

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN TUOZHU TECHNOLOGY CO., LTD.,

Petitioner

v.

STRATASYS, INC.

Patent Owner.

PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 8,562,324

Case No. IPR2025-00311

PATENT OWNER'S PRELIMINARY RESPONSE

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EXHIBIT LIST

Exhibit No.	Description
2001	Docket Navigator – Judge Rodney Gilstrap Motion Success for Stay Pending IPR and Time to Milestones
2002	United States District Courts — Judicial Caseload Profiles for Eastern District of Texas (Sept. 30, 2024 and Dec. 31, 2024), available at https://www.uscourts.gov/data-news/reports/statistical-reports/federal-court-management-statistics
2003	Minute Entry for proceedings held before District Judge Gilstrap on Nov. 7, 2024, <i>Stratasys, Inc. v. Shenzhen Tuozhu Technology Co. Ltd.</i> , No. 2:24-cv-00644-JRG (E.D. Tex. Nov. 14, 2024)
2004	Discovery Order, <i>Stratasys, Inc. v. Shenzhen Tuozhu Technology Co. Ltd.</i> , No. 2:24-cv-00644-JRG, Dkt No. 35 (E.D. Tex. Dec. 2, 2024)
2005	Protective Order, <i>Stratasys, Inc. v. Shenzhen Tuozhu Technology Co. Ltd.</i> , No. 2:24-cv-00644-JRG, Dkt No. 36 (E.D. Tex. Dec. 3, 2024)
2006	e-Discovery Order, <i>Stratasys, Inc. v. Shenzhen Tuozhu Technology Co. Ltd.</i> , No. 2:24-cv-00644-JRG, Dkt No. 41 (E.D. Tex. Dec. 19, 2024)
2007	Invalidity and Ineligibility Contentions, <i>Stratasys, Inc. v. Shenzhen Tuozhu Technology Co. Ltd.</i> , No. 2:24-cv-00644-JRG, (E.D. Tex. Jan. 30, 2025)
2008	Transcript of Hearing on the Nomination of Howard Lutnick, of New York, to be Secretary of Commerce (Jan. 29, 2025)

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, 3-11, and 17-22 (“challenged claims”) of U.S. Patent No. 8,562,324 (“the ’324 Patent”) (EX1001).

Petitioner alleges that the challenged claims are invalid based on 14 different grounds (1A through 2G). Petitioner argues that independent claims 1 and 19 are obvious over U.S. Patent No. 6,580,959 (“*Mazumder*”) (EX1004) in view of U.S. Patent Publication No. 2010/0063615 (“*Mori*”) (EX1005) in Ground 1A and over U.S. Patent Publication No. 2006/0054039 (“*Kritchman*”) (EX1015) in view of *Tay* (EX1013) and *Henke* (EX1014) in Ground 2A.

Petitioner has failed to meet its burden of showing a reasonable likelihood that it would prevail with respect to any of the challenged claims. As an initial matter, the Board should exercise its discretion to deny institution under 35 U.S.C. § 314(a). Among other reasons articulated below, the parallel district court litigation will reach a final resolution in a jury trial before any final written decision in this forum.

On the merits, the Petition suffers from fatal defects in the asserted grounds, which provides an independent basis to deny institution.

The challenged claims and the '324 Patent are directed to solutions that include a user interface that presents both an image of a build volume from a video camera and a two-dimensional projection of the three-dimensional model that is fabricated as an object within the build volume of a three-dimensional printer, in which the projection is from the point of view of the video camera. The primary references *Mazumder* in Grounds 1A-1G and *Kritchman* in Grounds 2A-2E each fail to teach such a user interface. Further, the secondary references *Mori* in Grounds 1A-1G and *Tay/Henke* in Grounds 2A-2E fail to remedy this deficiency. Petitioner's assertions are driven by hindsight, a flawed understanding of the intrinsic record, and misinterpretation of the references themselves. In addition, two of the references *Mori* and *Henke* are not proper references for an obviousness analysis. *Mori* is not analogous art under Petitioner's theory that it is in the same field of invention as the '324 Patent, and *Henke* is not analogous art under any potential theory (Petitioner fails to assert any).

In summary, there are two independent reasons for the Board to deny institution. The Board should exercise its discretionary power to deny institution under § 314, and the Board should not institute IPR in any event because each of Petitioner's grounds are deficient and thus Petitioner cannot satisfy its burden for obviousness.

