UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN TUOZHU TECHNOLOGY CO., LTD.,
Petitioner

v.

STRATASYS, INC.
Patent Owner.

IPR2025-00438
U.S. PATENT NO. 10,569,466

PATENT OWNER'S PRELIMINARY RESPONSE

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I. INTRODUCTION

Pursuant to 35 U.S.C. § 313 and 37 C.F.R. § 42.107, Stratasys, Inc. ("Stratasys" or "Patent Owner") hereby submits this Preliminary Response to the Petition for *inter partes* review ("Petition" or "Pet.") filed by Shenzhen Tuozhu Technology Co., Ltd. ("Petitioner"), challenging claims 1-5, 7-13, 16-20 ("challenged claims") of U.S. Patent No. 10,569,466 ("the '466 Patent") (EX1001).

Petitioner alleges that the challenged claims are invalid based on 15 grounds (1A-1F, 2, 3A-3H). Petitioner argues that independent claim 1 is obvious over U.S. Patent Publication No. 2006/0091199 ("*Loughran*") (EX1004) in view of U.S. Patent Publication No. 2008/0192074 ("*Dubois*") (EX1005) in Ground 1A, *Loughran* and *Dubois* in further view of U.S. Patent Publication No. 2011/0299110 ("*Jazayeri*") (EX1010) in Ground 1B, U.S. Patent Publication No. 2006/0127153 ("*Menchik*") (EX1009) in Ground 3A, and *Menchik* in view of *Jazayeri* in Ground 3B. Further, Petitioner argues that independent claim 19 is obvious over U.S. Patent Publication No. 2007/0026102 ("*Devos*") (EX1008) in Ground 2, *Menchik* in Ground 3A, and *Menchik* in view of *Jazayeri* in Ground 3B. Petitioner also argues that independent claims 1 and 19 are anticipated by *Menchik* in Ground 3A.

As explained below, Petitioner has failed to meet its burden of showing a reasonable likelihood that it would prevail with respect to any of the challenged claims because each of the asserted grounds has fatal defects.

The challenged claims of the '466 Patent are directed to solutions that include providing data that includes a property of a build material from a tag to a client over a network, determining an operational parameter that is based on the property stored on the tag, receiving the operational parameter from the client, and fabricating an object with build material according to the operational parameter.

The primary reference in Grounds 1A and 1B (*Loughran*) discloses a system that, unlike the '466 Patent, automatically and dynamically adjusts its use without interacting with a client. That reference also has fundamental differences with the secondary reference in Grounds 1A and 1B (*Dubois*) that Petitioner failed to address. Additionally, the *Loughran-Dubois* combination fails to teach several elements of claim 1.

The additional reference in Grounds 1B and 3B (*Jazayeri*) is an improper reference for obviousness as it is not analogous art. Further, multiple claim elements of the independent claims are not taught by the corresponding combinations.

The reference in Ground 2 (*Devos*) discloses a powder-based system that fails to teach a support structure requirement. There is no disclosure that *Devos* generates a parameters indicating how much support material to use in fabrication.

The primary reference for Grounds 3A and 3B (*Menchik*) fails to teach numerous elements of claims 1 and 19, including receiving a request from a client over a network to fabricate an object, providing data from the tag to the client, receiving operational parameter(s) from the client for fabrication of an object with the build material having a property stored in the tag.

In summary, the Board should not institute IPR because each of Petitioner's grounds are deficient and thus Petitioner cannot satisfy its burden to prove unpatentability.

II. THE '466 PATENT AND THE CHALLENGED CLAIMS

A. Summary of the '466 Patent (EX1001)

The '466 Patent relates to "three-dimensional printers" that "use build material of various type and configuration to print three-dimensional objects." EX1001 at 1:16-18. As the patent explains, "at least a basic set of characteristics of the build material to determine operation" may be needed "[i]n order to properly process the build material through the three-dimensional printer extruder for the fabrication of an object." *Id.* at 1:18-22. Thus, there is "a need for methods and

systems for the automatic detection and acquiring of three-dimensional printer build material characteristics." *Id.* at 1:23-25.

Figure 3 of the '466 Patent shows a three-dimensional printer system 300 that includes a three-dimensional printer 306 with a tag sensor 310 to read a data tag 304 included on a supply 302 of build material 312.

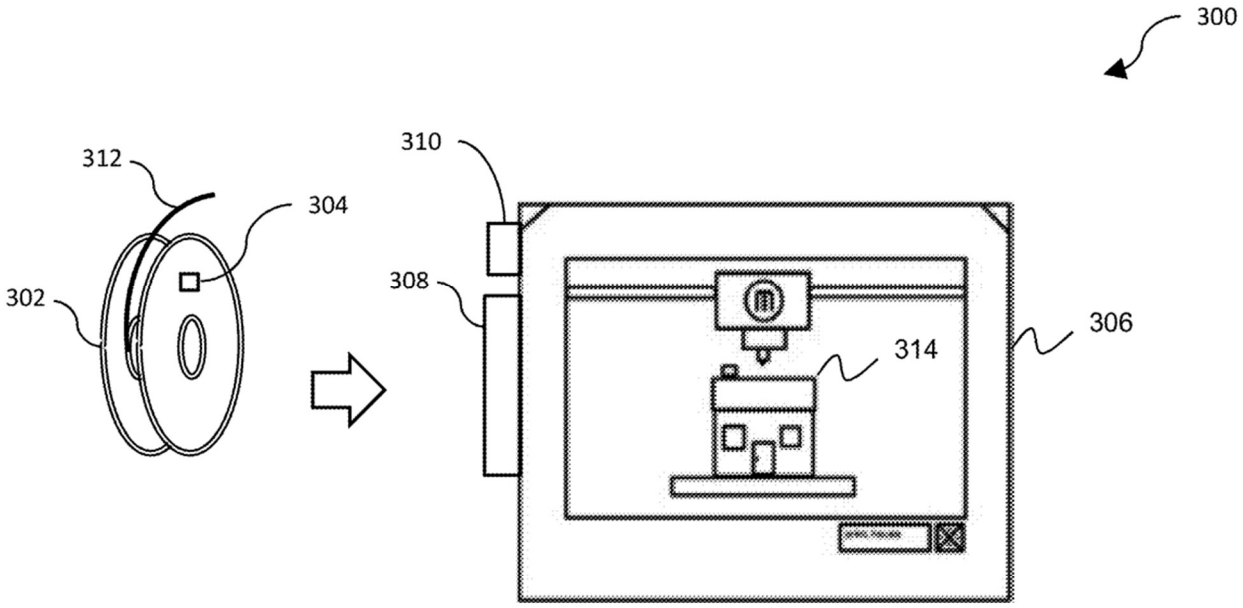


Fig. 3

Id. at 13:65-67, 14:30-35, 14:56-59, Fig. 3. As shown, the supply of material can be coupled via 308 to the three-dimensional printer 306 for the fabrication of an object 314. *Id.* at 14:9-23, 15:11-17, Fig. 3; *see also id.* at Figs. 4A-4C.

A diagram of a three-dimensional printer 100 is shown below in Figure 1 with a build platform 102, extruder 106, and controller 110 that cooperates "to fabricate an object 112 within a working volume 114 . . . ." *Id.* at 2:25-29, Fig. 1.

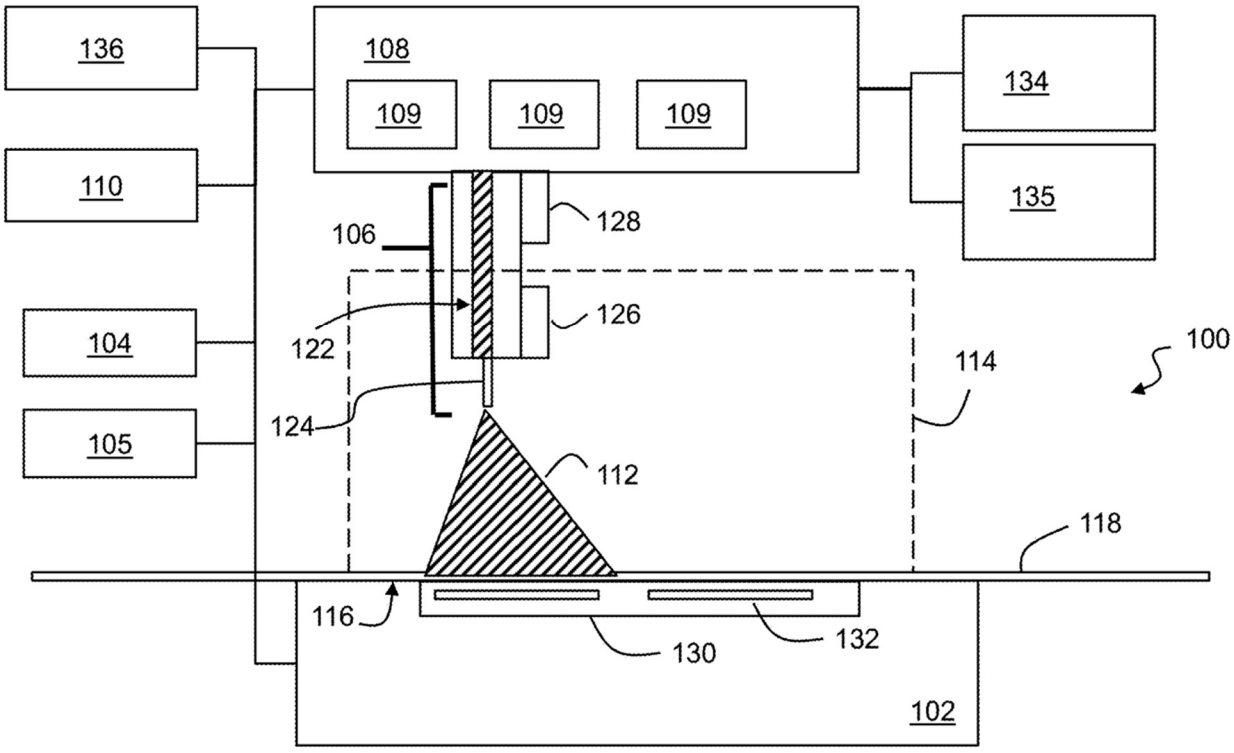


Fig. 1

Id. at Fig. 1. The extruder 106 may include a chamber 122 that receives build material that "can usefully be extruded to form a three-dimensional object." *Id.* at 2:43-49. For instance, the extruder 106 may include an extrusion tip 124 that includes an exit port that "extrudes build material." *Id.* at 2:49-53. In particular, the heater 106 may include a heater 126 to melt the build material "within the chamber

122 for extrusion through an extrusion tip 124 in liquid form." *Id.* at 2:54-57. Further, "[b]y controlling a rate of the motor 128, the temperature of the heater 126, and/or other process parameters, the build material may be extruded at a controlled volumetric rate." *Id.* at 3:5-8.

