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**Datasheet for the decision
of 16 September 2021**

Case Number: T 2458/17 - 3.3.10

Application Number: 07716229.5

Publication Number: 1968922

IPC: C07C17/087, C07C21/19, C09K5/00

Language of the proceedings: EN

Title of invention:
METHOD FOR PRODUCING FLUORINATED ORGANIC COMPOUNDS

Patent Proprietor:
Honeywell International Inc.

Opponent:
ARKEMA FRANCE

Headword:
METHOD FOR PRODUCING FLUORINATED COMPOUNDS/HONEYWELL

Relevant legal provisions:
EPC Art. 100(b), 100(c), 56, 114
RPBA Art. 12(4), 13(1)

Keyword:

Grounds for opposition - fresh ground for opposition (yes) -
subject-matter extends beyond content of earlier application
(no)

Inventive step - (yes)

Late-filed argument - procedural economy

Decisions cited:

G 0010/91

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 2458/17 - 3.3.10

D E C I S I O N
of Technical Board of Appeal 3.3.10
of 16 September 2021

Appellant: ARKEMA FRANCE
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 2 November 2017 rejecting the opposition filed against European patent No. 1968922 pursuant to Article 101(2) EPC.**

Composition of the Board:

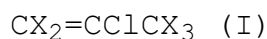
Chairman P. Gryczka
Members: J.-C. Schmid
 W. Van der Eijk

Summary of Facts and Submissions

I. The Appellant (opponent) lodged an appeal against the decision of the Opposition Division rejecting its opposition against European patent No. 1 968 922, independent claim 1 reading as follows:

"1. A method for producing 2,3,3,3-tetrafluoro-1-propene (HFO-1234yf), comprising;

i) fluorinating a tetrachloropropene of Formula (I)



where X is independently selected from H and Cl provided that the total number of Cl atoms is 4, to form $\text{CF}_3\text{CCl}=\text{CH}_2$ (HFO-1233xf);

ii) fluorinating HFO-1233xf to form $\text{CF}_3\text{CFClCH}_3$ (HFC-244bb); and

iii) subjecting HFC-244bb to a dehydrohalogenation reaction, to form HFO-1234yf."

II. The Appellant filed an opposition requesting revocation of the patent-in-suit in its entirety on the grounds of lack of novelty and inventive step (Article 100(a) EPC) and extension of the subject-matter of the patent-in-suit beyond the content of the application as filed (Article 100(c) EPC). At the oral proceedings before the opposition division it furthermore raised an objection of insufficient disclosure of the invention under Article 100(b) EPC and requested the introduction of this ground of opposition into the proceedings.

III. *Inter alia*, following documents were cited in the opposition/appeal proceedings:

- (9) Henne, A.L. et al: "Fluorinated derivatives of propane and propylene. VI", J. Am. Chem. Soc., vol. 68, 1946, pages 496-497,
- (11) EP-A-0 939 071,
- (17) US-2-787 646,
- (20) WO-A-2005/012212,
- (21) ACS abstract of the article : G. L. Heard and B. E. Holmes. "1,2-FC1 Rearrangement as an Intermediate Step in the Unimolecular 1,3-HCl Elimination from Chlorofluoropropanes", J. Phys. Chem. A 2001, 105, 1622-1625, and
- (27) Zhu Li et al. "Rate Constants and Kinetic Isotope Effects for Unimolecular 1,2-HX or DX (X = F or Cl) Elimination from Chemically Activated CF₃CFClCH₃-d₀, -d₁, -d₂ and -d₃" J Phys. Chem. A 2006, 110, 1506-1517.

IV. The Opposition Division did not admit the ground of opposition under Article 100(b) EPC, since it was late and not *prima facie* relevant.

According to the opposition division, claim 1 of the patent as granted complied with the requirement of Article 123(2) EPC. Document (9) represented the closest prior art to the invention. This document disclosed the synthesis of HFO-1234yf starting from

$\text{CH}_2=\text{CHCl}-\text{CH}_2\text{Cl}$ via 5 steps involving fluorinations, chlorination and dehydrochlorination.

