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D E C I S I O N
of 19 November 2001

Case Number: T 0396/99 - 3.2.4

Application Number: 92307644.2

Publication Number: 0533357

IPC: F16J 15/08

Language of the proceedings: EN

Title of invention:
Metal gasket

Patentee:
NIPPON GASKET COMPANY Ltd.

Opponent:
ElringKlinger AG

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - yes"

Decisions cited:
T 0024/81

Catchword:
-



Case Number: T 0396/99 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 19 November 2001

Appellant: ElringKlinger AG
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Respondent: NIPPON GASKET COMPANY Ltd.
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Representative: Jenkins, Peter David
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 9 March 1999
rejecting the opposition filed against European
patent No. 0 533 357 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: C. A. J. Andries
Members: M. G. Hatherly
H. Preglau

Summary of Facts and Submissions

- I. The opposition division's decision rejecting the opposition against European patent No. 0 533 357 was posted on 9 March 1999.

On 16 April 1999 the appellant (opponent) filed an appeal and paid the appeal fee, filing the statement of grounds on 13 July 1999.

- II. Claim 1 as granted reads:

"A metal gasket (1) including an elastic plate, disposed in use between a cylinder block and a cylinder head fixed to said cylinder block, which is made of a metal material, and having holes (2) for combustion chambers and beads (11,21,31) as seal portions having convexities on one of the surfaces thereof and concavities on the other surface formed along said holes (2), said elastic metal plate comprising a first elastic metal plate (10), a second elastic metal plate (20), and a regulation plate (30) disposed between said first and second elastic metal plates (10,20), said first elastic metal plate (10) having holes (2) and beads (11) formed along said holes (2), said beads (11) having convexities on one of the surfaces thereof and concavities on the other surface thereof, said regulation plate (30) having holes (2) matching with said holes (2) in said first elastic metal plate (10) and turnup portions (35) facing outward in a radial direction of said holes (2) defined therein, said second elastic metal plate (20) being so disposed as to oppose said regulation plate (30); characterised in that said regulation plate (30) has beads (31) formed along said holes (2) defined therein, said beads (31)

having convexities on one of the surfaces thereof and concavities on the other surface thereof, in that said turnup portions (35) are turned up towards said convexities of said beads (31) of said regulation plate (30), in that said convexities of said beads (11) of said first elastic metal plate (10) are laminated on said concavities of said beads (31) of said regulation plate (30), in that said turnup portions (35) are shaped to a thickness smaller than the height of the portions where said beads (31) of said regulation plate (30) are formed so as to prevent full compression of said beads (31) of said regulation plate (30), and in that said second elastic metal plate (20) has beads (21) which face said beads (31) of said regulation plate (30), said convexities of said second elastic metal plate (20) opposing and being in mutual contact with said convexities of said beads (31) of said regulation plate (30)."

III. The following documents played a role in the appeal proceedings:

D1: EP-B-0 306 766.

D2: US-A-4 799 695.

D3: JP-A-2/118 275.

D3(T): Translation into English of D3.

D7: JP-U-50/26822.

D7(T): Translation into English of D7,

- EP-A-0 230 804,

- Decision X ZR 87/95 of the Deutsche Bundesgerichtshof of 9 December 1997, paragraph bridging pages 11 and 12,
- Daimler Benz cylinder head gasket technical description for OM628 in W220, W211, AAV - Fktgrp. Vlach, 16 October 1997, pages 1, 2 and 4 to 11 (not prior art).

IV. Both parties attended oral proceedings on 19 November 2001.

During the appeal proceedings the appellant argued that the gasket of the present invention was obvious to the skilled person in view of the prior art, in particular the teachings of D2.

During the appeal proceedings the respondent (patentee) maintained that no combination of the teachings of the prior art would lead the skilled person in an obvious way to the claimed subject-matter.

V. The appellant requested that the decision under appeal be set aside and the patent revoked.

The respondent requested that the appeal be dismissed i.e. that the patent be maintained unamended.

Reasons for the Decision

1. The appeal is admissible.
2. *Drawings*

The Figures on the third page of the drawings of the patent specification are wrongly numbered Figures 7 to 10 and do not correspond to the numbers used in the description. The corrected numbering Figures 6 to 9 will be used in this decision.

