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**D E C I S I O N**  
of 10 March 1997

**Case Number:** T 0486/94 - 3.2.3

**Application Number:** 88901445.2

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**IPC:** B05B 7/10, B01F 5/00, F23D 11/38

**Language of the proceedings:** EN

**Title of invention:**  
Atomiser

**Patentee:**  
HIRT COMBUSTION ENGINEERS LTD.

**Opponent:**  
L. & C. Steinmüller GmbH

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 56, 114(2), 104

**Keyword:**  
"Inventive step (yes)"  
"Late filed documents - admitted (no)"  
"Costs - apportionment - (no)"

**Decisions cited:**  
T 0117/86

**Catchword:**  
-



Case Number: T 0486/94 - 3.2.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.3  
of 10 March 1997

**Appellant:**  
(Opponent)

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**Respondent:**  
(Proprietor of the patent)

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**Representative:**

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**Decision under appeal:**

Interlocutory decision of the Opposition Division  
of the European Patent Office dated  
17 March 1994, posted on 20 April 1994 concerning  
maintenance of European patent No. 0 349 540 in  
amended form.

**Composition of the Board:**

**Chairman:** C. T. Wilson  
**Members:** F. Brösamle  
L. C. Mancini

## Summary of Facts and Submissions

- I. In the oral proceedings of 17 March 1994 the Opposition Division upheld European patent No. 0 349 540 in amended form; the written decision within the meaning of Article 106(3) EPC was posted on 20 April 1994.
- II. The independent claims upheld with the above decision read as follows:

"1. An atomiser comprising a body (10) having a duct (11) formed therein for receiving, at an upstream end, liquid to be atomised and for discharging, at a downstream end, a mixture of atomised liquid and gas, the duct (11) being straight and unobstructed and flow passages (12) for atomising gas being arranged to intersect the duct (11) so that atomising gas entering the duct (11) has a significant proportion thereof directed along paths tangential to the duct (11), the duct (11) having, in sequence, an upstream first section (11a), a constricted second section (11b) and a downstream third section (11c) constituting a diffuser, all the flow passages (12) for atomising gas intersecting the duct (11) in the constricted section (11b), characterized in that each of said flow passages (12) has an axis which lies at right angles to the axis of the duct (11), and in that the first section (11a) is an inverse diffuser which increases fluid flow velocity without turbulence."

and

"10. A method of burning a very viscous and/or solid-containing fluid fuel comprising passing it through the fluid duct (11) of an atomiser as claimed in any of Claims 1 to 9 to be atomised by gas entering via said passages (12) and thence to a flame."

- III. The opponent-appellant in the following - lodged an appeal against the above decision on 17 June 1994 paying the appeal fee on the same day. The Statement of Grounds of Appeal was filed on 22 August 1994.
- IV. He requests to set aside the impugned decision and to revoke European patent No. 0 349 540 in its amended form.

His arguments are essentially as follows:

- starting point of the invention is

(D1) US-A-3 615 053

whereby the document

(D2) GB-A-2 143 443

is also of relevance;

- atomisers of the Venturi-type according to (D1) are also known from

(D3) "Technishes Messen", page 95 and

(D4) US-A-3 601 318;

- from the textbook

(D5) "Einführung in die Technische Strömungslehre", pages 67 to 69

the interrelationship between the angle of a diffuser and the tendency of turbulence is known; it is, however, not allowable to derive therefrom that an inverted diffuser follows the same characteristics;

- novelty of the subject-matter of Claim 1 with respect to (D1) is not disputed, however, the inventive step thereof;
- the object of the present invention according to EP-B1-0 349 540, see column 1, lines 27 and 28, is not a "technical object" in view of (D1);
- it is trivial to avoid turbulences in the narrowing part of a Venturi-nozzle and this feature is moreover known from (D1);
- it is incorrect to suggest that a combination of flow passages "12" at right angles to the axis of the duct "11" with an inverse diffuser forming the first section "11a" of the duct "11" and serving as the means to avoid turbulence would be "counterproductive" as is stated in remark 11.5 of the impugned decision since D1 and D2 originate from the same technical field;
- under these circumstances it is obvious to combine (D1) and (D2) or (D1) and  
  
(D6) US-A-3 088 681  
  
even in combination with inverted diffusers;
- the impugned decision can therefore not be upheld. Rather the European patent No. 0 349 540 in its amended form has to be revoked.

V. The proprietor-respondent in the following - requests to dismiss the appeal, not to allow (D3) to (D6) into the proceedings, to remit the case back to the Opposition Division in the case that (D3) to (D6) are considered as relevant by the Board and finally to order that the appellant shall pay the costs of the

respondent arising from the introduction of the new documents into the proceedings in the case of remittal of the case to the Opposition Division and also even in the case that the Board decides that these documents do not affect the validity of the patent and are excluded pursuant to Article 114(2) EPC.

