

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/NL90/00035 (22) International Filing Date: 20 March 1990 (20.03.90) (30) Priority data: 8900729 23 March 1989 (23.03.89) NL (71) Applicant (for all designated States except US): AIRSPRAY INTERNATIONAL B.V. [NL/NL]; Zuiderkade 31-33, NL-1948 NG Beverwijk (NL). (72) Inventor; and (75) Inventor/Applicant (for US only) : VAN DER HEIJDEN, Edgar, Ivo, Maria [NL/NL]; Leursebaan 142A, NL-4814 NJ Breda (NL). (74) Agent: MOMMAERTS, J., H.; Exterpatent B.V., P.O. Box 90649, NL-2509 LP The Hague (NL).		(81) Designated States: AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), + CH (European patent), CM (OAPI patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GA (OAPI patent), GB (European patent), HU, IT (European patent), JP, KP, KR, LK, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL (European patent), NO, RO, SD, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US. Published With international search report.
(54) Title: SPRAY HEAD FOR A SPRAY CAN		
(57) Abstract		
A spray head for a spray can, comprising a hollow stem having a bore which is adapted to be brought into communication with the liquid space of the spray can, and which on the other hand, terminates near a spray nozzle having an exit aperture, so as to force liquid driven into said bore by the outward pressure of the spray can through said aperture for being sprayed; according to the invention, in the flow path (3, 4, 6) of the liquid, a passage operating as a jet pump (7) driven by the liquid flow pressed outwards is included, the suction side (10) of which communicates with the ambient air.		

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Spray head for a spray can.

The invention relates to a spray head for a spray can, comprising a hollow stem having a bore which is adapted to be brought into communication with the liquid space of the spray can, and which on the other hand, terminates near a spray
5 nozzle having an exit aperture, so as to force liquid driven into said bore by the outward pressure of the spray can through said aperture for being sprayed.

In the known spray cans using a driving agent contained in the spray can as a liquid which strongly evaporates at the
10 ambient temperature and mixes with the liquid to be sprayed, the droplets of the sprayed liquid formed in the nozzle will still contain driving agent which immediately evaporate, so that the droplets will be reduced which enhances the formation of a fine mist.

15 With some liquids coalescence of droplets occurs in the sprayed jet or large drops are formed by other causes which will lead to the formation of a coherent layer on a sprayed surface which is undesired. In order to avoid this, it is known to mix in a mixing chamber an additional amount of the
20 driving medium with the liquid pressed towards the nozzle which will lead to a reduction of the droplet size. This requires, of course, providing a larger quantity of driving agent in the spray can, which is unfavourable, and discharging noxious driving agents into the ambient air is highly un-
25 desirable.

In order to avoid the use of such driving agents it is known to use compressed air as the driving agent, which, for instance, is obtained by means of a protecting cap for the spray head operating as a pump. Since the air dissolved in the
30 liquid to be sprayed will hardly evaporate from the liquid droplets at or after spraying, larger drops will sooner occur in such spray cans than when using an evaporating driving agent, so that when using air the admixture of air will nearly always be required. This leads, however, to a larger air
35 consumption so that air is to be pumped in very often which can be onerous for the user.

It is an object of the invention to provide a spray head

for spray cans allowing to avoid a large driving agent consumption as a consequence of admixture, which spray head is intended, in the first place, for spray cans with air drive, but can also be applied with spray cans of the first-
5 mentioned kind, and then the ejection of undesired driving gas can be reduced or avoided.

To that end the spray head of the invention is characterised in that, in the flow path of the liquid, a passage operating as a jet pump driven by the liquid flow
10 pressed outwards is included, the suction side of which communicates with the ambient air.

In this manner ambient air is used as the additional mixing gas, so that the consumption of pressurised driving agent is reduced accordingly.

15 This spray head can be constructed in various manners, as defined in the subclaims.

The invention will be elucidated below by reference to a drawing, showing in:

Fig. 1 a diagrammatical representation of a spray head
20 for elucidating the principle of the invention; and

Figs. 2 and 3 cross-sections of practical embodiments of the spray head of the invention.

The principle of the invention is diagrammatically represented in Fig. 1. Therein a spray head 1 is shown in a
25 simplified manner, which head comprises a stem 2 with a bore 3, which stem is to be mounted on a spray can, and is designed for opening a dispensing valve not shown when being pressed downwards. Then the liquid to be sprayed will be driven into the bore 3 by the gas or vapour pressure acting within the
30 spray can.

At its upper end the bore 3 is continued by a transverse bore 4 of a spray nozzle terminating in a dispensing aperture 6. So far the present head 1 corresponds with the current spray heads.

