Datasheet for the decision of 11 December 2013

Case Number: T 2059/10 - 3.2.05
Application Number: 04710000.3
Publication Number: 1599689
IPC: F16L15/06
Language of the proceedings: EN

Title of invention: A threaded joint for tubes

Patent Proprietor: Tenaris Connections Ltd.

Opponent: Vallourec Oil & Gas France

Relevant legal provisions:
RPBA Art. 13(1)
EPC 1973 Art. 100(b)

Keyword:
Late-filed requests - justification for late filing (no)
Sufficiency of disclosure (no)
DECISION
of Technical Board of Appeal 3.2.05
of 11 December 2013

Appellant: Tenaris Connections Ltd.
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Decision under appeal: Decision of the Opposition Division of the European Patent Office posted on 5 August 2010 revoking European patent No. 1599689 pursuant to Article 101(3)(b) EPC.

Composition of the Board:
Chairman: M. Poock
Members: S. Bridge
G. Weiss
Summary of Facts and Submissions

I. An appeal was lodged against the decision of the opposition division revoking the European patent No. 1 599 689.

The opposition was filed against the patent as a whole based on Article 100(a) EPC 1973 (non patentable subject-matter under Article 52(2)(a) EPC 1973, lack of novelty, Article 54 EPC 1973, and lack of inventive step, Article 56 EPC 1973) and Article 100(b) EPC 1973 (the invention is not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art).

The opposition division held that the invention is not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

II. Oral proceedings were held before the board of appeal on 11 December 2013.

The appellant (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the claims submitted at the oral proceedings on 11 December 2013 as main request, first, second and third auxiliary requests or on the basis of the claims filed with letter dated 8 November 2013 as main request and first, second and third auxiliary requests now renumbered as fourth to seventh auxiliary requests.

The respondent (opponent) requested that the appeal be dismissed.
III. Claim 1 according to the main request reads as follows:

"1. A threaded joint for pipes, comprising a pin (1,1',
1") and a box (2,2',2"), each having, at at least one
end, a respective threaded portion, the joint being
provided with two most distant seals, in which said
respective threaded portions are coated with a layer of
dry lubricant having a thickness of between 5 μm and
30 μm and in which a nominal void volume (NVV) of the
space (6,7) between pin member and box member is sized
so that the following formula is satisfied:

\[ NVV[cm^3] \leq 4 \times OD[inch] \]

where OD is the nominal outer diameter of said pipes,
and wherein NVV is calculated by evaluating the empty
spaces between the two most distant seals."

IV. Claim 1 according to the first auxiliary request
differs from claim 1 according to the main request in
that, the feature:

"so that the following formula is satisfied:

\[ NVV[cm^3] \leq 4 \times OD[inch] \]

where OD is the nominal outer diameter of said pipes"

reads instead:

"so that the following formulas are satisfied:

\[ NVV[cm^3] \leq 4 \times OD[ins] \]

and

\[ \frac{NVV[cm^3]}{OD[ins] \times \sqrt{Wt[mm]}} \leq 1 \]

where OD is the nominal outer diameter of said pipes
and Wt is the thickness of the wall of said tubes".
V. Claim 1 according to the second auxiliary request differs from claim 1 according to the first auxiliary request in that, the feature "the joint being provided with two most distant seals" is replaced by the feature "the joint being provided with two most distant seal elements" and the following additional feature is introduced at the end of the claim: "wherein the area $g_T$ of the free space (5, 6) between the threads engaged in the section of the joint considered on an axial plane is less than \(0.4 \text{mm}^2/\text{pitch}\).".

VI. Claim 1 according to the third auxiliary request differs from claim 1 according to the second auxiliary request in that, the following additional feature is inserted after "the joint being provided with two most distant seals,": "wherein the pin has two outer threaded portions (12, 13) with frusto-conical shape, which are axially staggered and separated by a shoulder (9'), and the box has two inner threaded portions (10, 11) having a frusto-conical shape, which are axially staggered and separated by a shoulder (9''), which acts as a detent during screwing,"

VII. Claim 1 according to the fourth auxiliary request reads as follows:

"1. A threaded joint for pipes, comprising a pin (1,1', 1") and a box (2,2',2''), each having, at at least one end, a respective threaded portion, the joint being provided with two seal elements, in which said respective threaded portions are coated with a layer of dry lubricant having a thickness of between 5 μm and 30 μm and in which a nominal void volume (NVV) of the
space (6,7) between pin member and box member is sized so that the following formula is satisfied:

\[ \text{NVV[cm}^3\text{]} \leq 4 \times \text{OD[inch]} \]

where OD is the nominal outer diameter of said pipes."

