

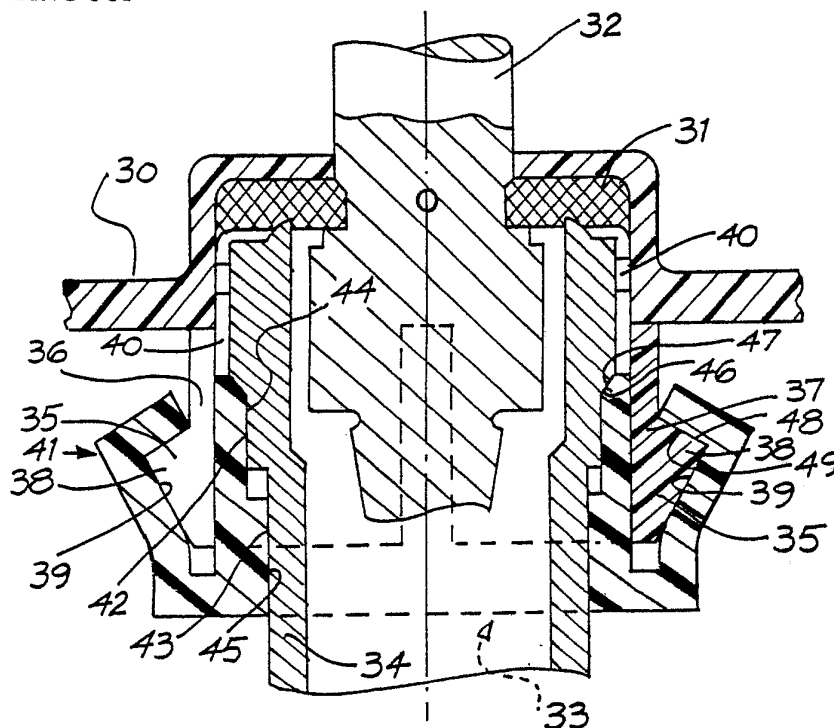


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/AU87/00059 (22) International Filing Date: 3 March 1987 (03.03.87) (31) Priority Application Number: PH 4851 (32) Priority Date: 3 March 1986 (03.03.86) (33) Priority Country: AU (71) Applicant (for all designated States except US): PRECISION VALVE AUSTRALIA PTY. LIMITED [AU/AU]; Williamson Road, Ingleburn, NSW 2565 (AU). (72) Inventors; and (75) Inventors/Applicants (for US only) : BORLAND, John, Maxwell [AU/AU]; 'Glendale', Keating Place, Denham Court, NSW 2565 (AU). CROOKS, Harold [AU/AU]; 29 Owen Street, North Bondi, NSW 2026 (AU). (74) Agent: F.B. RICE & CO.; 28A Montague Street, Balmain, NSW 2041 (AU).		(81) Designated States: AT (European patent), AU, BE (European patent), CH (European patent), DE (European patent), FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent), US. Published <i>With international search report.</i>

(54) Title: PLASTIC VALVE MOUNTING CUP**(57) Abstract**

A mounting cup and valve assembly for an aerosol container, which can be pressure filled through the valve. The assembly includes a mounting cup (30) moulded from plastics material, the cup (30) having a flange around its periphery whereby it is adapted for connection to a container. A central aperture is provided in the cup (30) which aperture is surrounded on the underside of the cup (30) by a gasket (31). A valve assembly (33) is provided on the underside of the cup (30) and has a stem (32) projecting through the aperture and being in sealing contact with the gasket (31). A skirt (35) is moulded integrally with the cup (30) and projects downwardly around the gasket (31) defining an annular space (40) between a housing (34) for the valve (33) and the skirt (35). A plurality of slots (36) extend upwardly through the skirt (35) to form apertures in communication with the annular space (40). A circumferential rib (38) surrounds the free end of the skirt (35). An annular locking ring (41) surrounds the lower end of the housing (34) and engages with the radially inner and outer surfaces of the skirt (35). The locking member (41) includes an annular recess (39) which co-operates with the rib (38) and serves to urge the housing (34) into contact with the gasket (31).



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PLASTIC VALVE MOUNTING CUP

The present invention relates to aerosol containers and more particularly to a mounting cup and valve assembly for an aerosol container, made substantially wholly of plastics materials.

BACKGROUND ART

Containers for aerosols are at present generally manufactured with a metal or glass container, to the upper rim of which is crimped a metal valve mounting cup. Figure 1 shows a typical mounting cup assembly in which a mounting cup 10 is provided with a circumferential flange 11 which is adapted to be crimped to the upper edge of a suitable container. To the mounting cup is attached a valve assembly indicated generally at 12 and around which the central portion 13 of the mounting cup is crimped to make contact with sloping faces 14 on the valve housing 15. This results in the upper edge of the valve housing 15 being held securely against a sealing gasket 16. The contents of the container are released by displacing the stem 17 against the action of the spring 18 to allow the contents of the container to pass through the passage 19 into the bore 20 of the stem.

