

**Internal distribution code:**

- (A) [ ] Publication in OJ  
(B) [ ] To Chairmen and Members  
(C) [X] To Chairmen  
(D) [ ] No distribution

**D E C I S I O N**  
**of 20 November 2002**

**Case Number:** T 0161/98 - 3.3.5

**Application Number:** 93120845.8

**Publication Number:** 0592019

**IPC:** A62D 1/00

**Language of the proceedings:** EN

**Title of invention:**

Fire extinguishing composition and process

**Applicant:**

E.I. DU PONT DE NEMOURS AND COMPANY

**Opponent:**

-

**Headword:**

Fire extinguishing/DU PONT

**Relevant legal provisions:**

EPC Art. 54(1) and (2), 56

**Keyword:**

"Novelty - not decided"

"Inventive step - no, revival of old technical teaching in  
view of recent development"

**Decisions cited:**

T 0206/83, T 0081/87, T 0077/87, T 0666/89, T 0412/91,  
T 0952/92

**Catchword:**

-



**Case Number:** T 0161/98 - 3.3.5

**D E C I S I O N**  
**of the Technical Board of Appeal 3.3.5**  
**of 20 November 2002**

**Appellant:** E.I. DU PONT DE NEMOURS AND COMPANY  
1007 Market Street  
Wilmington  
Delaware 19898 (US)

**Representative:** Woodcraft, David Charles  
Brookes Batchellor  
102-108 Clerkenwell Road  
London EC1M 5SA (GB)

**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 30 June 1997  
refusing European patent application  
No. 93 120 845.8 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** R. K. Spangenberg  
**Members:** G. J. Wassenaar  
M. B. Günzel

## Summary of Facts and Submissions

I. European patent application No. 93 120 845.8, publication No. 0 592 019, was refused by a decision of the Examining Division.

II. The decision was based on the set of claims 1 to 6 filed with the letter dated 13 August 1996 and amended during oral proceedings before the Examining Division. Claim 1 thereof corresponded to claim 1 as originally filed and read as follows:

"A process for preventing, controlling and extinguishing fire in an enclosed air-containing mammalian-habitable enclosed area which contains combustible materials of the non-self-sustaining type, which comprises introducing into the air in said enclosed area an amount of at least one partially fluorinated ethane selected from  $\text{CF}_3\text{-CHF}_2$  (HFC-125),  $\text{CHF}_2\text{-CHF}_2$  (HFC-134) and  $\text{CF}_3\text{-CH}_2\text{F}$  (HFC-134a), sufficient to impart a heat capacity per mol of total oxygen that will suppress combustion of the combustible materials in said enclosed area."

The following documents were cited *inter alia* in the contested decision:

D1: US-A-1 926 395

D2: US-A-3 715 438.

III. The Examining Division held that the subject-matter of claim 1 was new but lacked an inventive step over D1.

Although they indicated that the process according to

claim 1 was described in D1, novelty was accepted because the components used according to claim 1 and described in D1 were not available in 1933, the publication year of D1. In this respect reference was made to decision T 206/83.

- IV. The appellant lodged an appeal against this decision. In the statement of grounds of appeal it was essentially argued that since D1 does not form state of the art for novelty it should also be ignored for the purpose of assessing inventive step.
- V. In a communication the Board expressed the preliminary opinion that the subject-matter of claim 1 seemed to lack novelty over D1.
- VI. With the letter dated 4 February 2001 the appellant filed a new set of claims 1 to 5 as an auxiliary request. Claim 1 thereof differed from claim 1 according to the main request in that the use of at least one of three fluoroethanes was limited to the use of only  $\text{CF}_3\text{-CHF}_2$  (HFC-125).
- VII. In a further communication of the Board it was indicated as a preliminary opinion that in view of new documents presented in a different case, the subject-matter of claim 1 of both the main and the auxiliary request lacked an inventive step. Additional reference was inter alia made to the following documents:
- D9: Findings of the chlorofluorocarbon chemical substitutes international committee  
EPA-600/9-88/009, April 1988, and

D11: ASHRAE Journal, Dec. 1987, Pages 69 to 77.

