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# Datasheet for the decision of 24 October 2022

**Case Number:** T 0256/16 - 3.2.05

**Application Number:** 05783838.5

**Publication Number:** 1791683

**IPC:** B29C67/00, B27N5/00

**Language of the proceedings:** EN

**Title of invention:**
Method for manufacturing products based on wood powder

**Patent Proprietor:**
L3F Sweden AB

**Relevant legal provisions:**
EPC Art. 100(a), 100(b), 100(c), 104(1), 123(2)
RPBA Art. 12(4), 13(1)

**Keyword:**
Admittance of documents D7 to D16 (no)
Admittance of auxiliary request 1 (yes)
Sufficiency of disclosure (yes)
Novelty and inventive step (yes)
Unallowable extension (yes: main request; no: auxiliary request 1)
Apportionment of costs (no)

**Decisions cited:**
T 2350/15

Europäisches Patentamt
European Patent Office
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**Case Number: T 0256/16 - 3.2.05**

# D E C I S I O N
# of Technical Board of Appeal 3.2.05
# of 24 October 2022

| | |
|---|---|
| **Appellant:** (Opponent) | voxeljet AG<br>Paul-Lenz-Str. 1<br>86316 Friedberg (DE) |
| **Representative:** | Hoefer & Partner Patentanwälte mbB<br>Pilgersheimer Straße 20<br>81543 München (DE) |
| **Respondent:** (Patent Proprietor) | L3F Sweden AB<br>Karshult 2<br>545 93 Töreboda (SE) |
| **Representative:** | Valea AB<br>Box 1098<br>405 23 Göteborg (SE) |
| **Decision under appeal:** | **Decision of the Opposition Division of the European Patent Office posted on 7 December 2015 rejecting the opposition filed against European patent No. 1791683 pursuant to Article 101(2) EPC.** |

**Composition of the Board:**

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|---|---|
| **Chairman** | P. Lanz |
| **Members:** | O. Randl |
| | W. Sekretaruk |

## Summary of Facts and Submissions

I. The opponent filed an appeal against the decision of the opposition division to reject the opposition against European patent No. 1 791 683 ("the patent").

II. Among the documents taken into account by the opposition division, the following are relevant for the appeal proceedings:

D1: WO 01/34371 A2
D2: US 2004/0038009 A1
D3: EP 0 431 924 A2
D5: DE 198 53 814 B4
D6: DE 101 58 233 A1

Together with its statement of grounds of appeal, the appellant also filed the following documents:

D7: Expert opinion of Dr. Ingo Ederer dated 7 April 2016
D8: E. Sachs et al., "CAD-Casting: Direct Fabrication of Ceramic Shells and Cores by Three Dimensional Printing", Manufacturing Review, vol. 5, no. 2, June 1992
D9: Extract from T. Fan, "Droplet-Powder Impact Interaction in Three-Dimensional Printing", doctoral thesis, MIT, September 1995
D10: US 5,807,437
D11: DE 600 14 714 T2
D12: EP 1 324 842 B1
D13: M.S.Wahab et al., "Rapid Prototyping Of Wood-Based Material", Proceedings of the Malaysian Technical Universities Conference on Engineering and Technology MUCEET2009, 20-22 June 2009, p. 31-35 (undated)
D14: "Z®Print Software" manual (version 6.2) issued

by the Z Corporation (undated)
D15: US 5,902,441
D16: "Z®406 3D Color Printer User Manual" issued by the Z Corporation, dated November 2002

III. On 5 July 2019, the board summoned the parties to oral proceedings to be held on 6 May 2020. A communication pursuant to Article 15(1) of the 2007 version of the Rules of Procedure of the Boards of Appeal (RPBA 2007) was issued on 4 November 2019. The oral proceedings were subsequently cancelled (see the board's communication dated 22 April 2020) and rescheduled for 20 May 2021 (see the board's communication dated 9 June 2020). The board informed the parties on 6 April 2021 that it intended to hold the oral proceedings in the form of a videoconference. In view of the respondent's (i.e. the patent proprietor's) refusal, the board scheduled in-person oral proceedings to take place on 24 October 2022 (see the board's communication dated 28 April 2021). On 22 September 2022, the appellant (i.e. the opponent) informed the board that it would not be represented at the oral proceedings. In a letter dated 27 September 2022, the respondent informed the board that it requested oral proceedings "in the event that the Board is unable to accede to our Main Request or to Auxiliary Request 1 presently on file during the course of the written procedure".

IV. The oral proceedings took place on 24 October 2022, in the absence of the appellant.

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

The respondent (patent proprietor) requested that the appeal be dismissed and that the patent be maintained as granted (main request), or that the decision under appeal be set aside and the patent be maintained on the basis of one of auxiliary requests 1 to 3 filed by letter dated 22 January 2020. The respondent also requested an apportionment of costs for preparing for and attending the oral proceedings.

VI. Claim 1 of the patent as granted (main request) reads as follows (the feature references used by the board are indicated in square brackets):

"[**A**] A method for manufacturing a continuous product of wood powder, characterized in that [**B**] a layer (23) of wood powder is applied onto a support (4), that [**C**] binding agent (33) is deposited onto the wood powder layer, [**D**] whereupon an additional layer of wood powder is applied onto the preceding wood powder layer, and that [**E**] such application of wood powder and such deposition of binding agent are alternately repeated a desired number of times, [**F**] said binding agent being deposited on said wood powder layer in a quantity so that said binding agent sinks into said preceding wood powder layer,
wherein [**G**] wood powder of each layer and of adjacent layers is bonded into a continuous product by means of the binding agent."

Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that the feature "so that the two adjacent layers are bonded to each other" has been added after the words "said preceding wood powder layer".

VII. The parties' written submissions with regard to the issues relevant for the decision can be summarised as follows:

(a) Admittance of documents D7 to D16

(i) Appellant

Several technical facts and circumstances known to the skilled person were not adequately assessed in the opposition proceedings. The new documents submitted by the appellant are not to be understood as newly submitted prior art. They constitute a reaction to the surprising views held by the opposition division and provide evidence of the lack of patentability.
The appellant's submissions at the time of appeal were complete, in accordance with Article 12(2) RPBA 2007.
The new documents are not late-filed as they simply recall and support arguments raised during the oral proceedings before the department of first instance.
Moreover, these documents express the skilled person's common general knowledge. In particular, document D7 presents general facts relating to 3D printing and deals, *inter alia*, with the porosity present in 3D components. This document can be regarded as an objective presentation of the technical issue at hand, irrespective of the position of the author.
No "squeeze-and-stretch" of the technical facts is apparent; nor is it clear why an engineer working in the field of 3D printing, such as Dr. Ederer, should not be regarded as a relevant skilled person. Documents D10 to D16 were submitted to clarify and scientifically substantiate a certain technical aspect and the technical facts on which it is based, both of which were known to the skilled person. It is not correct that the skilled person's common general knowledge

should only be taken into account if corresponding documents were submitted with the opposition.