To read build material tag data and fabricate an object, the '466 Patent illustrates a flowchart in Figure 6. *Id.* at 1:50-52.

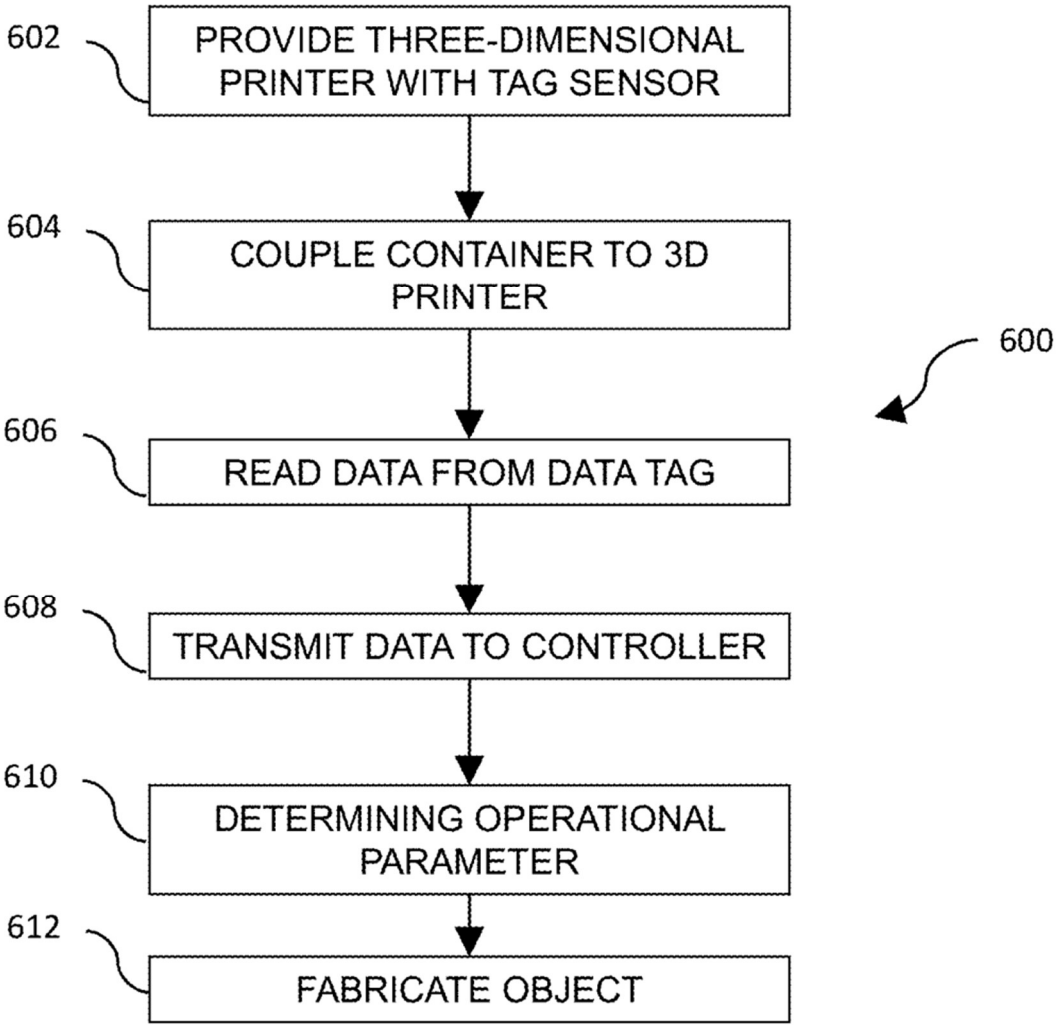


Fig. 6

Id. at Fig. 6. At step 602, a three-dimensional printer is provided with a tag sensor, such as via an add-on component to the printer. *See id.* at 20:64-21:4. At step 604, a container for build material with a data tag is coupled to the three-dimensional printer. *Id.* at 21:5-13. The data on the tag may include information about the

mechanical, structural, thermal, and aesthetic properties of the build material. *Id.* at 21:14-20.

Although such information can be used to determine operational parameters, the data tag may also store data that is not "tied to operational parameters . . . such as an amount of material in the container . . . , an expiration date, [and] a brand name . . . ." *Id.* at 21:21-21:25. As explained by the '466 Patent, the amount of material in the container may be an initial amount or a measured amount using active circuitry. *Id.*; *see also, e.g.*, *id.* at 18:40-43 (The supply of material "may optionally include sensors and processing circuitry to actively provide data concerning an amount of build material."), Fig. 4B.

Additionally, the data on the data tag may include "data indirectly related to build material properties such as a unique identifier for the build material or the container." *Id.* at 21:26-28.

At step 606, the data on the data tag is read using the tag sensor. *Id.* at 21:39-41. And then, at step 608, the data read from the tag sensor may be transmitted to a controller. *Id.* at 21:44-45.

At step 610, an operational parameter for fabrication of the object may be determined based on data from the data tag. Namely, information about the build material that is stored in the data tag can be used to determine how the build material should be used in a fabrication process. *See id.* at 21:50-56. For instance, a

controller associated with the three-dimensional printer may use the type of build material to determine "an extruder temperature, a feed rate, a build platform temperature, a build volume temperature, an infill requirement, a rafting requirement, a support structure requirement, an extruder movement speed, and a cooling requirement." *See id.* at 21:56-61. The determined operational parameter may be transmitted from a remote resource to the three-dimensional printer to fabricate an object. *See id.* at 16:34-40, 16:41-55.

At step 612, the object is fabricated while using the operational parameter to control operation of the three-dimensional printer. *See id.* at 22:21-24. As a result, "a user may simply load a build materially from a suitably instrumented container and select an object to print without specifying various configuration details that might otherwise be required." *Id.* at 21:27-31.

Numerous claims embody these solutions, including independent claims 1 and 19. For instance, claim 1 recites "reading data from the tag with the tag sensor;" "providing the data from the tag to the client over the network, the data including at least one property of the build material;" "receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag; and" "fabricating the object with the build material according to the one or more operational parameters." *Id.* at

23:40-50. Similarly, claim 19 recites "reading data from the tag with the tag sensor;" "transmitting the data to the controller;" "determining an operational parameter for configuring the three-dimensional printer for a fabrication process using the build material based upon at least one property of the build material in the data, the operational parameter including at least one of a build platform temperature, a build volume temperature, an infill requirement, a rafting requirement, a support structure requirement, and a cooling requirement;" "controlling operation of the three-dimensional printer with the controller according to the operational parameter; and" "fabricating an object with the three-dimensional printer based upon the operational parameter." *Id.* at 24:60-25:7.

As explained below, the asserted grounds fail to teach the elements of claims 1 and 19. Because claims 2-5, 7-13, 16-18 depend from claim 1 and claim 20 depends from claim 19, the asserted grounds also fail to teach the elements of dependent claims 2-5, 7-13, 16-18, and 20 for at least the same reasons.

B. Summary of Prosecution History of the '466 Patent (EX1002)

During prosecution, the applicant explained that unlike the cited art, the operational parameter(s), which are based on information that is read from a tagged container, must be used when fabricating an object. EX1002 at 160. The applicant explained that the examiner correctly noted that U.S. Patent No. 8,286,236 to Jung, et al. ("*Jung*") did not disclose a tag sensor associated with a controller and a tag

that stores one or more properties of the build material on a contain that stores the material. *Id.*at 159; *see also id.* at 120-21. The examiner had rejected the claims over *Jung* in view of U.S. Patent No. 7,520,740 to Wahlstrom, et al. ("*Wahlstrom*"). *Id.* at 158, 120. But the applicant argued that *Wahlstrom* only described tags and readers for identifying expired or unauthorized material to sound an alarm. *See id.*at 159-60. Thus, there was no teaching or suggestion of adjusting operational parameters used when fabricating an object based on information that was read from a tagged container. *See id.* In response to applicant's arguments, the examiner allowed the claims explaining that the prior art fails to teach or suggest the claimed method. *See id.* at 176, 202.

As explained below, the references asserted in the Petition suffer from similar deficiencies as the art cited during prosecution and the asserted grounds do not teach all elements of independent claims 1 and 19 of the '466 Patent.