VIII. In reply the appellant argued essentially as follows:

D9 and D11 related to the possible substitution of perfluoroalkanes by hydrogen substituted fluoroalkanes in blowing agents and as refrigerants. Since it was silent about fire preventing or fire extinguishing it was not relevant for this case.

The only documents relating to fire prevention were D1 and D2. They taught in common that carbon tetrafluoride was a useful fire preventing agent whereas D2 additionally taught that the same was true for ethane and propane perfluorides. The mention of the other halogenated methanes and ethanes as fire preventing agents in D1 was speculative. Such speculative information would be disregarded by a skilled person. D2 disclosed that the perfluoro compounds were good fire preventing agents because they were extremely stable and chemically inert and that they did not decompose at temperatures as high as 400°C. D2 completely excluded any compounds which decompose and split off chlorine and bromine. D2 specifically disclosed that the perfluoroalkanes could not be ignited even in pure oxygen so that they continued to be effective as flame suppressants at the ignition temperatures of the combustible items present in the compartment. There was thus the clear statement that a good fire preventing agent must be stable and inert at the ignition temperatures because they could no longer be effective fire preventing agents if they decomposed. It followed therefrom that hydrogen substituted compounds such as HFC-125, which were much less stable at the ignition temperatures were regarded as

ineffective. Despite this teaching the appellant surprisingly found that the hydrogen containing fluor compounds according to claim 1 proved to be good fire preventing agents.

It was further argued that HFC-125 was an accepted commercial product and that a third party, American Pacific, has recently developed a blend of HFC-125 and predominantly HFC-134a and received a U.S. EPA approval.

Copies of scientific articles were filed to prove the much higher reaction rate at 1000°F of the compounds used according to claim 1 in comparison with perfluoroethane (PFC-116). Additionally a copy of Du Pont product information sheets was filed.

IX. The appellant requested that the decision under appeal be set aside and a patent be granted on the basis of:

1. Main request:  
Claims 1 to 6, filed with the letter dated 13 August 1996 and amended during oral proceedings before the Examining Division.
2. Auxiliary request:  
Claims 1 to 5, filed with the letter dated 4 February 2001.

### **Reasons for the Decision**

1. D1 was published before the priority date of the present patent application and is therefore state of the art within the meaning of Article 54(2) EPC. The Board cannot accept the appellant's submission that a

skilled person would have found all the technical information provided by D1 inconsistent and unreliable, so that the whole document would not form part of the state of the art. The Board fully agrees with the statements in earlier decisions according to which technical information which is wrong (T 77/87, OJ EPO 1990, 280) or which is so implausible in view of common general knowledge that the skilled reader would reject it as erroneous (T 412/91 of 27 February 1996, point 4 of the reasons and further decisions cited there) should be excluded from the state of the art. In the Board's judgment, however, it does not at all follow from the cited earlier decisions that each technical teaching in a document containing wrong statements will no longer form part of the state of the art. What does not belong to the state of the art is the wrong information, and not the whole technical teaching of the document. In the present case, D1 contains information that turned out later on to be incorrect, such as the boiling point of pentafluoroethane which is indicated in Figure 2 as being  $-80^{\circ}\text{C}$ , whereas the correct boiling point is  $-48,5^{\circ}\text{C}$ . Since the exact value of the boiling point is of relevance only insofar as the suitable compounds should be gaseous at temperatures supporting human life, the Board sees no reason why the incorrect boiling point would have deterred the skilled person from considering the relevant technical teaching of D1, i.e. that in addition to carbon tetrafluoride, a number of other halogenated carbon compounds are useful in a process for preventing fire. The Board can accept, for the sake of argument, that a part of the technical information in D1 may be based on "speculation" in the sense of extrapolation or generalisation of findings based on experimentally established facts. This in

itself is however no reason to assume that a skilled person, being interested in technical reality (see T 77/87, point 4.1.2 of the reasons) would have disregarded that information. In fact, many if not the majority of statements concerning properties common to all members of a generic group of chemical compounds, particularly in the patent literature, are based on experimental results obtained with only a limited number of examples, so that large domains of the disclosure may be regarded as "speculative". This equally applies to the present patent application, which does not contain any example falling under the scope of claim 1. See in this context also T 81/87, OJ EPO 1990, 250, point 4 of the reasons, where it is stated that a disclosure of a use is not necessarily insufficient if not all materials suitable for that use are available and that it would be unfair to exclude those which may be used in the future. Thus the Board cannot accept the appellant's allegation that, because of the mention in this document of an unrealistically low boiling point of pentafluoroethane (HFC-125), the skilled person would not seriously contemplate, in the sense of T 666/89 (OJ EPO 1993, 495), or even disregard, in the sense of the above-mentioned decision T 412/91, the basic teaching of that document. In this respect, the Board observes that the correctness of that teaching for carbon tetrafluoride, also recommended in D1, has been confirmed by D2 before the priority date of the application in suit.

