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

(11) Publication number: **0 192 865**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **85301319.1**

(22) Date of filing: **27.02.85**

(51) Int.Cl.⁴: **B 05 B 1/26**

(43) Date of publication of application:
03.09.86 Bulletin 86/36

(84) Designated Contracting States:
AT BE CH DE FR GB IT LI LU NL SE

(71) Applicant: **MARSHALL SONS AND COMPANY LIMITED**
Beaumont Street
Gainsborough Lincolnshire(GB)

(72) Inventor: **White, Kenneth Arthur**
54 Ordsall Park Road
Retford Nottinghamshire(GB)

(74) Representative: **Carmichael, David Andrew Halliday et al,**
G.F. REDFERN & CO. High Holborn House 52/54 High Holborn
London WC1V 6RL(GB)

(54) **Spray nozzle.**

(57) A Spray Nozzle comprising a surface (1) with openings therein, one of the said openings (2) being adapted to pass material for atomisation and one or more other openings (9) arranged so that gas can be ejected therefrom to impinge on the material emanating from the said one opening (2) to cause atomisation of the material.

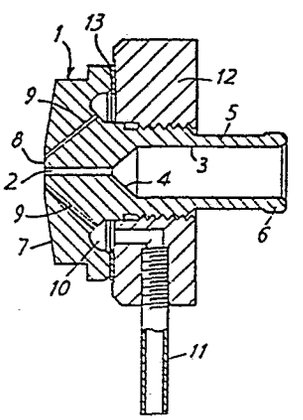

FIG.2

EP 0 192 865 A1

IMPROVEMENTS RELATING TO SPRAY NOZZLES

0192865

This invention relates to spray nozzles.

The invention is more particularly but not exclusively concerned with a spray nozzle adapted for spraying viscous materials.

According to the present invention a spray nozzle comprises a surface with openings therein, one of the said openings being adapted to pass material for atomisation, and one or more other openings arranged so that gas can be ejected therefrom to impinge on the material emanating from the said one opening to cause atomisation of the material.

In most cases the gas would be air.

Preferably the one opening for the material to be atomised is formed by a centrally arranged bore terminating at the surface and the other openings for the gas by a plurality of equally angularly spaced smaller bores also terminating at the surface and arranged on a pitch circle with respect to the axis of the one opening.

The bores for the gas (gas bores) may be angularly directed towards the axis of the centrally arranged bore at a position spaced beyond the surface so that gas ejected through the gas bores will impinge on the material to be atomised beyond the surface of the nozzle. This assists in preventing the material being atomised setting on the nozzle and thus tending to cause blockage.

The gas bores are preferably arranged so that while creating turbulence they cause no spin. The gas bores may be connected to an annular chamber located in the nozzle to the rear of the surface and to which a supply of pressurised gas is fed. This ensures equal pressure at the outlets of

the smaller bores so that the gas inpinges on the resin with equal pressure all round The central bore may comprise a narrow neck portion terminating at the surface and a wider inner portion connected thereto, preferably by a tapering shoulder.

The nozzle as setforth above may also be used in combination with a spray chamber, and in this case according to a further aspect of the present invention in such a combination the spray chamber is adapted to be maintained at a pressure lower than ambient pressure. Thus there is no danger of the material being atomised, which may be dangerous, penetrating to the outside atmosphere.

The invention may be performed in various ways and one specific embodiment will now be described by way of example with reference to the accompanying drawings in which:

Fig. 1 is a front elevation of a spray nozzle according to the present invention and

Fig. 2 is a view of the line II - II of figure 1.

As can be seen from the figures the spray nozzle comprises a head 1 which may be either substantially circular with flats as shown in figure 1 or of hexagenal shape. Arranged centrally in this surface is a bore 2 through which material to be atomised is ejected, said bore 2 being a narrow bore and extending rearwardly in the head 1 to a wider bore 3 the two bores being connected by a tapering shoulder 4.

The bore 3 extends rearwardly in the form of a shaft 5 to form the rear of the nozzle head 1 and which is adapted to be connected at 6 to a pipe or tube through which resin or

other viscous material to be atomised is supplied.

