(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 577 229 A2

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.09.2005 Bulletin 2005/38

(51) Int Cl.[7]: **B65D 83/14**

(21) Application number: **05075623.8**

(22) Date of filing: **15.03.2005**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR LV MK YU

(30) Priority: **15.03.2004 EP 04075878**

(71) Applicant: **de Schrijver, Aster**
London SE19 1HZ (GB)

(72) Inventor: **de Schrijver, Aster**
London SE19 1HZ (GB)

(74) Representative: **Colens, Alain M.G.M.**
Office Hanssens Colens
Square Marie Louise 40
Bte 19
1000 Bruxelles (BE)

(54) **Improvements of the hydrophobic properties of the tilting valve grommet of an aerosol can**

(57) The present invention concerns an improvement to a rubber grommet for a tilting and/or gun aerosol valve grommet, more particularly regarding the protection against moisture diffusion and uptake through the rubber grommet. The grommet has at least one part of its surface treated by a hydrophobic composition. It may be a non-thermoplastic rubber-type grommet. The coating composition is polymeric. The grommet may be siliconized after the treatment. The treatment comprises the step of spraying, impregnating, brushing or laying by plasma treatment a coating of a silicon or fluoro-polymer based composition on at least part of its surface.

EP 1 577 229 A2

Description

[0001] The present invention concerns an improvement to a rubber grommet for a tilting and/or gun aerosol valve grommet (hereafter called the aerosol valve grommet), more particularly regarding the protection against moisture diffusion and uptake through the rubber grommet.

[0002] Generally the aerosol valve will be used for dispensing one or two component polyurethane (PU) foam systems contained in a pressurized can or vessel or any other polymer system curing or sensitive by/to moisture/water uptake.

[0003] The type of aerosol valves relevant for the present invention is used for more than 25 years in order to dispense the content of an aerosol can. By tilting or vertical activation of the stem, the valve opens and delivers the vessel's content. Such a valve consists of a number of plastic and metal parts. The inner gasket/seal, called the grommet, is made of rubber. Other parts are a special metal cup with inlaid rubber gasket and a plastic stem.

[0004] Since the chemical components present in the can or vessel are water sensitive and react with water to form for example the final polyurea in the case of a polyurethane prepolymer , it should be acknowledged that any contact with ambient moisture is to be avoided in order to prevent the forming of polyurethane and/or similar derivatives inside the can or vessel. Moisture penetrates via the valve system, more particularly through the grommet in the case of aerosol valves.

[0005] The polyurethane and/or similar components formed due to moisture uptake (diffusion) inside the can or vessel sticks against the grommet and or the stem. Once the first layer of PU formed on the grommet on the face inside the can or vessel, the sealing properties of the valve diminished and makes the valve subject to blocking and/or leaking.

[0006] A standard tilting or gun valve get stucked after contact with the polyurethane prepolymer in the can at higher temperature and higher conditions of humidity. This contact is made possible by inappropriate storage of cans (horizontal or upside down) or excessive shaking during transport.

[0007] It is believed that the stucking/blocking of the valve is made possible by a combination of at least two features

- water diffusion through the grommet from the outside to the inside of the aerosol can or vessel,
- diffusion of prepolymer through the grommet from the inside of the can with the propellant as carrier.

[0008] Where both water and prepolymer are meeting a reaction will take place and a kind of cylindrical hardness front will be formed. This hardness front will prevent the stem from being tilted or displace vertically and will result in a stucked valve.

[0009] Therefore there is a need for an improved appropriate moisture repulsive grommet.

[0010] In order to prevent moisture uptake through the grommet, a hydrophobic thermoplastic or non thermoplastic elastomer could be used such as : styrene-butadiene, butylene-styrene, silicone rubbers, isopropyl ether (Kraton, Shell), chlorinated polyethylene (Tyrin, Dupont de Nemours), epichlorhydrin homopolymers or copolymer, ethylene propylene (Nordel, Dupont de Nemours), fluoroelastomers (Viton, Dupont de Nemours), alcryn MPR (chlorinated olefin interpolymer alloy), Santoprene etc..