(ii) Respondent

Documents D7 to D16 are not *prima facie* relevant to the proceedings. They should not be admitted. All these documents were available to the opponent on the expiry date of the opposition period.

(b) Main request: interpretation of claim 1

(i) Appellant

The wording of claim 1 is "open" in many respects.

As acknowledged by the opposition division, materials other than wood powder are not excluded by the wording of the claim. Therefore, all the prior art documents destroy the novelty of **feature B**, provided that it is a powder-based 3D printing process with selective binder incorporation. Furthermore, "cellulose" and even "wood" is disclosed in document D6. The claim wording only mentions that "a layer of wood powder is applied", without specifying that this must be "essentially" or "exclusively" of wood particles. This is not clear from the description of the patent in suit, either. Therefore, the opposition division erred in finding that this feature could establish novelty. It is part of common general knowledge or, at any rate, is implicit in the prior art and relates to an inevitable physical phenomenon. Similarly, the opposition division erred in interpreting feature B to the effect that it included the word "exclusively". The powder material may be a mixture comprising, *inter alia*, wood powder.

**Feature F** is implicit in any prior-art document describing a powder-based 3D printing process using a binder. This is especially true of processes that use a mechanical binder. A certain degree of porosity is present in every bulk material and in every component after the printing process. The binder inevitably penetrates into the previous layer. Feature F is therefore part of common general knowledge or is at least implicit in the prior-art documents cited in the opposition proceedings. A 3D printing process in which a powder layer is repeatedly applied followed by selective binder application cannot work at all if the applied binder does not penetrate into the preceding layer and thereby bind the particles of the different layers together. Otherwise, only individual layers that are not bonded to each other would be produced. This problem is not new, but has been known for a long time and has already been solved in the state of the art. Reference is made to the introduction of document D6, to expert opinion D7, to article D8, and to documents D9 to D16. Feature F can be completely disregarded in the novelty analysis and constitutes what could be referred to as a "non-feature".

The term "by means" in **feature G** refers to the fact that binder is needed to bind the particles together. This term is again an "open" wording within the meaning of patent law, as it presupposes the presence and participation of a binder in the bonding process of the particles, but does not exclude or even "prohibit" the participation of other constituents or components in this process. The binder itself is also not subject to any restrictions according to this wording. All binder materials that lead to the bonding of the particles are covered by the claim wording.

(c) Main request: unallowable extension

(i) Appellant

The feature incorporated into claim 1 during the examination proceedings was taken in isolation from the description. The other features disclosed in this context should also have been incorporated into claim 1 as granted. Thus, Article 123(2) EPC was infringed. The opposition division justified its decision by pointing out that this feature "solves the problem" or that this feature "solves the problem presented in the description". However, the examination of compliance with Article 123(2) EPC is not related to the problem solved by the invention. The standard of examination is the disclosure of the originally filed application documents and how features were originally disclosed and in what subject-matter context. The decisions T 17/86, T 284/94 and T 470/05 cited by the opposition division are not applicable to the present case.

(ii) Respondent

The amendment introduced during the examination proceedings is supported by the terminology of the application as filed. Page 8, lines 31 and 32, clearly refers to the method and the binding agent in general terms. Consequently, the amendment has not resulted in an unallowable intermediate generalisation. Further, several features are presented as optional or are simply not relevant to the invention per se.
The appellant repeatedly ignores the fact that a method is claimed.

Claim 1 does not contravene Article 123(2) EPC as only part of the disclosure on page 8, lines 31 to 33, was

added to claim 1 when the claim was amended during the examination proceedings. Claim 1 as granted fulfils the requirements of Article 123(2) EPC as the feature of the binding agent causing the adjacent layers to be bonded together was already present in claim 1 as filed: "wherein wood powder of each layer and of adjacent layers is bonded into a continuous product by means of the binding agent". The ground for opposition under Article 100(c) EPC does not prejudice the maintenance of the patent as granted.

(d) Main request: insufficiency of disclosure

(i) Appellant

The opposition division attributed wide-ranging competence and skills to the skilled person.
It stated that the skilled person could determine with simple experiments how much binder has to be used.
In section 10 of the reasons for the decision under appeal, the opposition division stated that the amount of binder necessary to saturate a layer can be easily determined. However, it is impossible to completely fill a layer of porous particle material with binder, i.e. a certain porosity (30 to 60%) always remains. The layer penetration is achieved by "effects of gravity and capillary pull". It is precisely this phenomenon that corresponds to feature F. However, the amount of binder must be selected in a well-dosed manner in order to avoid undesired effects such as "bleeding". Too little binder would result in the individual print layers not bonding because not enough binder would diffuse into the previous layer and therefore the particles of the different layers would not bond sufficiently (no "stitching"). In any case, the skilled person cannot find any instructions in the

patent in suit on how to select the correct amount of binder. Moreover, feature D can probably be put into practice, because either the binding agent covers the wood powder layer and thus no second wood powder layer can be applied on top of a wood powder layer, or, if only wood powder is visible, no layer bonding can occur, because in that case wood powder lies on top of wood powder and the subsequently applied binding agent only penetrates one wood powder layer at a time, but does not bond the two wood powder layers. Furthermore, the amount of binding agent is undefined in the claim and thus the necessary technical teaching is not disclosed to the skilled person in the claim. Thus, the requirements of Article 83 EPC are not met.

(ii) Respondent

The basis for the decision was the finding that the skilled person could have carried out the invention without undue burden. The appellant ignores the fact that the skilled person would in fact have known what to look for when putting the invention into practice because the original application discloses this information. The detailed description discloses a step-by step way of carrying out the invention. Furthermore, a simple test would have made it possible for the skilled person to select an appropriate amount of binding agent. There is a major difference between performing a trial and error test in the dark and performing a trial and error test when knowing what to look for, i.e. being able to identify the correct result. On page 8, lines 31 and 32, of the original application, the skilled person is taught what to look for, namely that the binding agent should sink into the preceding layer of wood powder. This will form a continuous product with substantially no distinct

layers. In the light of this teaching, a simple test could be performed by the skilled person without undue burden. Consequently, the invention is sufficiently disclosed for the skilled person to be able to carry out the invention. The ground for opposition under Article 100(b) EPC does not prejudice the maintenance of the patent as granted.

