

**Internal distribution code:**

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

**Datasheet for the decision  
of 4 April 2025**

**Case Number:** T 2473/22 - 3.2.02

**Application Number:** 15853515.3

**Publication Number:** 3209359

**IPC:** A61M16/10, A61M16/12,  
C01B21/30, C01B21/32, A61M16/00

**Language of the proceedings:** EN

**Title of invention:**

SYSTEMS AND METHODS FOR THE SYNTHESIS OF NITRIC OXIDE

**Patent Proprietor:**

The General Hospital Corporation

**Opponent:**

Beyond Air, Inc.

**Headword:**

**Relevant legal provisions:**

EPC Art. 54, 56, 123(2)

**Keyword:**

Novelty - (yes)  
Inventive step - (yes)  
Amendments - added subject-matter (no)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

Boards of Appeal of the  
European Patent Office  
Richard-Reitzner-Allee 8  
85540 Haar  
GERMANY  
Tel. +49 (0)89 2399-0

Case Number: T 2473/22 - 3.2.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.02**  
**of 4 April 2025**

**Appellant:** Beyond Air, Inc.  
(Opponent) 825 East Gate Boulevard, Suite 320  
Garden City, NY 11530 (US)

**Representative:** Müller, Christian Stefan Gerd  
ZSP Patentanwälte PartG mbB  
Hansastraße 32  
80686 München (DE)

**Respondent:** The General Hospital Corporation  
(Patent Proprietor) 55 Fruit Street  
Boston, MA 02114 (US)

**Representative:** Samson & Partner Patentanwälte mbB  
Widenmayerstraße 6  
80538 München (DE)

**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 26 September  
2022 rejecting the opposition filed against  
European patent No. 3209359 pursuant to Article  
101(2) EPC.**

**Composition of the Board:**

**Chairman** M. Alvazzi Delfrate  
**Members:** S. Böttcher  
C. Schmidt

## **Summary of Facts and Submissions**

- I. The opponent filed an appeal against the decision of the opposition division to reject the opposition.
- II. Oral proceedings before the board took place on 4 April 2025 in the absence of the appellant. By letter dated 28 February 2025 the appellant had informed the board that it would not be attending the oral proceedings.
- III. The appellant had requested in the written proceedings that the decision under appeal be set aside and the patent be revoked.

The respondent requested that the appeal be dismissed, i.e. that the patent be maintained as granted, or that the patent be maintained on the basis of one of auxiliary requests 1a to 5a, filed by letter dated 28 March 2025, or on the basis of one of auxiliary requests 1 to 6 filed with the reply to the statement of grounds of appeal dated 16 June 2023.

- IV. Claim 1 of the patent as granted (main request) reads as follows:

"An apparatus for generating nitric oxide to be integrated into a respiratory system having a breathing apparatus, an inspiratory line, and an airway flowmeter arranged on the inspiratory line, the apparatus comprising:

one or more pairs of electrodes;  
a filter arranged downstream of the electrodes;  
a scavenger arranged downstream of the electrodes;  
one or more sensors configured to measure at least one

of a flowrate of gas, an oxygen concentration upstream of the electrodes, a nitric oxide concentration downstream of the scavenger, and a nitrogen dioxide concentration downstream of the scavenger; a controller in communication with the electrodes and the one or more sensors and configured to supply an electrical signal to the electrodes that controls timing and sparking characteristics of the electrodes; and wherein the sparking characteristics of the electrodes determine a concentration of nitric oxide generated by the electrodes."

V. Documents referred to in this decision

- D5 US 6,296,827
- D6 WO 2014/143842
- D8 Namihira, Takao et al., "Production of Nitric Oxide Using a Pulsed Arc Discharge", pages 1993 to 1998, IEEE Transactions on Plasma Science, vol. 30, No. 5, October 2002
- D10 WO 2013/052548
- D11 Yu, Binglan et al., "Detection and Removal of Impurities in Nitric Oxide Generated from Air by Pulsed Electrical Discharge", pages 1 to 25, Nitric Oxide, 30 November 2016
- D13 US 3,047,370
- D14 Brittanica Online Encyclopedia - Soda lime
- D16 WO 2012/155213
- D17 Carbon Dioxide Absorbents
- D18 JP 2004-65636
- D18a English translation of D18
- D19 Hui et al., "The Effect of Flow Distribution on the Concentration of NO Produced by Pulsed Arc Discharge", Plasma Science and Technology, vol. 9, No. 6, December 2007