VIII. Claim 1 according to the fifth auxiliary request differs from claim 1 according to the fourth auxiliary request in that, the end of the claim "so that the following formula is satisfied:

\[ \text{NVV[cm}^3\text{]} \leq 4 \times \text{OD[inch]} \]

where OD is the nominal outer diameter of said pipes." reads instead:

"so that the following formulas are satisfied:

\[ \text{NVV[cm}^3\text{]} \leq 4 \times \text{OD[ins]} \]

and

\[ \frac{\text{NVV[cm}^3\text{]}}{\text{OD[ins]} \times \sqrt{Wt[mm]}} \leq 1 \]

where OD is the nominal outer diameter of said pipes and Wt is the thickness of the wall of said tubes."

IX. Claim 1 according to the sixth auxiliary request differs from claim 1 according to the fifth auxiliary request in that, the following additional feature is introduced at the end of the claim: "wherein the area \( g_T \) of the free space (5,6) between the threads engaged in the section of the joint considered on an axial plane is less than 0,4 \( \text{mm}^2/\text{pitch} \)."

X. Claim 1 according to the seventh auxiliary request differs from claim 1 according to the sixth auxiliary request in that, the following additional feature is inserted after "the joint being provided with two seal
elements,": "wherein the pin has two outer threaded portions (12, 13) with frusto-conical shape, which are axially staggered and separated by a shoulder (9'), and the box has two inner threaded portions (10, 11) having a frusto-conical shape, which are axially staggered and separated by a shoulder (9''), which acts as a detent during screwing,"

XI. The following documents are referred to in the present decision:


XII. The arguments of the appellant in the written and oral proceedings can be summarised as follows:

Although a main request and a 1st, 2nd and 3rd auxiliary request (now renumbered as fourth to seventh auxiliary request) were already filed on 8 November 2013 in response to the annex to the summons to oral proceedings before the board, the practical difficulties in liaising with remote technical experts and inventors meant that the new main request and 1st, 2nd, and 3rd auxiliary requests now filed during oral proceedings on 11 December 2013 could not be provided any earlier. The respective claims 1 of these requests have been further limited by the introduction of features concerning two most distant seals. This change was made in response to an issue raised in the annex to the summons to oral proceedings before the board and is such that it can easily be dealt with by the respondent and the board. For these reasons, the new main request and 1st, 2nd, and 3rd auxiliary requests filed during oral procee-
dings on 11 December 2013 should be admitted into the proceedings.

Although the scope of claim 1 is not limited to the natural-gas and oil extraction industry, the relevant skilled person is from that industry. This skilled person understands that NVV should be understood as the actual amount of empty space present within the joint. The language in the description concerning NVV being an "index" (paragraph [0037]) is merely a poor translation from the Italian. Instead NVV should be understood as providing an "indication" of the amount of empty space present within the joint. The skilled person knows how to calculate the amount of empty space present within the joint, for example, using a computer aided design (CAD) system. The calculations and equations set out in paragraph [0039] merely explain the approximate, possibly wrong, calculations made by the inventor in arriving at the equation of claim 1. Alternatively, the calculations and equations set out in paragraph [0039] provide at least one manner of calculating NVV - a skilled person from the natural-gas and oil extraction industry knows how to perform these calculations and what is meant by the perfect thread length (PTL), the imperfect thread length (ITL) and nominal configuration of the joint which are, for example, disclosed in catalogues where the joint is shown under load. The invention is thus disclosed in a manner sufficiently clear and complete for it to be carried out by a skilled person from the natural-gas and oil extraction industry.
XIII. The arguments of the respondent in the written and oral proceedings can be summarised as follows:

The changes made to the respective claims 1 of the new main request and 1st, 2nd, and 3rd auxiliary requests filed during oral proceedings on 11 December 2013 do not address all the insufficiency of disclosure issues raised in the annex to the summons to oral proceedings before the board. Furthermore, the changes made introduce new problems with respect to Article 123(2) EPC, for example, with respect to the newly introduced feature of "two most distant seals". The explanation of the appellant concerning difficulties in liaising with remote technical experts or inventors is not sufficient to justify surprising the respondent with these late filed requests, in particular as the appellant had already filed a main request and 1st, 2nd and 3rd auxiliary request (now renumbered as fourth to seventh auxiliary request) on 8 November 2013 in response to the annex to the summons to oral proceedings before the board. For these reasons the main request and 1st, 2nd, and 3rd auxiliary requests filed during oral proceedings on 11 December 2013 should not be admitted into the proceedings.