(e) Main request: novelty over document D1

(i) Appellant

Document D1 concerns a 3D printing process. A two-component binder is used, which can be composed in different ways (see page 7, second paragraph).
The binder is described as "two reactive components dispensed in a fluid", whereby the "fluid" (i.e. the binder) is printed onto the powder material, penetrates into it and leads to a binding of the particles.
A binder consisting of one fluid and containing two reaction components is also described on page 15, lines 28 and 29. Thus, document D1 also discloses this feature of claim 1 of the patent in suit. Feature F would have been understood by the skilled person to be implicit in document D1. Feature B ("wood powder") is explicitly disclosed on page 21, line 3, of document D1. Thus, document D1 discloses all of the allegedly distinguishing features of claim 1.

(ii) Respondent

Document D1 does not disclose feature F. It does not disclose exactly how and in what amount the reactants are applied other than on page 25, line 3, in which the skilled person is taught that the fluid should be maximised in order to ensure that fluid is available to

act as a vehicle in which the reaction may take place. Document D1 clearly expresses "an upper end of a scale thinking". The skilled person is taught that each layer of material is "flooded", forming distinct layers in the product (see also page 25, lines 16 to 18). In the light of this teaching, it is far-fetched to proclaim that a certain amount of binder material will always sink into the preceding layer. Regarding feature B, document D1 mentions "wood powder" as an additive in a list of other materials including cellulose, for example. However, document D1 does not disclose that a layer of wood powder is applied. When applying a layer of wood powder, at least a majority of the material has to be wood powder (see column 3, lines 31 and 32, of the patent). Further, wood powder is only disclosed in document D1 as being an optional additive, i.e. a material which may optionally be used in addition to the particulate material. In the light of this, the subject-matter of claim 1 is novel over the disclosure of document D1.

(f) Main request: novelty over document D2

(i) Appellant

Document D2 also discloses a 3D printing process (see the abstract). A two-component adhesive is used, of which at least one component is printed onto the particle layer for reaction and penetrates into the particle layer. The use of "cellulose" (feature B) is disclosed in paragraph [0024]. Wood consists of cellulose and thus document D2 also discloses wood powder to the skilled person. The fact that this disclosure is found under the heading "Other Additives" is irrelevant since claim 1 of the patent is not limited to wood powder and also allows other components

in the particulate layer. In any case, cellulose is disclosed as a component of the particulate layer. Moreover, feature F is implicitly disclosed in document D2. It constitutes an "inevitable result" (see decisions T 666/89, T 270/97, T 12/81, T 6/80, T 677/91, T 465/92, T 410/99 and T 6/80).

(ii) Respondent

It is not correct that cellulose fibres are the same as wood powder. Cellulose fibres may be a bundle of different things, including naturally occurring fibres such as cotton fibres or linen fibres, or manufactured fibres from plants which have been processed into pulp, for example. The plants may be crops, wood, leaves or the like; rayon or viscose fibres are cellulose fibres just as a matter of example. Wood powder will include substances such as lignin, pectin and ash. A cellulose fibre is a much more refined and elegant material and in all aspects lacks substances that wood material would include. Moreover, document D2 does not disclose feature F. The powder material in document D2, or the powder system, is formed by a water-soluble crosslinking agent, a strengthening component, and an aqueous liquid and, optionally, fillers. The layer is crosslinked by the existing crosslinking agent in the layer after addition of water, for example. The layers in document D2 form substantially solid layers (see paragraph [0010]). The basic principle of this document is that solid layers are formed due to the binding action of crosslinking agents. Further, clearly in the light of document D2, there can be powder systems which do not form, or retain, a porosity as is alleged by the appellant. Document D2 teaches that solid layers are provided. For this reason the subject-matter of claim 1 is novel over the disclosure of document D2.

(g) Main request: novelty over document D6

(i) Appellant

Document D6 relates to a 3D printing process (see the abstract). The binder system is a two-component system which has to penetrate the powder layer to become effective and lead to a binding effect. Two-component binders are not excluded from the wording of claim 1 of the patent in suit and therefore this feature is disclosed. Feature F is implicit in document D6. Furthermore, feature B is explicitly disclosed on page 8, line 51. The heading "fillers/fibres" refers to the materials of the powder layer. Due to the "open" wording of claim 1 of the patent in suit, this feature is also disclosed by document D6.

(ii) Respondent

Document D6 does not disclose a layer of wood powder. It discloses a layer of bulk material formed by a first and a second component which, after adding a liquid medium, react with each other (see paragraph [0001]). A solid layer is formed. The chemical reaction leads to a solidification within the layer, and between the layers (see paragraph [0002]). Wood fibres are mentioned in document D6 as optional fillers in paragraph [0079]. There is no disclosure of a layer of wood powder. In document D6, the wood fibres would constitute a minority part of the material. Moreover, document D6 does not disclose feature F. It teaches that a mixture of reactants are provided in a layer, which then reacts after water, for example, has been provided to form a solid layer. Document D6 cannot be said to disclose that a binding agent (which is already

present in the layer in document D6 via the two reactants) penetrates into the preceding layer. In fact, it is highly questionable that this document discloses feature C, as the actual binding material is already present and actually forms the layer itself. The bulk material in document D6 is thus formed by the binding material. For this reason the subject-matter of claim 1 is novel over the disclosure of document D6.

(h) Inventive step

(i) Appellant

The opposition division's finding of inventive step is based on features B and F. As an inevitable phenomenon in every powder-based 3D printing process with binder insertion, feature F is disclosed in the cited prior art in view of the EPO's established case law. Consequently, it is irrelevant to the question of inventive step. Thus, the use of wood powder is the only feature distinguishing the claimed method from the methods of the prior art. The problem underlying the patent was thus to provide a powder-based 3D printing process with binder incorporation that uses wood powder in the powder layer as an alternative particle material. Several documents may serve as the closest prior art:

- Document D6 discloses all of the features of claim 1 of the patent in suit and suggests the use of wood powder in the particulate layer.
- Document D2 discloses all of the features of claim 1 of the patent in suit, describing cellulose as the material for the particulate layer.
- Document D1 discloses all of the features of claim 1 of the patent in suit, wherein "organic

material" (suggesting wood to the skilled person) is mentioned for the powder layer.