III. LEVEL OF ORDINARY SKILL

For the purpose of this Preliminary Response, a personal of ordinary skill in the art (a "POSITA") in relation to the subject matter of the '466 Patent would have had a bachelor's degree in Mechanical Engineering, Computer Engineering, Electrical Engineering, Chemical Engineering, Materials Science, or a comparable field and at least two years of experience related to 3D printing, with additional

experience potentially being a substitute for a formal degree or training (and vice versa).

As explained below, the Petition has failed to show that the claims of the '466 Patent are unpatentable irrespective of the level of skill of a skilled artisan.

IV. CLAIM CONSTRUCTION

For the purposes of this Preliminary Response, Patent Owner submits that the Board does not need to construe any claim terms in any particular way to conclude that the Petition is deficient and thus institution of review is not warranted. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("need only be construed 'to the extent necessary to resolve the controversy'").

V. APPLICABLE LEGAL STANDARDS

At a minimum, Petitioner must show there is a reasonable likelihood of prevailing with respect to at least one challenged claim. *See* 35 U.S.C. § 314(a); 37 C.F.R. § 42.108(c); Practice Guide at 3 ("The Board, acting on behalf of the Director, may institute a trial where the petitioner establishes that the standards for instituting the requested trial are met . . . .")

Each of Petitioner's grounds relies on obviousness under 35 U.S.C. § 103. A claim cannot be considered obvious if even one element of the claim is absent from the prior art. *See CFMT, Inc. v. YieldUp Int'l Corp.*, 349 F.3d 1333, 1342 (Fed.

Cir. 2003) ("Obviousness requires a suggestion of all limitations in a claim.") (citing *In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974)); *In re Rijckaert*, 9 F.3d 1531, 1534 (Fed. Cir. 1993) (reversing obviousness rejection as not all claim elements were taught or suggested); *Garmin Int'l, Inc. v. Patent of Cuozzo Speed Techs. LLC*, IPR2012-00001, Paper 15 at 15 (PTAB Jan. 9, 2013) (denying institution of IPR in part as prior art did not disclose all claim limitations in obviousness challenge).

Obviousness is resolved based on several factual determinations including the scope and content of the prior art, any differences between the claimed subject matter and the prior art, and the level of ordinary skill in the art. *See Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). IPR petitions "must address the *Graham* factors." *Eizo Corp. v. Barco N.V.*, IPR2014-00358, Paper 11 at 29-30 (PTAB July 23, 2014) (citing *Graham*, 383 U.S. at 17-18) (faulting Petitioner for its failure to identify differences between the claimed subject matter and the prior art and its conclusory assertions about the teachings of the prior art); *see also Moses Lake Indus., Inc. v. Enthone, Inc.*, IPR2014-00243, Paper 6 at 18 (PTAB June 18, 2014); *Moses Lake Indus., Inc. v. Enthone, Inc.*, IPR2014-00246, Paper 6 at 17 (PTAB June 18, 2014); *eBay, Inc. v. Paid, Inc.*, CBM2014-00125, Paper 15 at 21 (PTAB Sept. 30, 2014).

The conclusion of obviousness based on the combination of references must be supported by an explicit analysis of a reason to combine such references. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). Mere conclusory statements are insufficient. Instead, "there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); *see also LG Elecs., Inc. v. Cellular Commc'ns Equip. LLC*, IPR2016-00197, Paper 7 at 7-11 (PTAB Apr. 29, 2016) (petition's conclusion of obviousness lacked sufficient articulated reasons with rational underpinnings for modifying references to achieve specific elements of the claims).

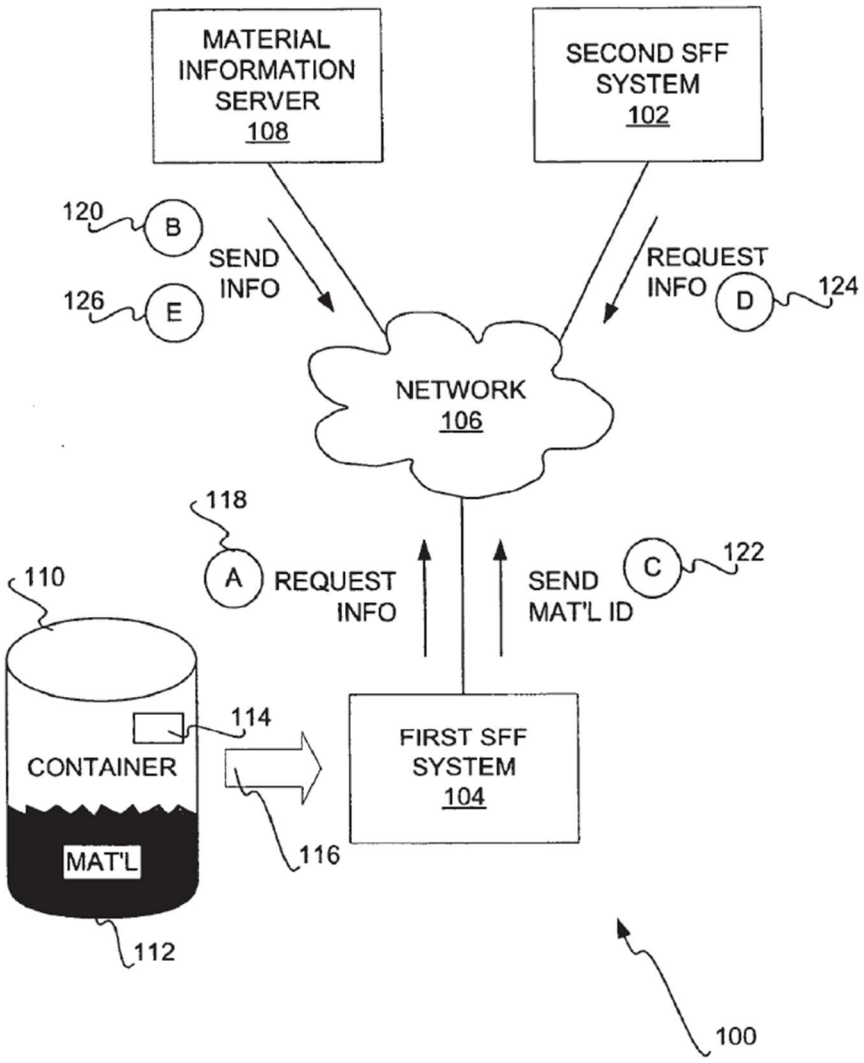
Ground 3A of the Petition also relies on anticipation under 35 U.S.C. § 102. "Because the hallmark of anticipation is prior invention, the prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements arranged as in the claim." *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (internal quotation marks omitted); *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009) (requiring "each and every element of the claimed invention" be "explicitly or inherently" disclosed in a single reference, and such elements "must be arranged or combined in the same way as in the claim") (internal citations and quotation marks omitted). "[I]t is not enough that the prior art reference discloses part of the claimed invention, which an ordinary artisan

might supplement to make the whole, or that it includes multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention." *Net MoneyIN, Inc.*, 545 F.3d at 1371 (citing *In re Arkley*, 455 F.2d 586, 587 (C.C.P.A. 1972) ("[T]he [prior art] reference must clearly and unequivocally disclose the claimed [invention] or direct those skilled in the art to the [invention] without *any* need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference.") (emphasis in original)).

VI. THE PETITION DOES NOT SHOW THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 1A

A. Overview of *Loughran* (EX1004)

Loughran discloses retrieving information on material used in solid freeform fabrication (SFF). *See* EX1004 at Title. As shown below in Figure 1, *Loughran*'s system 100 includes two SFF systems (102, 104) and a material information server (108).



Id. at Fig. 1, ¶ [0012]. Material container 110 is shown with a tag 114 that includes a material identifier. *See id.* at ¶¶ [0020], [0021]. Based on the material identifier, the SFF system (104)[1] is able to recognize material 112 introduced to the system

[1] The description of *Loughran* refers to SFF system 104 as the second SFF system whereas Figure 1 of *Loughran* refers to system 104 as the first SFF system. *Compare* EX1004 at ¶[0020] *with* EX1004 at Fig. 1. Patent Owner refers to SFF

and determine whether the material is known or unknown. *See id.* at ¶[0020]. When *Loughran*'s teachings are used in an inkjet SFF system, the material is held in a melted liquid state in reservoirs and fed to individual jetting heads that squirt tiny droplets of the materials in the required pattern. *Id.* at ¶[0016]. After a layer of the object is formed, *Loughran* explains that a milling head is passed over the layer to cut the layer in a destructive manner to achieve uniformity. *See id.*

If the material is unknown, SFF system 104 requests information about the material from material information server (108) as indicated by the letter 'A.' *See id.* at ¶[0022], Fig. 1

In response to the request, material information server 108 sends information about the material to SFF system 104, as indicated by the letter 'B.' *See id.* at ¶[0023], Fig. 1. SFF system 104 then knows the material and stores the material identifier in association with the information received from material information server 108. *Id.* As a result, SFF system 104 can "automatically and dynamically" adjust its use of the material to fabricate physical objects. *See id.*at ¶¶[0024], [0025]. These adjustments can occur while SFF system 104 is running, without

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system 104 and SFF system 102 consistent with Figure 1 and the written description of *Loughran*.

having to reboot the system and can also occur without user intervention and involvement. *See id.* at ¶[0037].