The parameter NVV (nominal void volume) is not usual in the technical area of threaded joints. The appellant's position that NVV should be understood as the actual amount of empty space present within the joint is contradicted by the description which explicitly states that the nominal empty volume is "an index" thereof (paragraph [0037]) and that NVV "must be" calculated using the equations set out in paragraph [0039]. These equations do not calculate the actual amount of empty space present within the joint. Furthermore, the only manner of calculating NVV (as defined in paragraph
[0039] of the patent in suit) involves ill defined quantities \((g_T, PTL, ITL, k, G_c)\) which require the skilled person to make arbitrary choices so that no consistent result can be obtained. Illustrations in catalogues are not always complete and the nominal configuration is a matter of definition, but none is supplied in the patent in suit. The patent in suit also fails to specify the kind of dry lubricant to be considered - however, this has implications for the amount of space it will need to occupy in the joint. Similarly, it is not clear whether NVV is to be calculated before or after the dry lubricant is applied. The latter issue is essential for determining \(g_T\) and \(G_c\). It is thus not possible for the skilled person to determine with certainty what to calculate for NVV or whether he is working in the prohibited area of the claims. In consequence, the invention is not disclosed in a manner sufficiently clear and complete to enable it to be carried out by a skilled person.

**Reasons for the Decision**

1. Admissibility of the main request and 1st, 2nd, and 3rd auxiliary requests filed during oral proceedings on 11 December 2013

The respective claims 1 of these requests have been further limited by the introduction of features concerning two most distant seals. Although this change addresses one of the issues raised in the annex to the summons to oral proceedings before the board, none of the other issues (such as the nature of the "nominal configuration"; whether the volume occupied by the dry lubricant is included or excluded from the calculation of "NVV"; the definition or calculation of the parame-
ters "perfect-thread length PTL", "imperfect-thread length ITL", "k" and "g_T" raised in point 8 of the annex to the summons to oral proceedings) were addressed and thus cannot be prima facie overcome. In addition, as pointed out by the respondent, these requests would need further discussions with respect to Article 123(2) EPC, for example, with respect to the feature that it is the "joint" which is provided with "two most distant seals" (main request and 1st auxiliary request), respectively, "seal elements" (2nd and 3rd auxiliary request).

The explanation of the appellant concerning difficulties in liaising with remote technical experts or inventors is not sufficient to permit such late filing of these requests, in particular as the appellant had already filed a main request and 1st, 2nd and 3rd auxiliary request (now renumbered as fourth to seventh auxiliary request) in response to the annex to the summons to oral proceedings before the board on 8 November 2013.

For these reasons the main request and 1st, 2nd, and 3rd auxiliary requests filed during oral proceedings on 11 December 2013 are not admitted into the proceedings.

2. Sufficiency of disclosure - Article 83 EPC 1973

2.1 Claim 1, respectively according to the fourth to seventh auxiliary request, refers to a quantity NVV "of the space (6,7) between pin member and box member" called "nominal void volume (NVV)". As pointed out by the respondent and not contested by the appellant, the term "nominal void volume" is not generally known in the art of threaded pin and box joints and is not further defined in claim 1.
2.2 Meaning of NVV

It was argued on behalf of the appellant that the skilled person would nevertheless understand NVV to be the actual amount of empty space present in the joint between pin member and box member. However, the board cannot follow this argument, because it is not supported by the language of the description and claims. The language of claim 1 (respectively according to the fourth to seventh auxiliary request) "in which a nominal void volume (NVV) of the space (6,7) between pin member and box member is sized so that ..." clearly places the emphasis on the "nominal void volume NVV" and not on the "the space (6,7) between pin member and box member" so that, although NVV is somehow related to this space, it is not necessarily identical to it.

