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File Number: T 556/89 - 3.2.4
Application No.: 81 303 804.9
Publication No.: 0 049 563
Title of invention: Filament draw nozzle

Classification: D01D 5/12

D E C I S I O N
of 12 November 1991

Proprietor of the patent: CROWN ZELLERBACH CORPORATION

Opponents: I) Metallgesellschaft AG
II) Hoechst AG

Headword:

EPC Articles 56, 102(2)

Keyword: "Inventive step (yes)"
"No reasons to allow amendments to the patent as granted - cf.
section 7"

Headnote



Case Number : T 556/89 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 12 November 1991

Appellant :
(Opponent II)

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Respondent :
(Proprietor of the patent)

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Decision under appeal :

Interlocutory decision of the Opposition Division
of the European Patent Office dispatched on
26 June 1989 concerning maintenance of European
patent No. 0 049 563 in amended form.

Composition of the Board :

Chairman : C.A.J. Andries
Members : H.J. Seidenschwarz
J.P.B. Seitz

Summary of Facts and Submissions

I. European patent No. 0 049 563 concerning a "Filament draw nozzle" and comprising eleven claims was granted on 9 April 1986 in response to European patent application No. 81 303 804.9 filed on 20 August 1981.

II. Two oppositions were filed against the patent requesting it be revoked on the grounds of lack of both novelty and inventive step. The following documents were referred to:

(I) DE-B-1 785 158

(II) Derwent Reference 05782 B/03 (SU-A-595 440)

(III) Derwent Reference 16217 C/09 (SU-A-668 988)

(IV) Fachlexikon ABC Physik, Verlag Harri Deutsch, Zürich und Frankfurt am Main; Bd. 1: A-L, pages 206 and 207.

III. By interlocutory decision dispatched on 26 June 1989 the patent was maintained in amended form with the documents specified in the communication pursuant to Rule 58(4) EPC dated 14 December 1988.

The amendments refer only to the dependent Claims 5 and 7 and to the description as granted.

IV. Claim 1 as granted reads as follows:

"A filament draw nozzle having a body (12) provided with a throughbore (14) and an annular boss (18) having a cylindrical peripheral wall (20) leading to a generally smoothly curved surface (22) extending to said throughbore (14), the annular boss, when the nozzle is uprightly

arranged, projecting upwardly; and a housing (30) positioned in engagement with said body (12) whereby said housing (30) is aligned relative to said body (12) with an aperture (32) through the housing axially aligned with the throughbore (14), said body (12) and housing (30) defining a pressurizable annular air cavity connected to air supply means (34) and said housing inner wall and said surface (22) defining a restricted annular passageway leading to a downwardly directed slit providing communication between the air cavity and throughbore (14) whereby pressurized air in the cavity passes through the slit to the throughbore (14) and downwardly along surface (22); and a fiber inlet member (40) being provided in said aperture for the feed of filamentary material to be drawn by supplied air through the throughbore, characterised in that the housing (30) includes a downwardly directed inner wall leading to the aperture (32); in that the fiber inlet member (40) includes a cylindrical fiber feed tube having an outer wall projecting through the aperture into said throughbore; in that said fiber feed tube is selectively removably positionable in said housing aperture with said outer wall bearing against the housing (30) and with the fiber feed tube concentrically disposed relative to and within the throughbore; and in that said slit and said surface (22) define a Coanda nozzle capable of directing and maintaining air flow in a downward direction to the throughbore (14) and aperture (32) when the fiber feed tube (40) is removed from aperture (32) with the air feed maintained to said air cavity."

- V. On 23 August 1989 the Appellant (Opponent II) lodged an appeal against the decision, paying the appeal fee simultaneously.

The Statement of Grounds was received on 3 November 1989. In this Statement, the Appellant submitted for the first time document DE-B-2 339 603 (V).

VI. Oral proceedings took place on 12 November 1991. Nobody was present on behalf of the party to appeal proceedings as of right in accordance with Article 107 EPC (Opponent I), who had been duly summoned pursuant to Rule 71(1) EPC and had written to say that he would not be attending. The oral proceedings, therefore, were continued without him (Rule 71(2) EPC).

(i) The Appellant argues that document (I), Figure 1, discloses a filament draw nozzle which is the closest prior art. Also this nozzle uses the Coanda effect for drawing filaments through the fibre feed tube (4) since the generating angle θ of the slit (15) is smaller than the critical angle, up to which the Coanda effect occurs. In this known nozzle no means is provided for maintaining the Coanda effect when the fibre inlet member with the fibre feed tube is removed. Therefore a blow-back of the pressurised air may occur.