His arguments can be summarised essentially as follows:

- (D3) to (D6) should not be allowed into the proceedings;
- (D1) aims at maintaining a constant gas pressure for good atomisation of liquid fuel whereas the claimed invention seeks to reduce the pressure needed for atomisation; turbulence arising from the fluid flow at the inlet of the device and from the introduction of the atomising gas into the fluid flow are both addressed by the invention, namely by the provision of an inverted diffuser and by the location and disposition of the gas flow passages; none of these items can be seen from (D1) so that appellant's assertion that (D1) already achieves the advantages inherent in the subject-matter of the attacked Claim 1 is not supported by the facts;
- appellant's argument that (D1), (D2) and (D6) seen in combination render obvious the claimed atomiser is not based on the "problem-and-solution" approach since (D1) addresses a completely different problem to the one that the invention is concerned with and since the appellant arbitrarily selects parts of different prior art specifications without considering their context; even then (D6), (D2) and (D1) do not produce all the features as claimed;

- the IPC cannot determine a document as relevant since it is the disclosure of the document that counts in the context of assessing inventive step;
- according to Article 104(1) EPC the respondent asks for apportionment of respondent's costs in particular for reasons of equity since late filing of (D3) to (D6) - i.e. after the expiry of the time-limit for giving notice of opposition - has considerably increased the costs incurred by him; appellant's appeal almost entirely rests on (D3) to (D6) so that the respondent was faced with a "completely new case against the patent" whereby "the fact that (D3) to (D6) turned out not to be relevant does not affect the additional costs incurred by the respondent";
- under these circumstances the request for an apportionment of costs is seen as being justified.

### Reasons for the Decision

1. The appeal is admissible.
2. *Novelty*

The issue of novelty needs no detailed argument since even the appellant admits that the subject-matter of Claim 1 is novel, see Statement of Grounds of Appeal page 5, paragraph 2. Since Claim 1 defines novel subject-matter present Claim 10 which is linked to it also defines novel subject-matter.

3. *Inventive step*
  - 3.1 The subject-matter of Claim 1 being novel the crucial issue to be decided is inventive step.

3.2 The prior art to be considered in this respect is (D1) and (D2) since (D3) to (D6) are considered to be irrelevant for the following reasons:

3.2.1 (D3) deals with a Venturi-nozzle see "Bild 7" bottom, and the possibility of measuring the flow rate of a fluid using the pressure differential between the entrance and the constricted zone of this nozzle. A swirl of the fluid is, however, not considered in (D3). Moreover, no atomising effect is envisaged in (D3) so that (D3) is completely irrelevant and discloses only handbook knowledge.

3.2.2 (D4) deals with the problem of how **two liquids** can be **mixed**, not **atomised**. A nozzle *per se* can be seen in (D4) which has three zones more or less as in Claim 1. The openings "7" of the nozzle "1", preferably do not enter at a right angle, see column 2, lines 63 and 64 of D4, and do not have a tangential component with respect to the main channel of the nozzle. While the attacked patent is based on turbulence for achieving a good atomising effect in the restricted zone of the nozzle, (D4) teaches away from turbulence, see column 3, lines 4 to 7. Without an *ex post facto* analysis (D4) is not helpful for a skilled person who is confronted with the problem of how an atomiser can be improved.

3.2.3 (D5) relates to turbomachines such as turbines and compressors and in particular to losses in tubes of varying cross-sections. Neither atomising nor a swirl in the meaning of the attacked patent are dealt with in (D5) so that it is also irrelevant.



3.2.4 (D6) is the only document out of (D3) to (D6) which relates to an atomiser. It is true that the flow passages "53" are at right angles to the axis of the oil channel "47, 49". However, a **second** group of flow passages "55" is realised which is at an angle of 45° to the axis of the oil channel. The first system of flow passages "53" is according to Figures 3 and 4 arranged in tangential directions with respect to the oil channel "47, 49". Summarising, (D6) discloses flow passages "53" which comply with the teaching of Claim 1. Since they are, however, not related to the **constricted** zone "49" of the nozzle but to the **downstream diffuser** "52" the above coincidence is meaningless. Also to be considered is that the nozzle body does not end in an "inverse diffuser" but is followed by a **cylindrical portion** "52". The right angle of the flow passages is not obligatory in (D6), see column 4, lines 6 to 8, since any other angle can be used. This information leads also away from the claimed atomiser so that (D6) is also irrelevant.

3.2.5 Summarising, (D3) to (D6) disclose specific features of Claim 1 but not in combination with an atomiser according to the preamble of Claim 1.

3.2.6 As a consequence of the considerations according to above remarks 3.2.1 to 3.2.5 (D3) to (D6) are not allowed to the proceedings, Article 114(2) EPC.

3.3 Present Claim 1 is correctly delimited over (D1) which document discloses an atomiser where the gas pressure is maintained at a constant gas pressure for good atomisation of liquid fuel, see column 1, lines 18 to 23 and column 2, lines 58 to 69 as well as Claim 1 of (D1).

The upstream first section according to (D1) comprises a cylindrical and a conical part leading to turbulence in this section of the nozzle; the channels "26" are drilled at a forward inclination of 45° from horizontal, see column 3, lines 2 to 5 and Figures 1 and 3, so that the mixture of liquid fuel and gaseous fuel rapidly leaves the mixing zone since a swirl is missing.