The technical problem underlying the patent in suit was to improve the production process of HFO-1234yf. The proposed solution was the process according to claim 1 of the patent in suit involving two fluorination reactions and a dehydrohalogenation via the intermediates HCFC-1233xf and HCFC-244bb. The examples in the patent in suit showed that the proposed process was economically more efficient since it required fewer steps and led to better yields overall. Processes for producing HCFO-1234yf were known not only from document (9), but also from other prior art documents, such as those cited in paragraph 5 of the patent in suit. None of these documents disclosed the intermediates HCFO-1233xf and/or HFC-244bb. These intermediates were disclosed in documents (11), (17) and (21), however, without hint of their use in the production of HFO-1234yf. Combining these documents with document (9) could only be done with hindsight. But even if documents (9), (11), (17) and (21) were combined, it would not lead to steps (i) to (iii) as requested by claim 1 of the patent in suit. The proposed solution was therefore not obvious in the light of the cited prior art. Hence, the requirements of Article 56 EPC were fulfilled.

- V. According to the appellant, the ground of opposition under Article 100(b) should be admitted into the proceedings by the Board. There were no sufficient reasons in the contested decision not to admit this ground, since in particular there was no explanation as to why the patent provided sufficient information to the skilled person to reproduce the invention across the whole scope of claim 1 of the patent as granted.

The opposition division therefore did not properly exercise its discretion under Article 114(2) EPC to admit or not this ground into the proceedings.

Multiple selections from the disclosure of the application as filed should be made to arrive at the subject-matter of claim 1 of the patent as granted. Furthermore, the tetrachloropropenes required as starting compounds by claim 1 of the patent as granted were disclosed in the application as filed only in relation to embodiments in which they were "directly" converted to a compound of formula (II), whereas the process of claim 1 required intermediate steps. Thus claim 1 of the main request did not comply with the requirements of Article 123(2) EPC.

In relation with the objection of lack of inventive step, the new line of argumentation starting from document (21) (or document (27) of similar content) submitted with the letter dated 20 June 2020 should be admitted in the appeal proceedings, since these documents were closer to the invention than document (9) hitherto considered as the closest prior art. Furthermore, document (21) was cited in the opposition proceedings and therefore was known to the respondent.

Starting from document (9) as the closest prior art, the technical problem could only be seen in the provision of an alternative process to produce HFO-1234yf. The skilled person faced with the problem of providing an alternative process of preparing HFO-1234yf would turn to document (20) which discloses the synthesis of HFO-1234ze ($\text{CF}_3\text{CH}=\text{CHF}$), which is an isomer of HFO-1234ze. The skilled person would apply by analogy the route of synthesis proposed by document (20) to the preparation of HFO-1234yf. Document (20)

disclosed that HFO-1234ze was obtained from HCFO-1233zd by hydrofluorination to $\text{CFClCH}_2\text{CF}_3$ (HCFC-244fa), followed by dehydrochlorination of HCFC-244fa. HCFO-1233xf was therefore an obvious starting compound to produce HFO-1234yf by hydrofluorination and dehydrochlorination. Document (17) disclosed that HCFO-1233xf was obtained from $\text{CCl}_3\text{CCl}=\text{CH}_2$. Furthermore the skilled person would be encouraged to follow the synthetic pathway disclosed in document (20) to the preparation of HFO-1234yf by document (21), which disclosed that HFO-1234yf was obtained from HCFC-244bb. The production of HFO-1234ze from HCFC-244fa was confirmed by document (13). Thus, the solution proposed by the patent in suit was simply to apply the process for the production of HFO-1234ze to the production of its isomer HFO-1234yf involving products structurally similar to those used in documents (20) or (13). Therefore, the subject-matter of claim 1 of the patent as granted did not involve an inventive step.

VI. According to the respondent, the ground for opposition under Article 100(b) EPC was raised for the first time at the oral proceedings of 18 October 2017 before the opposition division which, considering that this new ground for opposition was not *prima facie* relevant, decided not to admit it into the proceedings. This ground for opposition was therefore a fresh ground for opposition and could not be introduced in the appeal proceedings since the proprietor did not consent to it.

Claim 1 of the patent as granted found basis on page 4, lines 7-14 and in the combination of claims 1 and 17-20 of the application as filed. The tetrachloropropenes of Formula (IA) were disclosed on page 2, lines 20-30 of the application as filed and did not relate to an embodiment wherein the tetrachloropropenes were solely

"directly" converted to compounds of Formula II. The application as filed explicitly stated that the term "converting" included both direct and indirect converting (page 2, lines 15-19). Hence, claim 1 of the patent as granted complied with Article 123(2) EPC.