3. *Interpretation of claim 1*

3.1 Lack of clarity is not a ground for opposition but it is necessary to comment on the meaning of claim 1 before proceeding to examine whether its subject-matter is patentable.

3.2 The opening part of the claim, in column 11 from line 49 to "holes (2)" in line 56, sets out the basic construction of a commonly known engine gasket i.e. that is basically an elastic metal plate with holes for the combustion chambers and sealing beads around these holes.

The more specific description of the gasket starts in line 56 of column 11, the elastic metal plate consisting in fact of (at least) three plates, namely a first elastic metal plate 10, a second elastic metal plate 20 and a regulation plate 30.

3.3 Column 12, lines 2 to 4 and 12 to 14 explicitly specify that both the first elastic metal plate 10 and the regulation plate 30 have beads (11 and 31 respectively) formed along holes 2. The skilled person knows that such a bead is formed to produce a convexity on one surface of the plate and, aligned with this convexity, a concavity on the other surface of the plate. The convexities and concavities for these two plates are specified in column 12, lines 4 to 6 and 14 to 16

respectively.

While the second elastic metal plate 20 is specified as having beads and convexities (see column 12, lines 27 and 29), it is not explicitly specified that it has (combustion chamber) holes, that the convexities belong to the beads and that the beads also have concavities. However these two features are implicit for a multi-layer gasket and indeed the respondent confirmed during the oral proceedings that the claimed second elastic metal plate 20 is in these respects the same as the first elastic metal plate 10 and the regulation plate 30.

3.4 The first and second plates 10 and 20 are specified as being elastic and metal whereas these properties are not explicitly set out for the regulation plate 30. However since the regulation plate 30 is part of the "elastic metal plate" (see column 11, lines 56 to 58) and since it is a **regulation** plate having beads (see column 12, lines 12 to 14) which imply that the plate has a spring function, it is implicit that the regulation plate 20 must be elastic. The respondent confirmed this interpretation during the oral proceedings and, as pointed out by the appellant in the statement of grounds of appeal, the elasticity is specifically specified in various places in the description e.g. "a regulation plate 30 as an intermediate elastic metal plate" in column 6, lines 25 and 26.

3.5 Looking at Figure 3 of the patent, the turnup portion 35 is located on the same side as the convexity of the bead 31 of the regulation plate 30. This is what is meant by the statement in column 12, lines 16 to 18

that "said turnup portions (35) are turned up towards said convexities of said beads (31) of said regulation plate (30)". The word "towards" refers to the **axial** direction of the combustion chamber bore (i.e. on Figure 3 down the page).

At the oral proceedings the appellant argued that here the **radial** direction was meant (i.e. on Figure 3 across the page).

However it makes no sense to assume the claim means the radial direction because then there would be no need to refer to the convexity of the bead, one would refer simply to the bead as a whole. Furthermore the statement would then be superfluous because the opposite would be impossible, a "turnup portion" extending radially away from the bead i.e. away from the rest of the plate would extend into the combustion chamber hole and would not be not a turnup portion at all.

It seems that, prior to the oral proceedings, the appellant had correctly understood this feature (see e.g. the fifth paragraph on page 3 of the statement of grounds of appeal). The introduction of the objection for the first time at the oral proceedings seems to be an attempt on the part of the appellant to misunderstand the claim. However, the skilled person when considering a claim should rule out interpretations which are illogical or which do not make technical sense. He should try to arrive at an interpretation of the claim which is technically sensible and takes into account the whole disclosure of the patent (Article 69 EPC). The patent must be construed by a mind willing to understand not a mind

desirous of misunderstanding.

3.6 Figures 3 to 7 of the patent show that the inner edge 32 of the regulation plate 30 is folded over on itself to form a turnup portion 35 i.e. nothing is sandwiched by the turnup portion 35 and the remainder of the regulation plate 30.

However, in the embodiment of Figure 8 of the patent "the turnup portion interposes a soft member 50 and is then turned up", see column 11, lines 25 to 27 of the description.

The question is whether a gasket whose regulation plate edge sandwiches not a soft member 50 but one of the elastic metal plates 20 or 30 (in the manner of Figure 2 of D2) would be covered by the wording of the claim.