- D20 L. Lorente, "Respiratory Filters and Ventilator-Associated Pneumonia: Composition, Efficacy Tests and Advantages and Disadvantages", 2012
- D22 Doctoral dissertation of Hu Hui
- D22a English translation of D22
- D23 Excerpt from Kirk-Othmer, "Encyclopedia of Chemical Technology", 3rd edition, 1980
- D24 Excerpt from "Ullmann's Encyclopedia of Industrial Chemistry", 1995

VI. The appellant's arguments concerning the main request (patent as granted) may be summarised as follows.

*Added subject-matter*

Claim 1 constituted an unallowable intermediate generalisation over claim 14 and the embodiments of Figures 1 and 4 as originally filed, as claim 14 required a data connection between the airway flowmeter and the controller which had been omitted in claim 1 as granted. The feature according to which the controller was in communication with the airway flowmeter was inextricably linked to other features in claim 14 as originally filed in that it specified how the "apparatus" and the respiratory system interfaced with each other.

The term "detecting an indication of inspiration" in claim 6 as granted was broader than "detecting inspiration" in claim 12 as originally filed, to which claim 6 corresponded. Claim 6 did not specify where the indication of inspiration came from.

Hence claims 1 and 6 of the main request included added subject-matter.

*Novelty in view of D6 or D10*

The linguistic structure of claim 1 did not contain a requirement for the filter and the scavenger to be two physically separate components of the apparatus, since both were specified to be located downstream of the electrodes. Hence they could have the same location. Furthermore, D23 and D24 disclosed that a scavenger would necessarily act as a filter as well.

Thus the subject-matter of claim 1 lacked novelty in view of D6 as the scavenger 226 disclosed in D6 (Figure 2) was a combined filter/scavenger, since the material of the scavenger (soda lime) had the capability to clear dust from air flow and would thus inherently act as a filter and a scavenger at the same time.

Furthermore, the cartridge 228 inevitably had to comprise a porous housing and this housing would act as a filter. D13 (column 2, lines 52 to 55), D16 (Figures 17 and 18) and D17 (page 4, bottom-right corner) disclosed soda-lime scavenger cartridges having partially porous housings.

The subject-matter of claim 1 lacked novelty over D10 for the same reasons as for D6. D10 disclosed an apparatus for generating nitric oxide including a granular soda-lime scavenger material 82 at the outlet acting as a filter (paragraph [0069], Figure 2). In addition, the replaceable scavenger constituted a cartridge, which of necessity included filters for allowing air flow through the scavenger while retaining the granular scavenger material and dust thereof inside the cartridge.

*Inventive step starting from D10 in combination with D8*

It was known from D10 that metal particles would be released from electrodes used in spark discharge (paragraph [0016]).

The presence of a filter in addition to the scavenger did not provide any advantage since all the particles released from the electrodes would already be trapped by the scavenger, as mentioned in D11. Therefore the objective technical problem to be solved was to provide an apparatus for generating nitric oxide with an alternative solution for dust removal.

D8 provided a simple and straightforward solution to this problem, namely the provision of a filter to remove said particles from the flow path (see abstract).

The person skilled in the art would have combined the teachings of D10 and D8, thus arriving at the claimed subject-matter without the need for an inventive step.

*Inventive step starting from D6*

The presence of a filter in addition to a scavenger did not provide any advantage since all the particles released from the electrodes would already be trapped by the scavenger, as mentioned in D11. Therefore the objective technical problem to be solved was to provide an apparatus for generating nitric oxide with an alternative solution for dust removal.

It was common general knowledge for the person skilled in the art that metal particles would be released from electrodes used in spark discharge, as evidenced for instance by D21 (page 93, right-hand column, first full

paragraph).

*Combination with D8*

D8 explicitly discussed electrode erosion and the release of metal particles into the patient's airway. It also provided a simple and straightforward solution to this problem, namely the provision of a filter to remove said particles from the airway (see abstract).

The person skilled in the art would have combined the teachings of D6 and D8, thus arriving at the claimed subject-matter without the need for an inventive step.

*Combination with D19*

D19 disclosed an NO generator with a filter (particle sieve film) and a scavenger (catalyst) located downstream of the electrodes (page 766, Figure 1 and right-hand column, first paragraph; page 769, right-hand column, second paragraph).

