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Datasheet for the decision of 23 October 2023

Case Number: T 1114/21 - 3.3.05

Application Number: 15888078.1

Publication Number: 3231878

IPC: C21C7/00, C21C7/072, C21C5/34,

C21C5/48

Language of the proceedings: EN

Title of invention:

Bottom-blowing plug

Patent Proprietor:

TYK Corporation

Opponent:

Refractory Intellectual Property GmbH & Co. KG

Headword:

Bottom-blowing plug/TYK Corp.

Relevant legal provisions:

EPC Art. 84, 123(2) RPBA 2020 Art. 13(2)

Keyword:

Claims - clarity after amendment (no)
Amendments - allowable (no)

Decisions cited:

G 0003/14

Catchword:



Beschwerdekammern

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Case Number: T 1114/21 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 23 October 2023

Appellant 2: TYK Corporation

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Representative: Mr Schob and Mr Dillis

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Appellant 1: Refractory Intellectual Property GmbH & Co. KG

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Representative: Mr Pacher and Mr Stübegger

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Decision under appeal: Interlocutory decision of the Opposition

Division of the European Patent Office posted on

6 May 2021 concerning maintenance of the European Patent No. 3231878 in amended form.

Composition of the Board:

P. Guntz

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Summary of Facts and Submissions

- I. The appeals from the opponent (appellant 1) and the patent proprietor (appellant 2) lie from the interlocutory decision of the opposition division to maintain patent EP 3 231 878 B1 in amended form on the basis of what was then auxiliary request 4.
- II. Claim 1 of the requests at issue reads as follows:

Initial remark: Claim 1 as originally filed is identical to claim 1 of the patent as granted. The amendments with respect to the original claim 1 in the auxiliary requests comprise the additional features or omissions, respectively, mentioned below, which are marked up (additions, deletions), unless otherwise stated.

Main request

"1. A bottom blowing plug to be attached to a combined blowing converter capable of processing 150 t or more of molten iron at a time, and comprising a plug body having an upper surface to contact the molten iron, the upper surface having a group of openings comprising openings of at least 30 through holes and inert gas being injected at 20 to 60 Nl/min from each one of the openings, wherein the group of openings is located at a central portion of the upper surface of the plug body, and when $S_{\rm u}$ cm² is area of the upper surface and $S_{\rm o}$ cm² is area of an opening group portion where the group of openings is located, $S_{\rm o}/S_{\rm u} \leq 0.25$ and $S_{\rm u}$ cm² \geq 400 cm², and—the opening group portion has an outermost contour, density of the openings constituting the group of

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openings, which is expressed by the number of openings divided by the area S_0 of the opening group portion, is 0.6 to 3.9 opening/cm², and no opening is provided at a position closest to a periphery of the upper surface on the outermost contour of the opening group portion."

Auxiliary request 1

"and the opening group portion has an outermost contour formed by connecting centers of adjacent outermost openings" after the feature " S_u cm² \geq 400 cm²," and

", and no opening is provided at a position closest to a periphery of the upper surface on the outermost contour of the opening group portion." at the end of the claim.

Auxiliary request 2

"and the opening group portion has an outermost contour having a polygonal or a polygon-like shape formed by connecting centers of adjacent outermost openings" after the feature " S_u cm² \geq 400 cm²," and

", and no opening is provided at a position closest to a periphery of the upper surface on the outermost contour of the opening group portion." at the end of the claim.

Auxiliary request 3

"and the opening group portion has an outermost contour having a polygonal or a polygon-like shape formed by connecting centers of adjacent outermost openings" after the feature " S_{11} cm² \geq 400 cm²," and

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", and, from openings located at vertices of polygons of the opening group portion being closest to the periphery of the upper surface, no opening is provided at a position closest to the periphery of the upper surface on the outermost contour of the opening group portion." at the end of the claim.

Auxiliary request 4

With respect to claim 1 of auxiliary request 3, claim 1 of auxiliary request 4 does not contain the feature "polygon-like shape".

