



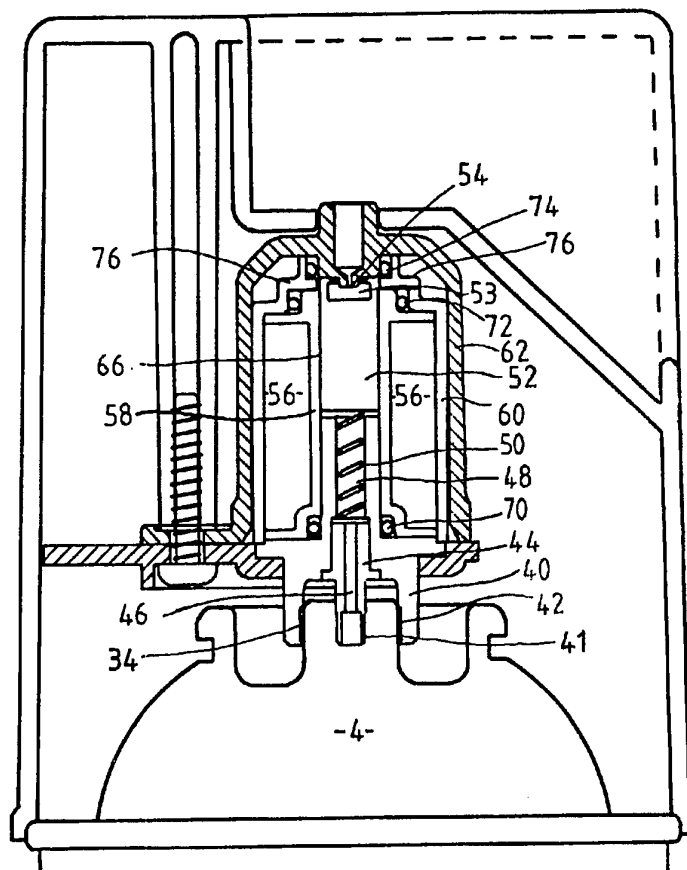
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<p>(21) International Application Number: PCT/NZ95/00002</p> <p>(22) International Filing Date: 16 January 1995 (16.01.95)</p> <p>(30) Priority Data:</p> <table border="0"> <tr> <td>250611</td> <td>15 January 1994 (15.01.94)</td> <td>NZ</td> </tr> <tr> <td>260784</td> <td>17 June 1994 (17.06.94)</td> <td>NZ</td> </tr> </table> <p>(71)(72) Applicant and Inventor: BARKER, Douglas, Christopher [AU/NZ]; 60 Napier Street, Freemans Bay, Auckland (NZ).</p> <p>(74) Agents: KNOWLES, Andrew, Arthur et al.; Knowles & Associates, 156 Vincent Street, P.O. Box 5073, Wellesley Street, Auckland (NZ).</p>	250611	15 January 1994 (15.01.94)	NZ	260784	17 June 1994 (17.06.94)	NZ	<p>(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ).</p> <p>Published <i>With international search report.</i></p>
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(54) Title: DISPENSER

(57) Abstract

An automatic aerosol dispenser for dispensing flowable substances, such as insect repellants, air fresheners or odour neutralizers provided in fluid form. The dispenser includes a solenoid metering valve and electronic actuating circuitry in the lid or cap of the aerosol container. The dispenser is as portable as the aerosol container itself, can be adjusted to dispense required quantities of the substance to be dispensed and provides good atomisation or misting of the substance.



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"DISPENSER"

TECHNICAL FIELD

This invention relates to dispensing apparatus. In particular, the invention relates to apparatus for dispensing required quantities of flowable substances, for example fluid
5 preparations such as insect repellents, insecticides, air fresheners and/or odour neutralizers from pressurised containers such as aerosol containers. However, the invention is not limited to these applications.

BACKGROUND ART

Aerosol fluid dispensers are known which are located within a housing which is
10 mounted on a wall, for example, or which sits on a shelf. The housing contains the aerosol container and contains a valve assembly and actuator for dispensing fluid from the aerosol container into the surrounding atmosphere.

The housing in known constructions is large relative to the aerosol container, so that sufficient space is provided; for mounting a dispensing valve; for containing the
15 valve actuating means, which may comprise a printed circuit board and solenoid or mechanical actuator; for containing the power supply which may comprise an electric battery; and for containing the aerosol container itself.

Unfortunately, the size of the housing means that the product takes up significantly more space or volume than that occupied by the aerosol container alone and the apparatus
20 is unwieldy, so it is not easily portable and cannot be easily transferred to different locations. Furthermore, the large housing has the disadvantage that the volume of material, such as plastic, from which the housing is made adds significantly to the cost of manufacturing and shipping the product.

These existing constructions are not suitable for the mass consumer market because of their size, cost, difficulty in fitting the aerosol can and complexity in programming.

Other known dispensers are disclosed in British patent No. 1021586 and United
5 States patent No. 3351240.

British patent No. 1021586 relates to a dispenser which is intended to be mounted on a permanent fixture such as a wall. Therefore the dispenser is not provided within the lid or cap of an aerosol container. This has the disadvantages of the dispensers located in larger housings discussed above. The greatest disadvantage is that the size of the
10 dispenser housing limits the mobility and uses of the dispenser. The size of the housing also adds to the cost of the product.

The dispenser disclosed in British patent No. 1021586 does not use a separate valve dispensing device, instead the valve provided in the aerosol container is used to meter out the flowable substance. Therefore, significant manual adjustment of the
15 solenoid actuated plunger needs to be performed before it can be used reliably and consistently to dispense desired quantities of the flowable substance to be dispensed. Another disadvantage is that the aerosol container is difficult to mount on the dispenser apparatus as at least two screws need to be manually loosened and then tightened to properly secure the aerosol container.

20 US patent No. 3351240 discloses a form of automatic aerosol dispenser located within a housing which is mounted about the upper portion of an aerosol container. However, the construction has a number of significant disadvantages.