Document (V), however, discloses the means which the person skilled in the art can use for preventing blow-back by maintaining said Coanda effect. Figure 7 of this document suggests the provision of a body (15) having a conical shape directed downwardly to the throughbore thus forming an annular slit (14) which guides the air flow in a downward direction through the throughbore even when the plug (16) in said body is removed.

Therefore, the person skilled in the art has only to provide the filament draw nozzle according to Figure 1 of document (I) with an additional surface

leading downwardly from the inner wall of the housing (1) to the throughbore (17) and parallel to the surface leading from the circular corner (14) to the narrowest point (16) of the wall (13). Thus the application of the teaching of document (V) to the nozzle according to document (I) leads the person skilled in the art directly to the device according to Claim 1 of the patent in suit.

Furthermore, the documents (II) and (III), and in particular document (IV) which explains the principle of the Coanda effect, give the person skilled in the art the information he needs to modify the filament draw nozzle known from document (I) in such a manner that the Coanda effect remains also effective when the fibre inlet member is removed.

- (ii) The Respondent contests the arguments of the Appellant and is of the opinion that neither any of the documents (I) to (V) taken individually nor their combination, discloses the subject-matter of Claim 1 utilising Coanda surfaces to provide a smooth efficient fluid flow to draw the fibre into the nozzle with the construction being such as to prevent blow-back when the fibre feed tube is removed.

VII. The Appellant requests that the decision under appeal be set aside and the European patent No. 0 049 563 be revoked.

The Respondent's request is to maintain the patent as granted.

According to his letter of 12 September 1989, the party as of right requests revocation of the patent.

Reasons for the Decision

1. The appeal is admissible.
2. None of the documents cited in the proceedings before the European Patent Office discloses a filament draw nozzle according to Claim 1 of the patent in suit. To give reasons is unnecessary since the Appellant and the party as of right no longer disputed the novelty with respect to this state of the art.

Hence, the subject-matter of said Claim 1 is novel within the meaning of Article 54 EPC.

3. Document (I) discloses, (see Figure 1 in combination with its description), a filament draw nozzle which comprises in addition to the features as specified in the precharacterising portion of Claim 1 also the following features as specified in the characterising portion of said claim:
 - the fibre inlet member (2,3,4) includes a cylindrical fibre feed tube (4) projecting through the aperture into the throughbore (17) of the body (18), and
 - the fibre feed tube is selectively removably positionable in the housing aperture and concentrically disposed relative to and within the throughbore.

Therefore, this prior art is closer to the subject-matter of Claim 1 than the filament drawn nozzle according to document FR-A-2 112 416 which is cited in the description of the granted patent as the closest prior art document (cf. document EP-B-0 049 563, column 1, lines 42 to 44).

4. The filament draw nozzle according to document (I) has the disadvantage that there is nothing to prevent the flow of pressurised air out through the aperture of the housing, rather than downwardly in the normal direction of flow when the fibre inlet member is removed for cleaning purposes or for replacement purposes because of wear of the fibre feed tube due to high air pressure at which the filament draw nozzles normally operate.

The technical problem to be solved is to provide a construction in which the fibre inlet may be removed while pressurised air is being introduced without blow-back occurring (cf. document EP-B-0 049 563, column 1, lines 45 to 49).

5. According to Claim 1, this problem is solved by designing the passageway for the pressurised air from the air cavity to the throughbore in such a manner that not only is the air deflected downwards all the time by a downwardly directed inner wall but also the surfaces of said passageway (defined among others by said downwardly directed inner wall) define a Coanda nozzle and that the Coanda effect remains effective in the normal way even when the fibre feed tube is removed. This permits loading, cleaning, repair and operating the nozzle at very low or high air supply pressures (in the range of two to twenty atmospheres). Therefore, the Board has no reason to doubt that due to the presence of both the downwardly directed inner wall and the defined Coanda nozzle a blow-back is prevented even at said low air supply pressures, i.e. two atmospheres.

6. On the question of whether or not the state of the art could suggest the filament draw nozzle according to Claim 1 of the patent as granted, the following should be observed:

- 6.1 According to document (IV), page 206, the Coanda effect relies on the tendency of a fluid-jet to adhere to an adjacent surface. There are two forms of this effect, namely the attachment of a fluid-jet to the surface of a cylinder or the "reattachment" of a fluid-jet to an inclined flat surface at a certain distance from the outlet of the nozzle.
- 6.2 The main aspect of the disclosure of document (I) is that in the region of the outlet (19) of the fibre feed tube (4) the pressurised air flows parallel to the flow of the filaments in the fibre feed tube. The enlargement of the expansion chamber (17) is such that this parallel flow is maintained in the region of said outlet. This prevents mutual interferences of the filaments (cf. column 3, line 59 to column 4, line 7; column 4, lines 24 to 26; column 7, lines 31 to 42).