Auxiliary request 5

"so that the openings are formed in the upper surface of the plug body so as to be respectively located at the vertices of squares having sides of P mm" after the feature "the group of openings is located at a central portion of the upper surface of the plug body",

"and the opening group portion has an outermost contour" after the feature " S_{11} cm² \geq 400 cm²," and

", and an opening at a vertex on the outermost contour of the opening group portion being closer to a periphery of the upper surface than other openings is not provided." at the end of the claim.

Auxiliary request 6

"so that the openings are formed in the upper surface of the plug body so as to be respectively located at the vertices of squares having sides of P mm" after the feature "the group of openings is located at a central portion of the upper surface of the plug body",

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"and the opening group portion has an outermost contour formed by connecting centers of adjacent outermost openings" after the feature " S_u cm² \geq 400 cm²," and

", and an opening at a vertex on the outermost contour of the opening group portion being closer to a periphery of the upper surface than other openings is not provided." at the end of the claim.

Auxiliary request 7

"so that the openings are formed in the upper surface of the plug body so as to be respectively located at the vertices of squares having sides of P mm" after the feature "the group of openings is located at a central portion of the upper surface of the plug body",

"and the opening group portion has an outermost contour having a polygonal or a polygon-like shape formed by connecting centers of adjacent outermost openings" after the feature " S_u cm² \geq 400 cm²," and

", and an opening at a vertex on the outermost contour of the opening group portion being closer to a periphery of the upper surface than other openings is not provided." at the end of the claim.

Auxiliary request 8

"so that the openings are formed in the upper surface of the plug body so as to be respectively located at the vertices of squares having sides of P mm" after the feature "the group of openings is located at a central portion of the upper surface of the plug body",

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"and the opening group portion has an outermost contour being an outermost square" after the feature " S_u cm² \geq 400 cm²," and

", and no opening is provided at a position closest to a periphery of the upper surface on the outermost contour of the opening group portion." at the end of the claim.

Auxiliary request 9

Claim 1 of auxiliary request 9 contains the same amendments as claim 1 of auxiliary request 8 with the exception of the amendment added at the end of the claim, which reads:

", and no openings are provided at a position closest to a periphery of the upper surface on the outermost contour of the opening group portion."

Auxiliary request 10

"so that the openings are formed in the upper surface of the plug body so as to be respectively located at the vertices of squares having sides of P mm" after the feature "the group of openings is located at a central portion of the upper surface of the plug body",

"and the opening group portion has an outermost contour being an outermost square" after the feature " S_u cm² \geq 400 cm²," and

", and no openings are provided at a position closest to a periphery of the upper surface on the outermost square of the opening group portion such that the outermost contour resembles a rounded trapezoid." at

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the end of the claim.

Auxiliary request 11

", such that a central opening at a center of the group of openings is located at a center of a regular hexagon having vertices at six openings at a distance of P mm from the central opening, and all the other openings are located at vertices or on sides of regular hexagons which are concentric around the central opening" after the feature "the group of openings is located at a central portion of the upper surface of the plug body",

"and the opening group portion has an outermost contour being an outermost regular concentric hexagon" after the feature " S_u cm² \geq 400 cm²," and

", and an opening at a vertex on the outermost regular concentric hexagon or an opening on a side of a regular hexagon adjacent to the opening at the vertex being closer to the periphery of the upper surface than openings located around other vertices is not provided." at the end of the claim.

Auxiliary request 12

With respect to claim 1 of auxiliary request 11, claim 1 of auxiliary request 12 was amended so as to additionally add the feature "having a rectangular or trapezoid shape" after the feature "having an upper surface".

Auxiliary request 12B

Claim 1 of auxiliary request 12B contains the same

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amendments as claim 1 of auxiliary request 12 with the exception of the addition after the feature " S_u $cm^2 \ge 400$ cm^2 ,", which reads:

"and relative arrangement of the openings constituting the group of openings is that the openings are formed in the upper surface of the plug body so as to be respectively located at vertices of regular triangles having sides of P mm, the opening group portion has an outermost contour being an outermost regular concentric hexagon".