Firstly, the outlet does not effectively spray or "atomise" or "mist" the flowable substance. As the substance is not properly dispersed, the utility of the apparatus is substantially negated.

Also, the arrangement of the solenoid actuator which opens and closes a valve member in the apparatus is such that the flow of the substance to be dispensed must change suddenly through a 90 degree angle and then travel a relatively long distance from the central axis of the can to the periphery of the apparatus to enter the surrounding atmosphere. This is a very inefficient flow path which leads to inefficiency of operation of the apparatus.

A further disadvantage is that the attachment of the apparatus to the upper part of the aerosol container is unreliable. The attachment uses a protruding bead on the upper edge of the aerosol can which engages with an internal groove provided on the apparatus. The engagement of the bead and groove holds the apparatus in place so that the aerosol container valve is in an open position. Small movements of the housing of the apparatus, for example due to temperature differences or handling by a user, can lead to movement of the aerosol outlet receiving portion of the apparatus which can lead to leaks about the outlet of the container.

The reliability of the attachment of the apparatus to the container is also of critical importance to the safety of a user. Due to the harmful environmental effects of chlorofluorocarbons, hydrocarbons are now commonly used as an aerosol propellant. As hydrocarbons are flammable it is vital that leakage does not occur.

DISCLOSURE OF INVENTION

It is an object of the present invention to provide dispenser apparatus which will at least go some way toward overcoming the above disadvantages, or which will at least provide the public with a useful choice.

5 Accordingly, in one aspect the invention consists in apparatus for dispensing a flowable substance from a pressurised container. The apparatus comprises a dispensing means for dispensing the flowable substance, a nozzle means through which the substance is dispensed from the apparatus, and a housing for housing the dispensing means. The housing comprises a lid or cap of the container.

10 In a further aspect the invention consists in apparatus for dispensing a flowable substance from a pressurised container. The apparatus comprises a moveable valve member actuated by an actuating means, the valve member being located in the flow path between an outlet of a container containing the substance and an outlet of the apparatus. At least a part of the flow path past the valve member is in a direction substantially
15 parallel to the direction of motion of the valve member. The valve member is provided within a lid or cap of the container.

 In a further aspect the invention consists in apparatus for dispensing a flowable substance from a pressurised container. The apparatus comprises a dispensing means for dispensing the flowable substance, a housing comprising a lid or cap of the container, and
20 engagement means for engaging the apparatus with the container. The engagement means comprises a threaded connection.

 In a further aspect the invention consists in a valve assembly for a flowable substance dispenser for dispensing a flowable substance from a pressurised container. The assembly comprises a moveable valve member within a valve wall, the valve member

being movable in response to energisation of an actuating means, the valve wall being shaped to at least substantially reduce the space between the valve member and inner surfaces of the valve wall.

The invention consists of the foregoing and also envisages constructions of which the following gives examples.

BRIEF DESCRIPTION OF THE DRAWINGS

One preferred form of the present invention will now be described with reference to the accompanying drawings in which;

Figure 1 is an isometric view of the apparatus of the present invention located on a pressurised fluid container,

Figure 2 is a front elevation in partial cross-section of the apparatus of figure 1 through line A-A of figure 3,

Figure 3 is a plan view in partial cross-section of the apparatus of figures 1 and 2,

Figure 4 is a further side elevation of the apparatus of the preceding figures shown in partial cross-section through line B-B of figure 3,

Figure 5 is a side elevation in partial cross-section of the apparatus of the preceding figures showing the valve assembly of the present invention in greater detail, and

Figure 6 is a simplified circuit diagram of control circuitry in accordance with the present invention.

BEST MODES OF CARRYING OUT THE INVENTION

Referring to figure 1, fluid dispensing apparatus generally referenced 2 is shown mounted on a pressurised container containing a flowable substance, such as an aerosol

container 4. The apparatus 2 comprises an outer housing 6 which is attached to a part of the container. The outer housing 6 comprises a lid or cap of the container 4 and has an aperture 8 therein through which a spray nozzle or outlet 10 projects for dispensing the flowable substance. The spray nozzle 10 can be provided as an integral part of the housing or can be provided separately, so that it is substantially located within the housing with only the nozzle outlet aperture 13 accessing the atmosphere outside the housing, or the nozzle can be located completely externally of the housing. The spray nozzle 10 dispenses the flowable substance that is dispensed by the apparatus. The spray nozzle does this by "atomising" or "misting" the substance. The spray nozzle 10 is usually referred to by those skilled in the art to which the invention relates as an "actuator", however it will be apparent that it is not required to actuate the flow of substance for the present invention as the actuation is performed by control circuitry as will be described further below. The spray nozzle 10 has a mechanical break-up insert 11 which has the outlet aperture or terminal orifice 13 which is dimensioned to provide a desired spray pattern. It is very important that the desired spray particle size is achieved as the particle size is critical to the effectiveness of the substances dispensed by aerosol dispensers. For example, to kill insects effectively, the particle size must be approximately 10 to 20 microns.

The outer housing 6 also has an attachment hook or loop 12 constructed from a length of wire for example. An activation switch or button 14 is provided to switch the apparatus between operational and inoperational states and can also provide a test switch to ensure the apparatus is operating correctly.

Referring to figure 2 the housing 6 is shown in cross-section. It can be seen that the housing has sufficient space to house a power supply such as a battery 26. In the

preferred embodiment a nine volt battery is used. A printed circuit board (PCB) 18 (not shown in figure 2 for clarity) is also provided in space 32.

Referring to figure 3 the dispenser apparatus is shown in plan view. The mountings 20 which connect the housing 6 to a dispensing means comprising a valve assembly 22 are shown. The battery 26 is contained in a battery housing 24. The location of the printed circuit board 18 is also shown.