II. THE *FINTIV* FACTORS FAVOR DENIAL OF THE PETITION

Institution of *inter partes* review is discretionary. 35 U.S.C. § 314 states that the “Director *may not* authorize an inter partes review to be instituted unless the Director determines that the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (emphasis added¹). As the Supreme Court has explained, § 314(a) “invests the Director with discretion on the question *whether* to institute review.” *SAS Inst., Inc. v. Iancu*, 584 U.S. 357, 366 (2018). Pursuant to the Director’s discretion, the Board is “permitted, but never compelled, to institute an IPR proceeding.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016); *see also Cuozzo Speed Techs. v. Lee*, 579 U.S. 261, 273 (2016) (“the agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion”) (citing 35 U.S.C. § 314(a)). Irrespective of whether the minimum standards for institution are met, other reasons, such as “events in other proceedings related to the same patent,” may favor denying a petition. Consolidated Trial Practice Guide (84 Fed. Reg. 64,280 (Nov. 21, 2019)) (“Practice Guide”) at 58 (citing *NetApp, Inc. v. Realtime Data LLC*, IPR2017-01195, Paper 9 at 12–13 (PTAB Oct. 12, 2017) and explaining that the Board in *NetApp* denied institution under § 314(a) where “the

¹ Emphasis added throughout unless otherwise stated.

Board likely would not have been able to rule on patentability until after the district court trial date”).

In determining whether to exercise its discretionary power under § 314(a), the Board balances a set of six factors, as articulated in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11, at 6 (PTAB “Precedential” Mar. 20, 2020) (“*Fintiv* Precedent”). Here, each of the six *Fintiv* factors favors discretionary denial or is neutral. A co-pending litigation in the Eastern District of Texas² (“Related Litigation”) involving both Petitioner and Patent Owner, substantially the same claims of the same patent, and invalidity challenges to the same patent (including the same prior art references as this Petition) will outpace a PTAB proceeding. The Petition fails to cite any credible reason why the “efficiency and integrity of the system” would not be “best served” by discretionary denial. *Fintiv* Precedent at 6.

A. The exercise of discretionary denial under the *Fintiv* Precedent is proper

As an initial matter, the exercise of discretionary denial under the *Fintiv* Precedent is proper and should be followed. Petitioner’s bare, unsupported assertions that the *Fintiv* Precedent “exceeds the Director’s authority, is arbitrary

² The Court in the Related Litigation consolidated two cases (2:24-cv-00644-JRG and 2:24-cv-00645-JRG) between the same parties for pretrial issues under the lead case (2:24-cv-00644-JRG). *See Stratasys, Inc. v. Shenzhen Tuozhu Technology Co., Ltd.*, No. 2:24-cv-00644-JRG, Dkt. No. 19 (E.D. Tex. Oct. 22, 2024).

and capricious, and was adopted without notice-and-comment rulemaking” are without merit. Pet. at 98. The Federal Circuit has already considered and rejected similar statutory and arbitrary-and-capriciousness challenges against *Fintiv*. See *Apple Inc. v. Vidal*, 63 F.4th 1, 12–14 (Fed. Cir. 2023) (affirming dismissal of plaintiff’s challenges to *Fintiv* as being contrary to statute or arbitrary and capricious under 5 U.S.C. § 701(a)(1)).

Further, a U.S. District Court has already considered and rejected a similar challenge claiming that notice-and-comment rulemaking is required. *Apple Inc. v. Vidal*, Case No. 20-CV-06128-EJD, 2024 WL 1382465, at *13 (N.D. Cal. Mar. 31, 2024). As the District Court explained, “the APA expressly excludes three categories of rulemaking from the notice-and-comment requirement: (1) interpretative rules; (2) general statements of policy; and (3) rules of agency organization, procedure, or practice.” *Id.* at 5 (citing 5 U.S.C. § 553(b)(4)(A)). Consistent with the APA, “Courts have formulated this distinction to hold that ‘[t]he notice-and-comment requirements apply ... only to so-called “legislative” or “substantive” rules.’” *Id.* (quoting *Lincoln v. Vigil*, 508 U.S. 182, 195 (1993) (citations omitted)). Under this framework, the District Court determined that “the *NHK-Fintiv* standard is a general statement of policy, rather than a substantive or legislative rule.” *Id.* at 13 Accordingly, “the Director was not required to conduct notice-and-comment rule making prior to designating the *NHK* and *Fintiv*

decisions as precedential.” *Id.* (concluding that “the lack of such rule making does not render the *NHK-Fintiv* standard unlawful”) (citing 5 U.S.C. § 706(2)(D)).

Thus, the *Fintiv* Precedent is proper—it does not exceed the Director’s authority, is not arbitrary and capricious, and does not need to be adopted with notice-and-comment rule making.

As explained below, when balancing the factors as set forth in the *Fintiv* Precedent, the Board should exercise its discretionary power to deny institution.

B. Factor 1: Whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted

Factor 1 weighs in favor of discretionary denial. In the Related Litigation involving both Petitioner and Patent Owner, there has been no request for a stay pending *inter partes* review and the judge in the case, Judge Rodney Gilstrap, has not granted a stay.

Petitioner contends that this factor is neutral because there is purportedly “no evidence that, if the action is maintained and a stay is requested, the court will deny a stay.” Pet. at 98. However, Petitioner ignores the reality that it is highly unlikely that Judge Gilstrap will grant a stay in the Related Litigation pending IPR. As an initial matter, Judge Gilstrap denies the vast majority of motions to stay pending IPR. Since 2019, over 85% of such motions were denied. EX2001 at 1.