- Document D3 discloses all of the features of claim 1 of the patent in suit and states that "other materials" can be used in the process. When seeking a solution to this problem, the skilled person would have come across documents D1, D2 and D6 which directly or indirectly disclose wood as a material for the powder layer.
- Document D5 discloses all of the features of claim 1 of the patent in suit except wood. The skilled person would have considered documents D1, D2 and D6 and would have been led in an obvious way to the claimed subject-matter.
- Document D13 discloses a powder-based 3D printing process with binder insertion on a 3D printing device which can be run with various materials and on which wood powder has been used as a particle material.
- Document D16 discloses a 3D printing machine capable of performing a powder-based 3D printing process with binder jetting. It follows that all of the basic features of claim 1 with the exception of "wood powder" are disclosed. However, the process shown here uses "starch", i.e. a plant material, which thus suggests other plant materials. The skilled person would have considered documents D1, D2 and D6 and would have been led by them (and by document D13) to the claimed subject-matter according to claim 1 of the patent in suit.

Thus, several prior-art documents or several combinations thereof suggest the subject-matter of claim 1. The requirement of Article 56 EPC is not met.

(ii) Respondent

The appellant not only fails to show that feature F is inherent in the prior art, but also fails to show that the so-called inherent feature was actually available to the public the day before the filing of the patent application (see G 2/88).

The appellant uses documents D3 and D5 as starting points.

Document D3 is directed at the use of powder material and the application of binder material to form a 3D product. The purpose of document D3 is to form a mold for metal casting. This document does not teach the use of wood powder or organic material at all. In fact, the purpose of document D3 is to provide a fast manufacturing method for a mould which permits metal casting. Wood material would appear to be highly unsuitable for this purpose as it would clearly deteriorate or turn to ash when hot metal is poured into the mould. Such a mould would probably not work at all. It is thus quite clear that if starting from document D3, the skilled person would not consider wood powder. Secondly, document D3 promotes and teaches fast hardening and individual layers, not a continuous product formed by binding agent penetrating into the previous layer of wood powder (see col. 8, lines 6 to 11, and col. 9, lines 33 to 37). Hence, even if the skilled person were to consider wood powder when starting from document D3, none of the features of claim 1 would be found and an embodiment falling within the scope of claim 1 would not be reached. Document D3, whether taken alone or together with common general knowledge, does not lead the skilled person to the claimed invention. Document D3 does not disclose

features B and F. In the unlikely event that the skilled person would turn to document D1, they would not be led to use wood powder, which is mentioned only as an optional additive. The quantity of wood powder is not disclosed at all. Thus, document D1 does not teach forming a layer of wood powder. There are several technical effects of a continuous product in comparison with a product having distinct layers (including good adhesion between each layer and a higher degree of freedom when selecting how the products should be produced). Moreover, wood powder is cheap and provides an environmentally-friendly solution. If the skilled person had turned to document D1, they would not have reached an embodiment falling within the scope of claim 1 because document D1 does not teach that the binding material should be applied in such a quantity that it sinks into the preceding layer, nor does it teach that wood powder can be applied as an individual layer of material. Document D1 only mentions wood powder as one of several choices of inert organic materials to be used as an additive. In fact, document D1 deters the skilled person from considering powder on the grounds of safety issues (see page 3, lines 29 to 31).
If the skilled person had turned to document D2, they would not have reached an embodiment falling within the scope of claim 1. Document D2 does not teach feature F. Instead, it teaches the formation of solid layers (see paragraphs [0007] and [0010]). Furthermore, document D2 does not teach the use of wood powder. Cellulose fibres are mentioned but there is a profound difference between cellulose fibres and wood powder, as outlined above. If the skilled person had turned to document D6, they would not have obtained an embodiment falling within the scope of claim 1. Document D6 does not teach feature F. Instead, document D6 is directed at forming distinct layers. As is clear from paragraph [0011] of

document D6, the particulate material and the binder is mixed in one layer. Hence, document D6 does not add a layer of binding agent and the binding agent simply cannot penetrate into the preceding layer; it is already mixed into each layer. Claim 1 is directed at a method; hence, the method step of applying a binding agent onto a layer of wood powder must not be diminished. Document D6 mentions "wood fibers". The exact meaning of this expression is not clear. Moreover, the wood fibres of document D6 are merely an additive. There is no teaching that a layer of wood powder should be formed. There is no teaching that the binding agent should be applied onto the layer of wood material and penetrate into the preceding layer of the wood material.

Document D5 is not the most promising starting point either, as it explicitly discourages the use of particulate material with reference to document D3. The solution in document D5 is instead directed at a pourable construction material from wax, and adding liquid droplets onto the building material (see paragraph [0019] of document D5). Further, no binder material is used (see paragraph [0025]), which of course is not necessary when using molten wax. Each layer will adhere onto the subsequent layer of wax as the wax solidifies. Starting from document D5, it makes no sense whatsoever to turn back to particulate material, and absolutely not to wood powder. In fact, document D1 deters the skilled person from considering powder on the grounds of safety issues (see page 3, lines 29 to 31). Wood powder and wax are by no means alternatives to each other as stated by the appellant. The materials are clearly different. Wax is applied in a liquid state as document D5 teaches; wood powder is not. There are clear technical differences arising from

this fact and as such the materials cannot be considered to be merely alternatives to each other. Concerning the combinations of documents D5+D1, D5+D2 and D5+D6, the arguments presented with respect to document D3 apply. As far as documents D13 and D16 are concerned, they should not be admitted. Document D13 is not prior art under Article 54(2) EPC. However, it discloses that wood powder was first used as a raw material in a 3D printing process in 2009. Document D16 was said to disclose a number of features of claim 1, but only vague references were given. It is not the respondent's responsibility to identify the relevant sections in a prior-art document in order to comment on objections raised by the appellant.

(i) Auxiliary request 1

(i) Respondent

This request was filed in response to the board's preliminary opinion with regard to Article 123(2) EPC. Claim 1 has been amended by the incorporation of the full sentence on page 8, lines 31 to 33, of the published application as filed. Accordingly, claim 1 of auxiliary request 1 requires the quantity of binding agent to be such that the binding agent sinks into the preceding layer, so that the two adjacent layers are bonded to each other. The amendment is fully supported by the disclosure on page 8, lines 31 to 33, of the application as filed and fulfils the requirements of Article 123(2) EPC.