35 In the bore 3 a jet pump 7 is diagrammatically indicated. This pump comprises a jet nozzle 8 through which the liquid driven through the bore 3 flows, said nozzle 8 opening into a wider chamber 9 communicating, via an additional bore 10, with the ambient air.

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When the liquid flows through the bore 3 because of the negative pressure generated thereby in the chamber 9, air will be sucked inwards in the known manner through the bore 10, and will be mixed with the liquid, which will be enhanced by 5 arranging means for forming turbulences in the chamber 9. As a consequence thereof the mist jet emerging from the aperture 6 is mixed with air to such an extent that the liquid droplets formed will not coalesce, and a fine mist is obtained.

As, now, ambient air is used for supporting the spraying, 10 no gas from the pressure space of the spray can is to be used anymore. In the case of an evaporating and often noxious driving agent this means less air pollution, and, when using an air pump for providing the interior pressure in the spray can, an air charge can be used longer so that less pumping is 15 required.

The jet pump 7 diagrammatically shown can be realised in many other ways, e.g. in the form of a venturi tube. Moreover the location thereof in the bore 3 can be varied. It can be favourable to arrange it as closely as possible near the 20 aperture 6, and this in view of manufacturing as well in view of the mixing effect.

In Fig. 2 a first practical embodiment of the spray head 1 is shown. The parts thereof corresponding with Fig. 1 have been indicated therein with the same reference numerals.

25 The transverse bore 4 terminates into a substantially annular chamber 11 into which a cylindrical cap 12 has been inserted which has a front wall 13 in which the aperture 6 is provided. The wall 13 defines, together with an end face 14 of a central piece 15 of the nozzle portion 5, a chamber 16 30 communicating with the bore 4 in which sloping baffles 17 can be arranged in order to allow the liquid to be brought in a revolving motion before emerging through the aperture 6.

A thin tube 18, having a bore which forms the air suction passage 10, ends beyond the end face 14 coaxially in the 35 aperture 6 which is so much wider than the end of the tube 18 that the liquid flowing through the bore 4 and chamber 16 can emerge along the tube end outwards. This tube end and the aperture 6 form together the jet pump 7.

This embodiment of the nozzle 5 is of the current design

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with the exception of the additional tube 18 opening into the aperture 6 which adaptation can easily be realised.

Fig. 3 shows still another practical embodiment in which, again, parts corresponding with Figs. 1 and 2 have been 5 provided with the same reference numerals.

Here the tube 18 has been omitted, and before the end face 13 of the cap 12 a disc 19 directed parallel thereto is provided which, together with this end face 13, defines a passage 10' forming the air suction passage. Near the outer 10 edge of the disc 19 air suction openings 20 are provided, and in the centre of this disc an aperture 6' has been formed which is situated coaxially with the aperture 6 of the cap and has substantially the same diameter. Also the passage 10' can be provided, if required, with guiding baffles for imparting a 15 revolving motion to the air flow sucked in, which motion, as the case may be, can be opposite to that of the revolving motion of the liquid caused by the baffles 17.

It will be clear that within the scope of the invention many modifications are possible.

Claims

1. A spray head for a spray can, comprising a hollow stem having a bore which is adapted to be brought into communication with the liquid space of the spray can, and which on the other hand, terminates near a spray nozzle
5 having an exit aperture, so as to force liquid driven into said bore by the outward pressure of the spray can through said aperture for being sprayed, **characterised** in that in the flow path (3, 4, 6) of the liquid, a passage operating as a jet pump (7) driven by the liquid flow pressed outwards
10 is included, the suction side (10) of which communicates with the ambient air.

2. The spray head of claim 1, **characterised** in that the passage operating as a jet pump (7) is formed by an additional passage (18) in the head (5), which opens separately from the
15 liquid passage (4, 16) into the exit aperture (6), said aperture being so much wider than the outer periphery of said additional passage (18) that a passage for the liquid emerging from the liquid passage (16) remains free.

3. The spray head of claim 2, in which the bore of the
20 stem opens into an annular chamber communicating with the exit aperture, **characterised** in that the additional passage (18) is a bore (10) extending substantially coaxially with the annular chamber (16), a wall (14) defining this chamber being provided with a projection extending into said aperture and surrounding
25 the end of said bore (10).

4. The spray head of claim 1, in which the exit aperture has been formed in a disc closing the liquid passage, **characterised** in that the passage operating as a jet pump (7) is formed by a second disc (19) arranged at the exit side of
30 the former disc (13) and at a small distance thereof and parallel thereto, said second disc (19) being provided with a second aperture (6') situated coaxially in respect of the first aperture and having substantially the same diameter, the interspace (10') between both discs (13, 19) communicating
35 (20), near the circumference, with the surroundings.