According to the description of the patent in suit, NVV is also called "nominal empty volume" and is first mentioned in paragraph [0036] in connection with the formula $NVV[cm^3] \leq 4 \times OD[inch]$ which also appears in the claim. It is thus reasonable for the skilled person to conclude that the terms "nominal empty volume", "nominal void volume" and NVV are synonyms.

Paragraph [0037] defines the "nominal empty volume" as "an index of the amount of empty space present within the joint". This definition implies that NVV need not necessarily correspond to the actual "space (6,7) between pin member and box member" but only has to be an "index of the amount of empty space present within the joint" (underlining added by the board).

It was argued on behalf of the appellant that the language in the description concerning NVV being an
"index" (paragraph [0037]) is merely a poor translation from the Italian and that instead NVV is to be understood as providing an "indication" of the amount of empty space present within the joint. However, even assuming this argument to be correct, this does not change the situation, because again such an "indication" need not necessarily be identical to the actual amount of empty space present in the joint.

According to paragraph [0039] of description of the patent in suit the "nominal empty volume NVV is"

\[ NVV = \pi (G_T [mm^2] + G_C [mm^3]) \times OD [in] \times 25.4 \left[ \frac{mm}{in} \right] \]

where

\( G_T \) is the "total empty area in the thread \([mm^2]\),

\( G_C \) are "other empty spaces", and

\( OD \) is the outside diameter of the pipe.

This equation confirms that NVV is not the amount of empty space present in the joint between pin member and box member, because the sum of the areas of the empty spaces \( G_T + G_C \) "considered on an axial plane" is simply multiplied by \( \pi OD \), i.e. the circumference of the outer diameter \( OD \) of the pipe. Thus, the right hand side of the above equation only corresponds to the volume of a hypothetical torus of mean diameter \( OD \) and cross sectional area \( (G_T + G_C) \). By contrast, the calculation of the actual volume would instead require multiplication by the true length along one pitch of the thread at the respective centroids of the areas \( G_T \) and \( G_C \), i.e. not at the outside diameter of the pipe.

Thus, the disclosure of the patent in suit indicates that the quantity NVV is not "the amount of empty space
present within the joint" but merely an arbitrary quantity to be calculated by means of the equation

\[ NVV = \pi (G_T [mm^2] + G_C [mm^2]) \times OD [in] \times 25.4 \left( \frac{mm}{in} \right) \]

given in paragraph [0039], or in the language of the patent, corresponds to an "index".

2.3 Skilled person

Claim 1, respectively according to the fourth to seventh auxiliary request, concerns a threaded joint for pipes and is not limited to a particular field of industry. During the oral proceedings, the appellant confirmed that this was also his understanding of the subject-matter of claim 1.

The board thus cannot accept that the skilled person for this invention should be from the natural-gas and oil extraction industry as asserted by the appellant without the provision of any supporting argumentation. Paragraph [0001] of the patent in suit merely presents the natural-gas and oil extraction industry as an example.

Thus, the skilled person is an engineer skilled in the design of threaded pipe joints. However, such a skilled person will not necessarily be familiar with the natural-gas and oil extraction industry.

2.4 Calculating NVV

Although both parties agreed that the skilled person knows how to calculate the actual amount of empty space present within a joint, for example, using a computer aided design (CAD) system, the disclosure of the
invention indicates a different course of action so that "NVV must be calculated" (underlining added by the board) as set out in paragraphs [0038] and [0039] of the patent in suit.

Thus, the argument advanced on behalf of the appellant, that the calculations and equations set out in paragraph [0039] merely explain the approximate, possibly wrong, calculations made by the inventor in arriving at the equation NVV[cm²] ≤ 4 × OD[inch] of claim 1, cannot be followed, because it is contradicted by the language used in the disclosure of the invention.

Paragraph [0039] discloses that "the extension of said spaces must be calculated considering" (underlining added by the board) the "total empty area in the thread" GT and "other empty spaces" GC which are then used in the above final equation to calculate NVV.

2.4.1 "Total empty area in the thread" GT

According to paragraph [0039] the total empty area in the thread GT is defined as "the effective space on the sides of the threads and between crests and roots when the two threads are mutually engaged in the nominal configuration". The description remains silent concerning the nature of the "nominal configuration".