It has now become apparent that it is desirable to replace the metal mounting cup 20 by means of a plastic component fulfilling the same function and preferably allowing existing valve components to be used. The reason for this is that the cost of production is likely to be reduced by eliminating the cost of expensive valve crimping and ancillary equipment as used in the metal mounting cup, crimping, assembly and metal stamping areas. A plastic mounting cup could be used either with a metal container of the existing type or with a plastic container to which it could be readily attached.

Aerosol containers including such conventional mounting cup and valve assemblies are filled with propellant through

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the valve at very high pressure.

Previous attempts at forming an all plastic mounting cup and valve assembly have included an imperforate annular skirt closely surrounding an upper end of the housing and an annular locking ring surrounding the lower end of the housing and fitting between the housing and the annular skirt. Such arrangements have suffered from the fact that aerosol containers incorporating such mounting cup and valve assemblies either cannot be filled with aerosol propellant through the valve or at best can be filled at a relatively slow rate and at a relatively low pressure.

DISCLOSURE OF THE INVENTION

The present invention in a first aspect consists in a mounting cup and valve assembly for an aerosol container comprising a mounting cup moulded from plastics material, the cup having means around its periphery whereby it is adapted for connection to a container, a central aperture in the cup surrounded on its underside by a gasket, a valve assembly on the underside of the cup having a stem projecting through the aperture in the housing and being in sealing contact with the gasket, a skirt-like member moulded integrally with the cup and projecting downwardly around the gasket and the housing, and defining an annular space between the housing and the skirt-like member, the skirt-like member including apertures in communication with the annular space and bearing, at its end distal to the cup, engagement means, an annular locking member surrounding the housing and engaging with the radially inner and radially outer surfaces of the skirt-like member, the locking member including complimentary engagement means which co-operate with the engagement means on the skirt-like member and serving to urge the housing into sealing engagement with the gasket.

In preferred embodiments the arrangement according to the present invention allows very much faster filling of aerosol containers than was previously possible using all

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plastic mounting cups and valves. The presence of an annular space between the housing and the skirt-like member and the apertures in the skirt-like member allow pressure filling of the aerosol container through the valve at a high rate. The propellant flows through and around the valve stem, displaces the gasket downwardly and flows past the gasket into the annular space and thence into the container. The presence of the locking member surrounding the skirt-like member prevents the free end thereof expanding and thus prevents displacement of the housing within the cup.

The skirt-like member formed integrally with the cup preferably includes a plurality of longitudinally extending slots which constitute the apertures. The free end of the segment of the skirt-like member defined by the slots preferably each include a circumferentially extending rib on its radially outer surface which ribs together constitute the engagement means.

The locking member is preferably formed on an independent part of U-shaped cross-section having a base and two upwardly extending annular flanges, the radially inner one of which extends into, and fills, the lower end of the annular space between the housing and the skirt, while the radially outer one closely surrounds the radially outer surface of the skirt-like member. In another embodiment the locking member may be formed integrally with the housing preferably formed on that portion which projects into the annular space with a tapered end which is adapted to engage with a correspondingly tapered shoulder on the housing. The portion of the locking member which surrounds the skirt-like member is preferably formed on its radially inner surface with an annular groove or recess constituting the complimentary engagement means and adapted to resiliently engage with the circumferential ribs on the radially outer surface of the skirt-like member.

The cup itself may be connected to a metal, glass or

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plastic container by any one of a number of conventional ways. A screw threaded annular collar may be used to hold the cap down on the bottle or other container having a complimentary threaded neck. The cap may have a downwardly extending peripheral collar which clips over a corresponding peripheral flange surrounding the open top of the container. The cup may also be connected to a plastic container by welding, particularly spin welding or sonic welding, the plastics parts together.

10 BRIEF DESCRIPTION OF THE DRAWINGS

In order that the nature of the invention may be better understood preferred forms thereof are hereinafter described by way of example with reference to the accompanying drawings, in which:-

15 Figure 2 is a sectional elevation of the central part of a mounting cup and valve assembly according to the invention;

Figure 3 is a similar view of a modified form of the invention and includes inserts showing details of the manner in which the mounting cup may be secured to the container;

20 Figure 4 is a similar view of the construction shown in Figure 2 showing details of further forms of construction by means of which the mounting cup may be secured to the container; and

25 Figure 5 is a similar view showing a modified form of construction in which the locking means forms a part of the valve housing.