If the gasket of any of Figures 3 to 7 of the patent were modified to turn the regulation plate 32 upwards around the edge 12 of the first elastic metal plate 10 then the gasket would no longer satisfy column 12, lines 16 to 18 of claim 1 which requires that the turnup portion 35 is turned up towards the convexity of the bead 31 of the regulation plate 30.

If on the contrary, the gasket of any of Figures 3 to 7 of the patent were modified to turn the regulation plate 32 downwards around the edge 22 of the second elastic metal plate 20 then the turnup portion would be extremely thick and would lock the opposed beads 31 and 21 together so that a technically realistic gasket would not be obtained.

In view of the above (and because there is a fundamental difference between, on the one hand, the soft member 50 which plays a role only in the region of the turnup portion and, on the other hand, the elastic metal plates 20 and 30), the board finds that claim 1 excludes the regulation plate edge sandwiching one of the elastic metal plates 20 or 30.

3.7 Column 12, lines 29 to 32 state that the convexities of the second elastic metal plate 20 are "in mutual contact" with the convexities of the regulation plate 30.

Figures 6 and 7 show a direct contact of the convexities of the second elastic metal plate 20 and the regulation plate 30 but Figures 3 to 5 show an indirect contact i.e. via an intermediate plate 40, this plate 40 not being mentioned in claim 1.

Claim 7 specifies the intermediate plate 40 and states that it is between the regulation plate 30 and the second elastic metal plate 20. Thus claim 7 is directed to the gasket of Figures 3 to 5.

Since claim 7 is dependent on claim 1, claim 1 must be construed as covering the gasket of Figures 3 to 5. The set of claims must be looked at as a whole and therefore the board concludes that it is not necessary to amend claim 1 or to delete claim 7 and the embodiment of Figures 3 to 5.

The words "in mutual contact" are thus construed as meaning a direct or indirect contact while column 12, lines 29 to 32 makes it clear that in either case the respective convexities must be opposed i.e. aligned.

4. *Novelty*

The board is satisfied that none of prior art documents on file discloses a metal gasket with all the features of claim 1. This was not disputed by the appellant in the appeal proceedings.

The subject-matter of claim 1 is thus novel within the meaning of Article 54 EPC.

5. *Comparison of claim 1 with Figures 2 and 9 of D2 taken separately*

5.1 The gasket shown in Figure 9 of D2 has the features of the pre-characterising portion of claim 1 except that D2 refers only to a combustion chamber **hole** (see Figure 1) whereas the presently claimed gasket specifies "holes (2) for combustion chambersg" (see column 11, lines 52 and 53).

5.2 Figure 2 of D2 shows a completely different gasket to that of Figure 9 and lacks many of the features of the pre-characterising portion of claim 1. The gasket of Figure 2 is only explicitly disclosed for one combustion hole, it consists of only a flat base plate 4 (henceforth termed elastic metal plate 4) and a flat compensating or subplate 6 (henceforth termed regulation plate 6). Thus the regulation plate 6 cannot be disposed between first and **second** elastic metal plates. Since there is no second elastic metal plate, it cannot be so disposed as to oppose the regulation plate 6.

5.3 Using the division of the characterising portion of

claim 1 set out in the statement of grounds of appeal, Figures 2 and 9 of D2 disclose the following:

- a. "said regulation plate (30) has beads (31) formed along said holes (2) defined therein, said beads (31) having convexities on one of the surfaces thereof and concavities on the other surface thereof"

The compensation plate 44 (henceforth termed regulation plate 44) of Figure 9 of D2 has no beads and therefore there can be no bead convexities and concavities.

Figure 2 of D2 shows this feature a.

- b. "said turnup portions (35) are turned up towards said convexities of said beads (31) of said regulation plate (30)"

The meaning of "towards" is discussed in section 3.5 above.

Figure 9 of D2 shows the regulation plate 44 with a turned up edge 44a (henceforth termed turnup portion 44a) but the regulation plate 44 has no beads and so has no bead convexities for the turnup portion 44a to be turned up towards.

In Figure 2 of D2 the turnup portion 6a is turned up **away** from the convexity of the bead 14.