The person skilled in the art would combine the teachings of D6 and D19, thereby arriving at the claimed solution without requiring an inventive step.

*Combination with D22/D22a*

D22/D22a disclosed in figure 4.1 on page 47 an NO generator having a pair of electrodes, a filter (filter 1) and a scavenger (filter 2) (D22a, page 50/119, first line). The purpose of including a filter was to remove metal particles resulting from electrode erosion (D22a, page 22/119, lines 3 and 4).

Thus the person skilled in the art would have been

prompted to modify the teaching of D6 by combining it with the teaching of D22 to arrive at the subject-matter of claim 1 in an obvious manner.

*Admittance of D18 and combination with D18*

D18 was filed to address the patent proprietor's argument that claim 1 required the scavenger and the filter to be two separate features of the claimed apparatus. This requirement could not be derived from the patent as granted.

D18 was highly relevant as it disclosed in paragraph [0022] that NO<sub>2</sub> was removed from the gas mixture downstream of the electrodes using a photocatalytic titanium oxide scavenger. It furthermore disclosed that said titanium oxide scavenger might deteriorate over time and that titanium oxide dust should be removed from the airflow by a dust filter that was arranged downstream of the scavenger to ensure the patient's safety (paragraph [0024]).

This teaching in D18 would have prompted the skilled person to modify the teaching of D6 by adding a filter downstream of the scavenger. In this manner, the skilled person would have arrived at the claimed subject-matter without the need for an inventive step.

*Non-admittance of D20 and the objection of lack of inventive step starting from D6 in combination with D20*

The opposition division's decision not to admit D20 into the proceedings was based on new facts alleged but not proven by the proprietor during oral proceedings, namely that electrical discharges in the chamber and the NO concentration in the product gas would

inevitably kill all bacteria in the air flow and, finally, that the skilled person would not have considered the use of HEPA filters in connection with NO generators. The opposition division's decision not to admit D20 into the proceedings was incorrect and should be set aside.

D20 was relevant as it taught adding a bacteria filter downstream of the electrodes. Since the person skilled in the art, based on their common general knowledge, would consider removing any particles from the air flow as beneficial, this teaching would have prompted them to modify the apparatus of D6 by adding a filter downstream of the electrodes.

Hence D20 should have been admitted into the proceedings.

*Admittance of the inventive-step objection starting from D6 in combination with D16*

This objection was based on facts identical to those of the novelty attack in view of D6 and the common general knowledge represented by D16. Hence the combination of D6 and D16 was not a new fact first raised during oral proceedings.

The objection was also *prima facie* relevant. D6 described an NO generator with a scavenger cartridge disposed downstream of the electrodes (see D6, page 12, lines 26-28). The person skilled in the art would have integrated into the NO generator a scavenger cartridge design such as the one disclosed in D16 comprising filters which were physically separate from the scavenger material to be enclosed therein.

Hence this objection should have been allowed into the proceedings.

- VII. The respondent's arguments concerning the main request (patent as granted) may be summarised as follows.

*Added subject-matter*

Figures 1 and 4 of the application as originally filed directly and unambiguously disclosed that the apparatus of claim 1 as originally filed could be integrated into a respiratory system having a breathing apparatus, an inspiratory line and an airway flowmeter arranged on the inspiratory line. The communication between the airway flowmeter and the controller shown in Figure 1 and mentioned in claim 14 and the membrane 104 protecting the electrodes (mentioned in paragraph [0104] of the published application) were not inextricably linked to the suitability of the apparatus to be integrated into a respiratory system. Hence the omission of these features in claim 1 did not constitute an unallowable intermediate generalisation.

The terms "indication of inspiration" of claim 11 as originally filed and "inspiration" in claim 12 as originally filed had the same technical meaning. Hence claim 6, referring to "an indication of inspiration", did not include added subject-matter.

*Novelty in view of D6 or D10*

The scavenger and the particle filter as claimed in claim 1 were two different technical components of the apparatus which were directed to different technical purposes. The fact that both were located downstream of the filter did not imply that they were one common

component. And the fact that a filter might comprise granular media (as disclosed in D23 and D24) did not mean that a scavenger material in any event acted as a filter.

Hence the scavenger of D6 could not act as a scavenger and a filter at the same time.

Furthermore, it could not be derived from D6 that the cartridge was one of those disclosed in D13, D16 or D17, i.e. having a perforated wall or a porous material or including a foam filter. Rather, it was evident that cartridges for granular scavenger materials could have varied shapes, and did not necessarily include filters.

