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D E C I S I O N
of 19 April 1996

Case Number: T 0558/94 - 3.3.2

Application Number: 88110381.6

Publication Number: 0297543

IPC: B01J 20/18

Language of the proceedings: EN

Title of invention:

Process for eliminating organic odors and compositions for use therein

Patentee:

UOP

Opponent:

- (01) Munters Zeol AB
(02) Eka Nobel AB

Headword:

Elimination of odours/UOP

Relevant legal provisions:

EPC Art. 54, 56

Keyword:

"Novelty - yes"
"Inventive step - no"
"Normal technical progress"

Decisions cited:

-

Catchword:

-



Case Number: T 0558/94 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal 3.3.2
of 19 April 1996

Appellant: UOP
(Proprietor of the patent) 25 East Algonquin Road
Des Plaines
Illinois 60017-5017 (US)

Representative: Eggert, Hans-Gunther, Dr.
Räderscheidtstrasse 1
D-50935 Köln (DE)

Respondent: Munters Zeol AB
(Opponent 01) Kalkstensvägen 1
S-223 78 Lund
Sweden (SE)

Representative: Sedvall, Bendt Gustaf
Brolin & Sedvall Patentbyrå AB
Box 7182
S-103 88 Stockholm (SE)

(Opponent 02) Eka Nobel AB
S-44501 Bohus (SE)

Representative: VOSSIUS & PARTNER
Postfach 86 07 67
81634 München (DE)

Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 20 May 1994 revoking
European patent No. 0 297 543 pursuant to
Article 102(1) EPC.

Composition of the Board:

Chairman: P. A. M. Lançon
Members: G. J. Wassenaar
R. E. Teschemacher

Summary of Facts and Submissions

I. European patent No. 0 297 543 was granted in response to European patent application No. 88 110 381.6.

II. Notices of opposition were filed by the Respondents (O1 and O2). Revocation of the patent in its entirety was requested on the grounds of lack of novelty and lack of inventive step (Articles 54, 56 and 100(a)EPC). Respondent O2 mentioned as ground also insufficient disclosure (Articles 83 and 100(b) EPC).

Amongst others, the following documents were cited:

- (1) WO-A-84/04913
- (3) US-A-4 648 977
- (7) US-A-4 061 724
- (8) US-A-4 073 865
- (11) JP-A-52/70200 (English translation)

III. The Opposition Division revoked the patent. The decision was taken on the basis of the two sets of claims, according to the main and auxiliary request, submitted during oral proceeding.

They considered that claim 1 of the main request lacked novelty over (3) and that claim 1 of the auxiliary request lacked an inventive step with regard to (3).

IV. The Appellant (Patentee) lodged an appeal against this decision.

With the statement of grounds, the Appellant contested the arguments of the Opposition Division and filed two new sets of claims as main and auxiliary request. Also

four new documents were filed to show that the expression "at least partly activated" was well known in the field of molecular sieves.

- V. Respondent O1 disagreed with the Appellant's submissions and maintained that the claimed subject-matter was not new or inventive in view of a.o. (1) and (3).
- VI. With a letter dated 20 June 1995, Respondent O2 withdrew the opposition.
- VII. In an annex to the summons for the oral proceedings, it was questioned whether the amendments were based on the application as originally filed and that the amended main claims appeared to lack clarity (Articles 123(2) and 84 EPC).
- VIII. Oral proceedings were held on 19 April 1996. During oral proceedings the Appellant amended claim 1 of the auxiliary request. The independent claims 1 of the requests on file read as follows:

Main request:

- "1. Use of a crystalline siliceous molecular sieve which has been at least partially activated and in which at least 90 per cent of the framework tetrahedral units are SiO tetrahedra, which has pore diameters of at least about 0.55 nm and a capacity for adsorbed water of not greater than 10 weight per cent when measured at 25°C and at a water vapor pressure of 6.1 mbar, for removing organic odors from the environment by contacting and adsorbing the odor molecules at a temperature of from -25°C to 100°C to such a degree that

residual concentrations thereof over the adsorbent are below the detection threshold of the human sense of smell."

Auxiliary request:

- "1. Use of a crystalline siliceous molecular sieve which has been at least partially activated and in which at least 90 per cent of the framework tetrahedral units are SiO tetrahedra, which has pore diameters of at least about 0.55 nm and a capacity for adsorbed water of not greater than 10 weight per cent when measured at 25°C and at a water vapor pressure of 6.1 mbar, in body powders, foot powders, genital sprays, menstrual pads, cat litter, diapers, hand cream, non-woven tissues, and in bathrooms, kitchens, garbage compactors and cans, refrigerators or closets, for removing odors by contacting and adsorbing the odor molecules at a temperature of from -25°C to 100°C to such a degree that residual concentrations thereof over the adsorbent are below the detection threshold of the human sense of smell."