Referring to figure 4 area 32 is shown which allows space for the PCB 18. It will be seen that area 32 provides sufficient space between the PCB 18 and the housing 6 to enable electrical and electronic components to be mounted on one or both sides of the PCB. In use the PCB 18 provides dispensing actuating means comprising control circuitry which selectively actuates the valve assembly by energising a solenoid which moves a valve member comprising an armature of the valve assembly so that predetermined quantities of fluid are dispensed at predetermined intervals. The activation switch 14 (not shown in figure 4) is located at the end of the PCB nearer the top of housing 6. A potentiometer 28 is also provided and an aperture 30 is provided so that the potentiometer 28 can be adjusted by a user for example, by using a screw driver in a slot provided in the potentiometer, to alter the quantity of fluid being dispensed by the apparatus. The pressurised gas container 4, which comprises an aerosol container for example, is also shown in more detail. The container 4 has a female type aerosol valve with an external male thread 34 for attachment of the valve assembly. A spigot 32 of the valve assembly is inserted into the can outlet 41. The threaded attachment of the apparatus to the container provides the significant advantage that the connection is reliable. This is particularly important as the pressurisation of aerosol cans makes the connection prone to leakage which results in loss of pressure and poor performance. The

use of hydrocarbons as a propellant in most modern aerosol containers also makes leaks very dangerous. The present invention is much safer than prior art constructions. Also, the threaded connection ensures that the apparatus fully opens the valve provided in the container. In prior art constructions, the container valve would not always open
5 satisfactorily. With the present invention a user will always ensure the container valve is fully open by screwing the apparatus onto the container until the end of the thread is reached.

It will also be seen that providing automatic flowable substance dispensing apparatus within the lid of a container provides significant advantages; the apparatus takes
10 up very little space, and may even be placed on a bench or ledge or hung from a ceiling for example. Also, it is easily portable so that it may be moved to different locations in a room, building, vehicle, boat, tent or elsewhere. Furthermore, the appearance of the dispenser is appealing and the product which is to be dispensed is easily identified as a user's view of the outside of the container, for example the container label (which usually
15 identifies the contents of the container) is unobstructed by the lid.

The valve assembly 22 is described in more detail with reference to figure 5.

Referring to figure 5 the valve assembly 22 comprises a base 40 having a female thread 42 on a part thereof for connection with male thread 34 of the container 4. A spigot 44 constructed of a material such as brass, for example, is provided in the base
20 40 of the valve assembly. The spigot has a central aperture 46 through which the flowable substance such as a fluid to be dispersed from the container 4 can travel. For the purposes of the following description, the flowable substance will be referred to as a fluid. A large aperture 48 is provided in the valve assembly base 40 and contains a biasing means such as a spring 50, for example, which in use biases a movable valve

member 52 comprising a moveable armature in a sealing engagement with a valve orifice 54 of the assembly. The armature 52 has a captive armature sealing disc 53 at the end of the armature adjacent to the valve orifice 54. Space 56 is provided between inner valve wall 58 and outer valve wall 60 of the valve assembly so a solenoid coil (not shown) can
5 be located therebetween so as to move the armature 52 into and out of contact with valve orifice 54. A further outer wall 62 dependent from valve orifice 54 shrouds outer wall 60. The outer wall 62 thus securely locates the inner wall 60 in position against the valve base 40.

In use, spring 50 holds the armature sealing disc 53 in sealing contact with valve
10 orifice 54, thus preventing fluid under pressure within the container 4 (and within apertures 46, 50 and spaces 66 about the valve member) from exiting the valve orifice 54. When the control means in the printed circuit board provide power to the solenoid in area 56, the armature 52 is forced under influence of the magnetic flux downwardly (with reference to figure 5) against spring 50 so as to move the armature out of sealing
15 contact with valve orifice 54 and thus allow fluid to exit the container 4 and the valve assembly through valve orifice 54 and then through the substance spray nozzle outlet 10. The armature moves only a very short distance to open the valve, for example, about 0.20-0.55mm. This very short range of movement makes the apparatus more efficient as less energy is required to actuate the solenoid. The length of time for which power
20 is applied to solenoid 56 is provided by the control circuitry on PCB 18 and is predetermined having been selected, for example, by a user. The period for which power is supplied is adjustable dependent on the setting of potentiometer 28 to provide a burst of a predetermined quantity of fluid. O-ring seal 70 prevents fluid within the inner walls 58 from escaping to atmosphere between inner walls 58 and valve base 40. Other O-ring

seals 72 and 74 prevent fluid escaping to atmosphere between inner wall 58 and outer walls 60 and 62. The shaped support portion of wall 60, referenced 76 which is provided between the seals 72 and 74 is not provided in known dispenser solenoid valve constructions and provides the significant advantage that the surface area of walls 60 and 5 62 exposed to pressurised fluid is reduced to a minimum. With such a very small surface area of the outer walls exposed to the pressurised fluids, the forces on the outer walls are reduced and this reduces the movement, distortion or creep of the outer walls which is a disadvantage with the prior art solenoid valve assemblies. If the distortion effect is too pronounced the outer walls move further away from the armature and the valve may 10 malfunction as there is insufficient magnetic flux to move the armature over a greater distance.

The minimal space between the armature 52 and walls 60 also ensures that there is a minimum "dead" flowable substance space, so very little substance is left in the apparatus in between dispensed bursts of fluid, and very little fluid is lost when aerosol 15 containers are attached and detached to and from the apparatus. For example in the closed position the available fluid volume in the valve is only in the order of 0.75 ml and in the open position in the order of 0.95 ml.

