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D E C I S I O N
of 14 February 1995

Case Number: T 0053/92 - 3.3.2

Application Number: 88311596.6

Publication Number: 0320243

IPC: B01J 23/76

Language of the proceedings: EN

Title of invention:

Catalysts

Applicant:

JOHNSON MATTHEY PUBLIC LIMITED COMPANY

Opponent:

-

Headword:

Catalyst/JOHNSON MATTHEY

Relevant legal provisions:

EPC Art. 84, 54

Keyword:

"Meaning of the expression 'consisting essentially of'"
"Interpretation on the basis of the description"
"Novelty (yes) after amendments"

Decisions cited:

T 0472/88

Catchword:

-

Case Number: T 0053/92 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal 3.3.2
of 14 February 1995

Appellant: JOHNSON MATTHEY PUBLIC LIMITED COMPANY
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Decision under appeal: Decision of the Examining Division of the European Patent Office dated 23 July 1991 refusing European patent application No. 88 311 596.6 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. A. M. Lançon
Members: M. M. Eberhard
J. A. Stephens-Ofner

Summary of Facts and Submissions

- I. European patent application No. 88 311 596.6 was refused by a decision of the Examining Division. The decision was based upon the amended set of claims filed on 21 May 1991.
- II. The grounds for the refusal were that the process of Claim 1 lacked novelty over either of the documents US-A-3 819 535 (hereinafter D1) and EP-A-0 145 584 (hereinafter D2). The Examining Division took the view that the terms "consisting essentially of" and "intimate mixture" were unclear and did not permit the scope of Claim 1 to be distinguished from the prior art. The meaning of "consisting essentially of" was obscure in view of the description including the possibility of having the catalyst carried on a support with an amount of support of up to 90% in the finished catalyst. According to the decision the application did not exclude the formation of copper aluminate and it could be expected that a certain amount of "intimate mixture" would be formed in D1 when calcining the layered catalyst at temperatures of 800 to 900°C; therefore, both the catalyst of Claim 1 and the catalyst of D1 contained copper aluminate and an undetermined amount of "intimate mixture" of copper oxide and ceria.

The Examining Division further held that Claim 1 was also not novel in respect of D2, in particular Examples 1 and 6 thereof, since additional elements such as the platinum group metals were not excluded from the scope of protection defined by Claim 1.

III. The Appellant lodged an appeal against this decision.

Oral proceedings took place on 14 February 1995. In the course of these proceedings the Appellant submitted four sets of amended claims as main request, first auxiliary request C1, second auxiliary request C2 and third auxiliary request C3 respectively, in replacement of the sets of claims previously on file. Claim 1 of the main request reads as follows:

"1. A method of treating gaseous effluents with a catalyst in order to combat air pollution characterised by treating the effluents with a catalyst, optionally supported, consisting essentially of an intimate mixture of copper oxide and ceria, the weight of the copper oxide being less than the weight of the ceria."

Claim 1 of the auxiliary request C1 differs from that of the main request by the insertion of the additional feature "and hence not containing an effective amount of platinum group metal" between the words "ceria" and "the weight of the copper oxide..."

Claim 1 of the auxiliary request C2 has the following wording:

"1. A method of treating gaseous effluents with a catalyst in order to combat air pollution characterised by treating the effluents with a catalyst, optionally supported, consisting, apart from any impurities and rare earth metal oxide promoters, of an intimate mixture of copper oxide and ceria, the weight of the copper oxide being less than the weight of the ceria."

In Claim 1 of the auxiliary request C3 the feature "apart from any impurities and rare earth metal oxide promoters" has been deleted.

IV. The Appellant's arguments insofar as they concern the sets of amended claims submitted during the oral proceedings can be summarised as follows:

The Appellant argued that it would be clear to a person in the art reading the present application that the term "catalyst" was used in Claim 1 to refer to the catalytically active phase. The terms "consisting essentially of" and "intimate mixture" were common and well recognised expressions in the catalyst art. In this context reference was made to several US and European patents and to the definition of "consisting essentially of" given in the decision T 472/88 (1991 EPOR, 490). According to the Appellant this expression meant that the catalyst responsible essentially for the catalytic treatment of gaseous effluents to combat air pollution was the intimate mixture of copper oxide and ceria. Other components might also be present in the composition, providing that the essential characteristics of the composition were not materially affected by their presence. Therefore, the wording of Claim 1 of the main request already excluded the use of a catalyst consisting essentially of platinum group metals such as the catalyst of D2. As regards the terms "intimate mixture", the Appellant stressed that they clearly excluded the separate layers of copper oxide and ceria as taught by D1 and meant that the two oxides were finely mixed.