In past decisions denying a stay pending IPR, Judge Gilstrap has made it clear that motions to stay will be denied if filed before the “last of the patents-in-suit to be acted upon by the PTAB.” Order Denying Motion to Stay Pending Inter Partes Review, *Acorn Semi, LLC v. Samsung Elecs. Co.*, No. 2:19-CV-00347-JRG, 2020 WL 10284981 at *2 (E.D. Tex. Sept. 14, 2020). Similarly, Judge Gilstrap has denied motions to stay pending IPR when the IPR proceedings do not challenge every patent asserted in the case. *See, e.g., Uniloc USA, Inc. v. Motorola Mobility LLC*, 2:16-cv-00992-JRG, Dkt. No. 125 at 3 (E.D. Tex. Apr. 5, 2017) (denying a stay “given that the pending IPR petitions do not challenge every patent asserted in this case”).

Petitioner fails to provide any reason why the Court in the Related Litigation would depart from its practice of denying motions to stay filed before the last of the patents-in-suit are acted upon by the PTAB and before every one of the patents-in-suit are challenged in IPR. Indeed, Petitioner has overlooked the fact that the Related Litigation involves multiple patents besides the '324 Patent, which are challenged in separate IPRs with different filing dates. *See, e.g.,* EX1024 at 30 (listing four other patents); IPR2025-00354, IPR2025-00438, IPR2025-00585, IPR2025-00611 (related IPRs for the other asserted patents). Thus, the reality is that Judge Gilstrap is highly unlikely to grant a stay in the particular Related Litigation due to facts specific to the case and parallel IPR proceedings.

A stay is also highly unlikely given that Petitioner has offered a very limited estoppel by stipulation that only covers “the same grounds of invalidity raised in th[e] petition.” EX1018. As Judge Gilstrap has explained, such a “limited estoppel,” as the one offered by Petitioner, increases its ability to “game the system,” “increase rather than reduce the complexity” of issues, and “devise an unfair second bite at the apple.” Memorandum and Order Denying Motion to Stay, *Intellectual Ventures II LLC v. Kemper Corp.*, No. 6:16-CV-0081-JRG, 2016 WL 7634422 at *3 (E.D. Tex. Nov. 7, 2016) (“The absence of a full statutory estoppel not only increases the ability of litigants to ‘game the system’ and devise an unfair second bite at the apple, it also has the potential to increase rather than reduce the complexity of the validity issues that may come before the Court.”). Petitioner has not agreed to be bound by the full “estoppel provisions of 35 U.S.C. § 315” (*id.* at 2) and thus any request for a stay in the Related Litigation will be denied. *See id.* at 2-3 (“This Court agrees with the last approach” in which “other courts have required that an accused infringer seeking to obtain the benefit of a stay should agree to be bound by the estoppel effect of 35 U.S.C. § 315(e).”).

Accordingly, factor 1 of the *Fintiv* analysis weighs in favor of discretionary denial because a stay in the related proceeding has not been requested and the evidence indicates that the Court in the Related Litigation will not grant a stay even if Petitioner were to request one.

C. Factor 2: Proximity of the court's trial date to the Board's projected statutory deadline for a final written decision

Given that trial in the Related Litigation is set to begin before any final written decision would be due, factor 2 favors discretionary denial. PTAB precedent makes clear that factor 2 favors discretionary denial “[i]f the court’s trial date is earlier than the projected statutory deadline.” *Fintiv* Precedent at 9.

Here, the Court’s trial date in the Related Litigation is earlier than the projected statutory deadline. The Court set a trial date for June 1, 2026. EX1019 at 1. The projected statutory deadline for any final written decision is June 20, 2026. *See* Notice of Filing Date Accorded to Petition and Time for Filing Patent Owner Preliminary Response, Paper 3 (setting preliminary response date for March 20, 2025); 35 U.S.C. § 314(b) (setting expected decision whether to institute review for 3 months after a preliminary response); 35 U.S.C. § 316(a)(11) (requiring a final determination by 1 year after the decision whether to institute review, extendable by 6 months).

In general, the Court’s trial date is consistent with both the U.S. court case statistics for the United States District Court for the Eastern District of Texas and statistics for patent cases before Judge Gilstrap, specifically. Since 2021, the median time from filing to trial for civil cases has varied between 19.0 and 23.0 months depending on the year and measurement period (e.g., by fiscal year or calendar year). *See* EX2002 at 1-2 (“From Filing to Trial (Civil Only)”). Applying

these median timings to the present case, which was filed in August 2024 (*see* EX1024), trial would be expected between March 2026 and July 2026.

For patent cases before Judge Gilstrap, specifically, the median time from filing to trial is 21.7 months for cases filed since January 2008 (107 cases), 21.7 months for cases filed since January 1, 2019 (41 cases), and 23.2 months for cases filed since January 2022 (small sample size of 13 cases). EX2001 at 3, 5, 7.

