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Anmeldenummer / Filing No / N° de la demande : 82 305 789.8

Veröffentlichungs-Nr. / Publication No / N° de la publication : 79186

Bezeichnung der Erfindung:
Title of invention:
Titre de l'invention : Apparatus for drawing optical fibres

Klassifikation / Classification / Classement : C03B 37/025

ENTSCHEIDUNG / DECISION

vom / of / du 14 November 1989

Anmelder / Applicant / Demandeur : CORNING GLASS WORKS

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant : N.V. PHILIPS GLOEILAMPENFABRIEKEN

Stichwort / Headword / Référence : Fibres

EPÜ / EPC / CBE Article 56

Schlagwort / Keyword / Mot clé : "Inventive step (yes)"
"Amendment - Broadening of scope"

Leitsatz / Headnote / Sommaire

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Case Number : T 604/88 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 14 November 1989

Appellant : (Opponent)
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Decision under appeal :
Decision of the Opposition Division of the European Patent Office dated 4 October 1988 rejecting the opposition filed against European patent No. 79 186 pursuant to Article 102(2) EPC.

Composition of the Board :

Chairman : G. Szabo
Members : R. Gryc
C. Holtz

Summary of Facts and Submissions

I. European patent No. 79 186 comprising nine claims was granted to the Respondent on 26 February 1986 on the basis of European patent application No. 82 305 789.8 filed on 1 November 1982. Claim 1 as granted reads as follows:

"1. An apparatus for drawing optical fibers comprising: a source of softened or molten glass (12) from which a fiber (16, 16') is drawn; means (30, 40, 42, 30', 40', 42', 76, 78) for cooling said fiber (16, 16'); means situated between said source and said cooling means for measuring the diameter of said fiber (16, 16'); and means (20) for applying a protective coating to the cooled fiber (16, 16'); characterised in that said cooling means comprises an elongate tube (30, 30') surrounding said fiber (16, 16'); a source (60) of coolant gas; and means (40, 42, 40', 42', 76, 78) surrounding said fiber (16, 16') at one end of said tube (30, 30') for flowing said coolant gas such that it has a flow component which is directed radially inwardly toward said fiber (16, 16') and a flow component which is directed longitudinally toward the opposite end of said tube (30, 30')."

II. The Appellant filed an opposition and requested the revocation of this patent on the grounds of lack of novelty and/or an inventive step in view of documents:

(1) US-A-4 030 901
(2) US-A-4 208 200
(3) US-A-3 853 171.

The Appellant further raised an objection under Article 123(2) EPC against Claim 1 of the patent.

III. After the opposition had been rejected by a decision of 4 October 1988 by the Opposition Division, the Appellant lodged an appeal on 9 November 1988 and paid the relevant fee simultaneously.

In his statement of grounds filed on 26 January 1989, the Appellant cited two new documents, i.e.

(4) GB-A-1 134 133 and
(5) JP-A-55 10470

and contended the following:

- granted Claim 1 extends beyond the content of the application as filed and the alleged invention resides only in cooling means already known from (1);

- in view of (4) and (5) taken in combination with (1), the subject-matter of Claim 1 is not inventive.

The Respondent (Patentee) contested the arguments of the Appellant and requested that the late-filed documents (4) and (5) be dismissed.

IV. In a communication dated 12 October 1989, the Board regarded document (5) to be particularly relevant and informed the parties that it would be considered even though it was submitted late.

V. At the oral proceedings of 14 November 1989, the Appellant argued that document (5) revealed all the essential features of granted Claim 1 and that the man skilled in the art would normally and inevitably carry out the cooling

means according to the teaching of Claim 1. The Appellant referred also to document (1) and to documents (6) GB-A-2 044 751 and (7) "The Journal of Applied Physics, Vol. 50, No. 10, October 1979, pages 6144 to 6148" already cited in the description of the patent and contended that these documents taught clearly the problem to be solved as well as the way of solving it.

The Respondent agreed that document (5) disclosed the closest state of the art but pointed out that the problem considered was not the same as according to the invention and that the cooling installation was not described at all. According to the Respondent, documents (1) and (4) showed that the problem of cooling uniformly the optical fibre was not essential and the subject-matter of document (3) belonged to a quite different technical field compared to the field of the invention.

The Respondent contended that, before looking for a solution in other technical fields, the man skilled in the art would normally consider first the solutions already carried out in the field of the invention.

At the end of the hearing, the Appellant requested that the impugned decision be cancelled and the patent revoked and the Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. **Amendments**

Claim 1 as granted results from the merging of Claims 1 and 2 as filed together with addition of the means for

measuring the fibre diameter and deletion of the initially claimed means for cooling the coolant gas. A support for the means measuring the fibre diameter can be found on page 3, lines 20, 21 of the application as filed describing an optical micrometer.

As far as the broadening of the scope of the claim by the deletion of the means for cooling the coolant gas is concerned, it should be noted that it is not essential for the coolant gas to be cooled provided that the temperature of the gas is less than the temperature of the fibre to be cooled. Moreover, in the further embodiment of the invention as described in page 2, lines 27-35 and page 3, lines 1-3, no means for cooling the coolant gas are provided. Therefore, the claim is well supported by the disclosure and no objection can be made against present Claim 1 as far as Article 123(2) EPC is concerned.