[0011] According to the present invention, there is a provided a rubber grommet with a moisture barrier provided by chemical treatment of a rubber grommet that may be otherwise usual. The rubber can be BUNA, EPDM or Neoprene, butyl etc...

[0012] The chemical treatment is a coating of at least part of the grommet surface in contact with the container's component, by a inert hydrophobic substance dispensed or brushed on said surface or by dipping or impregnation of the whole grommet into the substance.

[0013] The invention will be better understood with reference to the annexed figures provided as examples.

[0014] Fig. 1 illustrates an example of the tilting of a valve as is well-known, with the grommet 1, the stem 4 and the cup 5 to be coupled with the aerosol can or vessel (not illustrated). The tilting action provides an open passageway for the content of the can.

[0015] Fig. 2 illustrates a similar valve, the arrows indicating the diffusion of the propellant and prepolymer from the inside of the can on one side and, on the other side, of the moisture from the environment. It is to be noted that the moisture may access the grommet also through the hollow stem. There is shown an internal "front" in the grommet where a reaction between both components occurs and wherein consequently hardness is increased.

[0016] Fig. 3 represents schematically a transversal section of an isolated classical grommet 1 with a hole 2 for the stem and for which the bottom part 3 has been coated according to the invention, for example by spraying (arrows), brushing, dipping or impregnation of the whole grommet.

[0017] The chemicals used for this type of application are preferably silicon or fluoro-polymer based compositions.

[0018] According to the invention, the treatment may be conducted either by spraying or directly laying a coating by dipping or impregnation of the whole grommet. For example, preferably just after demoulding the rubber, it can be sprayed by a coating/reactive agent. The rubber can also be brushed, impregnated or plasma treated in order to obtain a coating on the whole surface of the grommet or only on the bottom part (ref. 3 in fig. 1). The applied composition can be a solution of fluoropolymer or a silicon based composition.

[0019] It has been found that a silicon based compo-

sition for coating or impregnation of the ACMOS type is appropriate, for example ACMOS 70-2406. The Münch coating spray MKX 02-125 may also be used. It is postulated that some chemical (covalent) bonding is produced between the coating and the rubber.

[0020] After the coating, impregnation or plasma treatment, the grommet is siliconized. This extra post siliconisation improves the snappiness of the rubber and the multi-use properties of the valve. A typical silicone mixture used is Bayer M350.

[0021] A significant improvement in overall properties of the valve is noticed. In a test, the aerosols or vessels are stored vertically, horizontally and shaken every day, which represent critical situations for a valve. It has however been found that the valves treated according to the invention are still working and no leakage or blocking of the can or vessel is encountered.

Claims

1. An aerosol valve comprising a grommet having at least one part of its surface treated by a hydrophobic composition.

2. An aerosol valve according to claim 1 wherein the grommet is a non-thermoplastic rubber-type grommet.

3. An aerosol valve comprising a rubber-type grommet having at least one part of its surface coated by a polymeric hydrophobic chemical composition.

4. An aerosol valve comprising a rubber-type grommet having at least one part of its surface coated by a polymeric hydrophobic chemical and where the hydrophobic properties of the valves are obtainable by a combination of both the gas permeation properties of the grommet compound and the hydrophobic properties of the coating.

5. An aerosol valve according to any of the claims 1 to 3 wherein the composition is a silicon or fluoropolymer based composition.

6. An aerosol valve according to any of the preceding claims wherein the grommet is treated on its bottom surface, oriented inside the container.

7. An aerosol valve according to any previous claims wherein the grommet is siliconized after the treatment.

8. A container comprising a valve according to any of the previous claims.

9. A method for treating a grommet of a valve comprising the step of spraying, impregnating, brushing or laying by plasma treatment a coating of a silicon or fluoro-polymer based composition on at least part of its surface.