2. The first instance accepted novelty on the ground that the compounds used according to claim 1 were not available at the publication date of D1 since their preparation was not described in the scientific literature at that time. The Board does not dispute



that the synthesis of pentafluoroethane was not explicitly described in a public document earlier than in 1940 and that pentafluoroethane was not commercially available at the publication date of D1. It nevertheless remains questionable whether a skilled person in 1933 was not able to produce said compound. Moreover, the Board has doubts that the fact that at the publication date of D1 pentafluoroethane (HFC-125) had not yet been described in the literature, and might therefore not have been available to the public at that point in time, really means that the disclosure of D1 does not anticipate the claimed subject-matter. The particular circumstances of the present case are much different from those underlying decisions T 206/83 and T 81/87, relied upon by the appellant. The most important difference is that, unlike in the cases referred to, the compound in question, pentafluoroethane (HFC-125), had become readily commercially available well before the priority date of the application in suit. The novelty question needs, however, not to be answered here, because for the reasons given below the subject-matter of claim 1 does in any case not involve an inventive step.

3. Because of its age the Board is reluctant to consider D1 as the closest prior art for the issue of inventive step and considers, in agreement with the submissions of the appellant, an approach which starts from the more recent document D2 as appropriate.

D2 discloses the creation of an habitable atmosphere which does not sustain combustion by adding to the air perfluoroalkanes selected from the group carbon tetrafluoride, perfluoroethane and octafluoropropane (abstract). In Example 1 perfluoroethane has been used

for that purpose.

4. Shortly before the priority date of the present patent application the problem of greenhouse gases was not only discussed in the scientific literature and amongst environmentalists but also in the daily press. Although attention was mainly focussed on the greenhouse effect caused by carbon dioxide, it was known that fully halogenated carbon compounds were also of concern because of their stability and high infra-red absorption properties; see D9, page 2 to 7, first paragraph.

After skilled people working with fully halogenated carbons became aware of this problem, around 1987, it was an obvious goal to try to find suitable substitutes for these products. Thus starting from D2 the problem underlying the invention can be seen in providing a process for preventing, controlling and extinguishing fire in a habitable enclosed area which is less harmful to the environment.

The appellant proposes to solve this problem by providing a process according to claim 1, whereby one of the selected fluorinated compounds is pentafluoroethane (HFC-125).

Since pentafluoroethane is much less stable than perfluoroethane, as testified by the scientific literature provided by the appellant, its atmospheric lifetime is much shorter and its greenhouse effect negligible. The Board is therefore satisfied that the claimed method actually solves the said problem.

5. If a substitute for the use of a harmful product is

sought, it must be expected from a skilled person that he looks in the prior art to see which other products have been proposed in the past for the same purpose. Not much literature seems to be available concerning the creation of a fire preventing but habitable atmosphere so that the skilled person could not overlook D1 even if it was published in 1933. D1 is a patent specification in the name of Thomas Midgley, who was a pioneer in the development and application of fluorinated hydrocarbons. He discovered that hydrocarbons containing fluorine were relatively non-toxic and had flame arresting properties; see D1, page 1, lines 13 to 13, and D11, pages 71 and 72 under "HISTORICAL DEVELOPMENT OF REFRIGERANTS". Moreover, as has been set out in point 1 above, the teaching of this document, as far as it relates to carbon tetrafluoride, has been confirmed and has found technical application. Thus the Board is unable to accept the appellant's submission that D1 is an obscure document which a skilled person would not have considered when looking for alternatives to hexafluoroethane as a fire preventing agent.