Thus the apparatus of D6 did not comprise a filter arranged downstream of the electrodes. Consequently, the subject-matter of claim 1 was novel in view of D6.

For the same reasons, the subject-matter of claim 1 was novel over D10.

*Inventive step starting from D10 in combination with D8*

D10 mentioned the problem of electrode wear, and suggested different solutions to reduce this effect (paragraphs [0017], [0018], [0023], [0034] and [0072]). Hence the provision of a filter downstream of the electrodes would not be envisaged.

The person skilled in the art would not have combined the teachings of D10 and D8.

Hence the subject-matter of claim 1 was based on an inventive step.

*Inventive step starting from D6*

In D6, the valve 206 was used to close the chamber 202 during sparking such that particles eroded from the electrodes could not enter the inspiratory line.

In the patent, valves were not necessary as the electrodes were arranged in the inspiratory line rather than in a separate chamber.

The provision of a filter downstream of the electrodes had the technical effect of retaining particles eroded from the electrodes in situations where those particles would not be retained by a valve. Thus the objective technical problem was to provide an apparatus for generating NO which could be integrated into the inspiratory line of a respiratory system.

*Combination with D8 (also when starting from D10)*

D8 related to a laboratory system rather than an apparatus to be integrated into a respiratory system, and did not include a scavenger as in the present patent. In D8, for instance, the concentration of brass particles in the gas mixture produced by the pulsed arc discharge was determined by passing the gas through a filter in combination with a balance (page 1994, left-hand column, third paragraph). The necessity of preventing the patient from inhaling such particles was not mentioned.

Consequently, the person skilled in the art would not combine the teachings of D6 and D8 in view of the differences regarding the setup.

*Combination with D19*

The apparatus disclosed in D19 was a laboratory setup not intended to be integrated into a respiratory system. Hence the person skilled in the art, when faced with the objective technical problem, would not have been prompted by D19 to provide a filter downstream of the electrodes.

For these reasons, the subject-matter of claim 1 as granted was based on an inventive step over D6 taken in combination with D19.

*Combination with D22/D22a*

Similarly to the apparatus of D19, the apparatus of D22/D22a was not a medical application intended to be integrated into a respiratory system. Rather, D22/D22a pertained to a laboratory experimental setup used for research purposes as part of a doctoral thesis. Hence the person skilled in the art, when faced with the objective technical problem, would not have had any motivation to combine the teaching of D6 with the teaching of D22/D22a.

For these reasons, the subject-matter of claim 1 as granted was also based on an inventive step over D6 taken in combination with D22/D22a.

*Admittance of D18 and combination with D18*

D18 was late-filed, and its filing could not be regarded as a reaction to a previous issue raised by either the patent proprietor or the opposition division. Hence it should not be admitted into the appeal proceedings.

Furthermore, it was not *prima facie* relevant since it did not mention metal particles evaporated from the electrodes. The filter in D18 was to prevent broken powdered TiO<sub>2</sub> from leaving the reaction chamber.

The person skilled in the art would not have been prompted to combine D6 with D18.

*Non-admittance of D20 and the objection of lack of inventive step in view of D6 and D20*

The opposition division had correctly decided not to admit D20 into the proceedings as it was late-filed and not *prima facie* relevant. D20 related to microbial filters placed in a patient's airway. It did not discuss the need for filters for removing metal particles evaporated from electrodes.

*Admittance of the inventive-step objection starting from D6 in combination with D16*

The opposition division had correctly decided, both in view of procedural economy and in view of its lack of *prima facie* relevance, not to admit this objection into the proceedings.

Scavenger cartridges did not necessarily comprise filters and cartridge housings did not constitute filters as claimed. Moreover, D6 did not contain a pointer to the specific cartridge of D16. Hence the person skilled in the art would not have combined D6 with D16 such as to arrive at the present invention.

## **Reasons for the Decision**

1. Subject-matter of the patent

The patent relates to an apparatus for generating nitric oxide (NO) to be integrated into a respiratory system.

NO can be generated by the reaction of nitrogen with oxygen at very high temperatures obtained by creating an electrical arc (plasma) between two electrodes which are powered at high voltage. Hence an air stream is necessary at the electrodes (paragraph [0093]). In the embodiments of the patent, the electrodes are arranged either in the inspiratory line 18 of the respiratory system (Figure 5), between an inlet 24 and an outlet 26 of a separate gas flow line in the respiratory system downstream of a gas pump 30 (Figure 2), or in a chamber 202 (Figures 7 and 8).