Referring to figure 6, a circuit diagram of dispensing actuating means comprising control circuitry is shown. The operation of the circuit will be known to a person skilled 20 in the art to which the invention relates. In essence a timing circuit is provided which provides power to the solenoid (connected to the soln + and soln - terminals) for predetermined periods of time dependent upon the setting of the potentiometer 28 (also referenced R6 in figure 6). A list of approximate component values is as follows:

Capacitor C1	0.1 microfarad
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	Capacitor C2	22 nanofarads
	Capacitor C3	0.22 microfarad
	Capacitor C4	2200 microfarads
	Diode's D1 and D2	1N4148
5	Timer U1	4541B
	Resistor R1	2M2
	Resistor R2	4M7
	Resistor's R3, R7 and R10	220k
	Resistor's R4 and R11	47k
10	Resistor's R5 and R8	4k7
	Resistor R9	150k
	Transistor Q1	BC548C
	Transistor Q2	BC327-25
	Potentiometer R6	100k adjustable

15 It can be seen that the present invention provides a fluid dispenser which provides significant advantages over the prior art. The present invention requires a smaller housing thus saving materials costs and reducing the space required for the device and it provides correct atomisation or misting of the substance being dispensed. The present invention is also portable, being small and compact, and can be left on a shelf in any one of a

20 number of locations, as permanent attachment to a fixture is not required. Therefore, it is as portable as an aerosol container itself. Furthermore, the present invention provides a valve assembly the performance of which is not adversely affected by the pressurised fluids being dispensed.

CLAIMS

1. Apparatus for dispensing a flowable substance from a pressurised container, said apparatus comprising a dispensing means for dispensing said flowable substance, a nozzle means through which said substance is dispensed from said apparatus, and a housing for
5 said dispensing means, said housing comprising a lid or cap of said container.
2. Apparatus as claimed in claim 1 wherein said nozzle is provided downstream of said dispensing means.
3. Apparatus as claimed in claim 1 or claim 2 wherein said dispensing means includes a valve means having a valve member movable relative to a valve seat/orifice.
- 10 4. Apparatus as claimed in any one of the preceding claims wherein said dispensing means includes dispensing actuating means.
5. Apparatus as claimed in claim 4 wherein said dispensing actuating means dispenses desired quantities of said substance from said container.
6. Apparatus as claimed in claim 4 or claim 5 wherein said dispensing actuating
15 means dispenses said substance from said container at desired intervals and/or dispenses said substance for a desired period of time.
7. Apparatus as claimed in any one of claims 4 to 6 wherein said dispensing actuating means comprises a stored energy apparatus.
8. Apparatus as claimed in any one of claims 4 to 7 wherein said dispensing
20 actuating means comprises electrical and/or electronic apparatus.
9. Apparatus as claimed in any one of claims 2 to 8 wherein said valve means includes a solenoid, actuation of said solenoid moving said valve member into or out of contact with the valve seat/orifice.

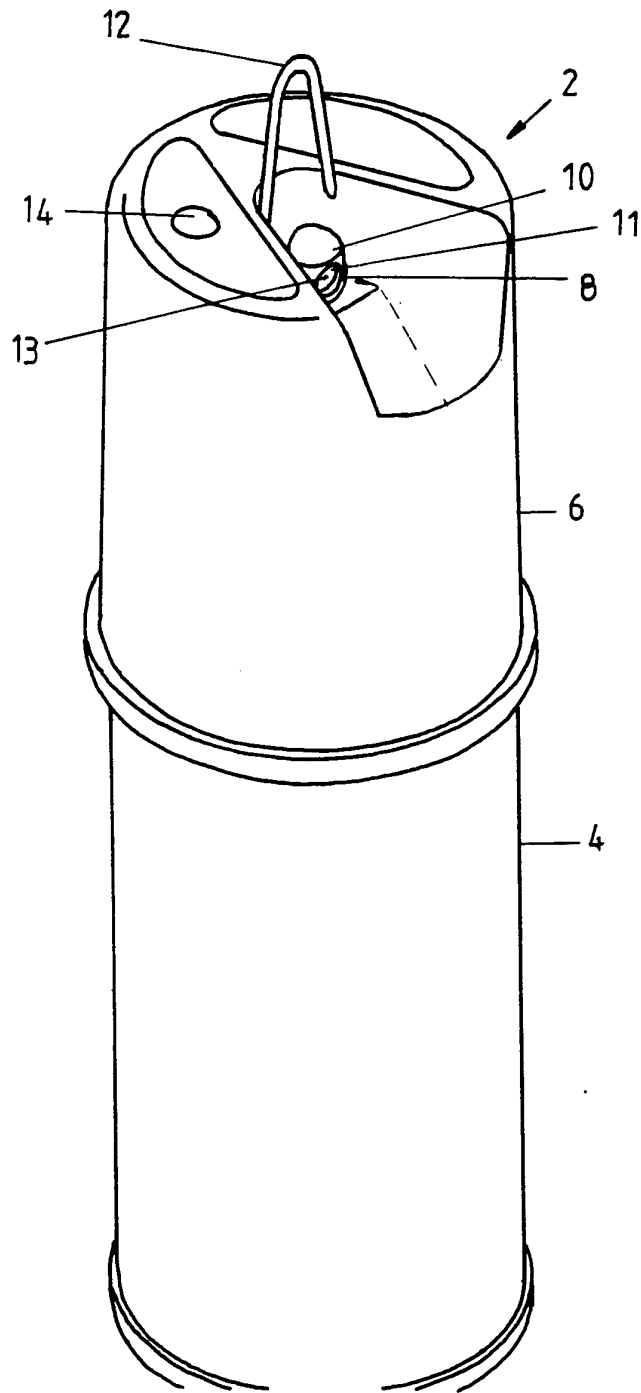
10. Apparatus as claimed in any one of claims 2 to 9 wherein a biasing means is provided to bias the valve member in a closed position or an open position relative to the valve seat/orifice.
11. Apparatus as claimed in any one of the preceding claims wherein said lid or cap
5 has an aperture therein to allow dispensed fluids to exit said housing.
12. Apparatus as claimed in any one of claims 2 to 11 wherein a minimum space for said substance is provided between said valve member and inner walls of the valve housing.
13. Apparatus for dispensing a flowable substance substantially as herein described
10 with reference to, and as illustrated by, the accompanying drawings.
14. Apparatus for dispensing a flowable substance from a pressurised container, said apparatus comprising a movable valve member actuated by an actuating means, the valve member being located in the flow path between an outlet of a container containing said substance and an outlet of said apparatus whereby at least a part of said flow path past
15 said valve member is in a direction substantially parallel to the direction of motion of said valve member, said valve member being provided within a lid or cap of said container.
15. Apparatus as claimed in claim 14 wherein a nozzle for dispensing said substance is provided downstream of said dispensing means.
16. Apparatus as claimed in claim 14 or claim 15 wherein said actuating means
20 actuates said valve member to dispense desired quantities of said substance from said container.
17. Apparatus as claimed in any one of claims 14 to 16 wherein said actuating means dispenses said substance from said container at desired intervals and/or dispenses said substance for a desired period of time.