Auxiliary request 12C

Claim 1 of auxiliary request 12C contains the same amendments as claim 1 of auxiliary request 12B with the exception that the shape of the upper surface has been restricted to one of the two alternatives. The addition after the feature "having an upper surface" thus reads "having a trapezoid shape".

Auxiliary request 13

The third line was amended to "a plug body having $\underline{a}n$ trapezoid upper surface ...",

", such that the openings are at vertices and on sides of regular concentric hexagons" after the feature "the group of openings is located at a central portion of the upper surface of the plug body",

"and the opening group portion has an outermost contour being an outermost concentric hexagon" after the feature " S_{11} cm² \geq 400 cm²," and

", and openings at positions closest to a periphery of

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the upper surface on the outermost regular concentric hexagon of the opening group portion are not provided such that the outermost contour resembles a rounded trapezoid." at the end of the claim.

Auxiliary request 13B

Claim 1 of auxiliary request 13B contains the same amendments as claim 1 of auxiliary request 13 with the exception of the amendment after the feature $"S_u \ cm^2 \ge 400 \ cm^2$, which reads:

"and relative arrangement of the openings constituting the group of openings is that the openings are formed in the upper surface of the plug body so as to be respectively located at vertices of regular triangles having sides of P mm, the opening group portion has an outermost contour being an outermost concentric hexagon".

Auxiliary request 14

Claim 1 of auxiliary request 14 contains the same amendments as claim 1 of auxiliary request 13 with the exception of the amendment added at the end of the claim, which reads:

", and six openings at vertices and on sides closest to a periphery of the upper surface of the outermost regular concentric hexagon of the opening group portion are not provided such that the outermost contour resembles a rounded trapezoid.".

III. The key arguments of appellant 2 (patent proprietor) can be summarised as follows:

Article 84 EPC: main request

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A skilled person would rule out interpretations which were illogical or did not make technical sense, because the claim must be read with the willingness to understand. Thus the skilled person would arrive at an interpretation of the claim which was technically sensible.

Once the outermost contour of the openings was established, the skilled person would omit only one or a few of the openings.

One possible configuration of a plug body had an upper surface of a square shape and an opening group portion with all the openings arranged in a square pattern, the openings of the outermost contour being arranged equidistant to the periphery of the upper surface. Such a plug body was shown in figure 4 of the patent in suit.

Appellant 2 acknowledged that the skilled person could not establish with certainty whether the plug body shown in figure 4 disclosed the plug body before or after omitting the openings because it was possible that the openings along the entire outermost contour had been omitted. This, according to appellant 2, was however a special case. Since the skilled person was aware of such special configurations, they would assume that no opening had been omitted. Such plug bodies are thus not covered by claim 1.

Once established, the outermost contour remained unchanged even if one or more openings were not provided. A recursive omission of the openings, as alleged by appellant 1, was not in line with claim 1. Claim 1 gave a clear instruction to the skilled person on how to establish the outermost contour and which openings not to provide. Claim 1 was therefore clear in

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this respect.

Article 84 EPC: auxiliary requests 1-11

The amendments more precisely defined the arrangement of the openings in the opening group portion so as to enhance the clarity of the respective claims 1.

Article 123(2) EPC: auxiliary requests 12, 12B

The openings in the opening group portion were arranged along regular concentric hexagons having openings at vertices or on sides. This implied that the outermost contour was a regular hexagon. Therefore paragraphs [0021]-[0025] of the description as originally filed provided a basis for this amendment.

It was apparent from the wording of claim 1 that all the vertices were provided with an opening with the exception of the openings which were explicitly not provided according to claim 1.

Admissibility: auxiliary request 12C

The auxiliary request filed in the course of the oral proceedings before the board should be admitted as it overcame the discussed objections with regard to Article 123(2) EPC.