(ii) Appellant

The filing of the auxiliary requests on 22 January 2020 is contrary to the applicable Rules of Procedure of the

Boards of Appeal. The respondent could have submitted these requests with its response to the statement of grounds of appeal, especially since the appellant did not submit any new arguments after the patent proprietor's response that would justify the new auxiliary request 1. Therefore, this request should not be admitted into the proceedings.

(j) Apportionment of costs

(i) Respondent

The board should order an apportionment of costs in favour of the respondent (costs for preparation, travel and presence at the oral proceedings before the board). In decision T 2350/15, the deciding board granted an apportionment of costs under similar circumstances. When asked why they had not asked for the oral proceedings to be held by videoconference to reduce the costs incurred, the appellant's representative explained that (1) it had been discovered very late that the oral proceedings would not be cancelled, and therefore all the bookings had been made; (2) the patent proprietor considered the patent very important and wanted the proceedings to be held in person; (3) the way in which the appellant's submission was drafted ("*Wir informieren die Beschwerdekammer darüber, dass die Einsprechende / Beschwerdeführerin nicht persönlich an der Verhandlung teilnehmen wird*.") did not clearly exclude the possibility that its representative would be present, and (4) there had been a change of representative. The respondent admitted that the appellant was not responsible for the patent proprietor's wish to have in-person oral proceedings. However, the appellant had repeatedly tried to surprise the patent proprietor by filing new evidence before and

during the oral proceedings before the opposition division, which forced the patent proprietor to invest time and effort in evaluating the relevance thereof. The appellant's behaviour throughout had been abusive. When asked by the board why they had not decided not to come to the oral proceedings, the respondent explained that they had not dared to do so because of the appellant's ambiguous statement and because the possibility that the new representative would show up could not be excluded. Moreover, the appellant had not reacted at all to the respondent's conditional withdrawal of its request for oral proceedings. There was no doubt that the appellant had not withdrawn its request precisely because it intended to cause additional costs for the respondent. Such behaviour is highly inappropriate. The respondent should at least pay for the respondent's attorneys' time (between 15 and 20 hours) spent on preparing for the oral proceedings before the board and taking part in them.

## Reasons for the Decision

1. Admittance of documents D7 to D16

Documents D7 to D16 were filed for the first time with the statement of grounds of appeal.

Document D9 is an extract from the doctoral thesis of Mr Fan. A more concise extract of that work was filed during the oral proceedings before the opposition division but was not admitted into the proceedings (see section 9 of the decision under appeal).

The appellant stated that all of the documents submitted in preparation for and during the oral

proceedings before the opposition division are relevant to the examination of the patent at issue and should have been admitted (see section 2.1 of the statement of grounds of appeal). This can only refer to document D4 (a Wikipedia extract which the opposition division did not admit) and possibly to document D9.

No justification for the late filing of documents D7, D8 and D10 to D16 was provided. It is not apparent to the board why these documents could not (and should not) have been filed during the opposition proceedings. Therefore, exercising its power under Article 12(4) RPBA 2007, the board holds these documents inadmissible.

2. Interpretation of claim 1

2.1 "Wood powder"

Feature B requires "a layer of wood powder" to be applied onto a support. The patent contains the definition that "[t]he expression wood powder refers to a powder made of a wood material" of various shapes and sizes (see paragraph [0013]). Paragraph [0014] adds that "small quantities of other substances/materials" may be added to the powder. In view of the above, the skilled person would have understood that the layer of wood powder referred to in feature B has to be predominantly made up of wood particles.

The statement of the opposition division in section 11 of the decision under appeal ("... materials other than wood powder are not excluded from the scope of the claim ...") should be read accordingly, as can also be seen from the addition that "the opposition division is

of the opinion that the main ingredient of the layer consists of wood powder".

A method involving powders, wherein the main ingredient of the powders is something other than wood powder, cannot anticipate the subject-matter of claim 1.

2.2 "Binding agent"

The board is of the opinion that the binding agent according to claim 1 has to be instrumental in the binding obtained by the claimed method. The language of the claim, which requires the binding agent to sink into the powder, also allows the conclusion to be drawn that the binding agent has to be different from the powder material.

2.3 Feature D

Feature D requires "an additional layer of wood powder" to be "applied onto the preceding wood powder layer".

The question is how the additional layer of wood powder can be applied onto the preceding wood powder layer in view of the fact that in feature C a binding agent is deposited on the only wood powder layer mentioned so far. The underlying assumption appears to be that the binding agent deposited on the wood powder layer of feature B sinks into that layer. The wood powder and the binding agent, having sunk into it together, form what is called the "preceding wood powder layer".
To put things differently, the "preceding wood powder layer" is a layer that already contains binding agent. It is upon this composite layer that the additional layer of wood powder is applied.

2.4 Feature F

Feature F requires the binding agent to be deposited on the wood powder layer "in a quantity so that said binding agent sinks into said preceding wood powder layer". Two points need to be noted:

First, the layer into which the binding agent has to sink is the preceding wood powder layer. For the interpretation of the expression "preceding layer", the board refers to section 2.3 above.

Second, there is a causal link ("... so that ...") between the quantity of binding agent and it sinking into the preceding layer.

Provided that the surface tension of the binding agent is sufficiently low, the agent may be expected to sink - presumably under the influence of gravity - into the powder layer on which it is deposited. But why would the binding agent sink into the preceding layer, which already contains binding agent? And why is this action related to the quantity of binding agent? When trying to understand the feature, the skilled person would arguably have consulted the patent specification.