Applying these median timings to the present case, trial would be expected between May 2026 and July 2026. Thus, the median time to trial statistics are consistent with the actual trial date the Court set for the Related Litigation, which is set for several weeks in advance of an expected final written decision deadline.

Petitioner asserts that this factor is neutral because any final written decision will be “nearly contemporaneous” with the trial date. However, Petitioner ignores numerous PTAB decisions that have weighed factor 2 somewhat in favor of discretionary denial when trial is expected to begin several weeks in advance of the expected final written decision deadline. For example, the PTAB exercised discretionary denial in the *Apple Inc. v. Fintiv, Inc.* case in part because trial was scheduled to begin “approximately two months” before a final written decision. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15, at 12–13 (PTAB “Informative” May 13, 2020).

Other PTAB decisions have exercised discretionary denial with even shorter periods between a trial and final written decision. For instance, in *EClinicalWorks, LLC v. Decapolis LLC*, the PTAB denied institution where trial would begin “roughly one to two months before any final decision.” Decision Denying Institution of Inter Partes Review, *EClinicalWorks, LLC v. Decapolis LLC*, IPR2022-00229, Paper 10 at 9 (PTAB Apr. 13, 2022). In *EClinicalWorks*, the PTAB recognized that jury selection was set to begin approximately six weeks before a final written decision was expected and determined that factor 2 “weighs somewhat in favor of denial.” *Id.* (citing *Apple*, IPR2020-00019, Paper 15 at 13). Consistent with previous PTAB decisions, such as those in *Apple* and *EClinicalWorks*, finding that a trial date set shortly before any final written decision weighs somewhat in favor of denial, factor 2 of the *Fintiv* analysis in this proceeding weighs somewhat in favor of discretionary denial, because it is likely that the jury trial in the Related Litigation will occur several weeks before a final written decision would be due. *See also* Decision Denying Institution of Inter Partes Review, *10X Genomics, Inc. v. President and Fellows of Harvard College*, IPR2023-01299, Paper 15 at 17 (PTAB Mar. 7, 2024) (finding factor 2 weighing in favor of discretionary denial where district court trial would occur at least one month before a final written decision would be due).

D. Factor 3: Investment in the parallel proceeding by the court and the parties

The proceedings of the Related Litigation are well underway and remain in progress. Petitioner asserts that “there has been little investment by the court and the Markman hearing is scheduled for December 3, 2025, well after institution.” Pet. at 82. However, Petitioner fails to address the efforts undertaken by the Court and parties thus far and efforts that will be undertaken before any decision on institution. Thus far, the Court has held a scheduling conference with the parties (EX2003) and entered numerous orders in the case, including a docket control order, discovery order, e-discovery order, and protective order. EX1019, EX2003, EX2004, EX2005, EX2006. In addition, the parties in the Related Litigation have (a) negotiated and proposed numerous orders, including the aforementioned orders, (b) exchanged initial disclosures (EX1019 at 6); (c) exchanged additional disclosures (EX1001 at 6); and (d) exchanged infringement, invalidity, and subject-matter eligibility contentions totaling well over 2,000 pages (*see* EX1019 at 5–6). Fact discovery is well underway with the parties having exchanged over 100 document requests, exchanged requests and responses to over 30 interrogatories, and produced documents exceeding 44,000 pages, and third-party discovery. In addition, the parties have briefed issues related to party joinder. *Id.*

Besides these existing substantial investments in the Related Litigation, the parties will make further substantial investments in the Related Litigation before a

decision whether to institute review is expected. Source code review and amended infringement contentions are anticipated based on the Court's local patent rules. *See* EX1019 at 5-6. Moreover, as explained above for factor 2, the parties and Court in the Related Litigation will make additional substantial investments by starting a jury trial prior to the expected final written decision deadline. Thus, any final written decision would simply revisit the jury's earlier findings regarding validity. Such duplicative efforts contradict the main purpose of *inter partes* review—to provide “quick and cost effective *alternatives* to litigation.” Practice Guide at 56 (quoting H.R. Rep. No. 112–98, pt. 1, at 40 (2011), 2011 U.S.C.C.A.N. 67, 69). Given the substantial investments made by the Court and parties, factor 3 weighs in favor of exercising discretionary denial.

E. Factor 4: Overlap between issues raised in the petition and in the parallel proceeding

The overlap in patent validity issues between the Petition and the Related Litigation is significant. There is significant overlap in claims with the vast majority of claims (claims 1, 3, 5-11, and 17-22) involved in the Related Litigation. *See* EX1016. There is also significant overlap in invalidity references and grounds. As explained above, the Petition asserts 14 grounds involving various combinations of *Mazumder*, *Mori*, *Kritchman*, *Tay*, and *Henke*, among other references. Each of these references in the Petition is included in the Invalidity

Contentions along with many others. *See* EX2007 at 33, 108-09. Accordingly, there can be no dispute that all of the asserted grounds and references in this IPR are also at issue in the Related Litigation and that additional asserted grounds and references are at issue in the Related Litigation.