- c. "said convexities of said beads (11) of said first elastic metal plate (10) are laminated on said concavities of said beads (31) of said regulation

plate (30)"

The regulation plate 44 on Figure 9 of D2 has no beads and therefore no concavities and so cannot be laminated in the specified way with the bead convexities of either base plate 48 or 50.

Figure 2 of D2 shows this feature c.

- d. "said turnup portions (35) are shaped to a thickness smaller than the height of the portions where said beads (31) of said regulation plate (30) are formed so as to prevent full compression of said beads (31) of said regulation plate (30)"

The regulation plate 44 on Figure 9 of D2 has no beads and so there can be no height comparison with the turnup portion 44a and no compression whatsoever.

Figure 2 of D2 shows this feature c, see also Figure 3 of D2.

- e. "said second elastic metal plate (20) has beads (21) which face said beads (31) of said regulation plate (30)"

The regulation plate 44 on Figure 9 of D2 has no beads and so the beads of either base plate 48 or 50 cannot face something that does not exist.

Figure 2 of D2 shows no second elastic metal plate so there is no bead to face the bead 14 of the regulation plate 6.

- f. "said convexities of said second elastic metal plate (20) opposing and being in mutual contact with said convexities of said beads (31) of said regulation plate (30)"

The regulation plate 44 on Figure 9 of D2 has no beads and so the convexities of the base plate (48 or 50) cannot oppose or contact, directly or indirectly, something that does not exist.

Figure 2 of D2 shows no second elastic metal plate so there is no convexity to oppose or contact, directly or indirectly, the convexity of the bead 14 of the regulation plate 6.

6. *Closest prior art, problem and solution*

6.1 The parties and the board agree that the gasket closest to the present invention is that shown in Figure 9 of D2 which has essentially the features of the pre-characterising portion of claim 1 (see section 5.1 above).

6.2 The features of the characterising portion of claim 1 are not known from the gasket shown in Figure 9 of D2 (see section 5.3 above).

6.3 The problem arising from the gasket shown in Figure 9 of D2 is one of durability so that over time the gasket fails.

6.4 This problem is solved by the features of claim 1 and in particular by those of the characterising portion. The gasket of the present invention has three independent plates, each with a bead. The ends of the

plates can move independently of each other. In addition, there is no wrapping of a folded edge over an edge of another plate which could move relative to the first plate and lead to damage of the folded part. The three elastic metal plates bear the load stress via the three beads. In contrast, D2 and the other documents relied upon by the appellant in the appeal proceedings) provide at most two beaded plates in any single gasket.

7. *Inventive step*

7.1 In the third paragraph of the statement of grounds of appeal the appellant argues that all features of the characterising portion of claim 1 are known from the two different embodiments shown in Figures 2 and 9 of D2. Essentially, the appellant maintains that these embodiments would lead the skilled person in an obvious way to the gasket defined by claim 1.

7.2 Starting in the fourth paragraph of page 4 of the statement of grounds of appeal, the appellant argues that the present patent is concerned with using the regulation plate additionally to reinforce the bead of one of the elastic metal plates of the gasket of Figure 9 of D2. The appellant continues that, since it is known from D2 to use a laminated structure of two elastic layers for bead reinforcement (see column 5, lines 4 to 7 of D2 describing the embodiment of Figures 1 to 3), if there are durability problems with the beads of Figure 9 of D2 then it would be obvious to reinforce them, as shown in Figure 2 of D2, Figure 3 of D3 or Figure 4 of D7.

The description of Figure 3 of D3 on page 14, lines 21 to 24 of the translation D3(T) states that "piling a

bead ... over the convex bead 12 ... so that the elastic restorability of the bead 12 can be increased" but the board does not see that D3 brings anything more than D2.

Figure 4 of D7 also shows superimposed beads but the board considers this document to be less relevant than D2 and D3 because no reason is given in the translation D7(T) for superimposing the beads and no distinction is drawn between superimposed beads in Figure 3 and beads pointing away from each other in Figure 4.