Another SFF system (102) in *Loughran* provides SFF jobs to SFF system 104, which fabricates the objects for the jobs as discussed above. *Id.* at ¶[0012]. SFF system 102 can also request information about the material. SFF system 104 can send a material identifier to SFF system 102 as indicated by the letter 'C." *Id.* at ¶[0028], Fig. 1. SFF system 102 may request information about the material from material information server 108 as indicated by the letter 'D.' *See id.* And, the material information server 108 sends the information to SFF system 102 as indicated by the letter 'E.' *See id. Loughran* explains that SFF system 102 can use material information, for example, to estimate build time, suggest feature orientation, or determine part scaling based on expected shrinkage. *See id.* at ¶[0027].

B. Overview of *Dubois* (EX1005)

Dubois discloses the production of a three-dimensional multi-material object via ink-jet printing. EX1005 at Title, ¶[0001]. *Dubois* explains that he uses ink-jet printing in a non-subtractive method that successively adds materials without employing a moulding stage and without using tools to remove material. *See id.* at ¶[0002]. A printer according to *Dubois'* teachings uses its own data processing

unit, which can accept user input to determine the print layers to be printed successively. *Id.* at ¶¶[0048]–[0049], [0149]–[0150], Figs. 5–6.

C. There Is No Motivation to Combine *Loughran* and *Dubois*

In addition to the deficiencies of the *Loughran-Dubois* combination addressed in the sections below, there is no motivation to combine *Loughran* and *Dubois* in the manner that Petitioner proposes. Namely, Petitioner asserts that there is a motivation to implement *Loughran's* SFF system to send the fabrication job from the CAD client using CAD information that includes printing parameters concerning the state or characteristics of the materials, as *Dubois* suggests, to achieve known benefits and enable *Loughran's* system to complete each fabrication job based on CAD information with the optimal set of material parameters. *See* Pet. at 10.

However, when discussing the references and the purported motivation to combine, Petitioner fails to address "fundamental differences" between *Loughran* and *Dubois* that are central to the proposed combination. *Adidas AG v. Nike, Inc.*, 963 F.3d 1355, 1359 (Fed. Cir. 2020) ("The obviousness inquiry does not merely ask whether a skilled artisan could combine the references, but instead asks whether 'they would have been motivated to do so.'") (quoting *InTouch Techs., Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014)). In fact, Petitioner's sole citation to *Loughran* in its motivation-to-combine argument is to

paragraphs [0001] and [0013] of *Loughran* to support Petitioner's assertion that the asserted references are each related to systems for fabricating three-dimensional objects in a layer-by-layer manner. *See* Pet. at 12 (citing EX1004, [0001], [0013]); *see generally* Pet. at 10-13.

Petitioner fails to acknowledge and address the fact that its proposed combination is contrary to key, express teachings of *Loughran* that enable an SFF system to automatically and dynamically adjust its own operation using information about the material for the printer:

- EX1004, ¶[0024] (the "SFF system 104 is automatically and dynamically adjusted for utilization with the material 112"),
- ¶[0025] (the "SFF system 104 dynamically adjusts its own parameters for fabricating physical objects from the material 112, as well as information intended for user education"),
- ¶[0035] ("The information may include machine-readable information by which the [] SFF system 104 is to be dynamically adjusted for using the material 112 . . . ."),
- ¶[0037] ("The [] SFF system 104 parses the retrieved information regarding the material 112 to, for instance, extract parameters regarding the material 112, and dynamically adjusts its own parameters based on parameters extracted (326). . . . These parameters

regarding the material 112 are employed by the [] SFF system 104 to adjust its own parameters so that physical objects can be properly fabricated from the material 112, as can be appreciated by those of ordinary skill within the art. The adjustment is dynamic in that it can occur while the [] SFF system 104 is running, without having to reboot the [] SFF system 104, and can also occur without user intervention and involvement.") and Fig. 3 (step 326),

- ¶[0045] ("The SFF mechanism 502 is the mechanism that actually fabricates a physical object directly from the CAD information of a SFF fabrication job received from the [] SFF system 102, in a layer-by-layer manner. . . . The SFF mechanism 502 can fabricate the physical object from the material 112, since the parameters of the [] SFF system 104 are dynamically adjustable based on the information regarding the material 112 retrieved from the material information server 108."), and
- ¶[0048] ("The SFF mechanism 502 is then able to dynamically adjust its parameters based on this information so that physical objects can be fabricated from the material 112").

Petitioner's proposed combination eviscerates these teachings of automatic and dynamic adjustments in *Loughran*, replacing the SFF system's ability to

automatically and dynamically adjust its own parameters based on material information (which changes over time) with waiting for the CAD client to adjust parameters based on material information and simply setting parameters as instructed by the client. *See* EX1004 at ¶[0003]. Combining *Loughran* and *Dubois* in the manner proposed by Petitioner would alter the principles of operation of *Loughran* and render *Loughran* inoperable for its intended purpose. *See Adidas AG*, 963 F.3d at 1359-60 (affirming the Board's determination of no motivation to combine where the Petitioner failed to reconcile fundamental differences between the asserted references in a combination).

Additionally, *Dubois* does not provide any motivation to modify *Loughran's* solution in which the SFF system/printer is connected to a network to access information about the material from a server and share the information with another SFF system/printer. *See, e.g.*, EX1004, Fig. 1. *Dubois* teaches an isolated solution with only one printer that includes its own data processing unit to determine the layers to be printed successively and all of the printing parameters. *See, e.g.*, EX1005 at ¶¶[0149]–[0150], Figs. 5–6. *Dubois* does not teach, suggest, or otherwise address a solution like *Loughran's* with a networked SFF system/printer that can access a server and another SFF system/printer. *See, e.g.*, EX1004, Fig. 1. As a result, *Dubois* does not provide any rationale for reconciling fundamental differences between the asserted references in the combination.

There is also no motivation for the proposed combination because *Loughran* and *Dubois* concern different types of inkjet printers. *Dubois* is concerned with non-subtractive, ink-jet printing. *See* EX1005, ¶[0002]. While *Loughran* does disclose that its system can be an inkjet printer, *Loughran's* inkjet printer is subtractive, contrary to the teachings of *Dubois*. In particular, *Loughran* discloses using subtractive inkjet systems that pass a "milling head" over each layer of an object to provide a uniform thickness in a destructive manner. There is no teaching or suggestion in *Dubois* of how its solution for a non-subtractive solution would apply to or benefit *Loughran's* subtractive solution, nor does Petitioner provide any explanation.

Further, there is no motivation to use "optimum values" or achieve "optimal use" of various printer functions by looking to *Dubois* as Petitioner asserts. *See* Pet. at 10-12. As discussed, *Loughran* already discloses a SFF system/printer that can dynamically and automatically adjust its own parameters to properly fabricate a physical object and periodically updates material information. *See* EX1004 at ¶¶[0026], [0037], [0039]. Nor is there any motivation to apply *Dubois's* non-subtractive techniques to *Loughran's* subtractive solution or to replace *Loughran's* networked, dynamic, and adjustable SFF system/printer with an isolated, static system/printer from *Dubois*. *See* Pet. at 12-13.

D. Ground 1A Does Not Render Claim 1 Unpatentable

1. The *Loughran-Dubois* combination does not teach or suggest receiving a request from a client over a network to fabricate an object on the three-dimensional printer

Petitioner also fails to address why the *Loughran-Dubois* combination purportedly teaches "receiving a request from a client over a network to fabricate an object on the three-dimensional printer." *See* Pet. at 16-18. Relying solely on the disclosure of *Loughran*, Petitioner makes a conclusory assertion that Loughran's SFF fabrication job corresponds to a request to fabricate an object on the three-dimensional. *See* Pet. at 18. It only argues that its assertion is "in accordance with the scope of this limitation advanced by Patent Owner in the litigation." *See id.* However, the only evidence cited in the Petition is the declaration of Petitioner's expert, who like Petitioner fails to provide any evidence to support his assertions. *See id.* (citing EX1003, ¶53). Nor does Petitioner advance any claim interpretation that would support its conclusory assertion. Thus, Petitioner has failed to satisfy its burden to explain to the Board how the claims should be interpreted and its mapping of the asserted grounds to the claims. *See* 37 CFR § 42.104(b)(3) ("[T]he petition must set forth: … a statement [that] must identify the following: … (3) *How the challenged claim is to be construed*."); *see also* Consolidated Trial Practice Guide (84 Fed. Reg. 64,280 (Nov. 21, 2019)) ("CTPG") at 42 ("petitioner must . . . *provide a claim construction for the*

challenged claims" and "must also identify how the construed claim is unpatentable over the relevant evidence"), 44; *see TP-Link Corp. Ltd. v. Netgear, Inc.*, IPR2023-01393, Paper 15 at 6 (PTAB Mar. 8, 2024) ("As part of the petitioner's burden, the petition must state how a challenged claim is to be construed and how each element of the construed claim is found in prior art patents or printed publications. The burden of persuasion never shifts to the patent owner.") (internal citations omitted) (citing 37 C.F.R. §§ 42.104(b)(3)–(4); *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015)).

Further, Petitioner tacitly admits that Loughran's SFF fabrication job is not a request to fabricate an object on the three-dimensional printer by introducing another ground (Ground 1B) to address the deficiencies in the *Loughran-Dubois* combination. *See* Pet. at 33; *infra* §VII (addressing Ground 1B). It is clear from *Loughran*'s disclosure that had the inventor wanted to describe his SFF fabrication job as a request to fabricate, he would have done so. *Loughran* repeatedly describes requests in other contexts, such as requesting information about the material.