Petitioner asserts that this factor “favors institution as Petitioner has made a stipulation not to pursue the IPR grounds in District Court.” Pet. at 99. However, Petitioner ignores that it has offered a very limited stipulation that openly permits overlapping issues between the jury trial in the Related Litigation and a latter final written decision that it seeks from the Board. *See* EX1018. In doing so, Petitioner has failed to provide a stipulation not to pursue in a parallel proceeding the same grounds as in the Petition or any grounds that could have reasonably been raised in the Petition. *See Sand Revolution II, LLC v. Continental Intermodal Group*, IPR2019-01393, Paper 24 at 12 n.5 (PTAB “Informative” June 16, 2020); *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 19 (PTAB “Precedential” as to §II.A Dec. 1, 2020). As a result, Petitioner is not restrained from asserting very similar obviousness theories in the Related Litigation that include only minor differences from the Grounds raised in this Petition.

Given this advantage, it appears that Petitioner has presented an opportunity for it to have two bites at the apple. As such, nothing prevents Petitioner from simply asserting the same reference or references repackaged in different

permutations or a nearly identical theory challenging the claims of the '324 Patent with simple variations in a primary or secondary reference.

While Petitioner's stipulation can reduce a very limited set of overlapping issues, it wholly fails to eliminate most of the overlap between the Related Litigation and this proceeding. While similar, narrow stipulations have resulted in this factor weighing marginally in favor of not exercising discretionary denial (*see Sand Revolution II*, Paper 24 at 12), when factor 4 is considered with the other factors of the *Fintiv* analysis, discretionary denial is still favored.

F. Factor 5: Whether the petitioner and the defendant in the parallel proceeding are the same party

Petitioner is also a defendant in the Related Litigation, and Patent Owner is plaintiff in the Related Litigation. As the PTAB explained in *Apple*, factor 5 weighs in favor of discretionary denial where “the petitioner and the defendant in the parallel proceeding are the same party.” *Apple*, IPR2020-00019, Paper 15 at 15. Petitioner failed to address this factor in its Petition. *See* Pet. at 99. On its face, *Fintiv* indicates that this factor should be considered. *See Fintiv* Precedent at 6. Thus, factor 5 weighs in favor of exercising discretion to deny institution.

G. Factor 6: Other circumstances that impact the Board's exercise of discretion, including the merits

The sixth factor of the *Fintiv* analysis also favors discretionary denial. Petitioner's sole argument for Factor 6 is premised upon pure speculation—the

prospect of its Motion to Dismiss in the Related Litigation being granted. *See* Pet. at 99 (arguing that its “Motion to Dismiss further favors institution under Factor 6”). The Court in the Related Litigation has not ruled on the Motion to Dismiss, which is premised on the failure to join another party. *See* Defendant’s Motion to Dismiss, *Stratasys, Inc. v. Shenzhen Tuozhu Technology Co., Ltd.*, Case No. 2:24-cv-00644-JRG, Dkt. No. 38 (E.D. Tex. Dec. 9, 2024). As Patent Owner explained in response to the Motion, the Motion fails to recognize “established principles,” including “as th[e] Court [in the Related Litigation] has repeatedly acknowledged, a plaintiff ‘is not required to accuse all infringers in the same action.’” *See* Plaintiff’s Response to Defendant’s Motion to Dismiss, *Stratasys, Inc. v. Shenzhen Tuozhu Technology Co., Ltd.*, Case No. 2:24-cv-00644-JRG, Dkt. No. 43 (E.D. Tex. Dec. 19, 2024) (internal citations omitted). As such, it is pure speculation whether the Court will grant the flawed Motion to Dismiss, much less whether the Court will do so before any decision on whether to institute review is due. Such speculation should not receive any weight under factor 6 and cannot “tip the balance in favor of Petitioner.” *See Apple*, IPR2020-00019, Paper 15 at 17.

Although Petitioner fails to raise an argument regarding the merits of its Petition under factor 6, as explained in the section below, Petitioner’s asserted grounds lack merits as they each have identified weaknesses. *See Apple*, IPR2020-00019, Paper 15 at 15–17 (finding that merits “do not tip the balance in favor of

Petitioner and instead also weigh in favor discretionary denial in a balanced assessment of all the circumstances”).