The appellant's new inventive step argumentation starting from document (21) or (27) as the closest prior art to the invention was an amendment to the appellant's case raised two years after filing of the statement of grounds of appeal. The appellant did not provide compelling reasons to justify this late amendment to its line of argumentation. The appellant's justification that this new line of argumentation was in response to the communication of the board in preparation of the oral proceedings, must be rejected since the Board merely summarised the inventive step arguments on file without expressing a preliminary opinion.. Furthermore, document (21) did not aim to prepare HFO-1234yf, but related to theoretical calculations for the degradation of chlorofluoropropanes. This document proposed a mechanism for the 1,3-HCl elimination from activated $\text{CF}_2\text{ClCF}_2\text{CH}_3$ yielding HFO-1234yf, wherein an initial 1,2-FCl rearrangement might occur forming HCFC-244bb as a transitional structure. This document was therefore not closer to the invention than document (9). Hence, the new line of arguments that claim 1 lacked an inventive step starting from document (21) or (27) as the closest prior art should not be admitted to the appeal proceedings.

The closest state of the art was document (9). This document disclosed the synthesis of HFO-1234yf from a hydrochloroolefin via a 5-step synthesis. Not a single step of claim 1, nor any intermediate compound defined

in claim 1, was disclosed in document (9). The technical problem was to provide an improved process for preparing HFO-1234yf; however even providing an alternative process involved an inventive step.

When looking to provide an alternative synthesis of HFO-1234yf, the skilled person would look for prior art that also aims to produce HFO-1234yf. It would not be obvious for the skilled person to look for prior art targeting the synthesis of other molecules. The skilled person would not turn to document (13) or (20), since these documents did not aim to produce HFO-1234yf, but HFO-1234ze. The appellant's argument that the skilled person would consider document (13) or (20) because HFO-1234ze and HFO-1234yf were isomers was not relevant, because HFO-1234ze and HFO-1234yf were not stereoisomers, or even geometric isomers, but regioisomers. Accordingly, these molecules differed in terms of which atoms are bonded to which, not just the spatial arrangement of chemical bonds. They had different chemical and physical properties. Combining document (9) with document (13) or (20) in the context of the production of HFO-1234yf and then extrapolating steps (ii)-(iii) of claim 1 therefrom and further combining with document (17) can only be done with hindsight. Claim 1 of the patent as granted involved therefore an inventive step.

VII. The Appellant (opponent) requested that the decision under appeal be set aside and the patent be revoked.

The Respondent (patent proprietor) requested that the appeal be dismissed, i.e. that the patent be maintained as granted, or subsidiarily that the patent be maintained on the basis of one of the 1st to 15th

auxiliary requests filed with the letter dated 17 July 2018.

VIII. At the end of the oral proceedings held on 16 September 2021, the decision of the Board was announced.

Reasons for the Decision

Fresh ground of opposition under Article 100(b) EPC

1. The opposition division did not admit the ground for opposition under Article 100(b) EPC into the opposition proceedings, since this ground was raised for the first time at the oral proceedings before said opposition division (see point 3. of the minutes) and was considered *prima facie* not relevant (point II.1 of the reasons of the contested decision).

The admission of the fresh ground of opposition is a discretionary decision of the opposition division generally falling within the ambit of Article 114 EPC.

According to the established case law of the Boards of Appeal (CLBA 9th edition 2019, IV.C.4.5.2), the discretionary power conferred by Article 114 EPC implies necessarily that the department of first instance of the EPO must have a certain degree of freedom in exercising its power. A Board of Appeal should only overrule the way in which a first instance department has exercised its discretion if the Board comes to the conclusion that the first instance department has exercised its discretion without taking into account the right principles, or in an unreasonable way.

In the present case, the opposition division decided not to admit into the opposition proceedings the ground for opposition under Article 100(b) EPC submitted late by the Appellant, justifying its decision on the basis that this ground for opposition was prima facie not relevant (see point II.1 of the reasons in the decision under appeal).

The Board cannot see any defects which would indicate that the opposition division has erred in the exercise of its discretion in accordance with Article 114(2) EPC. In particular, the discretionary power not to admit this ground of opposition to the proceedings does not require to provide the reasons why the conditions of Article 83 EPC are fulfilled. The opposition division's decision is based on the prima facie relevance criterion, which in the Board's view constitutes an objectively fair and thoroughly elaborated principle for evaluating the admissibility of late-filed submissions into opposition proceedings.

The Board concludes therefore that the opposition division has exercised its discretionary power according to the right principles and in a reasonable way so that there is no reason for the Board to overrule this decision.

