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D E C I S I O N
of 2 September 2003

Case Number: T 0145/00 - 3.3.5

Application Number: 94200092.8

Publication Number: 0606960

IPC: B01D 46/00

Language of the proceedings: EN

Title of invention:
Filter with quick-change coupling for cleaning gases

Patentee:
SCIENTIFIC GLASS TECHNOLOGY EXPLOITATIE B.V.

Opponent:
Varian B.V.

Headword:
Filter/SGTE

Relevant legal provisions:
EPC Art. 56, 84, 100(b)

Keyword:
"Inventive step (confirmed)"

Decisions cited:
T 0176/84, T 0195/84, G 0010/91

Catchword:
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Case Number: T 0145/00 - 3.3.5

D E C I S I O N
of the Technical Board of Appeal 3.3.5
of 2 September 2003

Appellant: (Opponent)
Varian, B.V.
Herculesweg 8
NL-4338 PL Middelburg (NL)

Representative:
Johnson, Terence Leslie
Edward Evans Barker
Clifford's Inn,
Fetter Lane
London EC4A 1BX (GB)

Respondent: (Proprietor of the patent)
SCIENTIFIC GLASS TECHNOLOGY EXPLOITATIE B.V.
Arnesteinweg 23A
NL-4338 PD Middelburg (NL)

Representative:
Smulders, Theodorus A.H.J., Ir.
Vereenigde
Postbus 87930
NL-2508 DH Den Haag (NL)

Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 9 December 1999 concerning maintenance of European patent No. 0606960 in amended form.

Composition of the Board:

Chairman: R. K. Spangenberg
Members: M. M. Eberhard
M. B. Günzel

Summary of Facts and Submissions

I. This appeal is from the decision of the opposition division according to which European patent No. 606 960 in the amended form according to the first auxiliary request meets the requirements of the EPC. The decision was based on the granted claims, as the main request, and on the set of amended claims submitted on 24 November 1999, as the first auxiliary request. Claim 1 of the first auxiliary request reads as follows:

"1. A filter for cleaning gases, comprising a quick-change coupling (3) having an inlet and an outlet channel (4 and 5 respectively), and a hollow filter housing (2) filled with filter material (6) through which the gas to be cleaned can flow from the inlet channel (4) to the outlet channel (5), the filter material housing (2) being enclosed by a guard (11) characterised in that the filter material housing (2) is manufactured from glass and the quick-change coupling (3) from a metal, such that the filter material housing (2)and the quick-change coupling (3) do not react with the gases to be cleaned and do not release any substances during operation, **the filter material housing (2) and the quick-change coupling (3) being detachably connected to each other.**" (emphasis added by the board).

The features in bold characters represent the difference between granted claim 1 and amended claim 1 of the first auxiliary request.

II. During the opposition proceedings the parties relied *inter alia* on the following documents:

D1: The Sulperco Reporter, Vol. VI, No. 4, July 1987, pages 1 to 3

D2: General Catalog 1990-1991, Restek Corp., page 106, including the affidavit from B. Rightnour (March 11, 1997)

D5: Brochure "Chrompack News, No. 32, 1980

D6: Brochure "High Resolution Chromatography Products", J&W Scientific Inc., 1987/88

In its decision the opposition division considered that the subject-matter of granted claim 1 lacked an inventive step in view of the teaching of the closest prior art, namely either D5 or D6, in combination with the teaching of any of D1 and D2. The subject-matter of claim 1 of the first auxiliary request was not obvious in view of the disclosure of D6 (closest prior art), D1 and D2.

III. At the appeal stage the appellant made reference to a further ground of opposition (Article 100(b) EPC) and to additional documents in its written submissions, in particular D10 consisting of three drawings, D11 (GB-A-1 128 183) and D12 (GB-A-242 388). The respondent also relied upon new documents, in particular Handbook for Glass Technology P. Heller et al., 1992, English translation pages 1 to 11 (D16), and Handbook of high precision technique, Part 4, design technique, IR. Van Bergen et al., 1968, English translation pages 1 to 8

(D17). Oral proceedings took place on 2 September 2003. At the oral proceedings the availability to the public of document D10 was discussed, and the appellant then indicated that it no longer relied upon D10 and D4 (Gas Purifiers of Chemical Research Supplies).

IV. The appellant requested that the decision under appeal be set aside and that the patent be revoked. The respondent requested that the appeal be dismissed.