Some of the nitric oxide produced combines with atmospheric oxygen to produce nitrogen dioxide, which is poisonous. Hence, before it is inhaled by a patient, the nitrogen dioxide has to be removed from the gas stream. In the patent this is done by a chemical reaction in a scavenger (paragraph [0094]).

During sparking, particles may break off the electrodes due to the high temperatures. To prevent the patient from inhaling these electrode particles, a filter is arranged downstream of the electrodes to remove these particles.

2. Main request - added subject-matter

2.1 The board in its communication under Article 15(1) RPBA indicated the preliminary view that the main request

did not comprise added subject-matter. The appellant did not submit any counter-argument in reply.

- 2.2 Claim 1 is based on claim 1 as originally filed and includes the additional feature that the apparatus is "to be integrated into a respiratory system having a breathing apparatus, an inspiratory line and an airway flowmeter arranged on the inspiratory line".

Figures 1 and 4 of the application as originally filed directly and unambiguously disclose that the apparatus of claim 1 as originally filed can be integrated into a respiratory system having a breathing apparatus, an inspiratory line, and an airway flowmeter arranged on the inspiratory line. The communication between the airway flowmeter and the controller shown in Figure 1 and mentioned in claim 14 and the membrane 104 protecting the electrodes (mentioned in paragraph [0104] of the published application) are not inextricably linked to the suitability of the apparatus to be integrated into a respiratory system.

- 2.3 Claim 6 as granted corresponds to claim 12 as originally filed in which the term "inspiration" has been replaced with "indication of inspiration". The terms "indication of inspiration" and "inspiration" have the same technical meaning. In fact, the controller in any case detects an indication of inspiration in that a certain flow rate in the airway, or a certain temperature or pressure in the inspiratory or in the expiratory line, indicates that an inspiration occurs (paragraph [0102] of the published application).

2.4 Thus claims 1 and 6 of the main request meet the requirements of Article 123(2) EPC.

3. Main request - interpretation of claim 1

3.1 The board agrees with the appellant and the respondent that filtration is the physical removal of solid particles, which are trapped in filter material.

However, although filters may be formed as porous plates, a porous housing (containing the scavenger material) does not necessarily act as a filter for filtering the gas flow through the housing.

3.2 The board agrees with both parties that a scavenger is a device for removing adulterants (e.g. unwanted gaseous compounds) from a gas or liquid by way of a chemical reaction (e.g. absorption or adsorption, or chemical conversion).

3.3 The scavenger and the particle filter as claimed are two different technical components of the apparatus which are directed to different technical purposes. The fact that both are located downstream of the electrodes does not imply that they can be regarded as one common component. Moreover, the fact that a filter may comprise granular media (as disclosed in D23 and D24) does not mean that a scavenger material in any event acts as a filter.

4. Main request - novelty in view of D6 or D10

The board in its communication under Article 15(1) RPBA indicated the preliminary view that the subject-matter of claim 1 of the main request was novel. The appellant

did not submit any counter-argument.

- 4.1 D6 discloses an apparatus for generating nitric oxide which is coupled to a respiratory system having a breathing apparatus, an inspiratory line and an airway flowmeter arranged on the inspiratory line. The apparatus comprises a chamber 202 having an inlet and an outlet and including electrodes 210 (Figure 2). A scavenger 226, placed in a cartridge 228, is arranged in the chamber (page 12, lines 22 to 27), and a filter 208 is arranged upstream of the chamber (page 7, lines 25 to 28).
- 4.2 Contrary to the appellant's view, the scavenger 226 of D6 cannot be regarded as a combined filter/scavenger since, as mentioned above, claim 1 requires the filter and the scavenger to be two different technical components of the apparatus.
- 4.3 It cannot be derived from D6 that the scavenger cartridge is one of those disclosed in D13, D16 or D17, i.e. having a perforated wall or a porous material or including a foam filter. Indeed, cartridges for granular scavenger materials can have varied shapes, including ones which do not necessarily include filters.
- 4.4 Thus the apparatus of D6 does not comprise a filter arranged downstream of the electrodes. Consequently, the subject-matter of claim 1 is novel over D6.
- 4.5 D10 discloses an apparatus for generating nitric oxide comprising a cartridge 78 comprising a scavenger material 82 arranged downstream of the electrodes 12, 20, which are arranged in a reactor chamber (Figure 2,

paragraph [0069]).