- EX1004, ¶[0022] ("[T]he second SFF system 104 requests the information regarding the material 112 from the material information server 108 over the network 106, as indicated by the letter A 118."),

- ¶[0028] ("In one embodiment, therefore, the first SFF system 102 requests the information regarding the material 112 from the material information server 108 over the network 106 based on the unique material identifier of the material 112, as indicated by the letter D 124."), and
- ¶[0031] ("In an alternative embodiment, there may be a single constant URL for all documents, or files, and the retrieval request may include an identifier of the material in the body, or payload, of the request.").

Thus, there is no evidence to support Petitioner's conclusory assertion about *Loughran*.

2. The *Loughran-Dubois* combination does not teach or suggest receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag

Similarly, Petitioner fails to address why the *Loughran-Dubois* combination purportedly teaches "receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag." *See* Pet. at 23-26. Although *Loughran* teaches that the print job is provided to the printer, there is no teaching that parameters are provided from a

client to the printer. *Loughran* expressly teaches that the printer itself has its own set of information about the material. EX1004, Fig. 1, ¶¶[0038], [0049]. And as discussed above, it also explains that using such information, the printer is designed to adjust its use automatically and dynamically for a material. *Supra* § VI.C (There Is No Motivation to Combine *Loughran* and *Dubois*); EX1004, ¶¶[0024], [0025], [0035], [0037], [0045], [0048], Fig. 3 at 336. Thus, rather than receiving parameters from a client, *Loughran* teaches the opposite approach where parameters are sent *to the client*.

While the Petition also relies on *Dubois's* disclosure to argue that a POSITA would have been motivated to implement *Loughran* using *Dubois's* suggestion of sending the fabrication job from the CAD client to include printing parameters concerning the state or characteristics of the materials (Pet. at 26), there is no explanation in the references or the Petition why one would override *Loughran's* express teaching of a printer that already has extensive information on the material and that is designed to adjust its use automatically and dynamically using such information. *Supra* § VI.C (There Is No Motivation to Combine *Loughran* and *Dubois*); EX1004, ¶¶[0024], [0025], [0035], [0037], [0045], [0048], Fig. 3 at 336. Sending "printing parameters concerning the state or characteristics of the materials" as Petitioner claims would ignore this important teaching in *Loughran*. And there is no teaching in *Dubois* to remedy this deficiency as *Dubois* is an

isolated solution with just one printer as opposed to *Loughran's* solution with two printers. *See* EX1005 at ¶¶[0149]–[0150], Figs. 5–6; EX1004, Fig. 1. Thus, the combination fails to teach receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag.

VII. THE PETITION DOES NOT SHOW THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 1B

A. Overview of *Jazayeri* (EX1010)

Jazayeri discloses a cloud-based print service for two-dimensional printers, such as cloud-aware two-dimensional and legacy two-dimensional printers, that can print on paper in color, black-and-white, and on one or two sides of the paper. *See* EX1010, Fig. 1, ¶¶[0024], [0027]; *see also id.* at ¶[0036] (describing "color vs. black-and-white, paper size, orientation, [and] number of copies" as print characteristics); ¶[0070] ("print characteristics may include a designation of one-sided versus two-sided printing, paper size, paper tray, color versus black-and-white"). *Jazayeri* explains that such printers typically require installing a print driver in an operating system that is specific to the type of printer and operating system. *See id.* at ¶[0002]. As a result, it may be difficult to create and maintain print drivers for all combinations of printers and operating systems or platforms, or for mobile environments that do not support print drivers. *See id.* at ¶[0005].

Further, printing documents from web applications is typically a problem because the documents must be converted to a standardized format, such as a PDF document, before predictably printing the document on paper. *See id.* at ¶[0006]. By contrast, *Jazayeri's* solution addresses these problems by supporting any application to communicate with a cloud print service to print documents, reducing the need for updating or maintaining print drivers. *See id.* at ¶[0028].

B. Jazayeri Is Not Analogous Art

As an initial matter, the *Jazayeri* reference asserted in Ground 1B (as well as Grounds 1B, 1D, 1F, 3B, 3D, 3F, and 3H) is an improper reference for an obviousness challenge. For a reference to be proper for an obviousness analysis, the reference must be analogous art to the claimed invention. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). The Federal Circuit has explained that there are two separate tests for analogous art: "(1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved." *Id.*

Jazayeri, which as discussed above relates to two-dimensional printers, is not in the same field of endeavor as the '466 Patent, which is about three-dimensional additive manufacturing. *See, e.g.*, EX1001, 1:23-33; *see also Airbus S.A.S. v. Firepass Corp.*, 941 F.3d 1374, 1380-81 (Fed. Cir. 2019) ("To determine

the applicable field of endeavor, the factfinder must consider 'explanations of the invention's subject matter in the patent application, including the embodiments, function, and structure of the claimed invention.'") (quoting *Bigio*, 381 F.3d at 1325). As Petitioner acknowledges, the '466 Patent addresses a need for automatic detection and acquisition of three-dimensional build material characteristics to determine how to use the material during fabrication of a three-dimensional object. *See* EX1001, 1:23-33 (cited by Pet. at 3). Thus, the '466 Patent is not in the same field of endeavor as *Jazayeri*.

Nor is the reference reasonably pertinent to the problem faced by the inventors. Petitioner asserts that Jazayeri relates to "networked printing environments" and that a POSITA has sufficient skill to incorporate teachings for printers that print content onto paper (two-dimensional printers) with additive manufacturing systems that create physical objects (three-dimensional printers). Pet. at 36, 73. But, Petitioner's own arguments show that the reference is not reasonably pertinent to the problem faced by the inventors. When defining the level of skill, for example, Petitioner describes that a POSITA would have had at least two years of research or industry experience in 3D printing or materials used for 3D printing. Pet. at 6. But neither category relates to two-dimensional printers that print on paper like the ones described by *Jazayeri*. Additionally, *Jazayeri* does not explain why an additive manufacturing system would benefit from its solution

that addresses the installation of two-dimensional, conventional printer drivers for an operating system. *See* EX1010 at ¶[0002]; *supra* § VII.A (Overview of *Jazayeri*). And Petitioner fails to address why *Jazayeri's* cloud-based services for two-dimensional printers relate to the problem solved by the inventors of the '466 Patent. *See* Pet. at 35. Thus, Petitioner has failed to show that *Jazayeri* is a proper reference for an obviousness challenge. *Bigio*, 381 F.3d at 1325.

C. No motivation to combine references in Grounds 1A (*Loughran* and *Dubois*) and 1B (*Loughran*, *Dubois*, and *Jazayeri*)

The combination of Ground 1B is deficient for multiple reasons. First, as explained above for Ground 1A, there is no motivation to combine *Loughran* and *Dubois*. *Supra* § VI.C.

Second, there is no motivation to combine *Jazayeri* with *Loughran* and *Dubois*. Petitioner asserts that a POSITA would implement *Loughran's* system in a manner that uses Jazayeri's suggestion (to provide an application manager, print dialogs to select available printers, and use a print server to send jobs to selected printers) to achieve several benefits and enable *Loughran's* system to receive a request to create a 3-D object over the network from a client device and respond by providing the client with a dialog to select an available additive manufacturing system. *See* Pet. at 34; *see also id.* at 33-36.

However, Petitioner shortcuts its analysis and fails to explain how *Jazayeri's* suggestion would have worked in the combined system. As Petitioner tacitly acknowledges, *Loughran's* client sends a print job to a SFF system and does not send a request to fabricate an object. *Supra* § VI.D.1. Petitioner does not assert that *Loughran* would have been modified to be implemented with a print server. Rather, it asserts that Loughran's SFF system would have been implemented with the functionality of a print server. *See* Pet. at 34. There is no explanation, however, of why a POSITA would have been motivated to implement *Loughran's* SFF system in this manner. In fact, Petitioner repeatedly relies on components unique to *Jazayeri*, such as its cloud print server 104, that are not included in the combination. *See* Pet. at 35. Further, there is no explanation of how providing "print server" functionality and a separate "cloud print service 102" (*see* Pet. 35) would have worked in *Loughran's* system of multiple printers (e.g., SFF printer systems 102 and 104). *See, e.g.*, EX1004 at Fig. 1.

Moreover, Petitioner's conclusory assertion that *Jazayeri* "does not disturb the aspects of Loughran and Dubois" is plainly deficient. *See* Pet. at 33. Petitioner ignores the teachings of *Dubois*, which discloses printer-specific implementations (*see* EX1005, ¶[0148] (quoted by Pet. at 11)), by asserting motivations to combine based on printer-agnostic implementations using *Jazayeri's* purported teachings. *See* Pet. at 35 ("[P]rovided a user with a printing experience that is 'platform-

independent.'"), 36 ("user can use software that is not printer specific"). Contrary to a platform-independent solution that uses printer-agnostic software, *Dubois* teaches performing printer-specific actions to achieve "optimum values" of printing parameters that are specifically a function of the characteristics of the printer, which is an ink-jet-type additive manufacturing system that specifically avoids the use of substrative production methods. *See* EX1005, ¶¶[0148], [0002]. Simply put, *Dubois* indicates that with printer-agnostic implementations like the one proposed by Petitioner, "it is impossible to produce a high-quality component which complies with the requirements" of a product's specification. *Id.* at ¶[0013]. For this additional reason, there is no motivation to combine *Jazayeri* with *Loughran* and *Dubois*.