18. Apparatus as claimed in any one of claims 14 to 17 wherein said actuating means comprises a stored energy apparatus.
19. Apparatus as claimed in any one of claims 14 to 18 wherein said actuating means comprises electrical and/or electronic apparatus.
- 5 20. Apparatus as claimed in any one of claims 14 to 19 wherein said apparatus includes a solenoid, actuation of said solenoid moving said valve member into or out of contact with a valve seat/orifice.
21. Apparatus as claimed in claim 20 wherein a biasing means is provided to bias the valve member in a closed position or an open position relative to the valve seat/orifice.
- 10 22. Apparatus as claimed in any one of claims 14 to 21 wherein said lid has an aperture therein to allow dispensed or atomised fluids to exit said housing.
23. Apparatus as claimed in any one of claims 14 to 22 wherein a minimum space for said substance is provided between said valve member and inner walls of the valve housing.
- 15 24. Apparatus for dispensing a flowable substance from a pressurised container, said apparatus comprising a dispensing means for dispensing a flowable substance, said housing comprising a lid of said container, and engagement means for engaging the apparatus with said container, said engagement means comprising a threaded connection.
25. Apparatus as claimed in claim 24 wherein an outlet nozzle is provided downstream
20 of said dispensing means.
26. Apparatus as claimed in claim 24 or claim 25 wherein said dispensing means includes valve means.
27. Apparatus as claimed in any one of claims 24 to 26 wherein said dispensing means includes dispensing actuating means.

28. Apparatus as claimed in claim 27 wherein said dispensing actuating means dispenses desired quantities of said substance from said container.
29. Apparatus as claimed in claim 27 or claim 28 wherein said dispensing actuating means dispenses said substance from said container at desired intervals and/or dispenses
5 said substance for a desired period of time.
30. Apparatus as claimed in any one of claims 27 to 29 wherein said dispensing actuating means comprises a stored energy apparatus.
31. Apparatus as claimed in any one of claims 27 to 30 wherein said dispensing actuating means comprises electrical and/or electronic apparatus.
- 10 32. Apparatus as claimed in any one of claims 25 to 31 wherein said valve means includes a solenoid, actuation of said solenoid moving said valve member into or out of contact with a valve seat/orifice.
33. Apparatus as claimed in claim 32 wherein a biasing means is provided to bias the valve member in a closed position or an open position relative to the valve seat/orifice.
- 15 34. Apparatus as claimed in any one of claims 24 to 33 wherein said lid has an aperture therein to allow dispensed fluids to exit said housing.
35. Apparatus as claimed in any one of claims 25 to 34 wherein minimum space for said substance is provided between said valve member and the area of the valve housing between said valve member and said valve seat/orifice.
- 20 36. A valve assembly for a flowable substance dispenser for dispensing a flowable substance from a pressurised container, said assembly comprising a movable valve member within a valve wall, said valve member being movable in response to energisation of an actuating means, said valve wall being shaped to at least substantially reduce the space between said valve member and inner surfaces of said valve wall.

37. A valve assembly as claimed in claim 36 wherein said actuating means comprises a solenoid.
38. A valve assembly substantially as herein described with reference to, and as illustrated by, the accompanying drawings.
- 5 39. Any novel feature or combination of features described herein.