The respondent did not consent to the consideration of this ground for opposition in the appeal proceedings.

Consequently, the ground for opposition under Article 100(b) EPC is not admitted into the appeal proceedings (see G 10/91).

Main request:- patent as granted

Ground of opposition under Article 100(c) EPC

2. According to the appellant multiple selections from the disclosure in the application as filed should be made to arrive at the subject-matter of claim 1. First, the process involving intermediates of synthesis should be chosen, second the final product should be selected to be HFO-1234yf, third HFO-1234yf should be prepared from HCFC-244bb, fourth HCFC-244bb should be prepared from HCFO-1233xf and last, HCFO-1233xf should be prepared from tetrachloroprenes. Furthermore, the disclosure of the tetrachloroprenes of Formula (IA) on page 2, lines 22-30 of the application as filed related solely to embodiments in which the tetrachloroprenes of Formula (IA) were "directly" converted to compounds of Formula (II), whereas claim 1 required that this conversion proceeds via HCFO-1233xf and HCFC-244bb.

Claim 1 of the patent as granted is derived from the combination of claim 1 with claims 17 to 20, wherein the starting compounds are restricted to the tetrachloroprenes of formula IA, as disclosed on page 2, lines 27 to 30.

Thus, Claims 17 to 20 (and also page 2, lines 7 to 14) of the application as filed disclose that HFO-1234yf is obtained by the process comprising steps (i), (ii) and (iii) and involving compounds of formula (IA), HCFO-1233xf, HCFC-244bb. Furthermore, the passage on page 2, lines 27 to 30 of the application as filed discloses that the preferred starting compounds for the claimed process are tetrachloroprenes of formula IA.

The section on page 2, lines 15 to 17, makes clear that the term converting includes both directly converting and indirectly converting. Therefore, contrary to the

appellant's submission, the passage on page 2, lines 20 to 30 does not solely relate to the direct conversion of tetrachloropropenes of formula (IA) to compounds of Formula (II).

It follows that the subject-matter of claim 1 of the patent as granted is directly derivable from the content of the application as filed. Therefore claim 1 of the main request complies with Article 123(2) EPC.

New lines of argumentation based on document (21) (or document (27)) as the closest prior art to the invention.

3. With its letter dated 22 June 2020 the appellant submitted for the first time in the opposition/appeal proceedings that the subject-matter of claim 1 of the patent as granted lacked an inventive step starting from document (21) (or document (27) of similar content) as the closest prior art document to the invention.

The appellant submitted that document (21) was closer to the invention than document (9), since it disclosed the last step of the claimed process, i.e. the conversion of HCFC-244bb to HFO-1234yf.

During the opposition proceedings, document (21) was discussed and the appellant did not argue lack of inventive step starting from document (21) as the closest prior art document to the invention. Nor did it do so in its statement of grounds of appeal. This does not support the alleged *a priori* relevance of this new line of argument against inventive step.

According to the established case law, appeal proceedings are meant to review the appealed decision

and not to deal with a fresh case; rather, the decision of the Board of Appeal will in principle be directed to the subject of the dispute in the first-instance proceedings. The appeal proceedings are thus largely determined by the factual and legal scope of the preceding opposition proceedings and the parties have only limited scope to amend the subject of the dispute in appeal proceedings. Therefore, the Board has the power to hold inadmissible facts, evidence and requests which could have been presented in the first instance proceedings (see Article 12(4) RPBA). The Board is of the view that this new line of argument could and should have been presented during the opposition proceedings, where document D21 was already discussed.

Furthermore, the appellant has to present its complete case already with the statement of grounds of appeal (Article 12(2) RPBA 2007) which requires a complete presentation of all the relevant evidence and arguments relied on. In the present case no reasons are apparent that could justify that these new objections and the underlying facts were presented for the first time at such a late stage of the proceedings thereby counteracting principles of procedural economy. The argument of the appellant that this new line of argument is a reaction to the preliminary opinion of the Board is not convincing. The Board did not formulate an opinion on the inventive step issue, but rather summarized the positions of the parties. Furthermore, provisional opinions are in principle not to be used as starting point for developing a new case. This could only be different if the opinion of the Board introduces facts or arguments that had not been part of the proceedings so far. This is not the case in the present proceedings.

For these reasons, the Board decides not to admit this new line of argumentation involving defining a different closest prior art into the appeal proceedings (Article 12(4) RPBA 2007; Article 13(1) RPBA 2007).