- 4.6 The cartridge 78 of D10 cannot be regarded as a combined filter/scavenger since claim 1 requires the filter and the scavenger to be two different technical components of the apparatus.
- 4.7 It cannot be derived from D10 that the scavenger cartridge 78 is one of those disclosed in D13, D16 or D17, i.e. having a perforated wall or a porous material or including a foam filter.
- 4.8 Thus the apparatus of D10 does not comprise a filter arranged downstream of the electrodes. Consequently, the subject-matter of claim 1 is novel in view of D10.
5. Inventive step starting from D10 in combination with D8
  - 5.1 The board indicated in its communication under Article 15(1) RPBA the preliminary view that the subject-matter of claim 1 of the main request involved an inventive step starting from D10 in combination with D8. The appellant did not submit any counter-argument.
  - 5.2 The presence of a filter in addition to a scavenger downstream of the electrodes provides the technical effect of retaining particles that might have vaporised or broken off from the electrodes during sparking. This further reduces the risk to the patient of inhaling these particles, even if a scavenger alone could remove most or all of these particles. Thus the objective technical problem was to provide an apparatus for generating nitric oxide which was safer for the patient.

- 5.3 D10 addresses the problem of electrode wear by suggesting solutions aiming at reducing the amount of erosion, for instance by optimising control parameters such as pulse duration, temperature and discharge frequency (paragraphs [0017], [0023], [0034] and [0072]) or by selecting an electrode material that is less susceptible to vaporisation and wear (paragraph [0065]). D10 does not mention that the nitric oxide generator can be integrated into a respiratory system. Nor does it mention that electrode particles could harm a patient and should be removed from the inspiratory air flow (as disclosed in D5, column 1, lines 54 to 67).
- 5.4 D8 mentions a filter for removing electrode particles from a nitric oxide generator (abstract). However, D8 does not relate to an apparatus to be integrated into a respiratory system either. Rather, it relates to a laboratory system the characteristics of which are assessed. The filter is used in combination with a balance to determine the concentration of brass particles in the gas mixture produced by the pulsed arc discharge (page 1994, left-hand column, third paragraph). The necessity of preventing the patient from inhaling such particles is not mentioned.
- 5.5 Hence, starting from D10, the person skilled in the art would not envisage the provision of a filter for removing electrode particles from the inspiratory flow. In any case, D8 would not prompt the person skilled in the art to modify the apparatus of D10 by introducing a filter downstream of the electrodes.
- 5.6 Consequently, the subject-matter of claim 1 involves an inventive step in view of D10 in combination with D8.

6. Inventive step starting from D6

- 6.1 The presence of a filter downstream of the electrodes provides the technical effect of retaining particles that might have vaporised or broken off from the electrodes during sparking.

Hence the objective technical problem can be formulated as being to provide an apparatus for generating nitric oxide for inhalation which can be integrated into a respiratory system connected to a patient and prevents inhalation of electrode particles by the patient.

- 6.2 It is common general knowledge for the person skilled in the art that metal particles are released from electrodes used in spark discharge (as evidenced by D21).

However, in D6, the electrodes are arranged in a chamber 202, and the outlet of the chamber, which acts as a cavity in a piston pump, is closed by a valve 206 during the spark discharges to ensure certain pressure conditions (page 8, line 6 to page 9, line 9). Hence, during the spark discharges, there is no gas flow to the patient which might include electrode particles. It is therefore not necessary to include a filter downstream of the electrodes for removing these particles.

- 6.3 The provision of a filter downstream of the electrodes allows the nitric oxide generator to be arranged directly in the respiratory system, without the use of valves which prevent the delivery of electrode particles to the patient.

#### 6.4 Combination with D8

D8 mentions a filter for removing electrode particles from an NO generator (abstract). However, D8 does not relate to an apparatus to be integrated into a respiratory system. Rather, it relates to a laboratory system the characteristics of which are assessed. The filter is used in combination with a balance to determine the concentration of brass particles in the gas mixture produced by the pulsed arc discharge (page 1994, left-hand column, third paragraph). The necessity of preventing the patient from inhaling such particles is not mentioned.