Additionally, to the extent current or future directives from the Commerce Secretary, or his subordinates at the USPTO, instruct the Board to consider whether to exercise discretionary denial when a foreign company seeks to use the PTAB (a USPTO tribunal) to revisit the validity of a duly issued U.S. patent invented by an individual in the United States and owned by a U.S. company, Patent Owner seeks to preserve any argument under such directives. Testimony by the Secretary of Commerce indicates that his directive may be that foreign entities, such as the Petitioner, are not permitted to use the PTAB, a tribunal of the United States Patent and Trademark Office, to challenge the duly issued '324 Patent, that was invented by an inventor in the United States and assigned to companies in the United States. See EX2008 at 57; see also Video of Hearing on the Nomination of Howard Lutnick, of New York, to be Secretary of Commerce (Jan. 29, 2025) at 1:56:15, available at https://www.commerce.senate.gov/2025/1/full-committee-nomination-hearing_2_3. Accordingly, Patent Owner preserves its argument under any such directive for the Board to consider whether to exercise discretionary denial when a foreign company seeks to use the PTAB (a USPTO tribunal) to revisit the validity of a duly issued U.S. patent invented by an individual in the

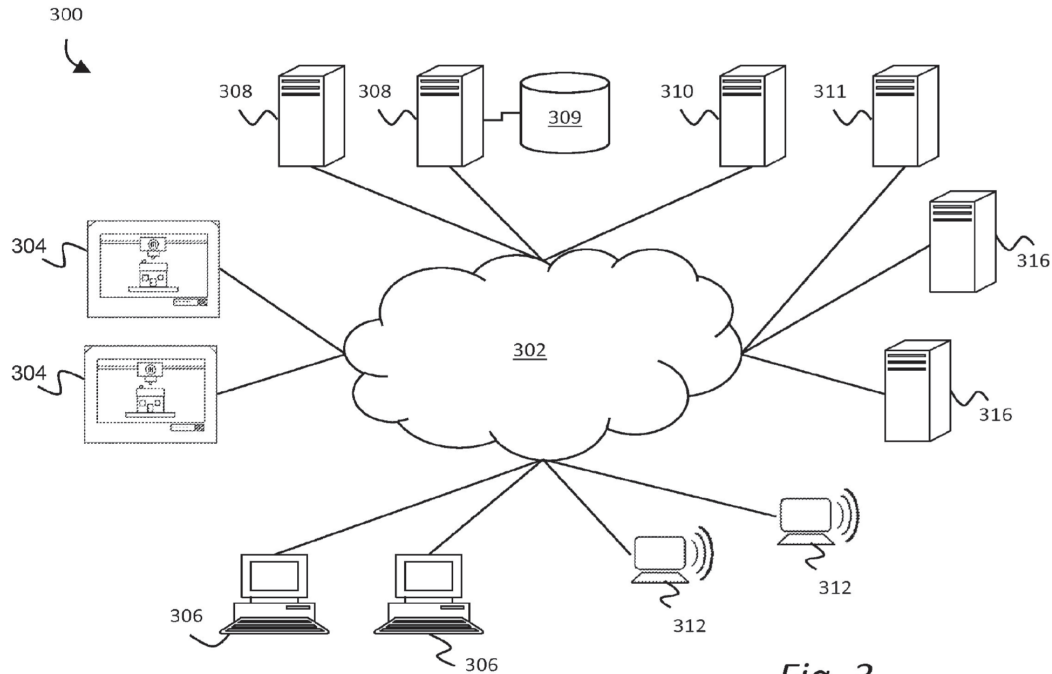
United States and owned by a U.S. company when the foreign company will receive due process on the validity of the patent in the U.S. federal court system.

III. THE '324 PATENT AND THE CHALLENGED CLAIMS

A. Summary of the '324 Patent (EX1001)

The '324 Patent “relates to three-dimensional fabrication using networked resources.” EX1001 at 1:14-15. The patent explained that “a more recent trend has emerged toward low-cost three-dimensional prototyping devices suitable for hobbyists and home users. As these resources become more readily and widely available, a need has emerged for networking capabilities and network management for three-dimensional printers.” *Id.* at 1:20-28.

Figure 3 of the '324 Patent shows a networked three-dimensional printing environment 300 that includes multiple 3-D printers 304 interconnected with multiple devices via a data network 302.



Id. at 8:7-15, Fig. 3. The devices in Figure 3 include servers (e.g., print server 308, content sources 310, web server 311, other resources 316) and devices (e.g., client devices 306 and mobile devices 312). *Id.* at 8:12-15, 12:28-39, Fig. 3.

A diagram of a 3-D printer 100 is shown below in Figure 1 with a build platform 102, conveyor 104, extruder 106, positioning assembly 108, and controller 110 “that cooperate to fabricate an object 112 within a working volume 114.” *Id.* at 2:17-21.