BEST MODE OF CARRYING OUT THE INVENTION

In Figure 2 is shown the central portion of a mounting cup and valve assembly which consists of a mounting cup 30 moulded from any suitable plastic material such as polyethylene terephthalate, nylon, or polypropylene. On the underside of the central raised portion of the mounting cup 30 is a gasket 31 through which the stem 32 of a conventional aerosol valve assembly 33 projects. The valve

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33 is surrounded by a housing 34 also of conventional construction and normally moulded from nylon. As can be seen from Figure 2 the upper edge of the housing 34 makes sealing contact with the gasket 31. This sealing contact is
5 maintained by means of a downwardly extending skirt 35 divided up by slots 36 to form a plurality of spring legs 37 which are moulded integrally with the mounting cup 30 and which terminate in enlarged heads 38 which engage with complementary recesses 39 on a locking ring 41 also moulded
10 from plastics material. The locking ring 41 is formed with faces 42 and 43 which fit closely around faces 44 and 45 of the housing 34. The face 46 on locking ring 41 presses on face 47 of the housing 34. The locking ring face 48 presses onto face 49 of the mounting cup 30 and there is an
15 interference fit between face 48 and face 49 which causes spring legs 37 of the mounting cup to clamp locking ring 41 to housing 34. The clamping action of locking ring 41 on housing 34 presses housing 34 against the gasket 31. It will be noted that an annular space 40 exists between the outer
20 surface of housing 34 and the inner surface of the skirt 35.

The parts are assembled by offering locking ring 41 up to the spring legs 37 and pressing it into position. Once in position it acts to clamp the assembly together and to hold the housing 3 in sealing contact with the gasket 31. The
25 pressure exerted between the housing 34 and the gasket 31 can be adjusted by slight variations of the position of the face 46 of the locking ring 41.

The legs 37 are arranged symmetrically around the housing 34 and any number of legs desired may be used,
30 adjacent legs 37 being separated by the slots 36.

It should be noted that in the construction described the valve components, including the stem, gasket, spring and housing, are identical with that at present used in conjunction with metal mounting cups.

35 The construction shown in Figure 3 is a variation of

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that shown in Figure 1, the locking ring 50 being of a slightly different form and engaging the housing in a slightly different manner otherwise the construction is substantially the same and the same numerals are used to indicate the same parts. The left hand insert in Figure 3 shows how the mounting cup 30 may be secured to the container by means of a screw cap 51, the mounting cup 30 being formed with a gasket 52 to engage the upper rim of the container. The insert on the right hand side shows a construction in which the periphery of the mounting cup 30 is formed so as to snap over a rim (not shown) formed on the container.

Figure 4 shows a construction similar to that of Figure 2 but illustrates two different ways in which the mounting cap may be fixed to the container. In that shown on the left, a gasket 60 is provided around the periphery of the cup 30 which is arranged to clamp over an annular rib 62 formed around the upper circumference of the container. In the arrangement on the right hand side an annular rib 62 of the container is provided with a gasket 63 onto which the mounting cup 30 seals. In both cases the mounting cup 30 is formed around its periphery with a series of spring ribs constructed to spring over the annular rib 61 or 62 as the case may be.

Figure 5 shows a construction that differs from the previous constructions in that the locking ring 70 is formed integrally with the housing 34 instead of separately from it; this construction reduces the number of parts used but uses a non standard valve housing. In the construction shown the mounting cup is designed to be secured to the container by a screw cap 71.

Any of the various forms of mounting cup and valve assembly of the invention may be secured to either a plastic, glass or metal container by any appropriate one of the various means described above.

It is to be noted that the slots 36 between the spring

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legs 37 are used as ports for faster filling and high pressure gassing of the container. The slots 36 provide an aperture through which propellant and/or actives may be introduced into the container. The propellant is introduced
5 around the valve stem 32 and flows either between the lower face of the mounting cup 30 and the gasket 31 into the annular space 40 or it flows between the gasket 31 and the valve stem 32 and thence between the underside of the gasket 31 and the uppermost edge of the valve housing 34. From the
10 annular space 40 the propellant flows through slots 36 into the container itself. The flow of propellant around the gasket 31 into space 40 and through slots 36 allows substantially faster filling than would be the case if the propellant were all to flow through the valve housing 34 and
15 into the container through a dip tube connected to the lower end of the housing.