V. The appellant's arguments can be summarised as follows:

The term "quick-change coupling" was not defined in claim 1. However this expression implied that two pieces had to be coupled to each other, and in view of the information in the patent in suit it was clear that the quick-change coupling allowed the filter housing to be connected to a base plate (or coupling piece) provided in the gas-carrying line. The decision under appeal contained an inconsistency. It was pointed out, on the one hand, that it was well-known to connect glass and metal to each other either detachably or permanently, but, on the other hand, the detachability of the metal quick-change coupling from the glass housing was not considered to be obvious. In the patent in suit, the quick-change coupling was acting as a lid for the filter housing. However, the provision of a detachable lid for a housing, which facilitated access to the contents of the housing, was a solution to a general technical problem which formed part of the general technical knowledge (see T 176/84 and T 195/84).

In D6 the quick-change coupling was made up of the "body", the knurled retaining nut and the flanged part of the disposable canister. Thus the "body" belonged to the gas-carrying line. D6 showed the detachability of the filter housing from the quick-change coupling. As according to the decision appealed, it was obvious in view of the teaching of D1 and D2 to use glass for the filter housing in order to avoid the diffusion of gases, claim 1 lacked an inventive step in view of D6 in combination with D1 or D2. Even if the detachability of the filter housing from the quick-change coupling were not considered to be disclosed in D6, this feature would not have involved an inventive step either. According to the patent in suit the said detachable connection permitted to re-use the housing and quick-change coupling and to regenerate the filter material. As it was generally known that glass and metal could be connected to each other either detachably or permanently, it would have been obvious to a skilled person who wanted to re-use the filter housing and to regenerate the filter material to detachably connect the glass housing to the quick-change coupling. D16 disclosed that any connection could be made between glass and metal and the choice of the connection type was therefore only a matter of design choice as confirmed by D17. Furthermore, D2 disclosed the use of detachable couplings in the gas-carrying line. The fact that glass and metal parts were permanently fixed in cheap mass production products like light bulbs was not relevant since the product was not re-usable.

The problem to be solved by the amended claim was to provide a filter assembly which did not release unwanted substances during use and which allowed the

filter material housing and the quick-change coupling to be decoupled so that these parts could be re-used. The patent in suit did not solve this problem since a gas-tight detachable connection between a glass housing and a metal coupling could not be achieved without using Teflon seals, Viton rubber O-rings and polyethylene caps, which would release undesired substances into the gas to be filtered. The lack of provision of a solution to the stated problem resulted in the patent in suit not involving an inventive step.

VI. The respondent presented *inter alia* the following arguments:

A new ground of opposition (under Article 100(b) EPC) was presented for the first time at the appeal stage. The patentee did not agree with discussing this new ground in the appeal proceedings. D6 did not disclose a filter in which the quick-change coupling was detachably connected to the filter material housing. The flanged part of the disposable canister could be considered as corresponding to the quick-change coupling which had to be connected to the "body" in the gas-carrying line, this body corresponding in fact to the coupling piece indicated in the patent in suit. When starting from the closest prior art D6, the problem to be solved was to provide a super-clean filter which included an indicator and was environment-friendly. The suitability of the filter to be re-used formed part of the invention itself. The prior art did not suggest the environmental problem caused by disposable filters, let alone the re-use of the filter housing. The appellant was using *ex post facto* reasoning when stating that the quick-change coupling

was acting as a lid for the filter housing. This was absolutely not the case for the quick-change filters disclosed in D5 and D6. The skilled person whose aim was to make a super-clean filter provided with a quick-change coupling would have been prompted to use a non-detachable glass-metal connection since such connections were known to be gas-tight or vacuum-tight. Non-detachable connections between glass and metal were known for example for very cheap mass production products like light bulbs. Regenerating the filter material was also possible with a melted connection, by carefully heating the whole filter in the presence of an appropriate gas. The obvious choice for the skilled person looking for a gas tight connection between glass and metal would thus have been a melt connection. However, in the present case the opposite was done by choosing a detachable connection of the filter housing to the quick-change coupling. D2 did not disclose that the metal part of the filter was detachable from the glass housing; the whole filter was detached from the gas-carrying line and the Swagelok-couplings were not quick-change couplings.

Reasons for the Decision

1. The appeal is admissible. This was no longer disputed at the oral proceedings.

2. It was not disputed that claim 1 meets the requirements of Article 123(2) and (3) EPC. Claim 1 is based on a combination of granted claims 1 and 2. The additional features introduced into claim 1 are disclosed in claim 2 of the application as filed. According to

amended claim 4, the quick-change coupling **is manufactured from** stainless steel or aluminium. This feature is disclosed in claim 5 of the application as filed. The scope of protection of the amended claims has clearly been restricted compared to that of the granted claims. Therefore amended claims 1 to 5 comply with the provisions of Article 123(2) and (3) EPC.