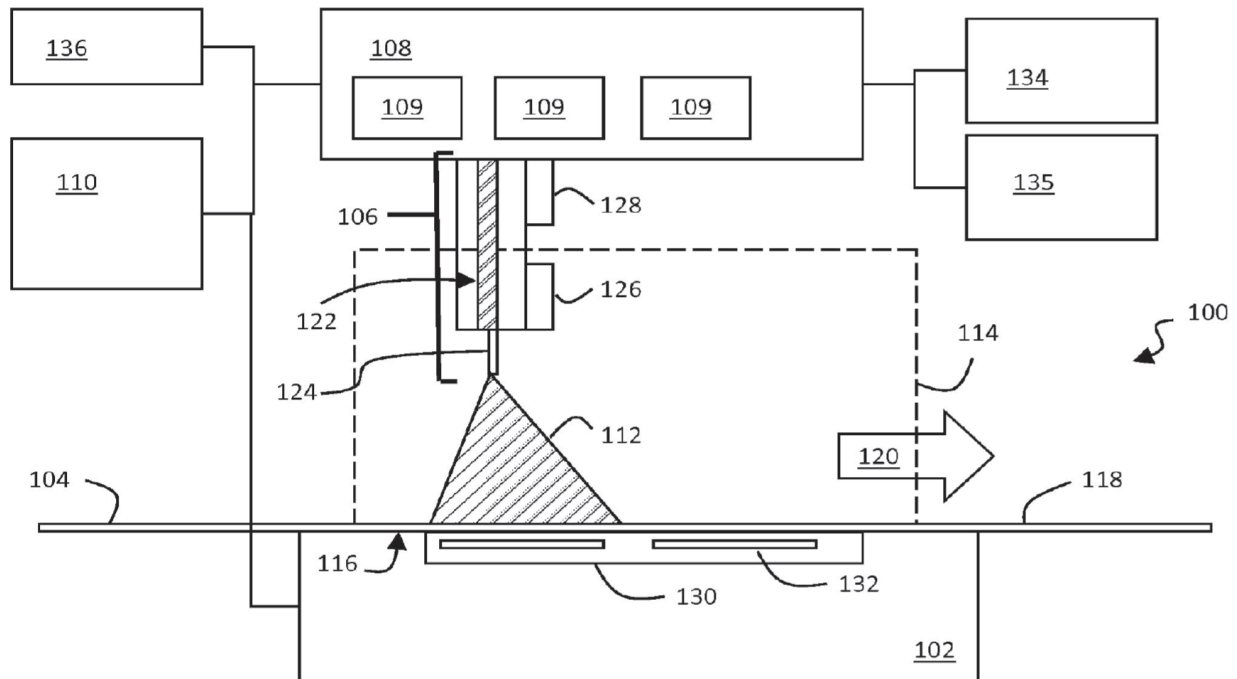


Fig. 1

Id. at Fig. 1. The printer includes one or more sensors 134, such as a video camera to “capture images” of the working volume 114 and object 112. *Id.* at 6:21-24; *see also id.* at 18:33-36 (The “sensors may include a video camera directed toward a working volume of the three-dimensional printer.”). The “video camera may provide a remote video feed through the network interface 136, which feed may be available to remote users through a user interface.” *Id.* at 6:24-30. The user interface is adapted to “present a video feed from at least one video camera of a three-dimensional printer to a remote user.” *Id.* at 6:30-33.

For example, a “server may include a web-based user interface configured for a user to submit a new print job to the server and to monitor progress of the new print job.” *Id.* at 14:63-66. “The web-based user interface may permit video monitoring of each one of the plurality of three-dimensional printers, or otherwise provide information useful to a remote user including image-based, simulation-based, textual-based or other information concerning status of a current print.” *Id.* at 14:66-15:3; *see also id.* at 20:22-26, 22:50-57 (describing status information that includes a photograph and showing an image of a working volume to enable a user to monitor progress or status of a remote print job).

To operate the 3-D printer with a video camera, the '324 Patent illustrates a flowchart in Figure 7 that “emphasizes incorporation of data from the video camera into operation and management of the three-dimensional printer.” *Id.* at 24:24-28.

