size than intended. Moreover, owing to the turbulence, it is possible that the spray may no longer assume the intended conical shape, resulting in impact of a portion of the preparation supplied on the inside walls of the delivery cone.

US6113008 describes another spray dispenser comprising a delivery cone. Not even this solution is fault-free. First of all the mechanical action required for delivery must be applied in the same direction as the axis of the delivery cone, a configuration that makes this dispenser rather inconvenient in some applications. Moreover, the delivery cone described here comprises ventilation slits positioned near the contact rim of the cone, i.e. where the latter rests on the user's skin. The position of these slits means that the aerosol spray generated by the nozzle is propagated in an almost closed environment, with consequences broadly similar to those already described for document US6978945. The ventilation slits have the dual purpose of balancing the pressure during delivery and of allowing the gaseous components of the preparation supplied to be dispersed in the environment. Document US6113008 makes explicit reference to the need to disperse any propellants, solvents, or similar in the environment, but it is obvious that these slits also allow unwanted dispersion of the fine mist.

The aim of the present invention is therefore to overcome at least partially the drawbacks mentioned above with reference to the prior art.

Embodiments of the present invention seek to make available a spray dispenser that allows precise control of the amount of preparation supplied.

More particularly, embodiments of the present invention seek to make available a spray dispenser that makes it possible to avoid dispersion of the fine mist. Embodiments of the present invention also seek to make available a spray dispenser that makes it possible to maintain the desired uniformity of administration of the preparation to be delivered.

According to an aspect of the present invention, there is provide a dispenser for spray delivery of a preparation, comprising:

- a reservoir suitable for housing the preparation;
- a pump
- a load chamber
- a nozzle having a delivery axis (*X*)
- a delivery cone having an axis (*X'*)

wherein the pump is suitable, at each operation:

- for drawing a predetermined quantity of preparation from the reservoir,
- for supplying such quantity of preparation to the load chamber upstream the nozzle, and
- for creating a delivery pressure in the load chamber,

and wherein the nozzle is suitable for delivering said quantity of preparation in the form of an aerosol spray,

wherein the delivery cone comprises, in the proximity of the nozzle, at least one through hole suitable for putting into communication the inside of the delivery cone with the surrounding environment.

Claims

1. Dispenser for spray delivery of a preparation, comprising:

- a reservoir suitable for housing the preparation;
- a pump
- a load chamber
- a nozzle having a delivery axis (*X*)
- a delivery cone having an axis (*X′*)

wherein the pump is suitable, at each operation:

- for drawing a predetermined quantity of preparation from the reservoir,
- for supplying such quantity of preparation to the load chamber upstream the nozzle, and
- for creating a delivery pressure in the load chamber,

and wherein the nozzle is suitable for delivering said quantity of preparation in the form of an aerosol spray,

wherein the delivery cone comprises, in the proximity of the nozzle, at least one through hole suitable for putting into communication the inside of the delivery cone with the surrounding environment.

2. Dispenser according to claim 1, wherein the delivery cone comprises a contact rim, and wherein the at least one through hole is positioned within 20% of the distance *l* between the nozzle and the contact rim.

3. Dispenser according to claim 1 or 2, wherein the delivery cone comprises a first portion and a second portion having different taper ratios from one another.

4. Dispenser according to claim 3, wherein a generatrix of a surface of the first portion forms with axis *X′* an angle α and a generatrix of a surface of the second portion forms with axis *X′* an angle β, wherein angle β is smaller than angle α.

5. Dispenser according to claim 3 or 4, wherein a generatrix of a surface of the first portion forms with axis *X′* an angle α comprised between 40° and 50°.

6. Dispenser according to any claim 3 to 5, wherein a generatrix of a surface of the

second portion forms with axis *X′* an angle β comprised between 6° and 16°.

7. Dispenser according to claim 3, wherein in a cross-section lengthways through the delivery cone along the axis (*X′*) of the delivery cone, a surface of the first portion is at an angle α to the axis (*X′*) of the delivery cone, and a surface of the second portion is at an angle β to the axis (*X′*) of the delivery cone, wherein angle β is smaller than angle α.

8. Dispenser according to claim 3 or 7, wherein in a cross-section lengthways through the delivery cone along the axis (*X′*) of the delivery cone, a surface of the first portion is at an angle α to the axis (*X′*) of the delivery cone and is between 40° and 50°.

9. Dispenser according to any of claims 3, 7 or 8, wherein in a cross-section lengthways through the delivery cone along the axis (*X′*) of the delivery cone, a surface of the second portion is at an angle β to the axis (*X′*) of the delivery cone, wherein angle β is between 6° and 16°.

10. Dispenser according to any claim 3 to 9, wherein the first portion extends up to about 15%-25% of the distance *l* between the nozzle and the contact rim.

11. Dispenser according to any claim 3 to 10, wherein the at least one through hole is comprised in the first portion of the delivery cone.

12. Dispenser according to any preceding claim, wherein the delivery cone comprises a plurality of through holes.

13. Dispenser according to any preceding claim, wherein the delivery axis of the nozzle and the axis of the delivery cone coincide in one single axis (*X*), even during operation of the dispenser.