The nozzle head 1 is somewhat curved at its outer surface 7 as can be seen from the drawings and having a substantially flat central portion 8 in which terminates the bore 2, and further bores indicated at 9. The bores 9 extend angularly from the surface rearwardly and outwardly into a chamber 10 formed behind the surface 7 in the nozzle head. The chamber 10 which is annular is connected to an air supply through a tube 11. The nozzle is in two parts for ease of manufacture and the rear of the chamber 11 is formed by a base 12 which is screw threaded onto the outside of bore 3 and shaft 5, a sealing gasket being provided at 13.

The invention is particularly suitable for atomising viscous fluids and is designed to work with materials between 5 and 20 Poise although the particular viscosity for which the nozzle is suitable is of the order of 15 Poise. In a typical example the material which is a synthetic resin is supplied under a pressure of 25lb per square inch through the bore 3 to the bore 2 which is then at a much high pressure and may be of the order of 100lb per square inch at the ejection from the surface. The air is supplied at a pressure of 80-100lb per square inch and the air is directed towards the material to be atomised at a point removed from the surface. This ensures that the air is not in contact with the material to be atomised until the material has left the nozzle, and thus avoids any reaction taking place too close to the surface which might tend to cause blockage of the nozzles. The effect of the nozzle arranged in the configuration is such

as to create a round spray pattern. It is to be noticed that the bores 8 are only angled with a simple angle to the bore 2 and there is no component tending to give a spin. The material being atomised tends to form a cone and for example at 60 p.s.i. a 3ft cone can be obtained.

The nozzle head can be altered to deal with more viscous materials, and the angle or the diameter of the bores 8 can be altered according to the fluid to be atomised.

The invention is particularly suitable for use in connection with the process generally described in the Applicants Granted UK Patent No. 2073096. That invention is directed to a method of making articles from raw fibrous materials in which the material in raw, unchopped or only coarsely chopped conditions is admixed with a thermal setting bonding agent, subsequent steps being carried out to compress the material and cure the bonding agent to produce articles having substantially raw characteristics. In carrying out the addition of the synthetic resin it has been found that the nozzle according the present invention is particularly suitable since it is thus possible to atomise the resin without it setting prematurely. By angling the surface of the nozzle the viscous material does not collect thereon and there is no problem of the jets becoming blocked. It may be that a very thin film of solid material may form at the end of the bore 2 but it has been found that this presents no problem since it immediately releases upon application of pressure.

It has also been found with the present invention that if the chamber into which the resin is sprayed is maintained at a lower pressure than the outside atmosphere there is no danger of the atomised resin which in itself can be dangerous, penetrating to the outside atmosphere.

CLAIMS

1. A Spray Nozzle comprising a surface with openings therein, one of the said openings being adapted to pass material for atomisation and one or more other openings arranged so that gas can be ejected therefrom to inpinge on the material emanating from the said one opening to cause atomisation of the material.

2. A Spray Nozzle as claimed in Claim 1 in which the one opening for the material to be atomised is formed by a centrally arranged bore terminating at the surface, and the other openings for the gas by a plurality of equally angularly spaced bores also terminating at the surface and arranged on a pitch circle with respect to the axis of the one opening.

3. A Spray Nozzle as claimed in Claim 2 in which the gas bores are angularly directed towards the axis of the centrally arranged bore at a position spaced beyond the surface so that the gas ejected through the gas bores will impings on the material to be atomised beyond the surface of the nozzle.

4. A Spray Nozzle as claimed in any one of Claims 1 - 3 in which the gas bores are arranged so that while creating turbulance they create no spin.

5. A Spray Nozzle as claimed in any one of the preceding claims in which the gas bores are connected to an annular chamber located in the nozzle to the rear of the surface and to which a supply of pressurized gas is fed.

6. A Spray Nozzle as claimed in any one of Claims 2 - 5 in which the central bore comprises a narrow neck portion

terminating at the surface and a wider inner portion connected thereto by a tapering shoulder.

7. A Spray Nozzle as claimed in any one of the preceding claims in which the surface of the nozzle head is angled to taper slightly inwardly away from the bores.

8. A Spray Nozzle as claimed in any one of the preceding claims in combination with a spray chamber into which the atomised material is sprayed and which is, in use, maintained at a lower pressure than ambient pressure.