Article 84 EPC: auxiliary requests 13, 13B, 14

The plug body had the shape of a trapezoid. The outermost contour of the opening group portion also had a trapezoidal shape, similar to the plug body, but the focus was to provide a rounded shape. The rounding corresponded to the periphery of the upper surface, which was angled in the same direction as the rounded trapezoid of the outer contour of the opening group portion. Thus the claim provided a clear instruction as

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to which openings had to be omitted.

IV. The key arguments of appellant 1 (opponent) are as follows:

Article 84 EPC: main request

The claimed subject-matter containing the negative feature "that no opening is provided at a position closest to a periphery of the upper surface on the outermost contour of the opening group" was not clear since it was not apparent from the final bottom blowing plug whether or not during the design any holes were considered and then omitted.

Article 84 EPC: auxiliary requests

This fundamental deficiency also affected all the auxiliary requests making use of this or a similarly-worded negative feature.

The addition of the feature <u>"such that the outermost</u> <u>contour resembles a rounded trapezoid"</u>, being in itself unclear, could not remedy this lack of clarity.

Article 123(2) EPC: auxiliary requests 12 to 12C

The subject-matter of these requests was not unambiguously disclosed in the application as filed, since passages referring to different specific examples had been combined. Moreover, since claim 1 of these requests did not require that the outermost region of an opening group portion be completely filled with holes, the outermost contour of the opening group portion might be different from an outermost regular concentric hexagon. The form of the outermost contour of the opening group portion might for instance be a triangle in such cases.

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Article 13(2) RPBA: auxiliary request 12C

No exceptional circumstances had been presented with cogent reasons why this very late submission, which apparently did not overcome the above-mentioned objection either, might be justified.

V. Substantive requests:

- (a) The appellant 1 (opponent) requested that the decision under appeal be set aside and that the European Patent be revoked.
- (b) The appellant 2 (patent proprietor) requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or, in the alternative, on the basis of one of auxiliary requests 1-12, 12B, 12C, 13, 13B or 14, whereby the auxiliary requests 12B and 13B have been submitted with the letter dated 7 June 2023, auxiliary request 12C has been submitted during the oral proceedings before the board, and all other requests have been submitted during opposition proceedings and re-submitted with the statement of grounds of appeal.

Reasons for the Decision

- 1. Main request: clarity, Article 84 EPC
- 1.1 The basis for the amendment of claim 1 introduced in opposition procedure originates from the description and may thus be examined under Article 84 EPC (G 3/14, catchword).

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The amendment requires that no opening be provided at a position closest to a periphery of the upper surface on the outermost contour of the opening group.

1.2 Claim 1 is directed to a bottom blowing plug, hence a product. The design consideration to omit specific openings cannot be seen on the claimed bottom blowing plug as such. In other words, it is not possible to identify openings which were not made by looking at the claimed bottom blowing plug.

This is particularly obvious for bottom blowing plugs as shown in figure 4 of the patent in suit. In this figure, all the openings are equidistant from the periphery of the upper surface. By omitting the openings closest to the periphery of the upper surface, all the outermost openings must be omitted, resulting in an identical, but smaller, outermost contour. It is thus, as admitted by appellant 2, not possible to establish whether figure 4 shows a bottom blowing plug before or after the invention is applied.

The skilled person is consequently unable to establish whether a bottom blowing plug as shown in figure 4 is covered by claim 1 or not, thereby not complying with the requirements of Article 84 EPC.

Article 84 EPC requires that the claims be clear. It is not possible, as argued by appellant 2, to consider as excluded from the scope of claim 1 those embodiments revealing a lack of clarity on the ground that the skilled person acknowledged that it could not establish the limits of the claimed subject-matter.

In analogy, this consideration also applies to all plug

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bodies with a geometric form identical to the geometric form of the outermost contour, the group of openings being arranged concentrically with regard to the upper surface of the blowing plug so that the outermost row of openings on all sides is equidistant from a periphery. Examples of such arrangements would be not only the above-mentioned square-shaped outermost contour being concentrically arranged in a square-shaped bottom blowing plug, but also a hexagon-shaped outermost contour being concentrically arranged in a hexagon-shaped blowing plug.