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CLAIMS:-

1. A mounting cup and valve assembly for an aerosol container comprising a mounting cup moulded from plastics material, the cup having means around its periphery whereby it is adapted for connection to a container, a central aperture in the cup surrounded on its underside by a gasket, a valve assembly on the underside of the cup having a stem projecting through the aperture in the housing and being in sealing contact with the gasket, a skirt-like member moulded integrally with the cup and projecting downwardly around the gasket and the housing, and defining an annular space between the housing and the skirt-like member, the skirt-like member including apertures in communication with the annular space and bearing, at its end distal to the cup, engagement means, an annular locking member surrounding the housing and engaging with the radially inner and radially outer surfaces of the skirt-like member, the locking member including complimentary engagement means which co-operate with the engagement means on the skirt-like member and serving to urge the housing into sealing engagement with the gasket.
2. A mounting cup and valve assembly as claimed in claim 1, in which the skirt-like member includes a plurality of longitudinally extending slots which constitute the apertures.
3. A mounting cup and valve assembly as claimed in claim 1 or claim 2, in which the engagement means comprise a circumferential rib disposed on the radially outer surface of the skirt-like member adjacent the end thereof distal to the cup.
4. A mounting cup and valve assembly as claimed in any one of claims 1 to 3, in which the locking member has a U-shaped cross-section having a base and two upwardly extending annular flanges, the radially inner one of which extends into, and substantially fills, the lower end of the annular space while the radially outer one closely surrounds the radially outer surface of the skirt-like member.

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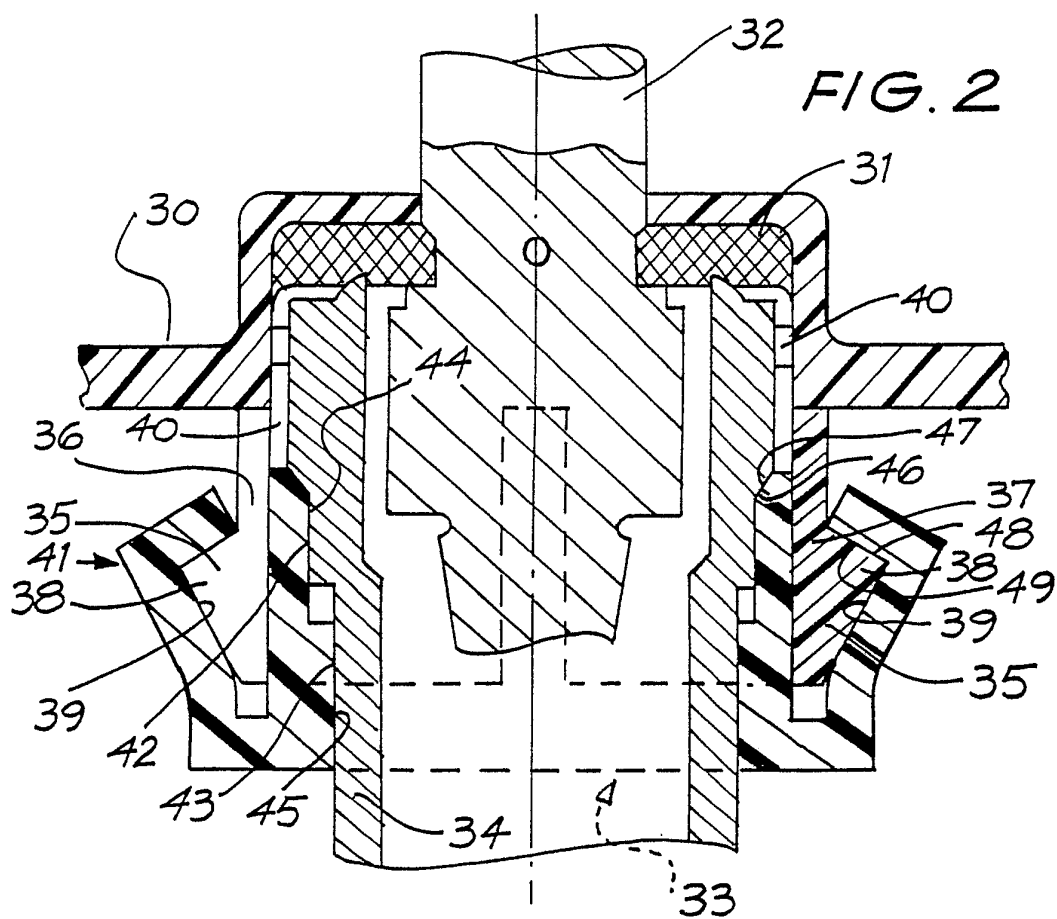
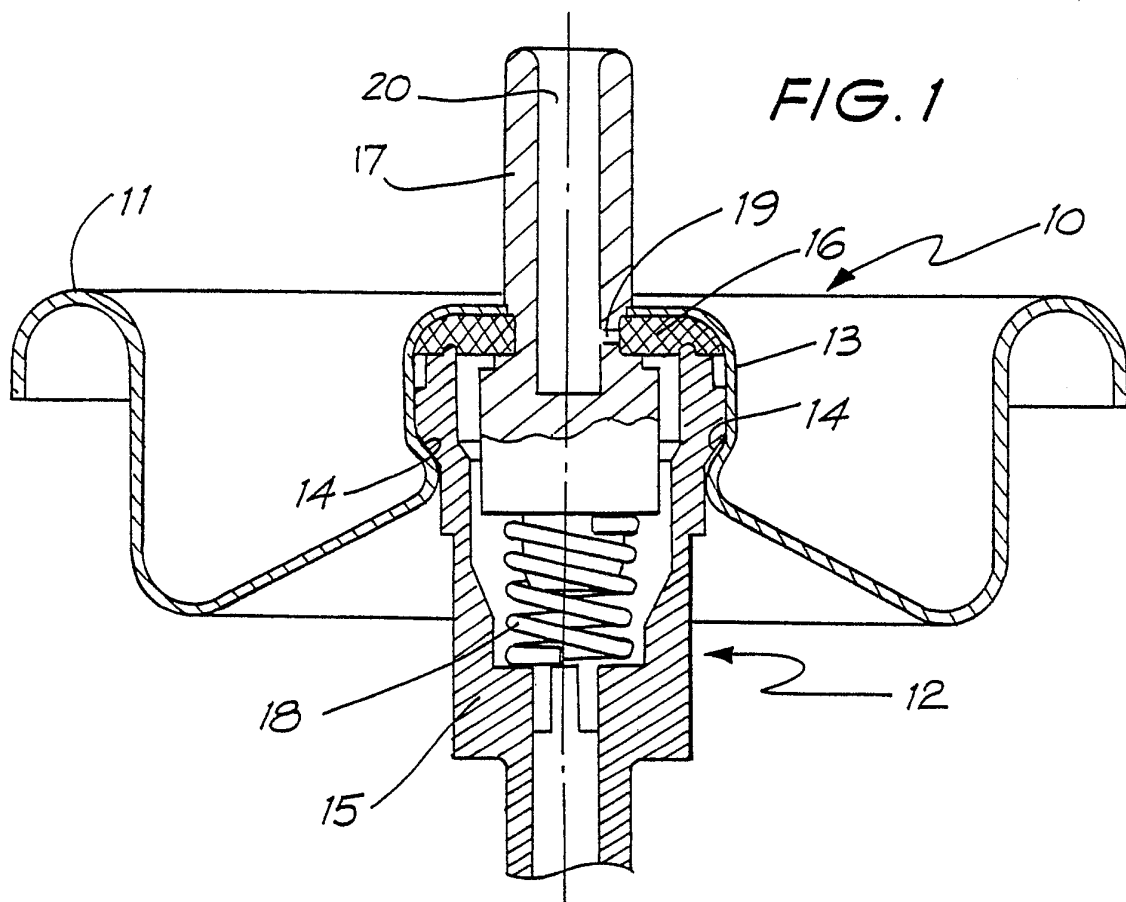
5. A mounting cup and valve assembly as claimed in claim 4, in which the radially inner annular flange is tapered at its free end and engages with a correspondingly tapered shoulder on the housing.