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5. The spray head of claim 4, **characterised** in that in the interspace (10') between both discs (13, 19) guiding baffles are provided which are adapted to impart a revolving motion to the air flow sucked therethrough.

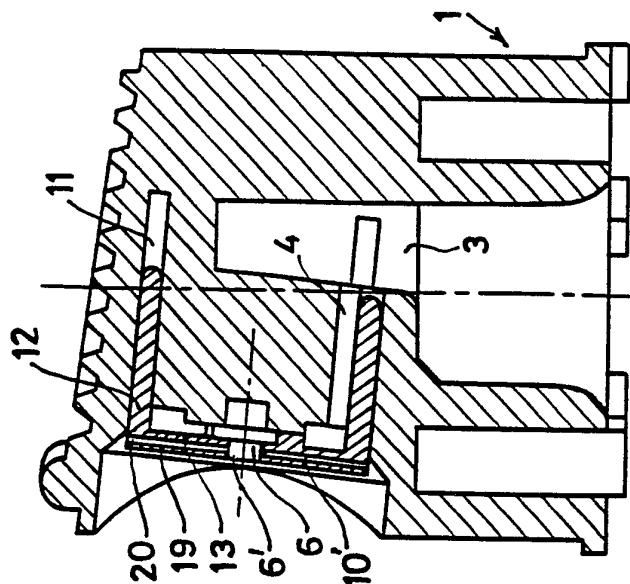


Fig. 5.

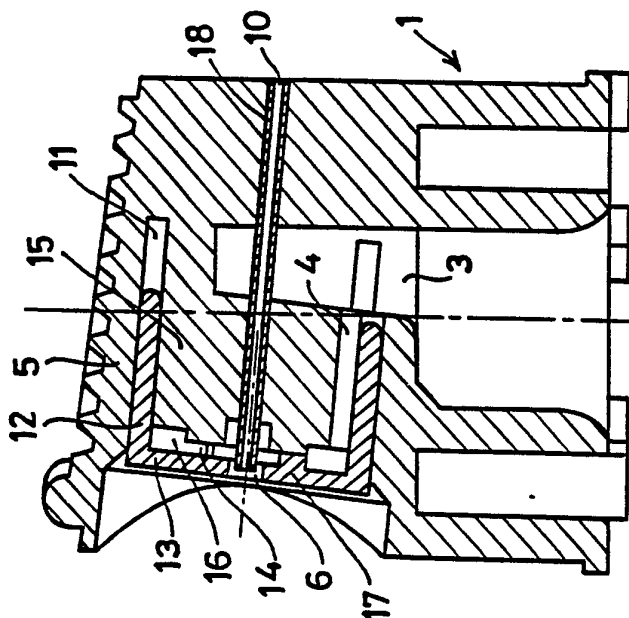


Fig. 2.

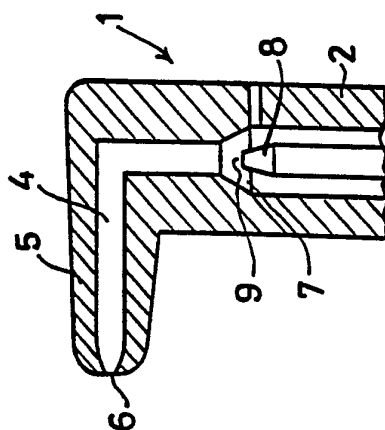


Fig. 1.

INTERNATIONAL SEARCH REPORT

International Application No PCT/NL 90/00035

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶
According to International Patent Classification (IPC) or to both National Classification and IPC

IPC⁵: B 65 D 83/28

II. FIELDS SEARCHED

Minimum Documentation Searched ⁷

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Documentation Searched other than Minimum Documentation
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹

Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	NL, A, 6708525 (WERNER & MERTZ) 17 January 1968 see page 3, line 24 - page 4, line 6; figures 1,2 --	1
A	NL, A, 7804166 (L'OREAL) 30 October 1978 see page 6, line 36 - page 8, line 28; figure 1 --	2,3
A	NL, A, 6701214 (ABPLANALP) 3 August 1967 see page 3, line 17 - page 4, line 20; figures 1-3 --	1,2,3
A	NL, A, 6803840 (LUTHI)	1

¹⁰ Special categories of cited documents: ¹⁰

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IV. CERTIFICATION

Date of the Actual Completion of the International Search

6th June 1990

Date of Mailing of this International Search Report

04. 07. 90

International Searching Authority

EUROPEAN PATENT OFFICE

Signature of Authorized Officer

M. Peis

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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	18 September 1968 see page 4, line 28; page 5, line 23; figures 5,6,7	
	-- FR, A, 2016334 (DEUTSCHE PRAZISIONS- VENTIL) 8 May 1970 -----	

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

NL 9000035

SA 35552

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 26/06/90. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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