3. The expression "quick-change coupling", which is indicated in claim 1 and was already used in granted claim 1, has been understood in different ways by the appellant and the respondent in their written submissions concerning novelty and/or inventive step. In view of these different interpretations, the question was discussed at the oral proceedings how this expression should be construed in the light of the patent specification. The respondent made reference to the passage in column 1, lines 18 to 34, of the patent specification and argued that, in the light of the information in this passage, the skilled person would have understood the expression "quick-change coupling" of claim 1 as meaning the part of the filter designated by the reference number (3) in Figure 1, ie the part which is detachably connected to the filter material housing, and not the "coupling piece" (not shown on Figure 1) which is provided in the gas-carrying line. The appellant agreed with this interpretation.

In the said passage it is indeed disclosed that "the gas carrying-line is provided with a number of **coupling pieces** to which the filters can be connected by means of the **quick-change couplings**". In the next sentences (column 1, lines 24 to 34) it is explained how the coupling piece and the filter work and co-operate when

the filter is connected to the coupling piece of the gas-carrying line by means of the quick-change coupling. An explanation of the function of the coupling piece when the filter is disconnected is also given. Although, this passage of the description relates to the prior art filter which has been considered in the preamble of claim 1 (see column 1, lines 3 to 18), it clearly derives from the whole content of the patent in suit that the same terminology has been used throughout the patent specification for designating the corresponding parts of the filter according to the invention: see in particular the passages stating the drawback of the prior art filter, the definition of the problem underlying the invention and its solution, ie column 1, line 42 to column 2, line 6; column 2, lines 31 to 41; see also the sentence bridging columns 2 and 3 where reference is made to the line section carrying the coupling piece; see column 3, lines 30 to 33, in which the quick-change coupling 3 is said to comprise an inlet channel 4 and an outlet channel 5 connecting to the open ends of the filter material housing 2. Therefore, the board can follow the respondent's interpretation of the expression "quick-change coupling" used in claim 1, which was also agreed to by the appellant. The considerations of the board in the present decision as regards the patentability of the claimed filter are thus based on the said interpretation.

4. The appellant raised an objection of lack of clarity under Article 84 EPC against dependent claim 5. It argued that if the guard was not detachably connected to the quick-change coupling, it would be impossible to gain access to the filter housing. The detachability of

the filter housing from the quick-change coupling as claimed in claim 1 would then become irrelevant. The respondent contested these arguments. The question as to how the filter housing can be reached and the filter material taken out from the housing when the guard is not detachably connected to the quick-change coupling was discussed at the oral proceedings. The respondent explained that the guard could, for example, be provided with a removable cap in its upper end (ie the end opposite to the connection with the quick-change coupling). This would permit to gain access to the filter housing by removing the cap and to the filter material by pulling the detachable glass housing. The board sees no reason not to accept this explanation which is plausible and was not contested by the appellant. Therefore, the board considers that there is no inconsistency between the features of claim 1 and those of claim 5.

5. The appellant raised an objection of insufficiency of disclosure under Article 100(b) in connection with claim 1 for the first time in the statement of grounds of appeal. As indicated above amended claim 1 is based on a combination of granted claims 1 and 2. However, this ground of opposition was not raised in the notice of opposition neither in connection with granted claim 1 nor in connection with granted claim 2. Insufficiency of description was also not dealt with in the decision under appeal or during the opposition proceedings. The respondent referring to decision G 10/91 (OJ EPO, 1993, 420) did not give its approval for the introduction of this fresh ground of opposition into the appeal proceedings. The respondent (patentee) having refused to give its agreement, the matter is not

taken into consideration by the board, in accordance with decision G 10/91.

6. The subject-matter of claim 1 meets the requirement of novelty with respect to the cited prior art. This was no longer disputed by the appellant at the oral proceedings. In these circumstances, further considerations in this respect are not necessary.

7. Turning to the issue of inventive step, the opposition division and the parties considered that D6 represents the closest prior art. The board can follow this approach taking into account that D6 discloses a filter for cleaning gases provided with a quick-change coupling and which does not present the drawback of plastic bodied filters.

D6 discloses a "Cartridge Model Oxygen Trap" suitable for use in high resolution chromatography, which comprises a disposable canister filled up with a highly active metal reagent. The canister is provided with a flanged portion at its end that is protected by a foil seal. The cartridge is connected to a "body" by means of a knurled aluminium retaining nut. As replacement cartridges can be installed in seconds, the cartridge can be considered to be provided with a quick-change coupling. The cartridge is an all-metal construction which eliminates the signal noise associated with plastic bodied filters. D6 further discloses that an inexpensive "Indicating Oxygen Trap" should be installed downstream to signal oxygen breakthrough and prevent premature replacement of the getter cartridge (see drawing and description on page 104).