After the explanation of the amendments by the Appellant, the Respondent and the Board did not persevere with the objections under Articles 123(2) and 84 EPC.

In the novelty and inventive step discussion special attention was drawn to documents (1), (3), (7), (8) and (11).

With respect to (1), (3), (7) and (8), the Appellant argued that they did not relate to the problem of removing odours from an environment in which the human nose can smell these odours. With respect to (11) it was

argued that the molecular sieves used according to the invention were different from the zeolites mentioned in (11) and that the molecular sieves according to the invention performed better because they were intrinsically hydrophobic, whereas the zeolites of (11) had to be treated with an emulsion to make them hydrophobic, which treatment reduced the adsorption capacity. The use of the molecular sieves according to claim 1 was regarded as a non-obvious selection from the zeolites disclosed in (11) for the same purpose.

IX. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of a set of claims submitted with the letter of 29 September 1994 as main request, alternatively on the basis of the set of claims submitted during oral proceedings.

The Respondent O1 requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request*
 - 2.1 Admissibility of amendments

The granted process claims have been redrafted as "use" claims. By this change of formulation, the subject matter of the claims and the protection conferred is not extended under the circumstances of the case.

Present claim 1 differs further from claim 1 as granted in the requirement that the adsorption takes place to such a degree that the residual concentrations of the odour molecules over the adsorbent are below the detection threshold of the human sense of smell. This feature is based on the sentence on page 10, lines 4 to 10 of the original description, saying that nowhere in the prior art it has been suggested that molecular sieve adsorbents are capable of such extreme selectivity as to be able to effectively sequester molecules of organic species to such a degree that residual concentrations over the adsorbent are below the detection threshold, in combination with the statement that the human olfactory system can detect odour quantities which exceed the analytical capability of essentially all types of test apparatus (page 9, last sentence to page 10, line 4).

The Board is therefore of the opinion that present claim 1 does not contain subject-matter which extends beyond the content of the application as filed and that the protection conferred is not extended, so that the amendments satisfy the requirements of Article 123(2) and (3) EPC.

2.2 *Clarity*

After Appellant's explanation that the additional sentence intends to express that the conditions under which the adsorbents is used are such that so much of the odour molecules is adsorbed that most human beings would not smell the odour in the vicinity of the molecular sieve, the Board is satisfied that claim 1 is sufficiently clear and makes it possible to examine the novelty and inventive step of its subject-matter.

2.3 *Novelty*

Following the interpretation of the Appellant, present claim 1 requires that the adsorbent is brought into contact with the air under such conditions that it adsorbs therefrom so much of the odour molecules that the residual concentration of the odour molecules in the vicinity of the adsorbent is below the detection threshold of the normal human sense of smell.

According to (3), relating to the removal of toxic organic materials from weak aqueous solutions thereof, the adsorbent is mixed with liquid water. No removal of odour molecules above the solution by contacting the adsorbent with the air above the solution takes place (column 2, lines 13 to 37).

But even if "environment" is taken in a very broad sense, including aqueous liquids as the Opposition Division seems to have understood the expression, (3) does not destroy the novelty of present claim 1 since (3) does not disclose that the residual concentration of the odour molecules is reduced below the threshold of the human sense of smell.

Document (1) discloses a method for reducing the hydrocarbon content in air or water by adsorption with a hydrophobic zeolite. Here again, there is no disclosure that the concentration of the hydrocarbons is reduced below the threshold of the human sense of smell. There is also no prove that such a reduction of the hydrocarbon concentration to such an extent is a direct and inevitable consequence of the adsorption process. Moreover, (1) does not disclose molecular sieves having a capacity for adsorbed water as required by present claim 1.

The only document on file which specifically relates to materials having deodorizing properties is (11). None of the therein disclosed adsorbents, however, fulfils all the requirements of present claim 1.

Thus the subject-matter of claim 1 must be considered novel.

2.4 *Inventive step*

2.4.1 The closest prior art is (11), which discloses the use of adsorbents in fibre products such as paper and cotton to remove emitted offensive odour. The adsorbents are chosen from natural zeolites, synthetic zeolites, active carbon and calcium bentonite, which are activated by heat treatment at 100 to 450°C and treated to be rendered water-repellant (claim 1). Specifically disclosed is the use of activated synthetic zeolite powder as an deodorizing adsorbent for sanitary napkins (Ex. 4). The zeolite powder has been rendered water repellent (hydrophobic) by treating it with a polysiloxane emulsion (Ex. 1).