Thus the person skilled in the art would not be prompted by D8 to modify the apparatus of D6 to include a filter downstream of the electrodes. The subject-matter of claim 1 therefore involves an inventive step in view of a combination of D6 with D8.

#### 6.5 Combination with D19

D19 mentions a particle sieve film arranged downstream of the electrodes in a spark-discharge nitric oxide generator (page 766, right-hand column, first paragraph). However, D19 does not refer to electrode erosion, and the purpose of this particle sieve is not mentioned.

The apparatus of D19 is a laboratory setup which is not intended to be integrated into a respiratory system. Hence D19 does not refer to the necessity of removing electrode particles from the air flow to the patient.

Thus the person skilled in the art would not be prompted by D19 to modify the apparatus of D6 to

include a filter downstream of the electrodes. The subject-matter of claim 1 therefore involves an inventive step in view of a combination of D6 with D19.

#### 6.6 Combination with D22/D22a

D22 discloses a nitric oxide generator having a pair of electrodes in an arc discharge plasma reactor and three filters arranged downstream of the electrodes (Figure 4.1, page 50/119, line 1 of D22a). It is mentioned that the two filters 1 have the purpose of removing particles, and filter 2 acts as a scavenger.

Similarly to D19, D22 relates to a laboratory setup used for experimental measurements and studies. The apparatus of Fig. 1.6 is not disclosed to be integrated into a respiratory system.

The disclosure of D22/D22a would not prompt the person skilled in the art to modify the apparatus of D6 to include a filter downstream of the electrodes. The subject-matter of claim 1 therefore involves an inventive step in view of a combination of D6 with D22/D22a.

#### 7. Admittance of D18 and the objection of lack of inventive step starting from D6 in combination with D18

D18 mentions that broken powder of  $\text{TiO}_2$  pellets must not be carried to the patient's suction mask (paragraph [0024] of D18a). The filter 51 in D18 removes "unnecessary dust" from the stream of NO gas. Hence this dust stems from broken powdered  $\text{TiO}_2$  in the outlet catalyst space 26 (figures on page 12, paragraph [0057] of D18a). D18 does not mention the necessity of removing electrode particles.

Since the scavenger of D6 does not include  $\text{TiO}_2$ , the person skilled in the art would not be prompted by D18 to modify the apparatus of D6 to include a filter downstream of the electrodes.

Hence D18 is not *prima facie* relevant and is therefore not admitted into the proceedings.

8. Non-admittance of D20 and the inventive-step objection starting from D6 in combination with D20
  - 8.1 The opposition division decided not to admit D20 into the opposition proceedings as it was late-filed and not *prima facie* relevant.
  - 8.2 A board of appeal should only overrule the way in which a department of first instance has exercised its discretion when deciding on non-admission of late-filed submissions if it concludes that the department of first instance has done so according to the wrong principles, or without taking into account the right principles, or in an unreasonable way, and has thus exceeded the proper limits of its discretion. It is not the function of a board of appeal to review all the facts and circumstances of the case as if it were in the place of the department of first instance in order to decide whether or not it would have exercised such discretion in the same way.
  - 8.3 In the present case, the opposition division did not exceed the proper limits of its discretion. The objection is not *prima facie* relevant for the reasons given below.

- 8.4 D20 relates to microbial filters used in anaesthesia machines. It does not relate to NO generators and does not refer to the need for filters for removing metal particles from electrodes. Thus the person skilled in the art would not be prompted by D20 to modify the apparatus of D6 to include a filter downstream of the electrodes.
- 8.5 Hence D20 is not admitted into the proceedings.
9. Admittance of the inventive-step objection starting from D6 in combination with D16
- 9.1 This objection was not admitted by the opposition division as it was considered a new fact submitted for the first time in the oral proceedings. The board considers that the opposition division has exercised its discretion according to the right principles and in a reasonable way.
- 9.2 Indeed, this objection is not *prima facie* relevant. A filter in the wall of the scavenger cartridge of D6 cannot be regarded as a filter which is arranged downstream of the electrodes, as required by claim 1, as the cartridge is arranged in the chamber and there is no fluid stream passing through the cartridge.
- 9.3 Hence this objection is not admitted into the proceedings.
10. In summary, none of the objections raised by the appellant preclude maintenance of the patent as granted.

## **Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:



A. Chavinier-Tomsic

M. Alvazzi Delfrate

Decision electronically authenticated