7.1 At the oral proceedings the question was first discussed which part of the purifying device shown in the drawing of D6 could be considered as the quick-change coupling. As pointed out in point 3 above (interpretation of the expression "quick-change coupling" in claim 1), the quick-change coupling as defined in the patent in suit is the part of the coupling that is connected to the filter housing and it should be distinguished from the "coupling piece" provided in the gas-carrying line. If the same definition and terminology are applied to the cartridge of D6, then the "body" (also termed "base plate" in the respondent's letter of 12 January 2001) corresponds to the "coupling piece", whereas the flanged portion of the canister is the quick-change coupling. Therefore, D6 discloses that the replacement getter cartridge is detachably connected to the coupling piece ("body") by means of the knurled retaining nut, but it does not give any information as to how the quick-change coupling is connected to the filter housing.

7.2 Starting from D6 as the closest prior art, the problem underlying the patent in suit can be seen in the provision of an environment-friendly filter which does not require the use of a separate indicator downstream in the gas-carrying line, while still providing very clean gases.

It is proposed to solve this problem by the filter as defined in amended claim 1. This filter differs from the filter of D6 in that (i) the filter housing is made of glass and enclosed by a guard instead of being made of metal in D6, and (ii) the filter is detachably connected to the quick-change coupling. It is derivable

from the patent in suit that the use of a glass housing and metal quick-change coupling which are inert to the gases to be cleaned and do not release any substances during operation, makes it possible to achieve a very good cleaning of the gases. The cleaned gases are suitable for use in detection processes such as gas chromatography with a detection limit of 10^{-14}. Furthermore, a filter having the quick-change coupling and the glass filter housing detachably connected to each other offers the advantage that the filter material can be replaced by new filter material without involving the loss of the filter housing and the quick-change coupling. Both can be re-used and need not be discarded so that they do not form any burden to the environment. It is also shown in the example of the patent in suit that an indicator may be located in the glass housing as in the case of known filters made of transparent plastic material (see patent in suit, column 2, lines 7 to 41; column 3, example, lines 35 to 42). In view of this information in the patent in suit, it is credible that the problem stated above has actually been solved by the claimed filter.

The appellant alleged that the required gas purity would not be achieved with the claimed filters since a gas-tight, detachable connection between a glass housing and a metal coupling could not be obtained without using Teflon seals, Viton rubber O-rings and polyethylene caps which would release undesired substances into the gas to be cleaned. This allegation was contested by the respondent. The board observes that, according to the patent in suit, the filter is suitable for cleaning gases used for the purpose of gas chromatography with a detection limit of 10^{-14} (see

preceding paragraph and example of the patent). Although the burden of proof lies on the appellant in connection with its allegation that the problem has not been solved, the appellant has provided no evidence that the presence of the said seals or O-rings results in a gas which does not exhibit the degree of purity required for use in gas chromatography with the said detection limit. In these circumstances the board cannot accept the appellant's arguments.

7.3 The environmental problem due to disposable cartridges is not addressed in D6, let alone measures for avoiding any burden to the environment. The possibility of re-using certain parts of the cartridge is also not suggested in D6 which, on the contrary, is focused on disposable cartridges. As pointed out by the respondent and not contested by the appellant, in the 80's and at the beginning of the 90's the main product available on the market was a disposable filter, namely the Chrompack filter disclosed in the Brochure "Chrompack News" (ie D5) referred to in the patent in suit, and the environmental problem resulting from disposable cartridges became salient only after the present invention. D5, D1 and D2, likewise do not address the environmental problem, let alone suggest that parts of the filter might be re-used. In these circumstances the board sees no reason not to accept the respondent's arguments that, at the priority date (15.01.1993), the skilled person starting from the filter of D6 would first of all have had to realise that parts thereof should be re-usable in order to avoid any burden to the environment. Then the skilled person would have had to find out how this filter could be made re-usable. It cannot be inferred from the drawing or from the short

