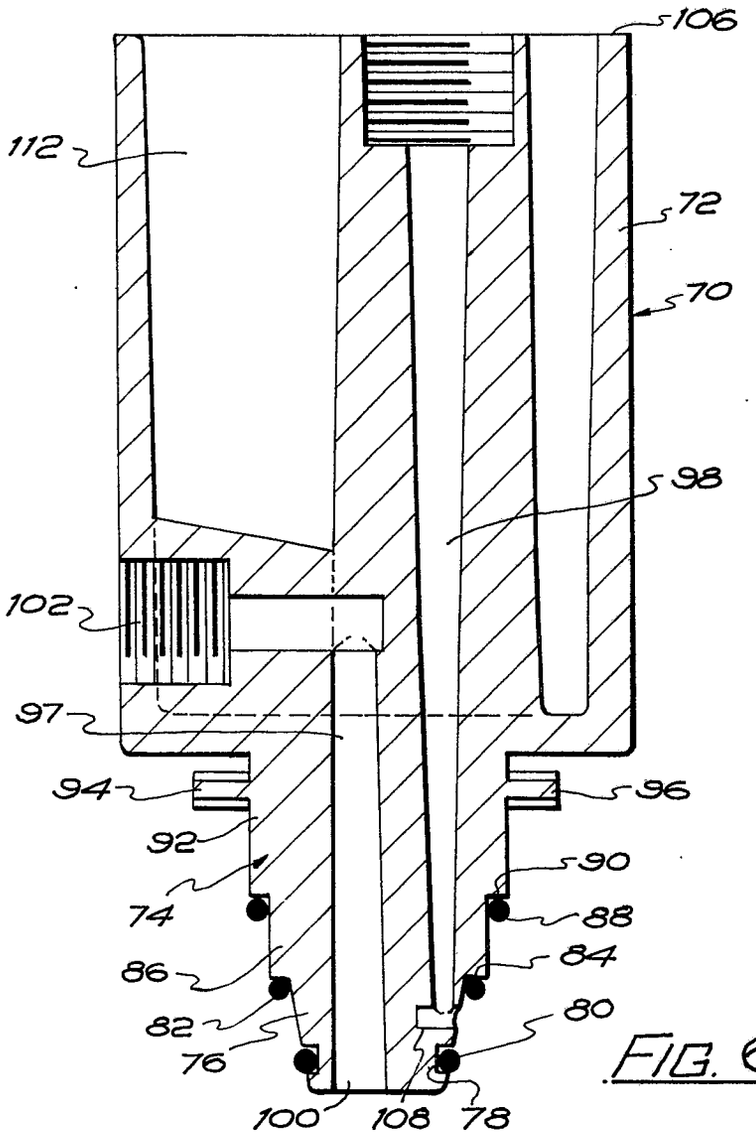

96
98
94
96

FIG.5


106
112
72
70
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102
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94
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76
100
108
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FIG. 6

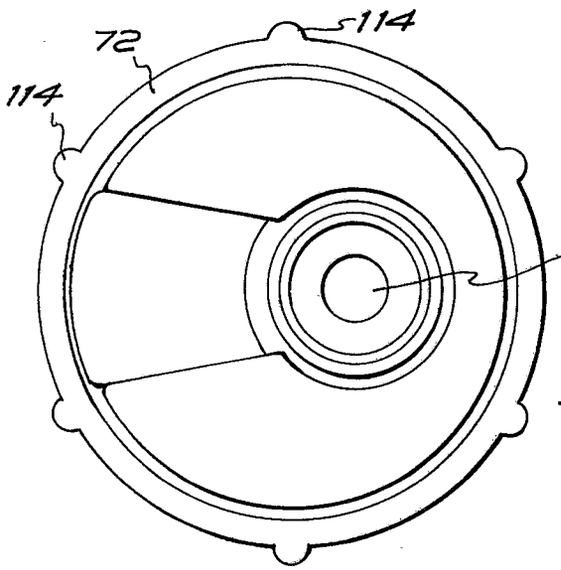
114
72
114
98

FIG. 7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 30 5560

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	DE-A-3 608 300 (GRANT) * Figures 1,7,10-12; page 21, line 12 - page 23, line 14; page 27, lines 4-14 *	1,2,10	B 67 D 1/08 B 67 D 5/02
Y		3,5-7	
Y	EP-A-0 202 199 (EUROBASE S.p.A.) * Figures 1,2,4; page 6, line 2 - page 7 *	3,5-7	
A	US-A-3 782 609 (ZUCCONI)		
A	US-A-3 545 475 (JOHNSON)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)
B 67 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16-08-1989	DEUTSCH J.P.M.

CATEGORY OF CITED DOCUMENTS

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