Inventive step

Closest prior art

4. The Board considers, in agreement with the opposition division and the respondent that document (9) represents the closest state of the art to the invention. In the statement of the grounds of appeal, the appellant also submitted that document (9) represented the closest prior art to the invention.

Document (9) discloses the preparation of HFO-1234yf starting from 2,3-dichloropropene.

Technical problem underlying the patent-in-suit

5. According to the respondent, the technical problem underlying the patent-in-suit was to provide an improved process for the preparation of HFO-1234yf.

The appellant is of the opinion that the technical problem to be solved by the invention is just the provision of an alternative process for producing HFO-1234yf. The Board will for the discussion of inventive step assume, in favour of the appellant, that the technical problem to be solved is the provision of a further process for producing HFO-1234yf.

Solution

6. The solution proposed by the patent-in-suit is the 3-step process of claim 1.

Success

7. The Board is satisfied that the process of claim 1 provides an alternative process for the synthesis of HFO-1234yf. This is not contested.

Obviousness

8. It remains to be decided whether or not it is obvious to the skilled person to modify the process for preparing HFO-1234yf disclosed in document (9) to arrive at the claimed 3-step process starting from tetrachloropropenes of formula IA.

Document (20) discloses the synthesis of 1,3,3,3-tetrafluoropropene $\text{CF}_3\text{CH}=\text{CHF}$ (HFO-1234ze) which is obtained by fluorinating $\text{CF}_3\text{CH}=\text{CHCl}$ (HCFO-1233zf) followed by the dehydrochlorination of the thus obtained $\text{CF}_3\text{CH}_2\text{CHFCl}$ (HCFC-244fa).

Document (13) discloses the synthesis of 1,3,3,3-tetrafluoropropene $\text{CF}_3\text{CH}=\text{CHF}$ (HFO-1234ze) comprising the dehydrochlorination of $\text{CF}_3\text{CH}_2\text{CHFCl}$ (HCFC-244fa)

According to the appellant $\text{CF}_3\text{CF}=\text{CH}_2$ (HFO-1234yf) and $\text{CF}_3\text{CH}=\text{CHF}$ (HFO-1234ze) are isomers. Thus, the solution proposed by the patent in suit was simply to apply the process for the production of HFO-1234ze to the production of its isomer HFO-1234yf involving compounds structurally similar to those used in documents (20) and (13).

HFO-1234ze and HFO-1234yf have the same molecular formula, i.e. the same number of atoms of each element. They are thus isomers, but not stereoisomers, since HFO-1234yf have two polar groups (F and CF₃) attached to the same carbon atom of the double bond, whereas HFO-1234ze have these polar groups attached to different carbon atoms. There is no evidence that they share similar chemical or physical properties.

Therefore, the skilled person seeking an alternative process for preparing HFO-1234yf would not have discarded the entire disclosure of document (9) relating to the synthesis of HFO-1234yf and would not have turned to document (20) or (13) which discloses a process for preparing an isomer thereof, i.e. HFO-1234ze.

Even if he had done so, and applied by analogy the process of producing HFO-1234ze by dehydrochlorination of CF₃CH₂CHFCl (HCFC-244fa) to the production of HFO-1234yf, he would not have arrived at the intermediate CF₃CFClCH₃ (HCFC-244bb), since HCFC-244bb differs from the intermediate HCFC-244fa disclosed in document (20) or (13) not only in the position of the fluorine atom, but also in the position of the chlorine atom. The appellant's further argument that the skilled person would combine the teaching of document (20) with document (21) to arrive at the claimed subject-matter is based on hindsight. Document (21) investigates the degradation of activated CF₂ClCF₂CH₃ and proposes a reaction mechanism for the 1,3-HCl elimination from CF₂ClCF₂CH₃ to HFO-1234yf which involves an initial 1,2-FCl rearrangement to HCFC-244bb. There is no reason why the skilled person applying by analogy the disclosure of document (20) to the synthesis HFO-1234yf would furthermore turn to document (21).

Therefore, the Board comes to the conclusion that the subject-matter of claim 1 of the main request, and for the same reason, that according to the dependent claims involve an inventive step within the meaning of Article 56 EPC.

Auxiliary requests 1 to 16

9. Since the main request is considered to be allowable, it is not necessary to decide on the lower-ranking auxiliary requests.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



C. Rodríguez Rodríguez

P. Gryczka

Decision electronically authenticated