FIG 1



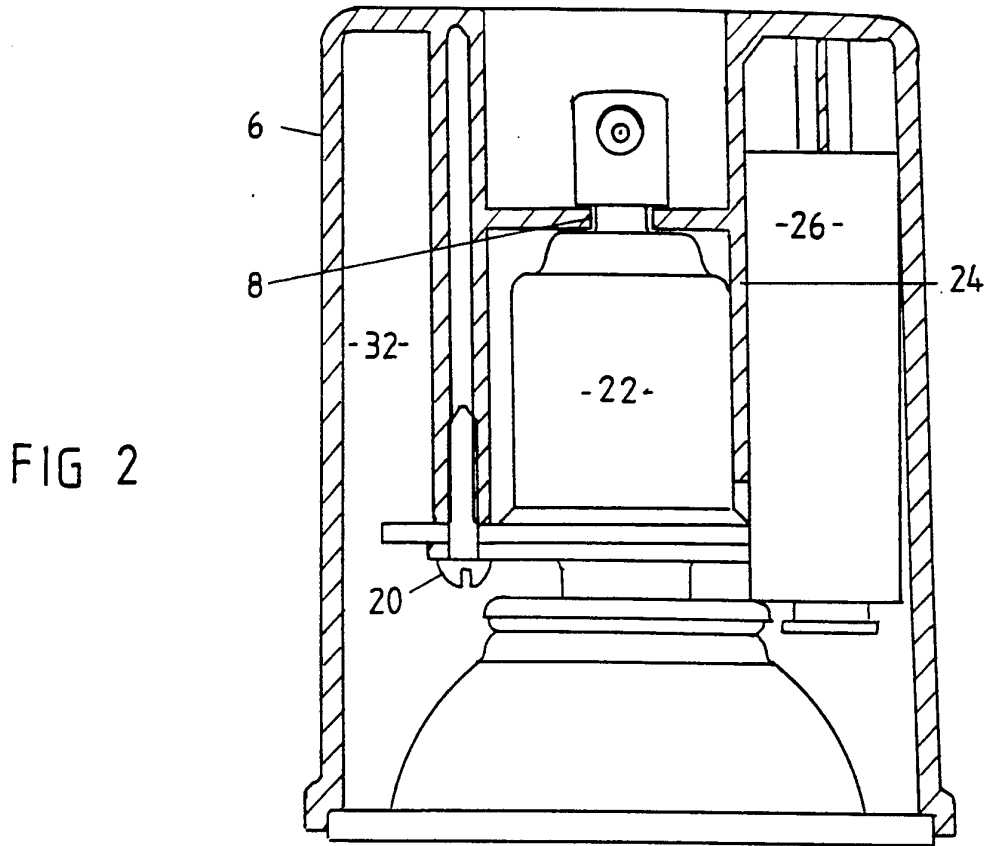


FIG 2

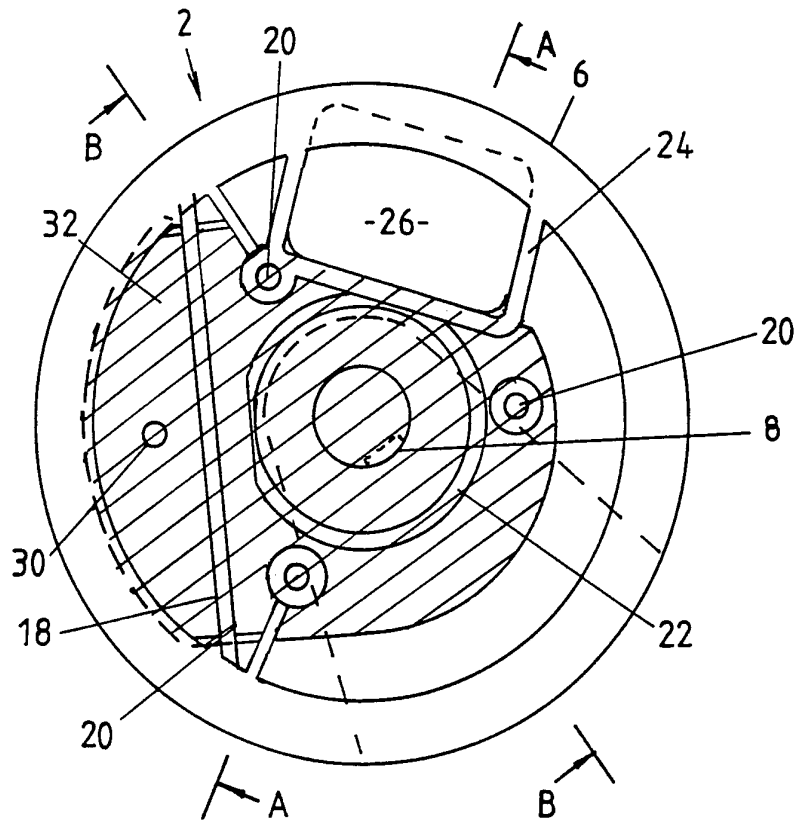


FIG 3

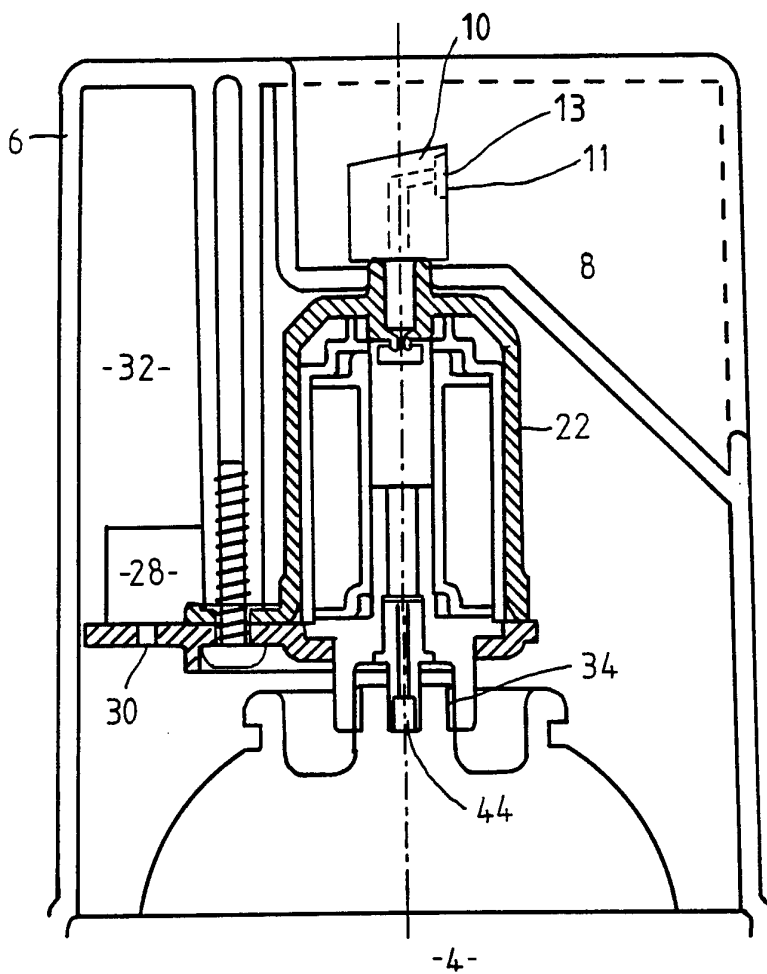


FIG 4

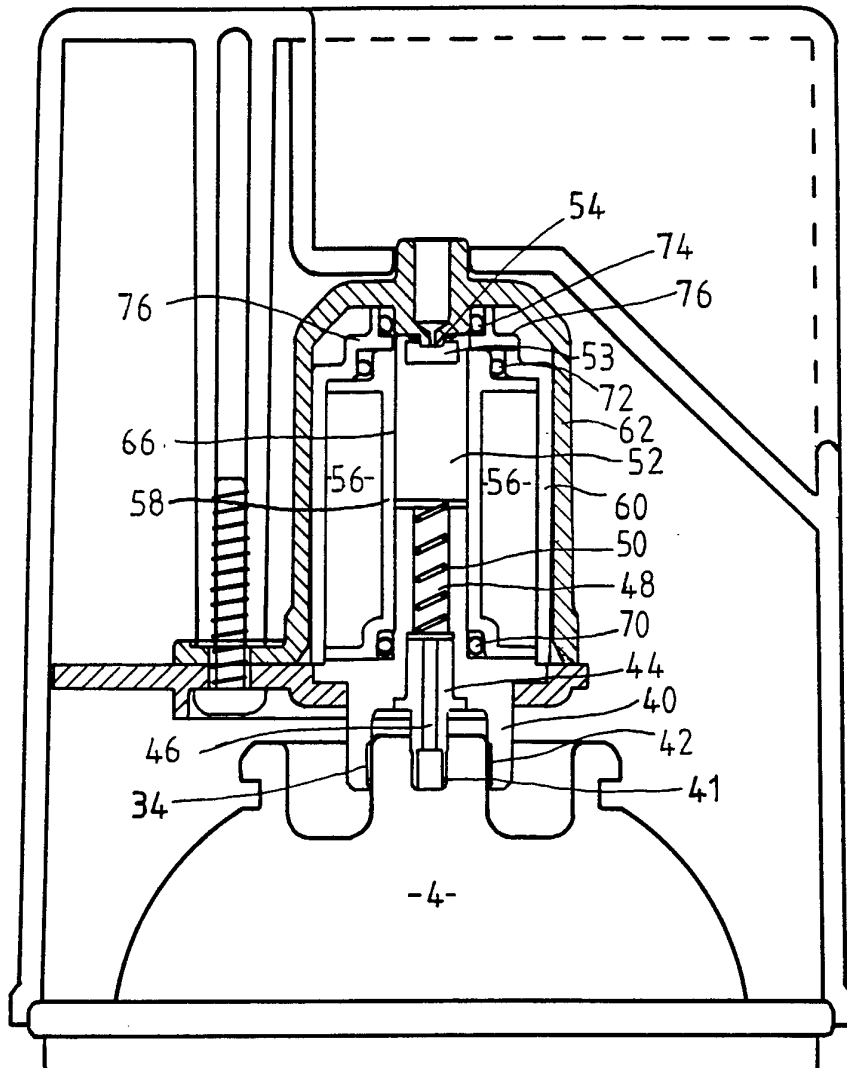


FIG 5

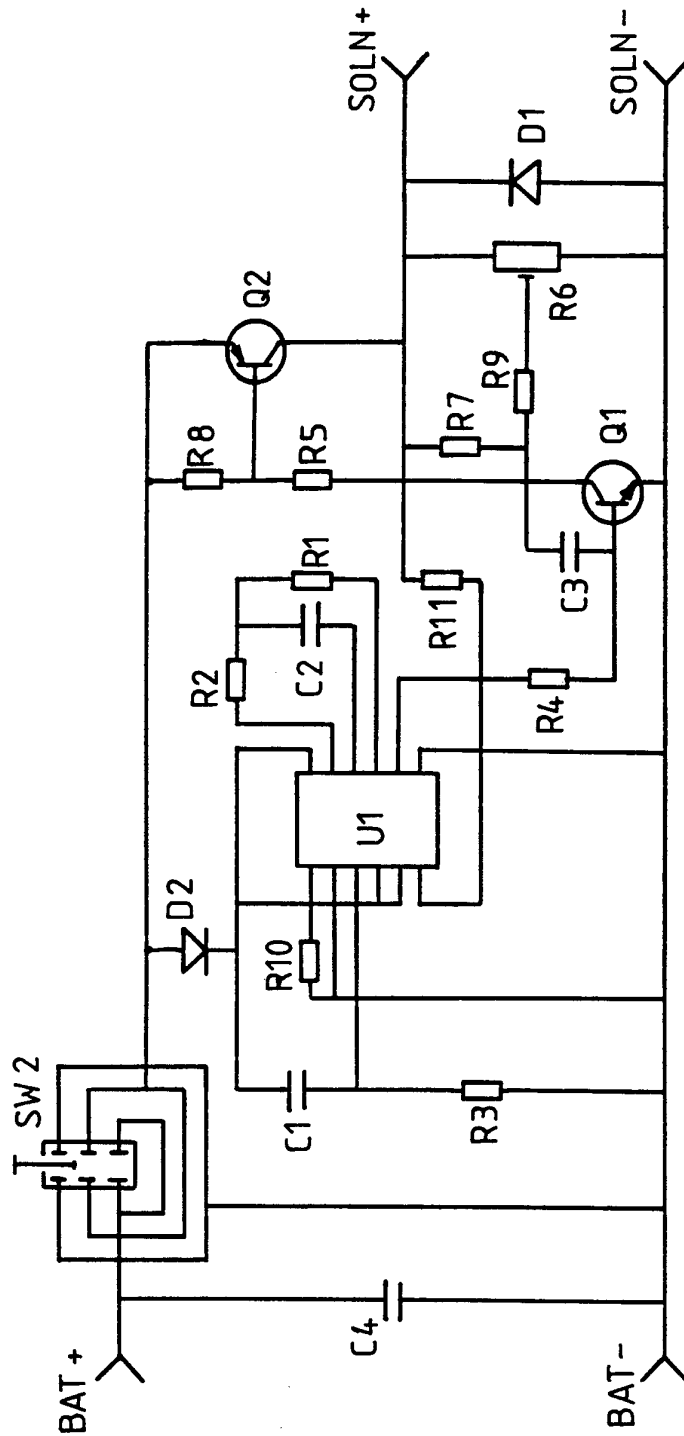



FIG 6

A. CLASSIFICATION OF SUBJECT MATTER Int. Cl. ⁶ B65D 83/26 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 : B65D 83/26, A61L 9/14 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU : Class 68.9; IPC B65D 83/14, 83/26 Electronic data base consulted during the international search (name of data base, and where practicable, search terms used) DERWENT : B65D 83/14; B67D (+ AEROSOL); B05B 11/- (+ AUTO)																						
C. DOCUMENTS CONSIDERED TO BE RELEVANT																						
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.																				
X Y	US,A, 3187949 (MANGEL) 8 June 1965 (08.06.65) Whole document	1-23, 36, 37, 38 28-35																				
X Y	US,A, 3627176 (SALLORS) 14 December 1971 (14.12.71) Whole document	1-23, 36, 37, 38 28-35																				
X Y	US,A, 3848775 (POSSELL) 19 November 1974 (19.11.74) Whole document	1-23, 36, 37, 38 28-35																				
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.																						
* Special categories of cited documents : <table border="0"> <tr> <td>"A"</td> <td>document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T"</td> <td>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</td> </tr> <tr> <td>"E"</td> <td>earlier document but published on or after the international filing date</td> <td>"X"</td> <td>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</td> </tr> <tr> <td>"L"</td> <td>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)</td> <td>"Y"</td> <td>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</td> </tr> <tr> <td>"O"</td> <td>document referring to an oral disclosure, use, exhibition or other means</td> <td>"&"</td> <td>document member of the same patent family</td> </tr> <tr> <td>"P"</td> <td>document published prior to the international filing date but later than the priority date claimed</td> <td></td> <td></td> </tr> </table>			"A"	document defining the general state of the art which is not considered to be of particular relevance	"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	