The adjective "nominal" typically refers to the ideal dimension of a component starting from which tolerances may be defined in the positive (component will be larger than ideal) or negative (component will be smaller than ideal) directions. However, in the case of a thread, the situation appears to be different, because the essential principle is that the actual
profiles of both the nut and bolt threads must never cross or transgress the theoretical profile. Practically, to make a thread, tolerances must be applied to ensure that this essential principal always applies. These tolerances merely specify a band of values for, say, the major diameter and the pitch diameter (e.g. ISO 965 ISO general purpose metric screw thread–tolerances) and will influence the space between the respective thread on the nut and bolt. Thus, in the case of a thread there is not necessarily any ideal value which would correspond to a "nominal configuration". Furthermore, when a nominal configuration has nevertheless been defined, it may not be unique. For example, document D07, figure 5 discloses differing "power-tight" and "hand-tight" configurations of a pin and box joint. However, the disclosure of the invention does not provide further guidance for determining the "nominal configuration". The argument advanced on behalf of the appellant, that what is shown in catalogues constitutes the "nominal configuration", was neither further substantiated nor is there any indication to this effect to be found in the patent in suit. Thus, reference to an undefined "nominal" configuration adds an arbitrary element to the calculation.

According to Paragraph [0039], the calculation is made using the following formula:

\[ G_T = g_T \times (PTL + ITL \times k) \times TPI \]

where

"\( G_T \) is the total empty area in the thread \([\text{mm}^2] \)

\( PTL \) is the perfect-thread length \([\text{ins}] \)

\( ITL \) is the imperfect-thread length \([\text{ins}] \)

\( TPI \) is the number of threads per inch \([\text{ins}^{-1}] \)

\( k \) is a constant which assumes that in the imperfect-thread length the empty spaces are greater than
the empty spaces in the perfect thread on account of the crests of the threads that are cut".

The patent in suit does not contain any further explanations concerning the perfect-thread length PTL or the imperfect-thread length ITL, or the nature of the imperfections referred to. In particular, although some standards (for example those of the American Petroleum Institute) may also use such vocabulary, there is no indication that the patent should only be understood in connection with a particular standard.

Although it is stated in paragraph [0039] that the parameter "k" has the value 5 in the above formula, there is no example of how it "is calculated [by] simulating the engagement of the threads in a portion of imperfect thread" or whether the value 5 is to be used in all cases.

The parameter $g_T$ is only mentioned in the above equation but is not otherwise explained in paragraph [0039]. However, the skilled person would assume that it is the same parameter $g_T$ which is explained in paragraphs [0033] and [0034] and which can either be calculated on the basis of the area 5 of figure 2 or on the basis of area 6 of figure 3. However, these two calculations necessarily yield different results, since one is only an approximation of the other. The patent in suit is silent about the significance of the difference or which one should be used for the above formula of paragraph [0039].

2.4.2 Calculations to be determined before or after application of the dry lubricant
According to the minutes of the oral proceedings before the opposition division, the appellant indicated that "the volume needed to accommodate the dry lubricant is designated as NVV" (point 5) but later changed this to "this volume is added to the lubricant, as is clear from paragraphs [0025], [0026] and [0035] of the patent specification" (point 12). In the contested decision, the opposition division considered that "the nominal void volume must be calculated before the dry lubricant is applied" (point 13.1.1). According to the grounds of appeal, the appellant now indicates that "...nominal values [are] determined before considering the layer of dry lubricant, as the voids are aimed at accommodating the dry lubricant" and the same paragraphs [0025], [0026] are now advanced for the opposite conclusion (page 04/25, lines 1 to 20 of the grounds of appeal). No reasons were advanced for these changes of position.

Paragraphs [0025] and [0026] of the patent in suit only indicate that a reduction of the empty spaces in the joint increases its performance and thus constitutes an optimisation of the joint - a statement which remains true whether the "empty space" in the joint is defined to include the space to be occupied by dry lubricant or not. These paragraphs thus do not shed any light on the issue of whether the "empty space" is to be calculated before or after dry lubricant is positioned in the joint.