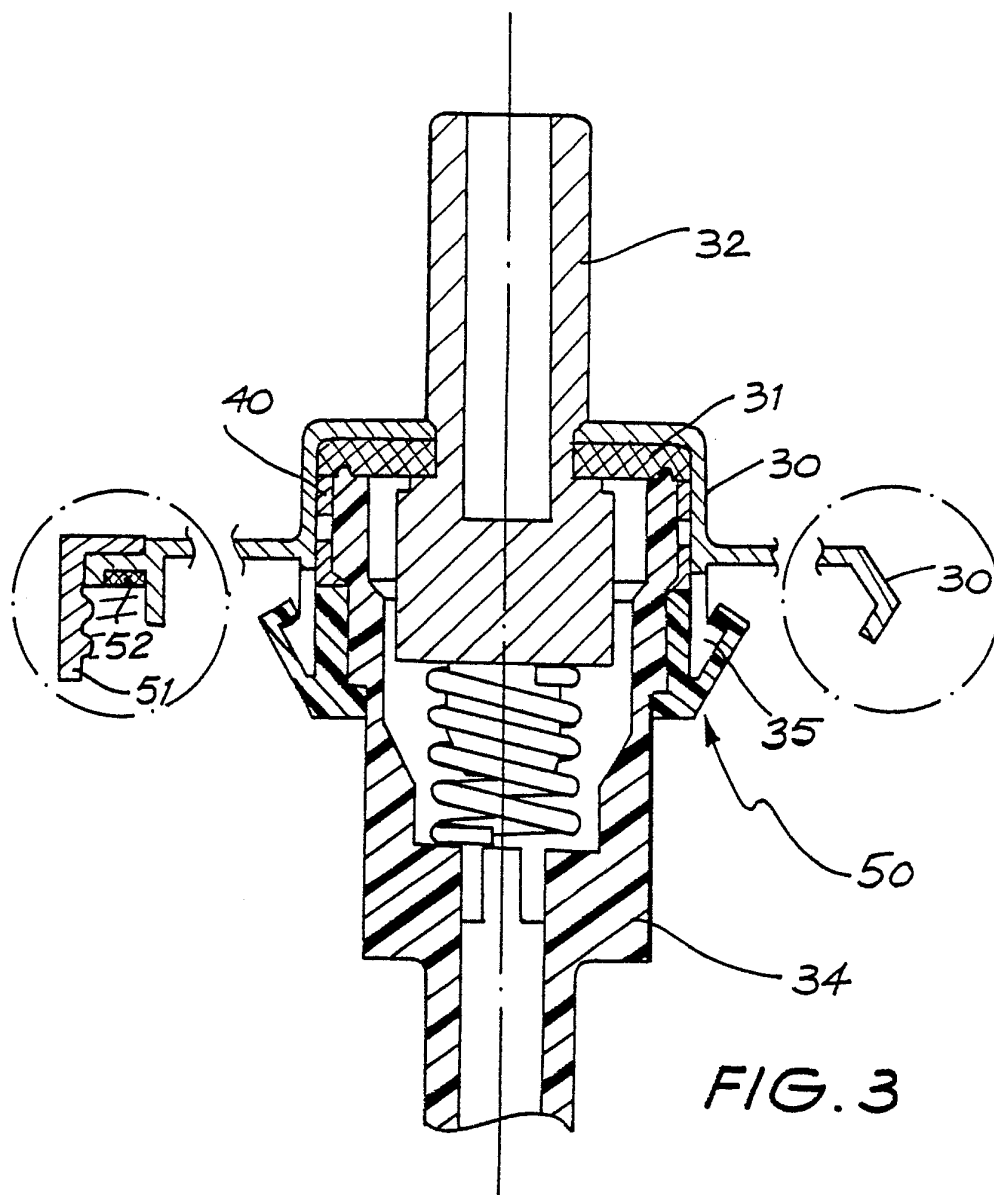
6. A mounting cup and valve assembly as claimed in claim 4 or claim 5, in which the radially outer annular flange of the locking member is formed on its radially inner surface with an annular groove comprising the complimentary engagement means.