The Appellant submitted comparative examples, which, he argued, confirmed that the catalyst of Examples 16 and 22 of D1 contained significant amounts of copper aluminium oxide and no copper oxide while the catalyst of the present invention showed little indication of copper aluminium oxide but copper oxide was present. Therefore the speculation that a certain amount of "intimate mixture" was formed in D1 was wrong. At the oral proceedings the Appellant's attention was again drawn to the fact that the starting alumina used in D1 was a stabilised alumina, contrary to the alumina of the comparative examples submitted with the letter of 10 December 1991, and that a reaction of the alumina with the barium and/or the chromium compounds might have occurred during the stabilization treatment. In reply, the Appellant's representative stressed that according to the Appellant's expert no reaction would have occurred, and alumina would have still been present in D1's stabilized spherical alumina and hence would have still reacted with the copper moiety at the calcining temperature of 900°C to produce copper aluminate. The Appellant also pointed out that D1 was referring to a physical stabilization since it described a stabilization against shrinkage.

As regards the terms "effective amount" of platinum group metal used in Claim 1 of the auxiliary request C1, the Appellant contended that these terms were clear and were directly and unambiguously derivable from the description which did refer to avoiding such difficult to produce ingredients as platinum and rhodium. The amount of platinum ought to be an effective amount, in association with any other catalytically active component, to treat gaseous effluents from an internal

combustion engine, and hence would be excluded from Claim 1.

The Appellant requested the reimbursement of the appeal fee on the ground that the Examining Division made a substantial error in not giving the Applicant an opportunity of commenting on the reasoning relied upon in the decision in connection with D1, in particular on the speculation that a certain amount of intimate mixture was formed in D1. The Appellant further argued that the Examining Division made reference to a new document which had not been cited in the previous communication.

- V. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of Claims 1 to 10 filed during oral proceedings (main request) or on the basis of any of the auxiliary requests C1, C2 and C3 all submitted in the course of oral proceedings. He also requested the reimbursement of the appeal fee.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request*
 - 2.1 The claims of the main request are considered to meet the requirements of Article 123(2) EPC. In particular, it is directly and unambiguously derivable from the application as originally filed that the catalyst of the original Claim 1 and the corresponding supported

catalyst can be used in a method of treating gaseous effluents to combat air pollution (cf. original Claim 1; page 9, lines 24 to 25; page 12, lines 21 to 22).

2.2 The claims also fulfil the requirement of clarity set out in Article 84 EPC. It is clear from the wording of the amended Claim 1 that the catalyst may be carried on a support or not, and therefore that the term catalyst is not used in the sense of a catalytic formulation including the support. In these circumstances the terms a catalyst "consisting essentially of" are consistent with the examples of the description in which the "catalyst" contains a great amount of alumina (cf. Example 5). Furthermore, as pointed out by the Appellant, an "intimate mixture" of copper oxide and ceria can be distinguished from two layers of copper oxide and ceria respectively. The said two layers obviously cannot be considered as an intimate mixture of the two oxides.

2.3 Turning to the issue of novelty, it should be noted that D2 discloses a method of treating exhaust gases from an internal combustion engine wherein the exhaust gases are treated with a catalyst containing a support and an active phase, the latter consisting of at least a metal of the platinum group and at least an additional metal (cf. Claim 1). The catalysts (A) and (F) described in Examples 1 and 6 contain 0.100% of platinum, 0.010% of rhodium, 0.050% of palladium, 3.5% of cerium, 1.0% of iron and 0.5% of copper, by weight relative to the support. As the preparation of catalyst (A) involves the impregnation of an alumina support with an aqueous solution containing cerous nitrate,

cupric nitrate and ferric nitrate, followed by a drying step and a calcination at a temperature of 550°C, i.e. a temperature which is comparable to that used in the examples of the present application, it must be assumed that catalyst (A) of D2 contains an intimate mixture of ceria and copper oxide. It was not contested by the Appellant that either of the catalysts (A) and (F) of D2 comprises an intimate mixture of ceria and copper. Although catalyst (F) is more active than catalyst (A), the latter is however catalytically active for the treatment of the exhaust gases from internal combustion engine (see page 22, line 14 to page 23, line 17). As the weight of the copper oxide is also less than the weight of ceria in the catalysts (A) or (F) of D2, the novelty issue turns on the question whether the expression the catalyst "consisting essentially of" used in Claim 1 excludes the presence of other ingredients such as the iron oxide and the platinum group metals which are contained in catalyst (A) of D2.

First of all it should be noted that the meaning of the expression "consisting essentially of" depends on the particular circumstances of the case, in particular on the specific technical field and on the content of the description. In other words, no general quantitative definition can be given for this expression and its meaning should be construed on the basis of the description. According to the description the catalyst (or the supported catalyst) contains the intimate mixture of copper oxide and ceria as catalytically active ingredients but it may also contain rare earth metal oxides. The amount of the latter may be of up to 10 wt% (as metal) of the cerium content, i.e. it may be higher than the copper oxide content. These additional

rare earth metal oxides are said to act as promoters (cf. page 9, 2nd paragraph) and hence they **increase the activity** of the catalyst according to the usual definition of a promoter. Therefore, the supported or unsupported catalyst as defined in the description may contain in addition to said intimate mixture further components which affect the essential characteristics of the catalyst, namely its activity. In these circumstances the terms the "catalyst, optionally supported, consisting essentially of" used in Claim 1 cannot in view of the description be construed as alleged by the Appellant, namely in the sense that "other components may be also present in the composition, providing that the essential characteristics of the composition are not materially affected by their presence". It follows that the wording of Claim 1 interpreted on the basis of the description does not exclude the presence in the catalyst of additional components which have an influence on its activity. In these circumstances, the Board can only come to the conclusion that the subject-matter of Claim 1 lacks novelty over the disclosure of D2. Therefore, the main request must be refused on the grounds that Claim 1 does not meet the requirements of Article 52(1) and 54 EPC.