According to claim 1 (respectively according to the fourth to seventh auxiliary request) and paragraph [0032], a dry lubricant coating thickness between 5µm and 30µm should be considered, but this does not shed any light on the issue of whether the empty space is to be calculated before or after dry lubricant is positioned in the joint.
Paragraphs [0033] to [0035] and [0039] and claim 1 (respectively according to the fourth to seventh auxiliary request) are ambiguous as to whether the parameters $g_T$ and $G_C$ i.e. the "free space between threads engaged in the section of the joint" and the "other empty spaces" are to be determined before or after application of the dry lubricant.

Thus, the skilled person (see point 2.3 above) cannot determine whether the empty spaces ($g_T$ and $G_C$) in the joint should be calculated before or after application of the dry lubricant.

It was argued on behalf of the appellant that the issue might be resolved by testing before and after the coating (of dry lubricant) was laid (page 05/25, second full paragraph, of the grounds of appeal). However, neither the nature of the tests nor any criteria for deciding the outcome were presented. In addition, no such tests or decision criteria are disclosed anywhere in the patent in suit. Thus, there is no concrete basis for concluding that the issue might be resolved through testing.

2.4.3 "other empty spaces" $G_C$

According to paragraph [0039], the "other empty spaces $G_C$" are designated by 7 of the joint illustrated in Figure 4 and "must be calculated when the male element and the female element are mated in the nominal configuration". There are no statements in the description as to how the particular example shown in figure 7 would carry over to threaded pipe joints in general as claimed in claim 1, respectively according to the fourth to seventh auxiliary request.
2.4.4 Thus, the skilled person wishing to calculate the quantity NVV is confronted with the following problems which are not resolved in the patent in suit:

- it is not clear what "nominal" configuration of the joint is referred to for calculating the "nominal void volume NVV" when considering two engaged screw threads in general, given that the length of engaged thread necessarily affects the "amount of empty space present within the joint";

- similarly, it is not clear whether the "nominal void volume NVV" calculations are carried out on the basis of the voids between the threads before or after the coating of dry lubricant has been applied. However, this issue is fundamental to any "optimisation of all the dimensions of the joint so as to reduce the total volume of the void space present therein" (paragraph [0026]);

- although vocabulary such as "perfect-thread length PTL" "imperfect-thread length ITL" appears in API standard D07, it is not clear whether the meaning these expressions have in a particular standard is being referred to. Furthermore, if the pipes are designed according to a different standard, it it not clear how PTL and ITL are to be determined;

- although the parameter "k" has the value 5 in the description, there is no example of how it "is calculated [by] simulating the engagement of the threads in a portion of imperfect thread" or whether the value 5 is to be used in all cases;

- the definition of the "other empty spaces" $G_C$ remains vague and open to arbitrary interpretations;

- the two ways of calculating the parameter $g_T$ given in the description would appear to yield different results, because one is an approximation of the
other. It is not clear which one should be used when evaluating the index NVV.

For all these reasons, the skilled person would not know how to resolve the above issues in order to calculate NVV according to the invention.

Furthermore, assuming, for the sake of argument, that the person skilled in the art wishing to practice the invention were able to calculate a sensible value for NVV for a given thread, then, if on finding that this NVV does not meet the requirement set out in claim 1, the patent in suit does not provide the skilled person with any teaching as to how "to optimize all the dimensions of the joint so as to reduce the total volume of the void space present therein" (paragraph [0026], underlining added by the board). In particular, there may be added difficulties when particular standards (e.g. document D07) also have to be met. Without such teaching, the skilled person has to start a research program as to which parameters of the thread should be changed by what amount.

It was argued on behalf of the appellant, that the calculations and equations set out in paragraph [0039] provide at least one manner of calculating NVV for a skilled person from the natural-gas and oil extraction industry and who knows what is meant by the perfect thread length (PTL), the imperfect thread length (ITL) and nominal configuration of such a the joint. However, as set out in point 2.3 above, such a choice of skilled person is not warranted by the more general scope of the claim and this does not address other issues such as the presence or not of the dry lubricant or on what basis the parameter k is to be determined.
2.5 For all the above reasons, the person skilled in the art of threaded joints cannot reliably calculate a value for NVV as used in claim 1 (respectively according to the fourth to seventh auxiliary request) for carrying out the invention.

The invention is thus not disclosed in a manner sufficiently clear and complete for it to be carried out by a skilled person (Article 83 EPC 1973).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Meyfarth M. Poock

Decision electronically authenticated