1.3 Appellant 2 moreover argued in its reply to appellant 1's grounds of appeal (page 6 to 9) that the outermost contour remained unchanged after an opening was omitted.

If the outermost contour remained unchanged despite the omission of certain openings, another lack of clarity would result.

Since the outermost contour may be in the form of a polygon of any shape, it cannot be determined with certainty whether the outermost contour of the opening group portion already covers openings closer to the periphery which were eventually not provided or whether the omission still had to be done. The limits of the claimed subject-matter could thus be purposively adapted.

The subject-matter of claim 1 lacks clarity for at least these reasons (Article 84 EPC).

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- 1.4 Auxiliary requests 1 to 11: clarity, Article 84 EPC
- 1.4.1 The amendments in these auxiliary requests aim at more specifically defining the arrangement of the openings in the opening group portion.

With the increasingly specific definition according to these auxiliary requests, the arrangement of the openings in the opening group portion gradually approaches the pattern shown in figure 2 (hexagonal pattern) or figure 4 (square pattern).

All these auxiliary requests contain the design consideration that no openings are provided closest to the periphery of the upper surface (or a similar wording). The number of openings closest to the periphery of the upper surface which were not provided is not limited in any of these requests. This design consideration as amended in opposition procedure originates from the description and may thus be examined under Article 84 EPC (G 3/14, catchword).

1.4.2 As outlined with regard to the main request in paragraph 1.2, a plug body with a square (or hexagonal) upper surface and a concentric square (or hexagonal) pattern of openings most obviously reveals the lack of clarity.

Like claim 1 of the main request, none of these auxiliary requests defines the shape of the upper surface of the plug body in claim 1. It is open-ended in this respect, i.e. upper-surface shapes corresponding to that of the outermost contour are also encompassed. Considerations in analogy to those concerning the main request apply at least for concentrically arranged outermost contours.

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The more specific definition of the arrangement of the openings in the opening group portion can therefore not resolve the lack of clarity as outlined for the main request under paragraph 1.2 because it results from the combination of both the arrangement of the openings in the opening group portion and the shape of the upper surface of the plug body.

As in claim 1 of the main request (see paragraph 1.3 above), the outermost contour may be in the form of a polygon of any shape. It cannot be determined with certainty whether the outermost contour of the opening group portion already covers openings closer to the periphery which were eventually not provided or whether the omission still had to be made. The limits of the claimed subject-matter could thus be purposively adapted.

The subject-matter of claim 1 of auxiliary requests 1 to 11 lacks clarity for at least the reasons outlined for the main request (Article 84 EPC).

1.5 Auxiliary request 12: Article 123(2) EPC

The feature "outermost regular concentric hexagon" lacks a basis in the application as originally filed.

Appellant 2 argues that paragraphs [0021]-[0025] of the description as originally filed provided the basis for the amendment.

Paragraphs [0021]-[0025] describe specific embodiments with specific parameters, such as the number of hexagons involved. These paragraphs essentially disclose arranging the openings on vertices and sides of concentric regular hexagons such that the region on

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and within the outermost hexagon is completely filled with openings in a triangular pattern. In such a specific configuration, the outermost contour is a regular hexagon. If the distance between the openings is equidistant, the opening group portion described in paragraphs [0024]-[0025] corresponds to the opening group portion shown in figure 2.

Only paragraphs [0034] and [0035] disclose a feature "outermost regular concentric hexagon". However, these paragraphs relate to figure 2 of the patent in suit, which is again a specific embodiment.

An outermost contour of the opening group portion in the form of an outermost regular concentric hexagon was only disclosed as a result of the complete filling of the region on and inside the outermost hexagon with openings in a triangular pattern. If this region is not completely filled, the outermost contour of the opening group portion may be different from an outermost regular concentric hexagon. Appellant 1 showed that the form of the outermost contour of the opening group portion may be a triangle in such cases.