D. Ground 1B Does Not Render Claim 1 Unpatentable

In addition to the deficiencies with *Jazayeri* and the purported motivation to combine discussed above, Ground 1B does not teach all elements of Claim 1. As explained above, Ground 1A does not teach receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag. *Supra* § VI.D.2. Although Ground 1B adds *Jazayeri* to the combination, the Petition does not rely on *Jazayeri* or the combination in Ground 1B for receiving one or more operational parameters. Thus,

for at least the reasons discussed above for Ground 1A, Ground 1B does not teach or suggest receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag.

VIII. THE PETITION DOES NOT SHOW THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 2

A. Overview of *Devos* (EX1008)

Devos discloses improved powder supply bins for solid freeform fabrication. EX1008, Title. The system includes a removable powder supply bin, a build bin, a roller, and a print head above the build bin that deposits a binder onto the powder in the build bin in a preselected pattern. *Id.* at Abstract.

Devos explains that "[o]bjects are fabricated by printing or ejecting an adhesive or binder onto a flat bed of powder. Where the binder is ejected, the powder is solidified into a cross section of the object being formed." *Id.* at ¶[0001]. The reference is directed to "a solid freeform applicator that is easier and less messy to use" and changing powder types via a removable bin. *Id.* at ¶¶[0003], [0011].

As shown below in Figure 2 of *Devos*, the system includes a supply bin 110 next to a build bin 102.

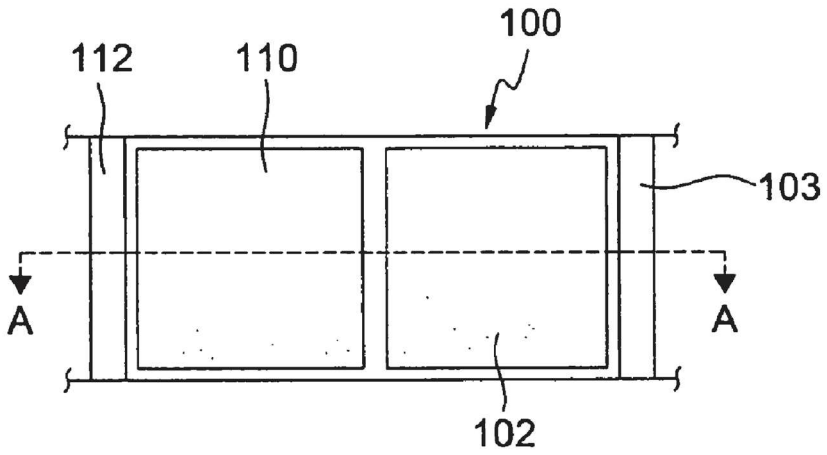

FIG. 2

Id. at Fig. 2. The top view also shows a roller 112 that traverses supply bin 110 to move a very thin layer of powder from the top surface of the supply bin 110 onto a platform of the build bin 102. *Id.* at ¶[0019]. After the powder is moved, a print head 103 deposits binder onto the powder to form one layer of the object. *Id.* *Devos* explains that his supply bin 110 is designed to be easily removable from the system and thus can be reused for another fabrication or disposed. *Id.*

Devos also illustrates the operation of a supply powder bin in Figure 3:

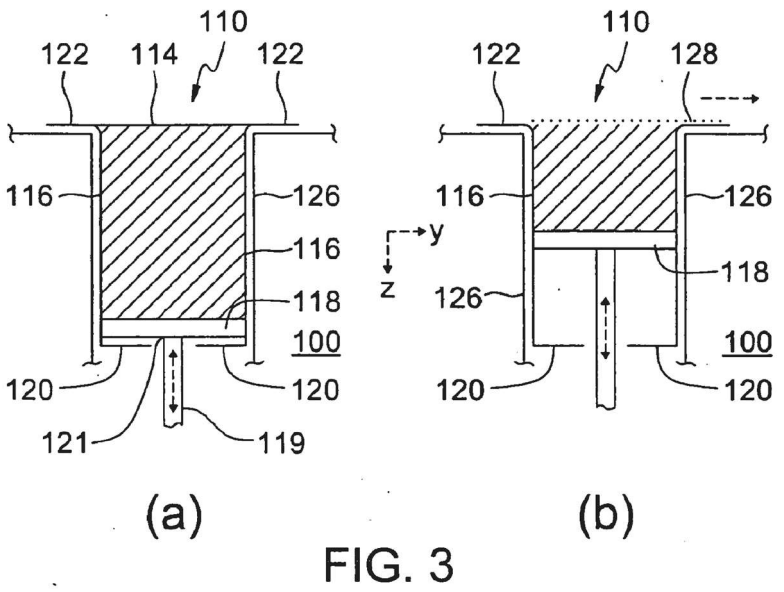

FIG. 3

Id. at Fig. 3. In particular, Figure 3(a) shows supply bin 110 when first placed in the system and Figure 3(b) shows supply bin 110 when powder 128 is partially deployed. As shown, the supply bin has a removable top, side walls, and a piston-like bottom that supports and feeds the powder to the roller during printing. *See id.* at ¶[0011].

Devos also discloses a flow diagram in Figure 6 that shows the operations for powder-based printing.

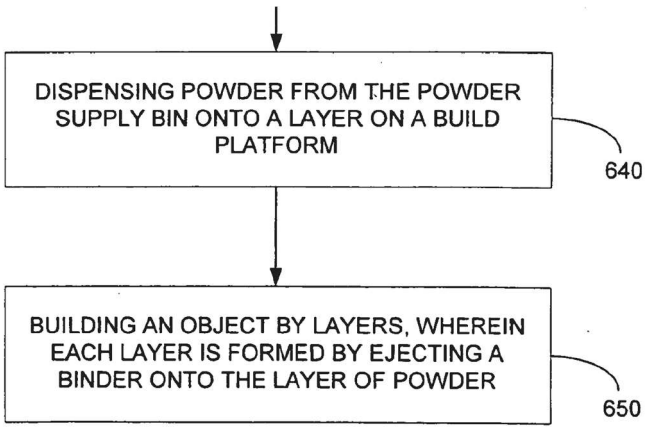

FIG. 6

Id. at Fig. 6 (excerpt). At step 640, powder is dispensed from the powder supply bin onto a layer on a build platform. *Id.* at ¶[0035]. And at step 650, the object is built in layers, where each layer is formed by ejecting a binder from a print head onto the powder that is on the build platform. *See id.* In this manner, the binder (also referred to as an adhesive) binds the adjacent or successive layers of the object together. *See id.* at ¶[0015]. Once the entire object is formed, *Devos* explains that the extra powder that is not bonded by the binder is "brushed away" leaving the base or "green" object. *Id.*

B. Ground 2 Does Not Render Claim 19 Unpatentable

Petitioner fails to show that *Devos* in Ground 2 teaches each element of claim 19. For instance, the Petition fails to explain why *Devos's* disclosure of "powder supports" teaches "determining an operational parameter for configuring the three-dimensional printer" in which the parameter includes a "support structure requirement" (claim element 19[e]). *See* Pet. at 49. It appears that Petitioner has

improperly sought to shift its burden to articulate its arguments to its expert, who claims the combined "system would need to generate a parameter indicating 'how much support' material to use in fabricating the object." EX1003, ¶113; *see also* 35 U.S.C. § 312(a)(3); 37 C.F.R. § 42.104(b)(4); *Current Lighting Sols., LLC v. ALSI Holdings, LLC*, IPR2023-00145, Paper 12 at 28 (PTAB May 3, 2023) (finding "Petitioner's failure to clearly articulate its challenge violates [the Board's] rules, and is inadequate to satisfy Petitioner's burden on institution.").

Indeed, even if the expert's argument were adopted by Petitioner as its own, there is no evidence to support the argument. Petitioner does not provide any evidence and neither does Petitioner's expert. *Devos* does not provide any support for the expert's argument either. It never discloses the use of "support materials." Rather, *Devos* discloses that only one powder is used to build objects. *See, e.g.*, EX1008 at Fig. 2, Fig. 6, ¶¶[0013], [0014], [0019]. There is no "support material" used in *Devos's* printing process as each layer directly supports each successive layer of the object. For each layer of the object, the powder is rolled onto a platform in a thin layer and then a print head applies a binder in a pattern to form the object. *See id.* Fig. 2 and ¶[0019], Fig. 3 and ¶[0011], Fig. 6 and ¶[0035]; *see also id.* at ¶[0015]. When the entire object is formed, the extra material (in powder form) that is not bonded with a binder/adhesive is "brushed away." *See id.* Accordingly, *Devos's* reference to "powder supports" and "how much support" has

nothing to do with support material or a "support structure requirement" as Petitioner and its expert argue. Therefore, the combination involving *Devos* does not teach determining an operational parameter for configuring the three-dimensional printer in which the parameter includes a support structure requirement.

To the extent Petitioner relies on alleged knowledge of a POSITA or common sense to supply this claim element, resorting to common sense or a POSITA's knowledge alone is improper. *See Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361 (Fed. Cir. 2016) ("common sense is typically invoked to provide a known motivation to combine, not to supply a missing claim limitation"). As the Federal Circuit explained in *Arendi*, the Court's cases "repeatedly warn that references to 'common sense'—whether to supply a motivation to combine or a missing limitation—cannot be used as a wholesale substitute for reasoned analysis and evidentiary support, especially when dealing with a limitation missing from the prior art references specified." *Id.* at 1362. In the rare case where common sense "is used to supply a missing limitation" the search for "a reasoned basis for resort[ing] to common sense must be searching" and "this is particularly true where the missing limitation goes to the heart of an invention." *Id.* Relying on the knowledge of a POSITA or common sense to supply this claim element would be improper where it is missing from the references in the asserted combination.