According to the Appellant, the treatment to render the zeolites of (11) hydrophobic reduces the adsorption capacity of the zeolites and the deodorisation may be unsatisfactory. This argument was not contested by the Respondent.

The Board is willing to accept that the technical problem underlying the invention is to remove more effectively offensive odours from the environment.

This problem is solved by using a molecular sieve as specified in claim 1.

Although no comparative examples have been presented, it is plausible that the molecular sieves specified in claim 1 are more effective in removing organic odours than the zeolites according to (11) since they need not be rendered hydrophobic by a treatment with a polysiloxane emulsion, which treatment probably blocks potential adsorption sites.

- 2.4.2 It remains therefore to be decided if it was obvious for the person skilled in the art to use the molecular sieves specified in claim 1 for solving the said problem.

The molecular sieves as defined in claim 1 are well known materials as acknowledged in the patent specification (see page 4, line 53 to page 5, line 16). Silicalite and F-silicalite, for instance, disclosed in (7) and (8) respectively, are mentioned as particular suitable for use in the present invention (page 5, lines 3 to 5). Silicalite has also been used in various examples according to the invention.

Silicalite is a very special kind of zeolite and got much attention from the scientific and technical community dealing with catalysis and adsorption.

Already in the abstract of (7) it is indicated that silicalite has very useful hydrophobic/organophilic characteristics which permit its use in selectively adsorbing organic materials from water, either in liquid or vapour phase.

Document (11) does not and could not provide a direct guide to silicalite since it became only available after December 1977 the publication date of (7); i.e. two years after the filing date of (11).

A person skilled in the art, trying to remove more effectively organic odours from the environment, would, however, certainly pay attention to any new organophilic adsorbent coming on the market. Because silicalite, having all the properties required by (11) and falling within the class of synthetic zeolites mentioned in (11), got so much attention he simply could not overlook silicalite as a potential candidate for solving the said problem. Since silicalite is hydrophobic without additional treatment the skilled man would realize that with silicalite as adsorbents the waterproofing treatment required by (11) is not necessary. Because the earlier required waterproofing treatment probably blocks some of the otherwise available adsorption sites, the skilled man would expect an improved adsorption of organic molecules for synthetic zeolites which are intrinsically hydrophobic such as silicalite.

The choice of silicalite to improve the adsorption of odour molecules thus results from the normal development in the field of adsorption techniques and does not involve inventive skill.

- 2.4.3 The appellant argued that it was not obvious to substitute the zeolite in (11) with silicalite, because the zeolite in (11) was mainly chosen because of its cation-exchange properties to sequester ammonium ions. The Board cannot accept this view for the following reasons:

Although (11) mentions the removal of ammonium ions by cation exchange with zeolites, it teaches in the same context that odour of ammonia gas is adsorbed by the adsorbability of the zeolite (page 4, 3rd paragraph). Since according to (11) also adsorbents can be used for deodorizing purposes having no ion-exchange properties such as active carbon (Ex. 3), the skilled man trying to

improve the deodorizing properties of cellulose based products would also take into consideration later developed hydrophobic adsorbents without ion exchange properties such as silicalite.

The appellant further argued that the selection of silicalite could not be obvious since silicalite is very different from the zeolites mentioned in (11).

As indicated above, the Board agrees that silicalite is a very special kind of zeolite but takes the view that the choice for silicalite is not so much a selection from the synthetic zeolites contemplated in (11) but follows from the normal technical progress in the art, which made available new adsorbents which were obviously suitable for deodorizing purposes as mentioned in (11).

Claim 1 of the main request, therefore, lacks an inventive step in the meaning of Article 56 EPC.

3. *Auxiliary request*

Claim 1 of the auxiliary request differs from claim 1 of the main request in specifying products in which the adsorbents are used and places where these products are used. These additional limiting features are based on page 14 of the original application so that no objection arises under Article 123(2) and (3) EPC. The reasons to accept the clarity and novelty of claim 1 of the main request equally apply to claim 1 of the auxiliary request.

One of the products specified in claim 1 of the auxiliary request is a diaper, which is identical to a sanitary napkin mentioned in Example 4 of (11). The

reasons for lack of inventive step given for claim 1 of the main request, therefore, equally apply to claim 1 of the auxiliary request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

P. Martorana

The Chairman:

P. A. M. Lançon