"E"	earlier document but published on or after the international filing date	"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	"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)	"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	"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family	"P"	document published prior to the international filing date but later than the priority date claimed		
"A"	document defining the general state of the art which is not considered to be of particular relevance	"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																			
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"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)	"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																			
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family																			
"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 28 February 1995 (28.02.95)		Date of mailing of the international search report 3 Mar 1995 (03.03.95)																				
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. 06 2853929		Authorized officer  R. KIRBY Telephone No. (06) 2832369																				

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
X Y	US,A, 3974941 (METTLER) 17 August 1976 (17.08.76) Whole document	1-13 28-34
X	US,A, 3351240 (GRAY) 7 November 1967 (07.11.67) Whole document	1-11
X Y	AU, B, 36751/71 (456469) (AIR GUARD CONTROL OF CANADA LTD) 14 June 1973 (14.06.73) Whole document	1-23 28-34
X Y	AU,A, 85845/91 (KONTROL AIR NEW ZEALAND LTD) 30 April 1992 (30.04.92) Whole document	1-23, 36, 37, 38 28-35
X Y	GB,A, 1598372 (FOJON) 14 September 1981 (14.09.81) Whole document	1-11, 14-22 28-34
X Y	FR, 2623780 (PRODUCT SEARCH & DEVELOPMENT) 2 June 1989 (02.06.89) Whole document	1-11, 14-22 28-34
X Y	US,A, 3326418 (KROPP) 20 June 1967 (20.06.67) Dispenser comprising threaded connection Threaded connection	1-4, 24-27 28-35
X Y	AU, A, 24896/77 (AB MALTE SANDGREN) 9 November 1978 (09.11.78) Dispenser comprising threaded connection Threaded connection	1-4, 24-27 28-34
X Y	AU, A, 43839/79 (ELSON) 16 August 1979 (16.08.79) Dispenser comprising threaded connection Threaded connection	1-4, 14, 15, 24-27 28-34
X Y	AU,A, 40403/85 (TOPLINE AUTOMOTIVE ENGINEERING, INC) 2 October 1986 (02.10.86) Dispenser comprising threaded connection Threaded connection	1-4, 24-27 28-34