7.3 The appellant rightly maintains that, as set out in the paragraph bridging pages 11 and 12 of the Decision X ZR 87/95 of the Deutsche Bundesgerichtshof, the skilled person in the present case would be a professionally qualified engineer with years of experience in gaskets. However the board wishes to emphasise that, when assessing inventive step, even this skilled person can only use that part of his knowledge which is available to the public (prior to the priority date). The skilled person's "years of experience" may include internal knowledge of his firm not available to the public. So simply to maintain that a skilled person could do something is insufficient. It must be clear why and how in a technically realistic manner the skilled person **would** do it and this approach has to be based on knowledge available to the public.

In the last paragraph on page 2 to the third paragraph on page 3 of the letter of 15 October 2001 the appellant cites standardisation and cost reasons and the engine manufacturer's specification (see the non-prior art Daimler Benz cylinder head gasket technical description) for arguing that the skilled person

wishing to change the gasket's spring force would neither change the thickness or stiffness of the metal plates nor alter the bead shape but that his only realistic possibility would be to stiffen the bead, namely by providing the regulation plate with a bead, as is known in other gaskets.

The board notes however that, if it were obvious to modify the gasket of Figure 9 of D2 by adding a bead to its regulation plate 44, the result would be a gasket with beads in three base plates but none of the documents relied upon by the appellant in the appeal proceedings - regardless of the specific type of the gasket - discloses a gasket with beads in three base plates.

Moreover the appellant's view is not borne out by at least the published prior art document D1 which from column 14, line 52 to column 15, line 1 explains that to change the spring characteristics the bead heights can be varied in accordance with the turnup portion.

- 7.4 In the second paragraph on page 5 of the statement of grounds of appeal, the appellant states that it is not a question of combining the embodiments of Figures 2 and 9 of D2. It is instead that the skilled person is sometimes faced with the problem of cracks or the like occurring in the bead of the first elastic metal plate. The appellant maintains that it is then a purely mechanical measure to reinforce the bead, as far as possible without affecting the other functions and in particular the stopper function and that using the stoppered plate of Figure 2 of D2 leads necessarily to the construction of the embodiments of the present patent.

7.4.1 In Figure 9 of D2 if the regulation plate 44 were to be provided with a bead to be fitted over the bead of either the first or the second elastic metal plate 48 or 50 then it would be necessary to provide a bead also in the intermediate plate 46 and the board cannot see that this would be obvious.

7.4.2 The appellant argues in paragraph 2 of page 4 of the statement of grounds of appeal that it follows from e.g. claim 1 of D2 that the intermediate plate 46 of Figure 9 of D2 is optional.

The board notes however that in fact claim 1 of D2 teaches **away** from the intermediate plate 46 being optional because it specifies two non-beaded plates (column 11, lines 37, 38, 49 and 50) i.e. the compensating (regulation) plate 44 and the intermediate plate 46.

Moreover the skilled person would be deterred from removing the intermediate plate 46 from Figure 9 of D2 because the turnup portion 44a could then no longer sandwich the edge of the intermediate plate 46 and thus also column 11, lines 50 to 53 of claim 1 of D2 would not be satisfied so that the skilled person would be departing even further from the teaching of D2 as expressed by claim 1.

The turnup portion of the regulation plate 44 of Figure 9 of D2 sandwiches the intermediate plate 46 while the regulation plate 6 of Figure 2 of D2 sandwiches the elastic metal plate 4. The skilled person could therefore be expected, if he used the regulation plate of Figure 2 of D2 in the embodiment of Figure 9 to use the turnup portion to sandwich the

first elastic metal plate 48. However this would not be in accordance with claim 1 of the patent (see the final paragraph of section 3.6 above).

Even if the stoppered plate 6 of Figure 2 of D2 were used in the embodiment of Figure 9 of D2 without the latter's intermediate plate 46 and without the turnup portion sandwiching the first elastic metal plate 48, then the result would still not be the gasket of claim 1 of the present patent because in Figure 9 the regulation plate 44 has no bead convexities for the turnup portion 44a to be turned up towards and in Figure 2 the turnup portion 6a is turned up **away** from the convexity of the bead 14 (see section 5.3 b above).

Also claim 8 of D2 (which is the independent claim directed to the embodiment of Figure 9) specifies two non-beaded plates (see column 14, lines 11 to 13) so the intermediate plate 46 cannot be optional. Therefore there should be a clear pointer and a good reason in the available prior art to deviate from the combination claimed by claim 8 of D2 but these have not been put forward by the appellant.