However, claim 1 does not imply that the region within the outermost regular hexagon is completely filled with openings arranged in a triangular pattern, similarly to what is shown in figure 2. It only requires that openings, in as far as they are provided, must be located at vertices or sides of regular hexagons. The feature outermost regular concentric hexagon is thus isolated from the context of the embodiments in the description as originally filed.

The requirements of Article 123(2) EPC are not met.

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1.6 Auxiliary request 12B: amendments, Article 123(2) EPC

With respect to claim 1 of auxiliary request 12, claim 1 of auxiliary request 12B additionally contains the feature:

"and relative arrangement of the openings constituting the group of openings is that the openings are formed in the upper surface of the plug body so as to be respectively located at vertices of regular triangles having sides of P mm,"

With respect to claim 1 of auxiliary request 12, it additionally requires that openings, to the extent they are provided, must be separated by a distance P mm. As apparent from the reasons relating to auxiliary request 12, this only more specifically defines the location of the openings. It has no influence on the number of openings.

The feature outermost regular concentric hexagon is thus isolated from the context of the embodiments in the description as originally filed, for the same reasons as outlined for auxiliary request 12.

1.7 Auxiliary request 12C: admission into the proceedings, Article 13(2) RPBA

Claim 12C was filed during the oral proceedings before the board. Its admission is thus subject to Article 13(2) RPBA 2020.

Claim 1 of auxiliary request 12C contains the same amendments as claim 1 of auxiliary request 12B, with the exception that the shape of the upper surface has been restricted to one of the two alternatives. The

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addition after the feature "having an upper surface" thus reads "having a trapezoidal shape".

Objections concerning Article 100(c) EPC in combination with Article 123(2) EPC had already been raised in opposition procedure and from the beginning of the appeal procedure. Auxiliary request 12C represents a further amendment of auxiliary request 12B, which had been filed back after the summons for oral proceedings and the board's communication had issued. No convincing exceptional circumstances justified by cogent reasons were presented by appellant 2 justifying the late filing of this further request. In addition, it is not immediately apparent that the objections made with regard to auxiliary request 12B are overcome.

Thus the board does not see any reason to admit auxiliary request 12C into the proceedings.

1.8 Auxiliary request 13: clarity, Article 84 EPC

Claim 1 was amended inter alia by adding the feature ", openings at positions closest to a periphery of the upper surface on the outermost regular concentric hexagon of the opening group portion are not provided such that the outermost contour resembles a rounded trapezoid." at the end of the claim.

The amendment was introduced in opposition procedure, originates from the description and may thus be examined under Article 84 EPC (G 3/14, catchword).

Figure 3 of the patent shows an opening portion which allegedly resembles a rounded trapezoid (see paragraph [0038] of the patent in suit). A trapezoid is a

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quadrilateral that has at least one pair of parallel sides. Even by rounding the corners, the resulting rounded trapezoid cannot be matched with the outermost contour of the opening portion shown in figure 3. The vague expression "resembles" exacerbates this lack of clarity because it adds to the uncertainty of the features implied in the expression "rounded trapezoid".

Contrary to appellant 2's view, it is thus still unclear which openings are to be omitted.

The requirements of Article 84 EPC are therefore not met.

1.9 Auxiliary request 13B and 14: clarity, Article 84 EPC

Auxiliary requests 13B and 14 also contain the feature "resembles a rounded trapezoid" at the end of claim 1.

With respect to claim 1 of auxiliary request 13, claim 1 of auxiliary request 13B further defines the pattern of arrangement of the openings, and claim 1 of auxiliary request 14 defines the number of openings which are not provided.

These amendments can obviously not overcome the lack of clarity as outlined for claim 1 of auxiliary request 13.

Auxiliary requests 13B and 14 therefore do not meet the requirements of Article 84 EPC for the same reasons as auxiliary request 13. - 21 - T 1114/21

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar:

The Chairman:



C. Vodz E. Bendl

Decision electronically authenticated