3. State of the art

3.1 Since Claim 1 as granted has not been modified neither during the opposition nor during the appeal procedure, documents (4) and (5) should have been filed earlier and are deemed not to have been submitted in due time. Nevertheless, the Board considers that they are very relevant and can have an effect upon the final decision. Consequently, these documents cannot be disregarded as requested by the Respondent and will be considered under its own motion (cf. Article 114(1) EPC).

3.2 Insofar as document (5) describes a combination of all the features of the precharacterising portion of Claim 1 together with the provision of a source of coolant gas as described in the second part of said claim, the state of the art disclosed in this Japanese document is to be considered as the closest to the invention.

3.3 The disclosure in that document referred only generally to the necessity of providing "cooling means" for the fibre between the measuring and the coating means. Nevertheless, it must be assumed that the skilled person was able to put the Japanese design into operation on the basis of common general knowledge. In view of a side entry of coolant liquid or gas into the cooling means sketched as a box, a very simple chamber, contacting a gas with the fibre, could be envisaged for the purpose but no more.

4. **Novelty**

Since the subject-matter of Claim 1 is distinguished from the closest state of the art as mentioned in 3.2 by the special characteristics of its own cooling means it is to be considered as novel.

5. **The problem and its solution**

The technical problem to be solved according to the invention, in respect of document (5), has been to cool efficiently optical fibres that are drawn at relatively high drawing speeds without causing turbulence, which vibrates the fibre and can move it laterally out of its proper position in the diameter measuring device (cf. column 1, lines 54-56 and column 5, lines 6-8 of the patent specification).

The solution given in Claim 1 consists in the provision of a cooling system **surrounding** the fibre comprising a tube having at one end means for flowing the coolant gas **obliquely** relative to the fibre.

6. Inventive step

The cooling system according to Claim 1 is not disclosed as such in the other documents concerning apparatuses for drawing glass or silica fibres such as documents (1), (2), (4), (6) and (7).

6.1 Document (1) does not describe any cooling installation but, on the contrary, a furnace comprising at both ends means for flowing inert gas countercurrently along the fibre to protect it against contamination.

A man skilled in the art looking for cooling systems avoiding turbulence would not normally consult a document concerning a heating installation using two gas flows in opposed directions to protect the fibre against contamination inside a furnace. Such interaction would not necessarily provide the physical conditions required for efficient cooling of the fibre at increased speeds. Even if he would have access to such a document, there is no reason why he should consider only the lower part of the installation and separate it from the rest of the furnace in order to place therebetween means for measuring the diameter of the fibre (see Decision T 56/87 of 20 September 1988, to be published).

6.2 Document (2) does teach how to cool a glass fibre, but a static cooling liquid is used instead of a coolant gas and therefore no information is given concerning the way of flowing gas without turbulence. The man skilled in the art would have thus found no instruction or hint leading him to the invention.

6.3 Document (4) concerns silica yarns coated with graphite for the manufacture of woven articles and has nothing to do with optical fibres. Moreover, in the described apparatus,

the gas stream is directed through a "T" junction perpendicularly against the fibre instead of obliquely all around the fibre according to the invention.

Therefore, instead of giving a hint to the person skilled in the art, the teaching of this document would lead him away from the solution according to Claim 1.

6.4 Document (6) teaches how to avoid contamination of an optical fibre inside a furnace and also inside a tube through which the fibre is drawn and cools. The fibre is first enveloped by a gas stream which flows through and is thus heated in the heating chamber of the furnace before passing through the tube and contacting the fibre. Normally, the person skilled in the art looking for an improved cooling system would have no reason to refer to such a known apparatus for avoiding contamination inside the furnace unless he had been suggested to do so.

6.5 As far as document (7) is concerned, this recognises the same problem as that involved in the present patent, since "higher air flows resulted in an excessive movement of the fiber due to air disturbances". However, the proposed cooling mechanism is composed of a cylinder having a slit positioned parallel to the fibre for flowing an air jet stream across the fibre and, to avoid excessive movement of the fibre due to air disturbances, low air flow velocities are recommended. Thus, the known, one-sided, perpendicular entry to the air flow was maintained, but it was distributed vertically to a number of entries reducing the vigour of the flow considerably. Such a known solution would normally lead the person skilled in the art away from the solution according to the invention.

6.6 Since the man skilled in the art could find a different and satisfactory solution to his problem in document (7), i.e.

in the same technical field as the field to which the apparatus known from (5) JP-A-55 10470 belongs, there was no need and no reason for him to explore neighbouring fields such as the drawing of steel wires disclosed in document (3). Even this citation, dealing with the cooling of steel wires, shows a perpendicular and a separate additional axial flow pattern for the gas, adding nothing new to what could be derived about cooling means from document (5) which is closer than (3) to the present invention.

7. Consequently, the subject-matter of Claim 1 should be considered as involving an inventive step in the meaning of Article 56 EPC.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

S. Fabiani

G. Szabo

R.C. 29.11.89
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