7.5 It was not clear to the board from the statement of grounds of appeal precisely what the construction of the gasket would be that the appellant was alleging was obvious and would fall within the scope of claim 1 of the patent.

In the oral proceedings however the appellant sketched the following construction, having four layers, namely - from the top downwards - a first elastic metal plate, a regulation plate, an intermediate plate and a second elastic metal plate. The first elastic metal plate had

a bead pointing downwards. The regulation plate had a bead pointing downwards and laminated on the bead of the first elastic plate. The second elastic metal plate had a bead pointing upwards. The intermediate plate was thus located between the bead of the regulation plate and the bead of the second elastic metal plate. Towards the combustion chamber hole the intermediate plate was bent upwards and its edge was sandwiched by a turnup portion of the regulation plate.

The appellant argued that this construction fell within the scope of claim 1 of the patent and was merely the result of providing the regulation plate 44 of the gasket of Figure 9 of D2 with a bead and then turning the gasket upside down.

The board however sees that a further change is needed, namely to bend the intermediate plate and the board cannot see that the skilled person would carry out this step, particularly since nothing in the available prior art discloses it or even suggests it.

Moreover D2 teaches away from such modifications because the claim in D2 which is directed to Figure 9 is claim 8 and this claim requires that each of the second base plates (i.e. the regulation plate 44) and the fourth base plate (i.e. the intermediate plate 46) is "substantially flat and free of annular beads" (see column 14, lines 11 to 13) whereas in the sketched construction the regulation plate is beaded and the intermediate plate is bent.

7.6 The appellant also maintains that if problems arose with the beads of the first base plate 48 on Figure 6 of D2 then it would be obvious to reinforce the beads

by using the plates of Figure 2 of D2, the latter plate being a plate having a stopper function.

However the board observes that both beads in Figure 6 point the same way (downwards) as do both beads in Figure 2 and that therefore that, even if it were obvious to modify the regulation plate 44 of Figure 6 to make it like the regulation plate 6 of Fig.2, then the result would be three beads all pointing downwards which however would not be in accordance with column 12, lines 26 to 32 of claim 1 of the present patent.

7.7 In the fourth paragraph on page 2 of the letter of 15 October 2001 the appellant argues that the claims of D2 are much more general than the individual embodiments and deliver a teaching to the skilled person that also covers combinations of the individual embodiments. Moreover the appellant points out that headnote II in T 24/81 (OJ EPO 1983, 133) states that "all previously published embodiments must be taken into consideration which offered a suggestion to the skilled practitioner for solving the problem addressed, even where those embodiments were not particularly emphasised."

The board opines that if the claims of D2 are themselves to deliver a teaching then what they teach must be within the scope of these claims. Independent claim 1 of D2 teaches three base plates of which two are free of annular beads (see column 11, lines 37, 38, 49 and 50) whereas according to claim 1 of the present patent there must be beads on three plates. Independent claim 7 of D2 concerns the embodiment of Fig.8 which shows a bead on only one plate. Independent claim 8 of

D2 teaches four base plates of which two are free of annular beads (see column 14, lines 11 to 13). Thus the presently claimed metal gasket falls within the scope of none of the claims of D2.

- 7.8 The board finds that the other prior art documents relied upon by the appellant in the appeal proceedings would not lead the skilled person in an obvious way to the claimed metal gasket.

The disclosure of EP-A-0 230 804 is similar to that of D2. A number of the embodiments of D1 are similar to those of D2, in particular Figure 6 of D1 is similar to Figure 9 of D2 apart from respectively the lack or presence of a fourth plate. However providing the compensation plate 12 of Figure 6 of D1 with a bead to conform with the bead 18 or 20 of either base plate 4 or 6 would not be obvious because it would then be necessary also to modify the turnup portion on compensation (regulation) plate 12 and this would destroy the turnup portion's symmetry of $h7 = h8$ and thus go away from the teaching of claim 1 of D1.

- 7.9 The board thus cannot see that any of the prior art documents relied upon in the appeal proceedings - taken singly or in combination - would lead the skilled person in an obvious manner to the subject-matter of claim 1 of the present patent.

8. The patent may therefore be maintained unamended.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Magouliotis

C. Andries