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international search report has not established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claim Nos.: 39
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Claim 39 is indefinite.

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims 1-35 to apparatus for dispensing a flowable substance from a pressurised container.
 2. Claims 36, 37, 38 to a valve assembly.
as reasoned on the extra sheet.
-
1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
 2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
 3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

 4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

Continuation of Box II:

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are two inventions:

1. Claims 1-35 directed to apparatus for dispensing a flowable substance from a pressurised container characterised by the "special technical feature" of the dispensing means/valve member of the apparatus being within a lid or cap of said container.
2. Claims 36, 37, 38 to a valve assembly characterised by the "special technical feature" of the valve wall of the assembly being shaped to at least substantially reduce the space between the valve member and inner surfaces of the valve wall.

Since the above-mentioned groups of claims do not share either of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept.

INTERNATIONAL SEARCH REPORT

PCT/NZ 95/00002

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	3627176						
US	3848775						
US	3974941						
AU	36751/71	BR	7108189	CA	940888	DE	2161032
		FR	2117658	IT	945375	JP	54010727
		US	3666144				
AU	85845/91	GB	2248888	NZ	235725		
GB	1598372	DE	2804100	FR	2379321	ES	455711
		ES	459421				
FR	2623780						
AU	24896/77	AR	211639	AT	3186/77	BR	7703117
		CA	1048456	CH	615642	DE	2721128
		DK	2037/77	FI	771417	FR	2351336
		GB	1582556	IT	1071326	JP	52138711
		JP	54041729	MX	144585	NL	7705241
		NO	771679	SE	7608916	US	4077442
		SE	7605446	ZA	7702697		
AU	43839/79	AT	897/79	BE	873935	CA	1093514
		DE	2903599	FR	2416057	GB	1592918
		IL	56521	IT	1164974	JP	54114819
		JP	63053439	NL	7900802	NZ	189551
		SE	7900921	US	4228933	ZA	7900245
AU	40403/85						
END OF ANNEX							