7. A mounting cup and valve assembly as claimed in claim 1, in which the locking member is formed integrally with the housing.

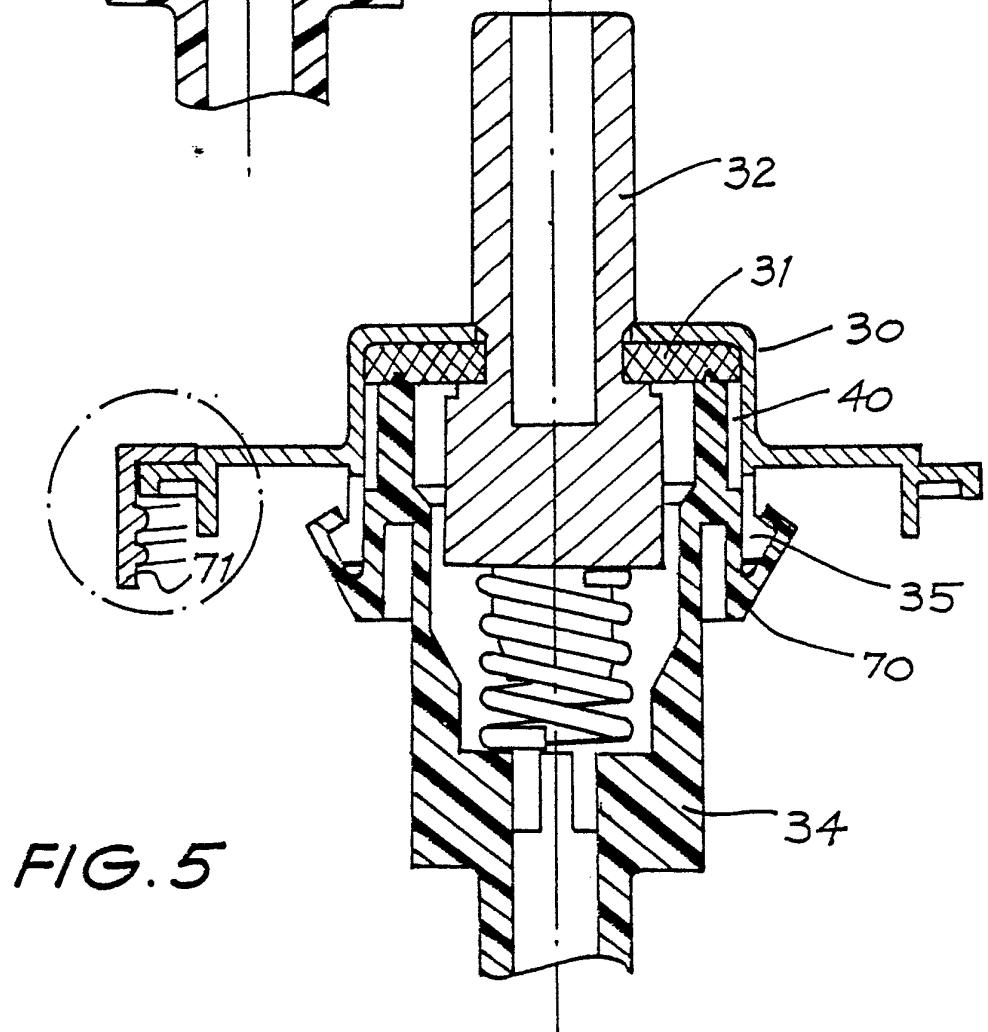
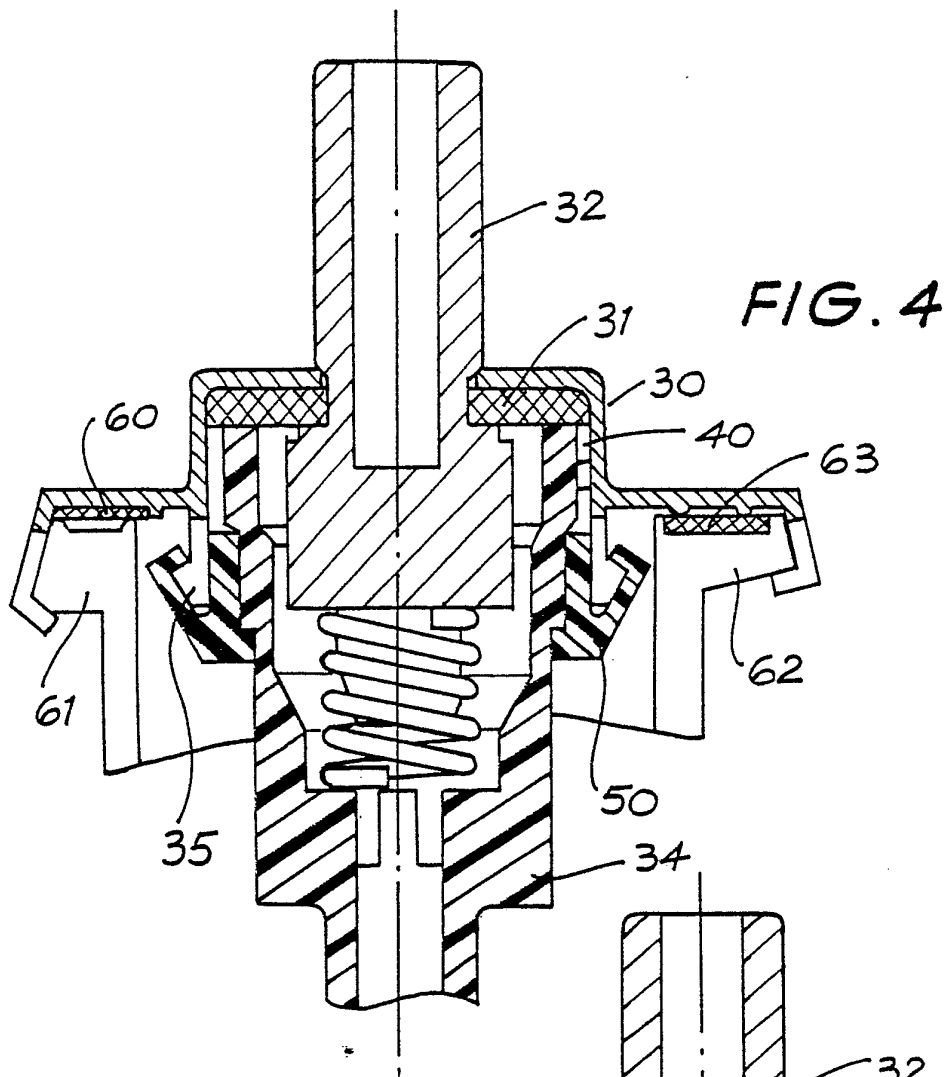
8. A mounting cup and valve assembly substantially as hereinbefore described with reference to any one of Figs. 2 to 5 of the accompanying drawings.