The feature is found in paragraph [0032] of the patent, which describes the operation of the device of Fig. 2:

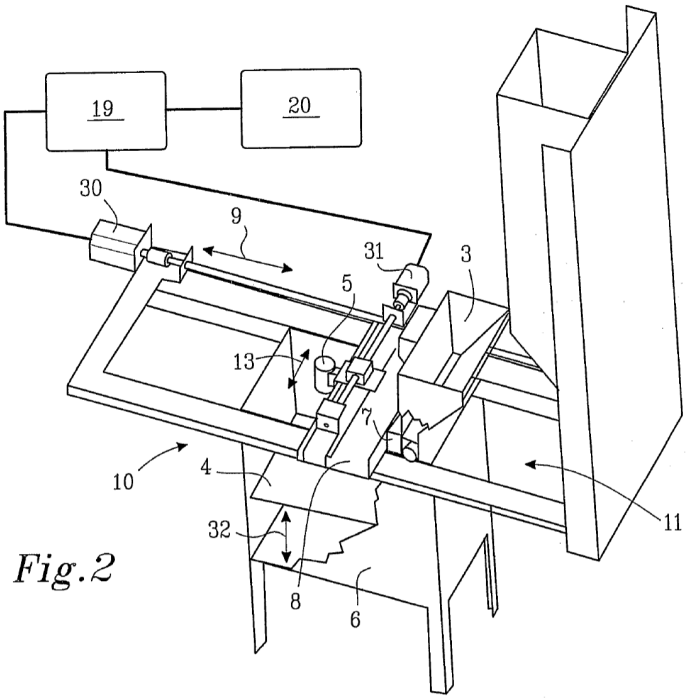


*Fig.2*

Paragraph [0031] mentions a uniform layer of wood powder that is produced on base plate 4 by means of a feeder 3, a scraper 14 and a suction device 16 (all shown in Fig. 3). Paragraph [0032] adds that binding agent is deposited by a nozzle 12 (also shown in Fig. 3). The rest of the paragraph explains how this is to be done. The desired product is built layer by layer. The base plate 4 is lowered after completion of each layer, so that the feeder is always at the same distance from the upper surface of the product. It is in this context that the following statement is made:

> "When depositing binding agent, the quantity of binding agent should be such that the binding agent sinks into the preceding layer, so that the two adjacent layers are bonded to each other."
> (underlining added by the board)

The board is of the view that this is best understood if "sink into" is not read to mean that the binding

agent is "swallowed" by the preceding layer (because the "preceding layer" is a composite layer containing wood powder and binding agent and does not have to contain a significant volume that can still be filled by binding agent), but to mean "sink in to", i.e. sink in to reach the preceding layer. In other words, the quantity of binding agent should be such that the binding agent, which sinks into the layer of wood powder applied onto the preceding layer, reaches the surface of the preceding layer so that it can bond with that layer.

This interpretation allows the understanding not only (1) that the sinking in results in bonding the two layers ("... so that the two adjacent layers are bonded to each other ..."), but also (2) that the quantity of the binding agent is relevant: as a matter of fact, if the quantity of binding agent is too small, the agent might not progress enough to reach the surface of the preceding layer and, therefore, might not establish a bond between the two layers.

Feature F is interpreted accordingly.

3. Ground for opposition under Article 100(c) EPC

The appellant objected to the introduction of feature F into claim 1. As already explained above, this feature is found in paragraph [0032] of the patent, which corresponds to page 8, lines 27 to 35, of the original description. This statement is not a mere description of what is shown in Fig. 2 but a general statement relating to the appropriate way of depositing binding agent in the claimed method. It is legitimate to extract this feature from its immediate context in the description and to amend original claim 1 accordingly.

However, in view of the interpretation of feature F set out above (see section 2.4), the feature "so that the two adjacent layers are bonded to each other" is not merely a statement of the immediate and necessary effect of feature F (in which case it could have been omitted) but qualifies the quantity of binding agent needed. Thus, the feature should have been inserted into claim 1.

The argument that feature G ("wherein wood powder of each layer and of adjacent layers is bonded into a continuous product by means of the binding agent") supplies the omitted elements is not without merit, but the direct relationship between the quantity of binding agent and the bonding of two adjacent layers is lost.

Consequently, the granted claim 1 contains added subject-matter. The ground for opposition under Article 100(c) EPC prejudices the maintenance of the patent as granted.

4. Ground for opposition under Article 100(b) EPC

This objection is also mainly based on feature F. The appellant argued that in the absence of any disclosure in the patent concerning the correct quantity of binding agent the skilled person would be unable to carry out the invention.

This objection is not convincing. It is true that the skilled person would have to carry out preliminary trials to determine the appropriate amount of binding agent, but this would not hinder them from carrying out the invention.

The appellant's objections based on feature D are found unpersuasive in light of the board's interpretation of this feature (see section 2.3 above).

Consequently, the ground for opposition under Article 100(b) EPC is not prejudicial to the maintenance of the patent as granted.

5. Grounds for opposition under Article 100(a) EPC

5.1 Novelty

The opposition division was of the opinion that none of the documents cited by the opponent (now the appellant) as destroying the novelty of the patent disclosed features B and F.

5.1.1 Novelty over document D1

Document D1 discloses a method of 3D printing, in which a homogeneous fluid 26 comprising an ionic reactant is deposited onto a region 30 of a layer 20 of dry particulate material also comprising an ionic reactant. An ion exchange reaction occurs between the reactants and causes a solidified material to form in that region (see claim 1, for example). This step is repeated until the final article is completed (see page 25, lines 10 and 11).

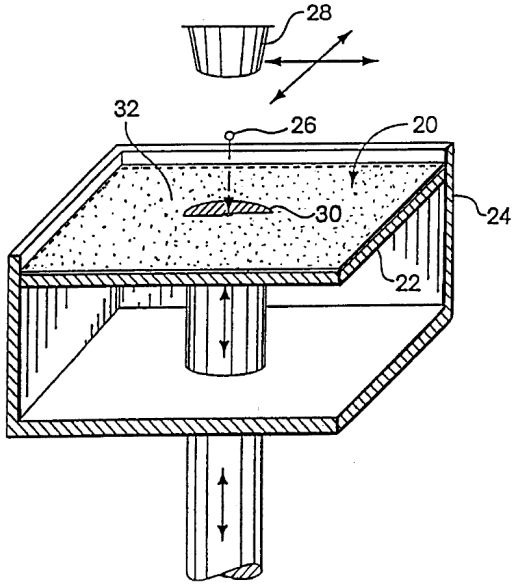


Fig. 2

(a) Feature B

The appellant referred to the disclosure of wood powder on page 21, line 3, of document D1.

Wood powder is indeed cited as one of eleven examples of inert organic materials. These materials are given as one of eight exemplary classes of inert particles (see page 20, lines 20 and 21), of which it is said that they can be included in the particulate material (see page 20, line 18).

However, this passage of document D1 cannot be said to directly and unambiguously disclose that a layer predominantly made up of (i.e. not only containing) wood powder is applied. Consequently, feature B is not disclosed in document D1.