3. *Auxiliary request C1*

Claim 1 of this request differs from that of the main request by the additional feature that the catalyst does not contain an effective amount of platinum group metal. This additional feature is not considered to fulfil the requirement of clarity set out in Article 84 EPC because the terms "not containing an **effective**

amount of platinum group metal" do not clearly define the upper limit of the amount of platinum group metal which may be present in the catalyst composition. Although this "effective" or "ineffective" amount depends upon the kind of catalytic reaction in which the catalyst is involved and also upon the amounts of the other catalytically active ingredients of the catalyst, neither the copper oxide and ceria contents of the catalyst nor the kind of catalytic reaction are stated in Claim 1. It should be noted in this respect that Claim 1 is not directed to the treatment of exhaust emissions from an internal combustion engine but concerns the treatment of any kind of gaseous effluents which causes air pollution.

It follows from the above that Claim 1 of the auxiliary request C1 is not allowable for non-conformity with the requirements of Article 84 EPC.

4. *Auxiliary request C2*

4.1 There are no objections on the basis of Article 123(2) EPC to the amended claims of this request. It is directly and unambiguously derivable from the application as filed that the catalyst, supported or not, consists of an intimate mixture of copper oxide and ceria and that the catalyst formulation may include rare earth metal oxides as promoters as well as the usual impurities (cf. original Claims 1 and 4; page 9, lines 16 to 17 and 24 to 25; page 15, lines 16 to 17; Examples). The use of this catalyst formulation in a method of treating gaseous effluents to combat air pollution finds a support at page 12, lines 21 to 22, of the original application. The features of the

dependent Claims 3 to 9 are disclosed in the original Claims 2 to 7 and the treatment of exhaust emissions from an internal combustion engine according to Claim 2 is mentioned at page 12, lines 23, of the original description. The subject-matter of the product Claim 10 is supported by the paragraph bridging pages 4 and 5 of the description.

4.2 Claim 1 is also adjudged to meet the requirements of Article 84 EPC. As already indicated in point 2.2 above the expression "intimate mixture" of copper oxide and ceria excludes that the copper oxide and the ceria are in form of two separate layers. As pointed out by the Appellant it means that the two oxides are finely mixed.

4.3 The subject-matter of Claim 1 is new over the disclosure of D2 since the wording of Claim 1 clearly excludes the presence of iron oxide and platinum group metals in the catalyst. The apparatus defined in Claim 10 is also novel with respect to D2 for the same reasons.

D1 discloses the treatment of exhaust gases from internal combustion engines with a copper oxide cerium oxide supported catalyst, the alumina support of which has been stabilized by a treatment with barium and chromium compounds. It derives from the comparative examples submitted by the Appellant with the letters of 6 and 10 December 1991 that when a non-stabilized alumina support is impregnated and calcined following the methods described in Example 16 of in Example 22 of D1, copper aluminate is formed and the resulting catalysts contain **no copper oxide**. Furthermore, the

Appellant's representative has stressed that according to the Appellant's experts the same results would be achieved with the Ba, Cr-stabilized support used in the Examples 16, 22, 23 or with the Ba-stabilized support of Example 25. During the oral proceedings the Board expressed some doubts in this respect, however in the absence of any evidence to the contrary it has decided to give the Appellant the benefit of the doubt, and therefore to accept this argument. It follows that the method and the product as defined in Claims 1 and 10 are considered to be new over the disclosure of D1.

- 4.4 Only novelty was at issue in this appeal. The question whether or not a process and a product as defined in the claims of this request involve an inventive step has not been examined by the Examining Division. In these circumstances, the Board finds it appropriate, in accordance with Article 111(1) EPC, to remit the case to the Examining Division for further prosecution on the basis of the request C2, in order to avoid loss of one instance.
5. The Appellant has also requested reimbursement of the appeal fee. According to Rule 67 EPC, reimbursement of the appeal fees shall be ordered only in prescribed circumstances, namely, in the event of interlocutory revision or where the Board of Appeal deems an appeal to be allowable, if such reimbursement is equitable by reason of a substantial procedural violation. In the present case, the appeal is not allowable since the main request must be refused on the same ground as that indicated in the decision under appeal (lack of novelty over the disclosure of D2). Furthermore, there has been no substantial procedural violation on the part of the

Examining Division as regards the refusal of the application on the ground that Claim 1 of 21 May 1991 did not meet the requirement of novelty over the disclosure of D2. The Board, therefore, is not in a position to order reimbursement of the appeal fee.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division for further prosecution on the basis of auxiliary request C2 submitted during oral proceedings.
3. The request for reimbursement of the appeal fee is refused.

The Registrar:

The Chairman:

P. Martorana

P. A. M. Lançon