6. D1 discloses a process which comprises adding to the atmosphere surrounding a possible point of combustion a quantity of a fluorinated aliphatic hydrocarbon in an amount sufficient to prevent combustion while supporting the existence of human life (claim 4). The sole compound for which details of this process are disclosed in the text of D1 is carbon tetrafluoride. The disclosure of D1 is, however, not limited to the use of this compound. D1 also explicitly discloses that *"the desired compound may be chosen from the accompanying charts which are explanatory of the compounds which may be formed which are comprised*

*within the group of halo-derivatives of hydrocarbons containing fluorine in which the halogen may be fluorine or another halogen"* (column 1, line 52 to column 2, line 3). To these charts belongs Figure 2 in which halo-derivatives of ethane are ranked according to boiling point and increasing combustion inhibition relative to monofluoroethane. The compounds are indicated by indices, which are explained in a key to Figure 2. One of these indices is "2.3" which undisputedly stands for CHF<sub>2</sub>-CF<sub>3</sub>, ie pentafluoroethane (HFC-125). The presentation of the suitable compounds in D1 is equivalent to a list of those compounds. Consequently, the Board does not accept the appellant's point of view that the only specifically disclosed fluoro compound in D1 is carbon tetrafluoride. On the contrary, it holds that pentafluoroethane has been specifically disclosed as a suitable compound for combustion prevention. Even if the actual use of pentafluoroethane in the process according to D1 is not considered to belong to the state of the art, the teaching of D1 remains that pentafluoroethane is potentially one of the most promising agents for use in the process described therein, combining low toxicity with high combustion inhibition (see Figure 2).

In April 1988 (publication date of D9) the skilled person was aware that HFC-125, comprising a hydrogen atom, was not a greenhouse gas. On the basis of the information given in D2 he might have had doubts whether HFC-125 is as efficient as a fire preventing agent as perfluoroethane but on the basis of the information given in D1, disclosing pentafluoroethane as one of the best fire-preventing compounds, there was at least a reasonable expectation that pentafluoroethane would be a realistic candidate for

solving the above-mentioned technical problem. Moreover, also D11, relating to environmentally acceptable alternatives for chlorofluorocarbons, discloses that HFC-125 (R125) has an atmospheric lifetime of only 1 to 4 years compared with more than 500 years for perfluoroethane (R116), has no flammability and low toxicity (Figures 5 to 7). D11 does not mention the use of fluorinated hydrocarbons as fire protection agents but deals with the problem of finding environmentally acceptable alternatives for halogenated alkanes used as refrigerants. Although the art of refrigerating is a different technical field it became related to the field of fire prevention through the use of the same group of compounds, ie fluorinated hydrocarbons. At their introduction through Thomas Midgley, he proposed their use in both technical fields so that it was common general knowledge to workers in both technical fields that similar compounds were used in the other technical field. Thus environmental problems related to the compounds in use, discussed in one of the two technical fields (in this case refrigerants), must have also caught the attention of the skilled persons in the other field (fire prevention). In the Board's view therefore, the skilled person trying to solve the above-mentioned problem must have been aware of D11. With respect to the expected reduced fire protecting properties and possibly increased toxicity of HFC-125 in comparison to perfluoroethane, the Board observes that the appellant has not provided evidence that HFC-125 is at least as good with regard to these properties as perfluoroethane. The Board further considers that pentafluoroethane was known as an accepted and practically non-toxic commercial product at the priority date and was used e.g. as a refrigerant

and blowing agent, as submitted by the appellant. Therefore, the Board is convinced that a skilled person not only could, but would have tested that compound, thereby performing the process as claimed, even if he was not aware of any additional advantages of using pentafluoroethane such as its very low cardiac toxicity or the alleged surprisingly excellent performance of that compound.

The Board does not dispute that blends of HFC-125 with HFC-134a (1,1,1,2-tetrafluoroethane) received a U.S. EPA approval, but holds that this is not surprising in view of the above-mentioned properties (inflammable, relatively non-toxic and no greenhouse potential) known to the skilled person before the priority date of the patent application.

7. Consequently, at least the embodiment of the claimed process making use of pentafluoroethane (HFC-125), which is covered by claim 1 of the main as well as the auxiliary request, lacks an inventive step.

## **Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

U. Bultmann

R. Spangenberg