IX. THE PETITION DOES NOT SHOW THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 3A

A. Overview of *Menchik* (EX1009)

Menchik discloses three-dimensional object printing. EX1009 at Title. The system includes cartridges with modeling models that are connected via valves for dispensing material. *Id.* at Abstract, Fig. 1 (reproduced below).

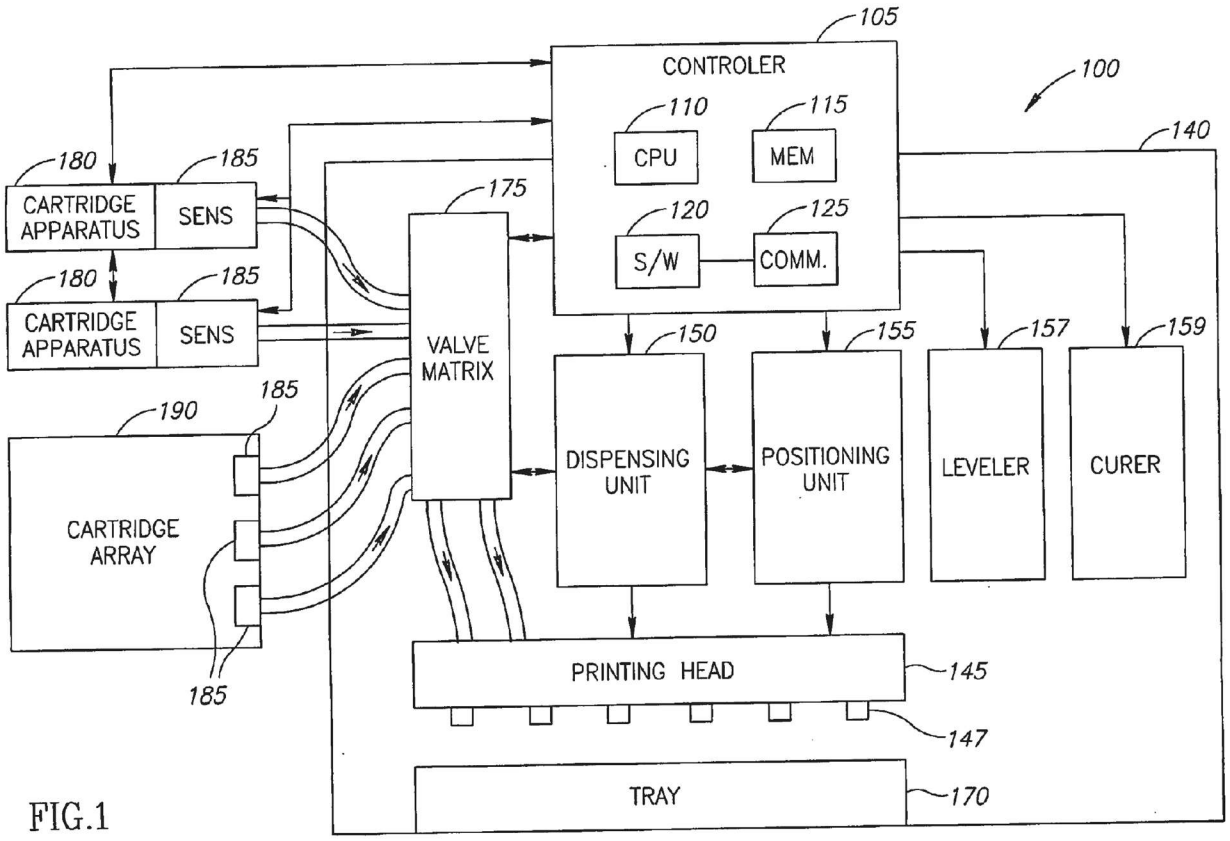

FIG.1

Sensors associated with the cartridges can monitor the status of the material, and a controller receives data from the cartridges and computes supply parameters for the materials. *Id.*

B. Ground 3A Does Not Render Claim 1 Unpatentable

As discussed below, Petitioner fails to show that *Menchik* discloses or teaches each of the elements of claim 1 and thus the reference does not anticipate or render obvious the claim.

1. *Menchik* does not teach or disclose receiving a request from a client over a network to fabricate an object on the three-dimensional printer

The Petition fails to show that *Menchik* teaches or discloses "receiving a request from a client over a network to fabricate an object on the three-dimensional printer." Namely, Petitioner asserts that controller 105 in *Menchik* is a client (Pet. 57-59) but fails to explain why controller 105 is a client.

Unrelated to whether controller 105 is a client, Petitioner asserts in the alternative, that to the extent a wired or wireless connection does not satisfy the "over the network" element, it would have been obvious to implement *Menchik* such that communication is over a network to allow for remote control of the printer by one or more computers in an office. Pet. 57-58 (citing EX1003, ¶128 (parroting the same conclusory statement as Petitioner without providing any evidence for the purported motivation to combine)).

As an initial matter, *Menchik* never uses the term client to describe anything, much less controller 105. Figure 1 of *Menchik* illustrates its components.

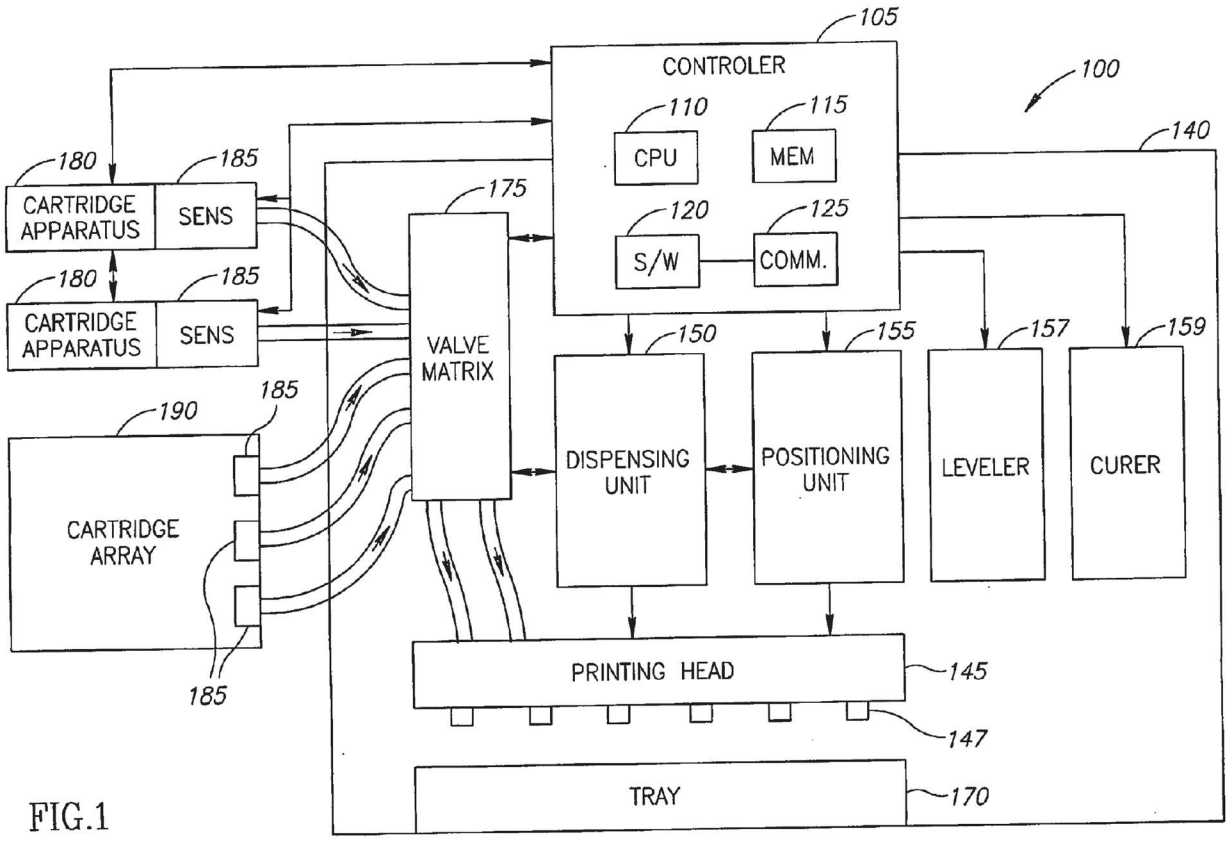

FIG.1

EX1009 at Fig. 1. As shown, controller 105 controls various parts of the printer 140, such as valve matrix 175, dispensing unit 150, positioning unit 155, leveler 157, and curer 159.

Although not shown in Figure 1, *Menchik* also describes a separate device—"a computing platform connected to 3D printer system 100"—as providing "a printing file" which the system then uses to determine "the order and configuration of deposition of building material" *Id.* at ¶[0025]. Petitioner argues in a conclusory manner that this separate device is an example of the controller 105 external to the printer 140. *See* Pet. at 58-59. But Petitioner conflates controller 105 with the separate device. *Menchik* never describes the separate device (a computing

platform connected to 3D printer system 100 for providing a printing file) as controller 105. *See* EX1009 at ¶[0025]. Petitioner does not provide any explanation beyond citing to its expert, who merely parrots the conclusory assertions in the Petition. *See* Pet. at 58-59 (citing EX1003, ¶¶129-30). Thus, Petitioner fails to show that *Menchik* discloses or teaches receiving a request from a client over a network to fabricate an object on the three-dimensional printer.