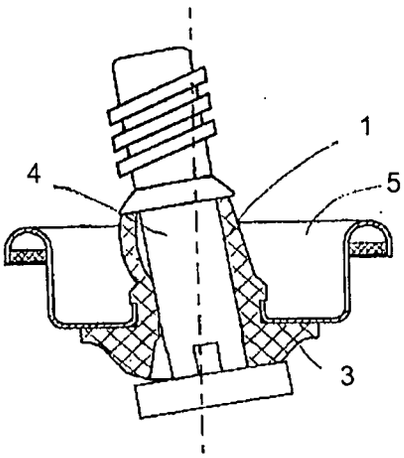

FIG. 1

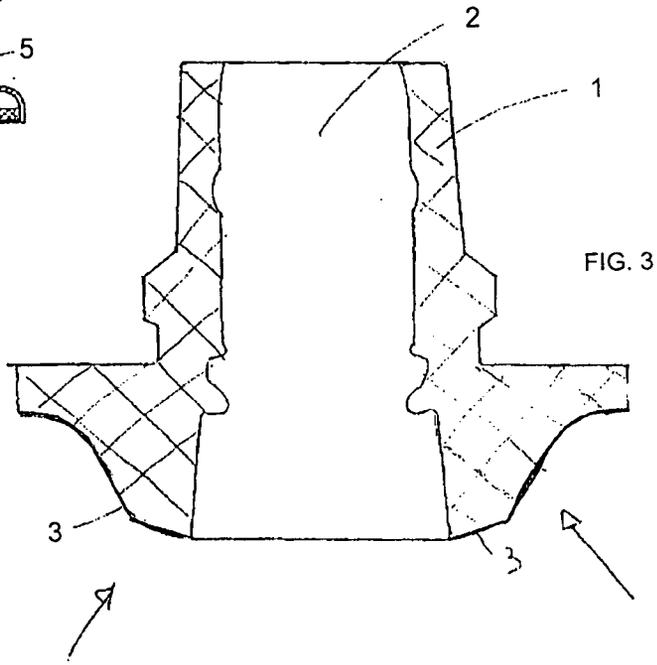

FIG. 3

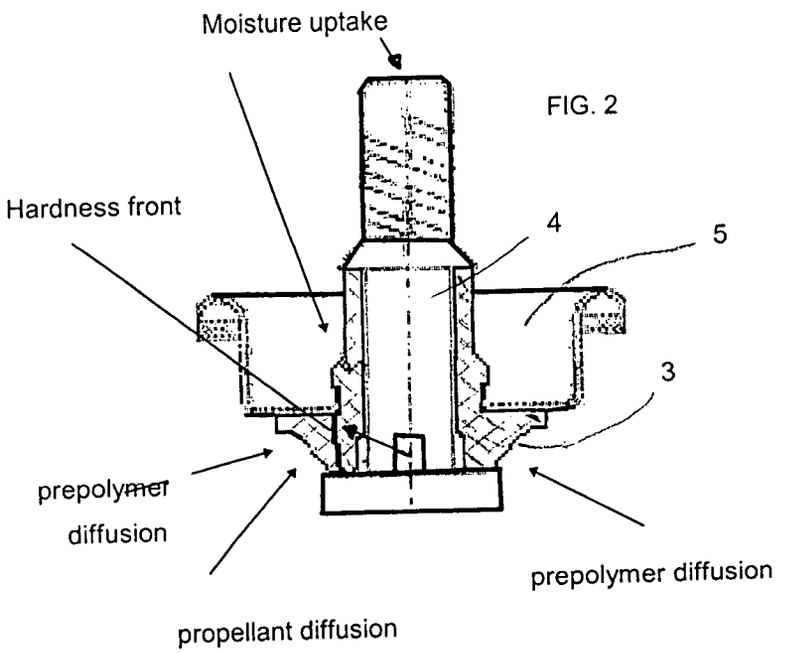

FIG. 2