9. A Spray Nozzle substantially as described herein with reference to and as shown in the accompanying drawings.

0192865

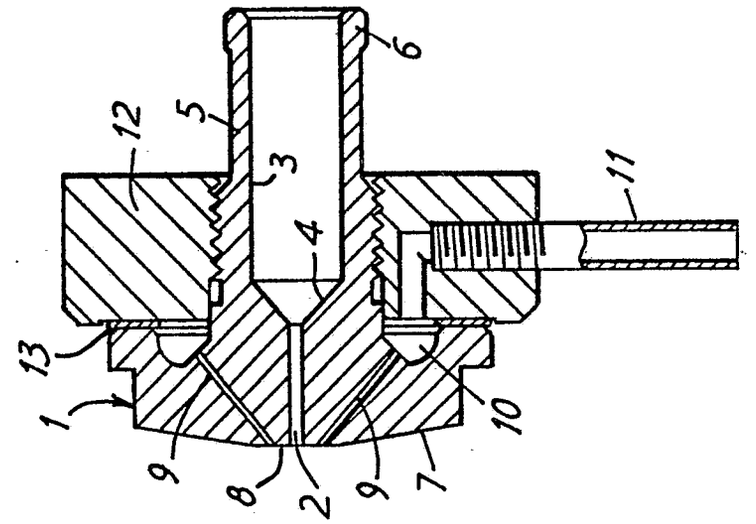

FIG.2

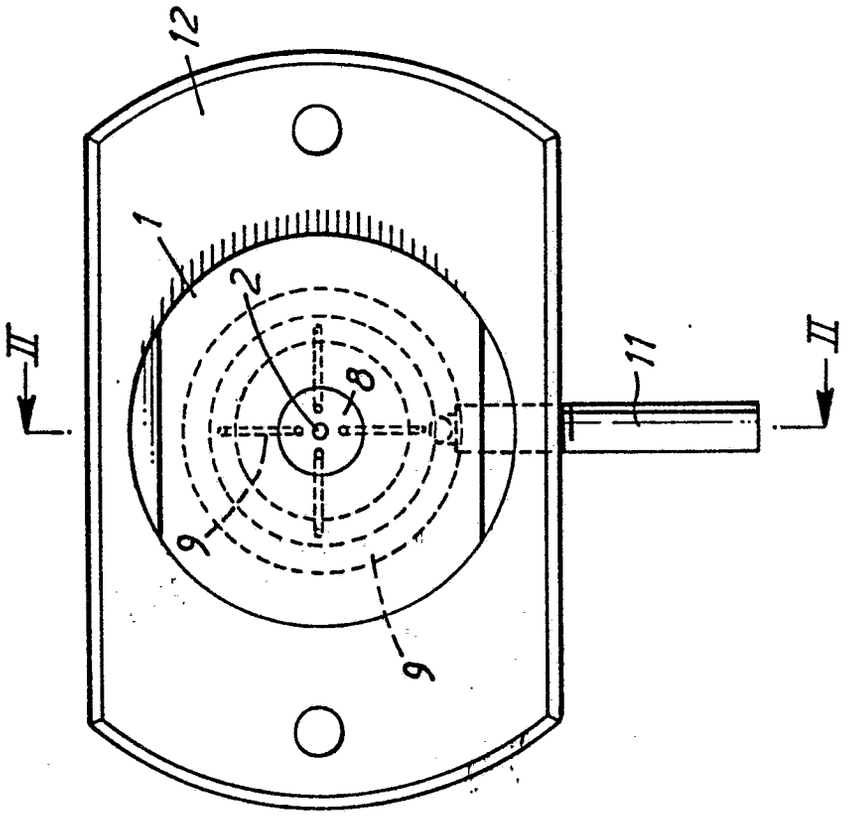

FIG.1

European Patent Office

EUROPEAN SEARCH REPORT

0192865
Application number

EP 85 30 1319

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl 4)
X	GB-A- 941 332 (SIEMENS-REINIGER-WERKE AG) * Page 2, lines 53-110; figures 2,3 *	1-6	B 05 B 1/26
Y		7	

Y	DE-A-3 238 149 (BRUGGER) * Page 6, lines 6-18, figure 2 *	7	

X	NAVY TECHNICAL DISCLOSURE BULLETIN, vol. 8, no. 4, June 1983, pages 5-8, Washington, US; F. BROWN et al.: "Salt water spray nozzle" * Page 7, paragraph 1 - page 8, paragraph 2; figures 1,2 *	1-3,5, 6	
	---		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
X	US-A-3 004 719 (POUPPIRT) * Claim 1; figure 1 *	1-3,5, 6	B 05 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22-10-1985	ERNST R.T.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO Form 1503 03 82