2. *Menchik* does not teach or disclose providing the data from the tag to the client over the network, the data including at least one property of the build material

In addition, Petitioner fails to show that *Menchik* teaches or discloses "providing the data from the tag to the client over the network, the data including at least one property of the build material." Citing back to its discussion for receiving a request from a client over a network to fabricate an object on the three-dimensional printer, Petitioner asserts that *Menchik* discloses providing data from the tag to the controller over a network. Pet. at 60-61 (referring back to claim element 1[b]). However, as discussed for claim element 1[b], *Menchik* does not teach or disclose receiving a request from a client over a network as the controller in *Menchik* is not a client. *Supra* § IX.B.1. For at least these reasons, Menchik also does not teach or disclose providing the data from the tag to the client over the network, the data including at least one property of the build material.

3. *Menchik* does not teach or disclose receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag

Further, Petitioner fails to show that *Menchik* teaches or discloses "receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag" under multiple, independent reasons.

First, operational parameters are not received from a client. Again, Petitioner refers back to its arguments for claim 1[b] and concludes that *Menchik* discloses a controller that sends operational parameters to the printer. *See* Pet. at 62. As discussed for claim element 1[b], *Menchik* does not teach or disclose receiving a request from a client over a network because the controller in *Menchik* is not a client. *Supra* § IX.B.1.

Second, there is no teaching or disclosure in *Menchik* of receiving one or more operational parameters that are selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag. Petitioner fails to clearly set forth its theories in the Petition, as required. It concludes that the printer "receives the printing file and the printing parameters, operation parameters, building

parameters, material parameters, and supply parameters (collectively operational parameters) from the controller 105" (Pet. 63) and yet fails to explain which printing file, printing parameters, operation parameters, building parameters, material parameters, and supply parameters are allegedly received. Petitioner also fails to explain why such information, if received, are operational parameters. *See id.*

As discussed above, *Menchik* discloses a separate device—"a computing platform connected to 3D printer system 100"—as providing a printing file which the system then uses to determine "the order and configuration of deposition of building material." EX1009, ¶[0025]. This separate device in *Menchik* is not the controller. *Supra* § IX.B.1. Thus, the printing file is not sent or received from a client, but rather a separate device that Petitioner does not identify as the client.

Petitioner references printing parameters on page 61 of the Petition, but that portion of the Petition only says that "printing parameters" are "compute[d]." Pet. at 61. There is no teaching or disclosure that any "printing parameters" are received from a controller. Indeed, *Menchik* does not describe that the computed printing parameters, such as "guidelines for which cartridges to use, how many to use, if and when any replacements are necessary etc.," are received from the controller. EX1009, ¶[0037].

Besides a conclusory assertion, Petitioner never references operation parameters or building parameters in its argument for claim element 1[f] or claim element 1[b], which is referenced in the argument for claim element 1[f]. *Menchik* only uses each of the terms "operation parameters" and "building parameters" once to describe the information stored on the memory chip. *See* EX1009, ¶[0035] ("optimal operation parameters" and "optimum building parameters"). However, *Menchik* does not teach or disclose receiving any of the parameters from the controller. Rather, *Menchik* discloses the opposite—that the parameters are stored on the memory chip 260, which is read by reader 225, which sends data to the controller. *Id.* at ¶[0037].

Although Petitioner references material parameters on page 61 of the Petition and *Menchik* discloses "material parameters," the reference merely describes computing "material parameters" and not receiving such parameters from the controller. *See id.* at ¶[0027] ("controller 105 may use software code 120 to process data related to the status of building material in one or more supply sources to compute material parameters for building material(s)" and "For example, material parameters may indicate potential yields during printing usage etc. For example, computations of material required may indicate how much material from one or more material supply sources may be used in constructing one or more objects.").

Similarly, there is no teaching or disclosure of receiving the supply parameters from the controller. *See* Pet. at 61-62. *Menchik* merely describes determining the supply parameters and then controlling system components or sending messages to a system operator to alert the operator to replace a cartridge. *See* EX1009, ¶¶[0027], [0051] ("the controller may provide instructions to close a valve of an empty cartridge, or a cartridge or source"), [0053] ("controller 105 may, for example, transmit an alert message to one or more system operators"); *see also id.* at Fig. 6 and ¶¶[0007] ("control the supply of the building material from two or more cartridges according to the supply parameters"), [0027], [0049].

Thus, even if Petitioner were to articulate its theories, as it was required to do, identifying which pieces of information are allegedly received and why such information are operational parameters (it has failed to satisfy its burden), there is no teaching or disclosure in *Menchik* that such information (printing file, printing parameters, operation parameters, building parameters, material parameters, and supply parameters) are received from a client.

C. Ground 3A Does Not Render Claim 19 Unpatentable

As discussed below, Petitioner fails to show that *Menchik* discloses or teaches each of the elements of claim 19 and thus the reference does not anticipate or render obvious the claim.

Similar to its assertions for claim 1, Petitioner fails to explain its assertions for claim 19. For instance, Petitioner merely asserts that *Menchik's* controller 105 is within printing apparatus 140 and refers back to its arguments for claim element 1[f] and claim 10. *See* Pet. at 68-71. But, claim element 1[f] and claim 10 do not recite the same elements as claim 19. Petitioner's suggestion that the Board should piece together Petitioner's argument for claim 19 improperly shifts Petitioner's burden to the Board. *See Gross v. Cicero*, 619 F.3d 697, 702 (7th Cir. 2010) ("Judges are not like pigs, hunting for truffles buried [in the record].").

Moreover, to the extent Petitioner argues that *Menchik* teaches or discloses an "operational parameter [that] includ[es] … a support structure requirement," as recited in claim element 19[e], the Petition does not cite any evidence in *Menchik* for claim 10. *See* Pet. at 67-68. Nor does Petitioner explain how *Menchik* teaches determining a support structure requirement for configuring the three-dimensional printer "based upon at least one property of the build material in the data."

Further, Petitioner's reference to "the amount of support liquid and support materials required" fails to cite to any evidence in *Menchik* or explain Petitioner's mapping. *See* Pet. at 68. *Menchik* only mentions the amount of "support liquid" and "support materials required" once:

> [0048] At block 615 the printer controller may compute, for example, the amount of modeling material, support liquid, or combination of modeling and support materials required for printing a given three-dimensional object. The printer controller may also compute the

> expected order and quantity of uptake and deposition of each type of material into the printing apparatus, for the printing or construction of a given object.

EX1009 at ¶[0048]. There is no teaching or disclosure of why the amount of support liquid or support materials required is a support structure requirement, and there is no teaching or disclosure of the amount of support liquid and support materials required being based upon at least one property of the build material in the data.

For each of the independent reasons, Petitioner has failed to show that *Menchik* anticipates or renders obvious claim 19.

X. THE PETITION DOES NOT SHOW THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 3B

Ground 3B proposes the combination of *Menchik* and *Jazayeri*. *See* Pet. 1. As explained above, *Jazayeri* is not a proper reference for an obviousness challenge. *Supra* § VII.B.

Additionally, Ground 3B (*Menchik-Jazayeri*) do not render claim 1 obvious. Petitioner only refers to *Jazayeri* for claim element 1[b] to assert an alternative to "the extent that Menchik's printing file . . . is not considered a request." Pet. at 71. However, Petitioner fails to adequately explain the combination. For example, Petitioner suggests that the combination includes "a printer server" and "a client device." *See id.* But neither *Menchik* nor *Jazayeri* describe a "client device." It appears that Petitioner has erroneously incorporated the "client devices" from

Loughran (*see* Pet. 23-24 (discussing *Loughran's* system)) into a combination that does not include the reference. Moreover, there is no explanation of how *Menchik's* controller is implemented in the combination, whether on *Loughran's* client device, a print server, or 3-D printer. As discussed above, *Menchik's* controller does not teach or disclose a client. *Supra* § IX.B.1. For at least these reasons, there is no motivation to combine *Menchik* and *Jazayeri* as proposed by Petitioner.

Further, Petitioner does not separately address claim element 1[e] and 1[f] in Ground 3B (*Menchik* and *Jazayeri*) and thus Ground 3B does not teach claim elements 1[e] and 1[f] for at least the same reasons as provided above for Ground 1A. *See* Pet. at 71; *supra* §§ IX.B.2, IX.B.3.

XI. ADDITIONAL COMMENTS

With respect to any arguments in the Petition that are not specifically addressed herein, Patent Owner does not concede the legitimacy of such arguments in the Petition and any underlying contentions in the Petition. If *inter partes* review is instituted, Patent Owner expressly reserves the right to rebut any such arguments and any such contentions at a later point, including in a Patent Owner Response. Patent Owner is not limited to the arguments presented here in this Preliminary Response and expressly reserves the right to raise further arguments, including claim construction arguments, not presented herein.

XII. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board decline to institute *inter partes* review of the '466 Patent.

Respectfully submitted,

Dated: July 7, 2025

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), I certify that this Preliminary Response complies with the type-volume limits of 37 C.F.R. § 42.24(b)(1) because it contains 10,069 words, excluding the parts that are exempted by 37 C.F.R. § 42.24(a), according to the word processing system used in preparation of this Request.

Dated: July 7, 2025

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e)(4), the undersigned certifies that on July 7, 2025, a complete copy of the foregoing Patent Owner's Preliminary Response was served on Lead and Back-up Counsel for Petitioner at the service address provided in Petitioner's Mandatory Notices:

Email: IPR56224-0010IP1@fr.com

Dated: July 7, 2025

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