No information whatsoever is given in this document firstly about the problem of blow-back, and secondly that the walls near and downstream of the throat (16) are or have to be constructed in such a way that the Coanda effect takes place, let alone the idea that use can be made of the Coanda effect to avoid blow-back. Therefore, document (I) contains no information which could suggest to the person skilled in the art the use of some kind of a Coanda nozzle in a filament draw nozzle.

- 6.3 Document (V) discloses a filament draw nozzle comprising a conical needle formed by two concentric shaped bodies (4,8), the inner one of which can be removed. The filaments are sucked into the larger opening remaining after the removal of the inner element. The purpose of this device is to facilitate the introduction of the filaments into the filament draw nozzle without expensive auxiliary means during the starting up of said nozzle (cf.

column 3, lines 56 to 61; column 4, lines 2 to 8; Claims 3 and 4; Figures 1, 2 and 4).

According to the embodiment of Figures 7 and 8, the nozzle consists of a conical nozzle needle (15) and the conical inner body comprising two segments (16). The pressurised air flows from an annular air cavity (13) to an annular slit (14), which is formed by the conical nozzle needle (15), the conical inner body and a counter cone (17) at the top of a throughbore defining body (18). The size of the annular slit can be varied by turning said body. After having pulled out the two segments the filaments can be sucked into the hollow cone of the conical nozzle needle (15) which is now distinctly enlarged (cf. column 7, lines 5 to 13, 19 to 21 and 32 to 36). From the fact that the filaments are sucked into the hollow cone it is clear for the person skilled in the art that no blow-back occurs when the conical inner body is removed from the nozzle needle with the air feed maintained to the annular air cavity. The suction effect is, however, produced by a jet-pump due to a kind of downwardly directed deflector (i.e. conical nozzle needle (15)) which creates a permanent downstream of fluid. Furthermore, there is no indication in document (V) that the Coanda effect is used. Therefore, the idea of using, in addition to the downwardly directed deflector, a specific construction in the form of a Coanda nozzle capable of directing and maintaining the air flow in a downward direction is not given. From this follows that the person skilled in the art receives no hint from the disclosure of document (V) which could suggest to him to provide in the filament draw nozzle according to document (I) the passageway for the pressurised air from the air cavity to the throughbore with those smoothly curved surfaces which define a Coanda nozzle according to the first form of the Coanda effect disclosed by document (IV).

6.4 The documents (II) and (III) concern filament draw nozzles which comprise a throughbore defining body, a housing and a fibre inlet member with a fibre feed tube projecting into the throughbore. Said body, housing and fibre inlet member define an air cavity connected to air supply means. The fibre inlet member and the throughbore are provided with ribs (document (II)) or the inside of the fibre feed tube is provided with grooves (document (III)). The purpose of this air guiding means is to increase efficiency and to improve filament quality by preventing entrained air stream swirling.

Since neither is the problem to be solved explicitly mentioned in these documents nor can a person skilled in the art even implicitly find the slightest hint towards a solution of the problem of blow-back, particularly since on the contrary it is clear that blow-back will occur if the fibre inlet members in the known filament draw nozzles are removed, the teachings of the documents (II) and (III) cannot, either alone or in combination with the teachings of the documents discussed in the foregoing sections, lead the person skilled in the art to a filament draw nozzle as specified in Claim 1 of the patent as granted.

6.5 Thus, the subject-matter as set forth in said Claim 1 also involves an inventive step within the meaning of Article 56 EPC.

7. The maintenance of the patent as amended according to the interlocutory decision of the Opposition Division is based on amendments concerning the correction of errors of transcription (dependent Claim 5; description, column 1, line 17) and concerning the support of dependent Claim 7 by the description. The meaning of Claim 7 is, however, clear in combination with the description (column 4, lines 17 to 21), the Figures 1 to 3 and the preceding claims of the patent as granted.

Since, for the above reasons (cf. sections 2 and 6), the grounds for opposition laid down in Article 100(a) EPC do not prejudice the maintenance of the patent as granted (cf. Article 102(2) EPC), and since the opposition procedure is not designed to be an extension of examination procedure, there is, following the jurisprudence of the Boards of Appeal (cf. decision T 406/86: "Trichlorethylen/WACKER", OJ EPO 1989, 302, section 3.1.6 and decision G 001/84: "Mobil Oil", OJ EPO 1985, 299, section 9), no reason for the amendments allowed by the Opposition Division.

Therefore, the request of the Respondent to maintain the patent as granted by the Examining Division is admissible.

8. In view of the above, the patent can be maintained as granted.

Order

For these reasons, it is decided that:

1. The contested decision is set aside.
2. The patent is maintained as granted.

The Registrar:



N. Maslin

The Chairman:



C. Andries



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