9. An aerosol container including a mounting cup and valve assembly as claimed in any one of claims 1 to 8.





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SUBSTITUTE SHEET

INTERNATIONAL SEARCH REPORT

International Application No PCT/AU 87/00059

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁴ According to International Patent Classification (IPC) or to both National Classification and IPC Int. Cl. ⁴ B65D 83/14																																
II. FIELDS SEARCHED Minimum Documentation Searched ⁷ <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> Classification System IPC </td> <td style="width: 50%; border: none; vertical-align: top;"> Classification Symbols B65D 83/14 </td> </tr> </table> Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched ⁸			Classification System IPC	Classification Symbols B65D 83/14																												
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AU : IPC as above; Australian Classification 68.9																																
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹ <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; font-size: 0.8em;">Category ⁹</th> <th style="width: 70%; font-size: 0.8em;">Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²</th> <th style="width: 20%; font-size: 0.8em;">Relevant to Claim No. ¹³</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top;">X,Y</td> <td>AU,A, 37065/84 (GROW VENTURES CORPORATION) 15 August 1985 (15.08.85)</td> <td style="text-align: center; vertical-align: top;">(1-3)</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td>AU,A, 25783/67 (STEWART) 12 February 1970 (12.02.70)</td> <td style="text-align: center; vertical-align: top;">(1)</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td>US,A, 3998361 (ARENA) 21 December 1976 (21.12.76)</td> <td style="text-align: center; vertical-align: top;">(1)</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td>US,A, 3845888 (FOCHT) 5 November 1974 (05.11.74)</td> <td style="text-align: center; vertical-align: top;">(1,7)</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td>US,A, 3806005 (PRUSSIN et al) 23 April 1974 (23.04.74)</td> <td style="text-align: center; vertical-align: top;">(1,3,7)</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td>US,A, 3698595 (GORTZ et al) 17 October 1972 (17.10.72)</td> <td style="text-align: center; vertical-align: top;">(1)</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td>GB,A, 1505530 (AEROSOL INVENTIONS & DEVELOPMENTS S.A. AIDS) 30 March 1978 (30.03.78)</td> <td style="text-align: center; vertical-align: top;">(1)</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td>GB,A, 1445202 (JOHNSON & SON INC.) 4 August 1976 (04.08.76)</td> <td style="text-align: center; vertical-align: top;">(1)</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td>FR,A, 2508136 (L'OREAL) 24 December 1982 (24.12.82)</td> <td style="text-align: center; vertical-align: top;">(1,2)</td> </tr> </tbody> </table>			Category ⁹	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	X,Y	AU,A, 37065/84 (GROW VENTURES CORPORATION) 15 August 1985 (15.08.85)	(1-3)	Y	AU,A, 25783/67 (STEWART) 12 February 1970 (12.02.70)	(1)	Y	US,A, 3998361 (ARENA) 21 December 1976 (21.12.76)	(1)	Y	US,A, 3845888 (FOCHT) 5 November 1974 (05.11.74)	(1,7)	Y	US,A, 3806005 (PRUSSIN et al) 23 April 1974 (23.04.74)	(1,3,7)	Y	US,A, 3698595 (GORTZ et al) 17 October 1972 (17.10.72)	(1)	Y	GB,A, 1505530 (AEROSOL INVENTIONS & DEVELOPMENTS S.A. AIDS) 30 March 1978 (30.03.78)	(1)	Y	GB,A, 1445202 (JOHNSON & SON INC.) 4 August 1976 (04.08.76)	(1)	Y	FR,A, 2508136 (L'OREAL) 24 December 1982 (24.12.82)	(1,2)
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[*] Special categories of cited documents: ¹⁰ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "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) "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 "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 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "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. "Z" document member of the same patent family																																
IV. CERTIFICATION <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> Date of the Actual Completion of the International Search 26 May 1987 (26.05.87) </td> <td style="width: 50%; border: none; vertical-align: top;"> Date of Mailing of this International Search Report (04-06-87) 4 JUNE 1987 </td> </tr> <tr> <td style="width: 50%; border: none; vertical-align: top;"> International Searching Authority Australian Patent Office </td> <td style="width: 50%; border: none; vertical-align: top;"> Signature of Authorized Officer <i>R. Kirby</i> </td> </tr> </table>			Date of the Actual Completion of the International Search 26 May 1987 (26.05.87)	Date of Mailing of this International Search Report (04-06-87) 4 JUNE 1987	International Searching Authority Australian Patent Office	Signature of Authorized Officer <i>R. Kirby</i>																										
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON
INTERNATIONAL APPLICATION NO. PCT/AU 87/00059

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Patent Document Cited in Search Report		Patent Family Members			
AU 37065/84	BR 8500093 IL 73814	EP 151881 JP 60216859	ES 540244		
US 3845888	AR 195067 BR 7202785 DE 2221305 GB 1330616 ZA 7202638	AU 41550/72 CA 966457 ES 402240 IT 953817	BE 783117 CH 544250 FR 2137526 NL 7205622		
US 3806005	BE 747921 NL 7004470	DE 2013178	FR 2039928		
GB 1505530	AU 81783/75	FR 2274849	ZA 7503544		

END OF ANNEX