(b) Feature F

Document D1 implicitly discloses feature F because the document only describes bonding by ion exchange reactions and because in order for the final article to form a coherent whole, there needs to be bonding between the different layers. As a consequence, the binding agent has to be deposited on the powder layer in a quantity that is sufficient to ensure that the binding agent sinks in to reach the preceding powder layer.

The disclosure of the passage invoked by the respondent, according to which:

> "*maximizing the amount of fluid printed to the layers ensures that fluid is available to act as a vehicle in which the reaction may take place*" (see page 25, lines 3 and 4),

does not lead to a different conclusion.

The following disclosure is also relevant in this context:

> "*In theory, there is no limit on the thickness of the layers of particulate material other than the capability of the equipment being used. In practice, the layers of particulate material are typically limited by the amount of fluid that may be delivered to the layer, as described below*" (see page 23, lines 10 to 13).

The board understands this to mean that the dimension of the layers is limited by the amount of fluid because

the fluid has to penetrate the whole layer (in order to establish bonding with the preceding layer).

(c) Conclusion

The subject-matter of claim 1 is novel over document D1 because this document does not disclose feature B.

5.1.2 Novelty over document D2

Document D2 discloses a powder system comprising a water-soluble crosslinkable agent for use in a 3D printer (see claim 1) and a method for operating a 3D printer in which the powder system is used to form a powder layer; an aqueous binder fluid is dispersed onto that layer so that it partially solidifies. Those steps are repeated until the 3D article achieves its final shape (see claim 34).

(a) Feature B

The argument that the reference to cellulose fibres in paragraph [0024] of document D2 discloses the use of wood powder is unpersuasive. It is correct that wood comprises cellulose fibres, but not all forms of cellulose correspond to wood.

(b) Feature F

Feature F is implicitly disclosed in document D2, for the same reasons as those given for document D1.

(c) Conclusion

The subject-matter of claim 1 is novel over document D2 because this document does not disclose feature B.

5.1.3 Novelty over document D6

This document discloses a reactive system for 3D printing. Two components react chemically with each other after the addition of a liquid medium to form a solid having improved mechanical properties or better water resistance.

(a) Feature B

Wood fibres are mentioned on page 8, line 51, of document D6, but this disclosure has to be seen in the context of the recurrent teaching in document D6 according to which, in order to vary and improve the mechanical properties of the objects, the reactive system can also contain fillers and/or fibres (see paragraphs [0011] and [0076]). There is no disclosure in document D6 that the system is predominantly made up of wood particles.

(b) Feature F

The liquid medium sinking into the powder layer does not qualify as binding agent within the meaning of claim 1 because its role is to dissolve the reactants and to bring them together. The proper binding is obtained by the reactants and not by the liquid medium.

(c) Conclusion

The subject-matter of claim 1 is novel over document D6, which does not disclose feature B or feature F.

5.1.4 Conclusion regarding novelty

The subject-matter of claim 1 is novel over the cited state of the art (Article 54 EPC).

5.2 Inventive step

The appellant used a great number of starting points, namely D1, D2, D6, D3, D5 and D16.

5.2.1 Starting from document D1

(a) Distinguishing feature

As has been explained above (see section 5.1.1), document D1 does not disclose feature B.

(b) Obviousness

It was argued that wood is an organic material and that the reference to such a material makes the use of wood powder obvious to the skilled person.

This reasoning is unpersuasive. Document D1 discloses that "the particulate material can include inert particles" (see page 20, line 18) and mentions wood powder as an example. It is not apparent why this teaching would have constituted an incentive for the skilled person to consider a particulate material predominantly made up of wood particles.

5.2.2 Starting from document D2

(a) Distinguishing feature

As has been explained above (see section 5.1.2), document D2 does not disclose feature B.

(b) Obviousness

It was argued that, cellulose being a component of wood, the reference to cellulose in paragraph [0024] of document D2 renders the use of wood powder obvious.

This argument is unpersuasive. It is not because wood contains cellulose that any reference to cellulose fibres can be understood as an invitation to consider wood powder.

5.2.3 Starting from document D6

Document D6 is more remote from the claimed subject-matter than documents D1 and D2 (see section 5.1.3 above). Consequently, it constitutes a less promising starting point and is therefore even less suitable for rendering obvious the subject-matter of claim 1 than documents D1 or D2.

5.2.4 Starting from document D3

Document D3 discloses 3D printing techniques in which powdered material is deposited in sequential layers one on top of the other. Following the deposition of each layer of powdered material, a liquid binder material is supplied to the layer of powdered material using an ink-jet printing technique in accordance with a computer model of the three-dimensional part being

formed. The unbound powder is then removed, resulting in the formation of the desired 3D part.

(a) Distinguishing features

(i) Feature B

There is no disclosure of wood powder in document D3.

(ii) Feature F

Feature F is implicitly disclosed in document D3, for the same reasons as those given for document D1. The disclosure in col. 6, lines 49 to 53, and in col. 9, lines 33 to 37, does not justify a different conclusion. The arguments of the respondent are based on an interpretation of what constitutes the "preceding wood powder layer" of feature F that is different from the interpretation of the board (see section 2.4).

(b) Obviousness

The appellant argues that document D3 refers to "other materials". The only reference to such materials is found at the end of the discussion of the prior art. In this context, document D3 states the following:

> "*It is desirable to devise a technique for providing such layered parts which will work satisfactorily with ceramic or metal materials, or combinations of such materials with each other or with other materials, but which will also work satisfactorily with plastic particles or with other inorganic materials*" (col 3, lines 10 to 15, underlining added by the board).

The board is unable to see in this sweeping statement an incentive for the skilled person to use the techniques disclosed in document D3 with wood powder.

It was argued that the skilled person looking for other materials would have referred to documents D1, D2 or D6 and found the claimed solution there.

The underlying assumption appears to be that the objective technical problem solved by the invention is to identify other inorganic materials that can be used with the technique of document D3.

However, the skilled person starting from document D3 and seeking a solution to the objective technical problem would not have been led by document D1 to the claimed solution. This is because document D1 does not teach the use of wood powder; rather, it only mentions wood powder as particles which the particulate material to be used can include (see page 20, lines 18 to 20, and page 11, line 3). The same holds true for document D6 (see paragraphs [0076] and [0079]). Document D2 does not even mention wood powder; it only mentions cellulose fibres (see paragraph [0024]).