text of D6 that the quick-change coupling and the metal filter housing are detachably connected to each other. D2, which the appellant relied upon at the oral proceedings, discloses an Indicating Oxygen Trap comprising a heavy-walled glass body. Swagelok fittings are mentioned at the end of the text concerning this device. The material the fittings are made of is not indicated, and the appellant has provided no evidence that the Swagelok fittings with the numbers "cat.# 20603" or "20604" are metal quick couplings. Furthermore, the copy is of such a poor quality that it is hardly possible to derive any information from the figure in the right-hand column referred to by the appellant. It may be assumed that Swagelok fittings are present on each side of the indicating tube and allow its installation into the carrier gas line. Nothing can be inferred from this figure about the construction of the indicating trap at both ends of the glass body. Therefore, D2 cannot give the skilled person an incentive to detachably connect the filter housing to the quick-change coupling in the cartridge of D6. The OMI-1 Indicating tube disclosed in D1 comprises a plastic-coated glass body. The glass body and Swagelok brass fittings prevent oxygen and water from diffusing or leaking into the gas (see page 2, right-hand column; page 3, 1st and 2nd paragraphs). The poor quality of the copy likewise does not allow to derive from the figure on page 3 how the indicating tube is built at its ends. It is questionable whether the fittings which are present on each side of the indicating tube and allow its installation into the gas-carrying line are quick couplings. In any case they are not quick-change couplings in the meaning of the patent in suit. Therefore, D1 and D2 contain no information suggesting

that the filter housing should be detachably connected to the quick-change coupling in the cartridge of D6. D16 and D17 neither relate to gas purifying devices nor address the problem of providing environment-friendly filters.

7.4 In another line of argument, the appellant did not start from the all-metal construction cartridge of D6 but considered that it was obvious in view of the teaching of D1 and D2 to replace the metal housing of this cartridge by a glass housing, while keeping the metal quick-change coupling. It took this modified cartridge as starting point for its further arguments. The question whether or not the said replacement was obvious in view of D1 and D2 can remain open, since it does not change the outcome of the present decision. For the sake of argument, it is thus assumed in favour of the appellant that this modification does not involve an inventive step.

The appellant's arguments that the claimed filter lacked an inventive step because it would have been obvious to detachably connect the filter housing to the quick-change coupling in order to re-use them and to regenerate the filter material, are not convincing for the following reasons. It was indeed well-known before the priority date that glass and metal parts can be connected to each other by either a detachable connection using gaskets, or by a "permanent" connection obtained for instance by melting the glass to the metal. However, one aspect of the problem to be solved was to provide a filter leading to very clean gases. The skilled person knew that, in order to achieve this objective, he had to avoid as far as

possible any risk of leak. Therefore, the skilled person would have been prompted to use a non-detachable glass-metal connection for connecting the filter housing to the quick-change coupling, since it was also well-known before the priority date that such connections do not leak and are gas-tight. Non-detachable, gas-tight connections between glass and metal are for example known for light bulbs, ie a cheap mass production product. The appellant's arguments do not take into account an important aspect of the problem, namely that a very clean gas has to be produced. Furthermore, as already indicated above, none of the documents hints at the possibility of re-using parts of the filter cartridge and the skilled person had firstly to realise that the filter housing and the quick-change coupling should be re-used. Even if the skilled person had thought of re-using these parts of the cartridge, then he would however have been prompted to choose a "permanent" glass-metal connection since this kind of connection is not only known to be gas-tight, but it also allows to re-use the cartridge and to regenerate the filter material. As argued by the respondent at the oral proceedings, the filter material of a filter having a permanent glass-metal connection can be regenerated by carefully heating the whole filter in the presence of an appropriate regenerating gas flowing through the filter. Therefore, the skilled person considering all aspects of the problem he was confronted with would not have been directed to detachably connect the glass housing to the quick-change coupling in the cartridge of D6 modified as indicated above.

7.5 The appellant's further line of arguments starting from the ascertainment that the quick-change coupling was acting as a lid for the filter housing in the patent in suit cannot be followed by the board. This line of argument is clearly based on an *ex post facto* analysis of the case requiring the knowledge of the invention since neither in D6 nor in D5 the quick-change coupling can be considered as acting as a detachable lid for the filter housing, which would facilitate access to the filter material.

7.6 The other documents published before the priority date, in particular D11 and D12, which the appellant no longer relied upon at the oral proceedings, are far more removed from the claimed subject-matter than the documents considered above. They contain no information which, in combination with the teaching of the preceding documents, would render the claimed filter obvious.

8. It follows from the above that the appellant's arguments concerning inventive step did not succeed in convincing the board that subject-matter of claim 1 lacks an inventive step. Claim 1 is thus considered to meet the requirement of inventive step set out in Articles 52(1) and 56 EPC. Claim 1 being allowable, the same applies to dependent claims 2 to 5, whose patentability is supported by that of claim 1.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann R. Spangenberg