- 3.4 According to EP-B1-0 349 540, column 1, lines 27 and 28, it is an object of the present invention to provide an improved atomiser.
- 3.5 This object is solved by an atomiser with the features of Claim 1, namely by the provision of flow passages "12" which lie at right angles to the axis of the duct "11" and by the provision of an inverse diffuser in the first section "11a" which increases fluid flow velocity without turbulence.
- 3.6 With the atomiser according to Claim 1 the pressure needed for atomisation can be reduced; due to the inverted diffuser in the first section of the duct the flow of liquid is accelerated constantly without losing its laminar characteristic and due to the provision of the flow passages at right angles the residence time of the liquid and the atomising gas is increased in the constricted second section "11b" so that there is sufficient time to establish a rotational motion of the components, namely for mixing thereof and for destroying the laminar flow in the constricted second section "11b". The facts do not therefore support the argument that (D1) already achieves the advantages inherent in the subject-matter of Claim 1. Under these circumstances a skilled person when starting from (D1) was not led automatically to the solution laid down in Claim 1.

3.7 This is also true for a combination of (D1) and (D2) since it is doubtful whether a skilled person would at all turn to (D2) which *per se* discloses channels having axes lying at right angles to the axis of the duct, see Figure 6 of (D2). In (D2) the problem is addressed to thoroughly mix gas and liquid without the provision of channels/holes which intersect the duct **tangentially** so that the gas flow impinges **vertically** on the liquid flow which is completely contradictory to the teaching of Claim 1.

3.8 Without knowing the atomiser according to Claim 1, the skilled person attempting to combine (D1) and (D2), would be faced with contradictory teachings as to the orientation of the flow passages, namely tangentially or not.

Even if a skilled person would consider a combination of (D1) and (D2) he would be forced to reconstruct the duct, namely by not applying the concept taught in (D2) in which the mixing section is an **insert** of the nozzle and by not applying the configuration of the first section of (D2) in the form of cylindrical-conical-cylindrical parts thereof, see Figures 7 to 10 of (D2). In (D2), see page 1, lines 75 to 79, the skilled person is taught to increase the **number** of flow passages and not simply to orientate them as claimed in present Claim 1, namely tangentially **and** at right angles.

3.9 Summarizing the above considerations, the subject-matter of Claim 1 is considered to be inventive in the meaning of Articles 56 and 100(a) EPC. Appellant's contrary findings are therefore not convincing:

- it is irrelevant whether or not Venturi-atomisers are known in the art - as long as the claimed configuration of an atomiser is novel and not rendered obvious by the combined prior art documents, here (D1) and (D2);
- in above remarks 3.3 and 3.4 the nearest prior art including its drawbacks and the object of the present invention are set out; the object of the present invention though global (provision of an improved atomiser) has to be seen in the light of the discussion of the nearest prior art and cannot be defined as a "nontechnical object" therefore;
- the IPC is helpful for carrying out a search for a technical feature. It is, however, not a foolproof means for defining the relevance of the subject-matter of a revealed document if its object clearly points away from the object of the present invention;
- since (D3) to (D6) were not admitted into the proceedings these documents cannot be considered in combination with the documents dealt with in the impugned decision.

3.10 For the above reasons present Claim 1 is valid.

#### Claim 10

4. This claim refers to a method of burning a very viscous and/or solid-containing fluid fuel including the step of passing it through an atomiser *inter alia* as defined in Claim 1 (or in any of the Claims 2 to 9 dependent thereon).

Under these circumstances the validity of Claim 10 follows from that of Claim 1 i.e. this claim also defines novel and inventive subject-matter within the meaning of Articles 54, 56 and 100(a) EPC.

5. *Costs*

5.1 The respondent requests an apportionment of costs since the appellant based his appeal basically on newly cited documents (D3) and (D6).

5.2 As already set out in the Board's communication pursuant to Article 110(2) EPC, see remark 4, the Board cannot see an abuse of the appeal proceedings when citing further pieces of prior art.

5.3 All four documents cited by the appellant only in the appeal proceedings are short documents.

(D4) and (D6) are moreover in English and for (D5) a translation into English has been filed by the appellant. (D3) is more or less only handbook knowledge so that consideration of "Bild 7" is enough for understanding its citation by the appellant.

5.4 Under these circumstances each party shall meet the costs he has incurred, Article 104(1) EPC, since in the present case "taking of evidence" could not have caused **undue extra-costs** and since oral proceedings had not to be carried out and since a reply to the appeal was among the normal tasks of the respondent. In the Board's view, the late filing of new material **has not considerably increased** the costs incurred by the respondent, in comparison with the situation which

would have arisen had all such material been presented as part of the notice of opposition - so that the present case cannot be compared with the situation in the decision T 0117/86, OJ EPO 1989, 401, (see in particular remarks 4 to 7).

**Order**

**For these reasons it is decided that:**

1. The appeal is dismissed.
2. The request for apportionment of costs is rejected.

The Registrar:



N. Maslin

The Chairman:



C. T. Wilson