5.2.5 Starting from document D5

Document D5 discloses processes for the manufacture of components in which a layer of wax particles is deposited and liquid droplets of wax are applied onto certain regions of that layer. These steps are reiterated to build a solidified structure.

(a) Distinguishing features

(i) Feature B

There is no disclosure of wood powder in document D5.

(ii) Feature F

Feature F is not disclosed in document D5 because the binding agent (molten wax) and the powder (wax particles) are made of the same material. As explained above (see section 2.2), claim 1 does not encompass this case. Also, when molten wax is applied to solid wax, the latter will partially melt and there will be a mixture. The molten wax cannot be expected to "sink into" the solid wax layer.

(b) Obviousness

It was argued that document D1, D2 or D6 would have led the skilled person to the claimed invention.

This argument is unpersuasive. Even if the only distinguishing feature was feature B, the skilled person looking for alternative materials to be used with the method according to document D5 would not have considered wood powder because this material cannot be melted. Moreover, as has been explained above, none of documents D1, D2 or D6 teaches the skilled person to predominantly use wood powder.

5.2.6 Starting from document D16

As mentioned above (see section 1.), the board has decided not to admit this document.

5.2.7 Conclusion regarding inventive step

The cited prior art does not render obvious the subject-matter of claim 1, which is therefore based on an inventive step within the meaning of Article 56 EPC.

6. Overall conclusion regarding the main request

As the ground for opposition pursuant to Article 100(c) EPC is justified (see section 3.), the patent cannot be maintained as granted and the respondent's main request has to be dismissed.

7. Auxiliary request 1

Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that the feature "so that the two adjacent layers are bonded to each other" was added after the words "said preceding wood powder layer".

7.1 Admittance

The appellant objected to the admission of auxiliary request 1 and argued that the respondent could have submitted this request with its response to the statement of grounds of appeal, especially since the appellant had not submitted any new arguments after the patent proprietor's response that would justify the new requests.

The board has decided to admit auxiliary request 1 under Article 13(1) RPBA 2007 because it constitutes an immediate and appropriate reaction to the board's observation in section 6 of the board's communication pursuant to Article 15(1) RPBA 2007. It is correct that section 2.2 of the statement of grounds of appeal

contained an objection under Article 123(2) EPC, but this objection is a sweeping assertion that the amendment is an unallowable intermediate generalisation and does not identify the allegedly missing features, contrary to the board's communication.

7.2 Compliance with Article 123(2) EPC

By means of this addition, the respondent has overcome the only objection against the main request the board had endorsed.

7.3 Sufficiency of disclosure and patentability

The board's findings in respect of the main request also apply to auxiliary request 1.

The amendment does not raise any new issues.

Therefore, the patent can be maintained on the basis of auxiliary request 1.

8. Apportionment of costs

Under Article 104(1) EPC, each party to the opposition proceedings shall bear the costs it has incurred, unless a different apportionment of costs is ordered for reasons of equity.

There is no definition of equity in the EPC. The boards of appeal generally hold that an apportionment of costs is justified if the conduct of one party is not in keeping with the care required, that is if costs arise from culpable actions of an irresponsible or malicious nature (see "Case Law of the Boards of Appeal of the European Patent Office", 10th edition, 2022, III.R.2).

The board is not convinced that in the present case an apportionment of costs in favour of the respondent for preparing for and attending the oral proceedings before the board would be equitable, for the reasons set out below.

By letter dated 22 September 2022 (i.e. more than one month before the oral proceedings before the board), the appellant informed the board that it maintained its request for oral proceedings but that it would not attend the oral proceedings in person.("*Wir halten unseren Antrag auf mündliche Verhandlung aufrecht. Wir informieren die Beschwerdekammer darüber, dass die Einsprechende / Beschwerdeführerin nicht persönlich an der Verhandlung teilnehmen wird.*")

The respondent gave four reasons why it nevertheless decided to attend the oral proceedings:

(1) It had been discovered very late that the oral proceedings would not be cancelled, and therefore all the bookings had been made.
(2) The patent proprietor considered the patent very important and wanted the proceedings to be held in person.
(3) The way in which the appellant's submission was drafted did not clearly exclude that its representative would be present.
(4) There was a change of representative.

None of these four reasons can justify an apportionment of costs. This is explained in the following.

Reasons (1) and (2) are unrelated to the appellant's behaviour. Instead, they result from the respondent's own actions and preferences.

Considering that, in proceedings before the boards of appeal, parties are usually represented by professional representatives, whose statements and acts are considered to be the statements and acts of the parties, the only reasonable interpretation of the appellant's statement is that the appellant would not be represented at the oral proceedings. Therefore, the board cannot endorse reason (3). The fact that a change of representative occurred after this statement does not lead to a different conclusion because the appointment of a new representative does not as such have the consequence that prior procedural declarations on behalf of this party are automatically rescinded. Thus, reason (4) is not decisive either.

Moreover, the board cannot confirm that the appellant's behaviour was clearly abusive. The fact that the appellant maintained its request for oral proceedings despite having no intention of participating in them does not necessarily stem from an abuse of procedure. The board is unable to see any culpable actions of an irresponsible or malicious nature on behalf of the appellant.

The board acknowledges that there are decisions such as T 2350/15, section 7 of the Reasons, where the deciding board granted an apportionment of costs under circumstances that are similar to the present case. However, the board is unable to endorse this approach because it is not apparent to the current board why an apportionment would be required in the case at hand for reasons of equity. Moreover, it cannot be said that the

present appellant's behaviour "obliged the appellant/ patent proprietor to come to the oral proceedings and to prepare for them", as stated in decision T 2350/15. In view of the provisional opinion of the board expressed in its communication pursuant to Article 15(1) RPBA 2007, which was not contested by the appellant, the maintenance of the patent on the basis of the claims of auxiliary request 1 was to be expected. The appellant cannot be blamed for the fact that the respondent nevertheless preferred to attend oral proceedings in person.

Consequently, the respondent's request for apportionment of costs is refused.

**Order**

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

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the European patent as amended in the following version:

   - Claims: No. 1 to 20, filed as auxiliary request 1 on 22 January 2020;
   - Description: paragraphs 1 to 37 of the patent specification;
   - Drawings: Figs. 1a, 1b and 2 to 5 of the patent specification.

3. The request for apportionment of costs is refused.

The Registrar: The Chairman:

N. Schneider P. Lanz

Decision electronically authenticated