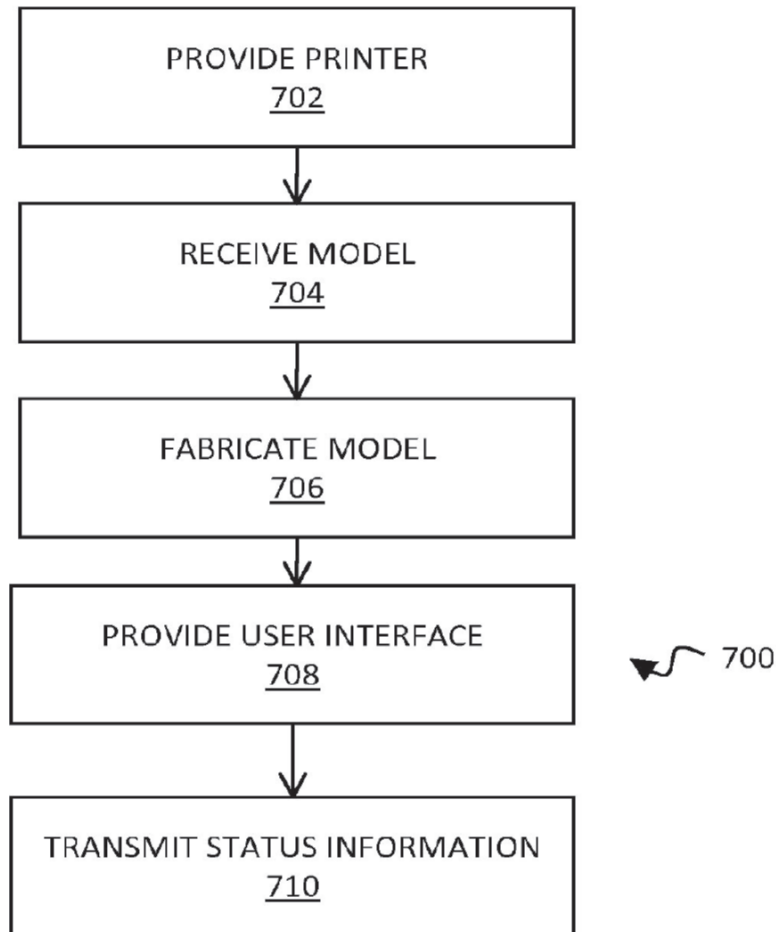


Fig. 7

Id. at Fig. 7. At step 702, “a video camera positioned to capture video of the build volume from a point of view, such as from above or in front a side of the build volume.” *Id.* at 24:29-35. Steps 704 and 706 receive and fabricate the model, and at Step 708, the method includes “providing a user interface to a remote user accessing the device through the network interface” where “the user interface presents an image of the build volume from the camera and a two-dimensional

projection of the three-dimensional model from the point of view of the video camera.” *Id.* at 24:47-52. For example, the two-dimensional projection can be a “visualization of the model and its current state of completion.” *Id.* at 24:58-61. The projection may be obtained from a “three-dimensional scanner or other data acquisition device” (*id.* at 24:61-64, 25:4-5) and may be “dynamically updated to correspond to a state of physical completion of the object” (*id.* at 24:64-25:3). The display of both the actual image and projection enables “comparing actual to expected two-dimensional” results. *Id.* at 25:45-49; *see also* 22:41-60 (“ . . . a user may visually monitor progress or status of a remote print job through the user interface 500. . . .”).

Numerous claims embody these solutions, including independent claims 1 and 19. For instance, claim 1 recites “a video camera positioned to capture video of the build volume from a point of view.” *Id.* at 27:23-24. Similarly, claim 19 recites “a video camera positioned to capture video of the build volume from a point of view.” *Id.* at 28:34-35. In addition, claim 1 recites a “processor further configured to provide a user interface to a remote user accessing the device through the network interface” and “to present in the user interface” both “an image of the build volume from the video camera *and* a two-dimensional projection of the three-dimensional model *from the point of view of the video camera.*” *Id.* at 27-29-35. Similarly, claim 19 recites “a video camera positioned to capture video of the

build volume from a point of view” (*id.* at 28:34-35) and “providing a user interface to a remote user accessing the device through the network interface” in which “the user interface presents” both “an image of the build volume from the video camera *and* a two-dimensional projection of the three-dimensional model *from the point of view of the video camera*” (*id.* at 28:41-46).

As explained below, the asserted grounds fail to teach the elements of claim 1. Because claims 3-11, 17-18 depend from claim 1 and claims 20-22 depend from claim 19, the asserted grounds also fail to teach the elements of dependent claims 3-11, 17-18, and 20-22 for at least the same reasons.

B. Summary of the Prosecution History of the '324 Patent (EX1002)

During prosecution, the applicant explained that unlike the cited art, the user interface must both show an image of an object being manufactured from a video camera and a three-dimensional model of the object from the same point of view. May 22, 2013 Amendment and Reply to Office Action at p. 7 (EX1002 at 160). Although the Petition recognizes that the user interface must provide both the image and two-dimensional projection, it fails to appreciate that the applicant explained that the image and projection must be from the same point of view. *See* Pet. at 5. For example, the applicant explained “for a remote user to monitor progress of fabrication in a meaningful way, the three-dimensional model is rendered in the user interface from the perspective of the video camera that

provides the image, thus advantageously permitting side-by-side comparison by a remote user of the model and the resulting object.” EX1002 at 160. “This feature is expressly claimed as a processor configured to ‘present in the user interface an image of the build volume from the camera *and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.*’” *Id.* (emphasis in original). On this basis, the cited art did not disclose the claimed user interface. *See id.* at 161 (“there is nothing in this general suggestion [in the cited art] that specifically leads to the applicant’s claimed user interface, which provides both video and model views *from the same point of view* in order to permit side-by-side comparison of model and results by a remote user.”) (emphasis in original). The examiner agreed with the applicant, noting, in the notice of allowance, that the cited art failed to teach “*presenting the user interface an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.*” Aug. 5, 2013 Notice of Allowance at p. 2 (EX1002 at 174) (emphasis in original).

As explained below, the references asserted in the Petition suffer from the same deficiencies as the art cited during prosecution and in the asserted grounds do not teach all elements of independent claims 1 and 19 of the ’324 Patent.

IV. LEVEL OF ORDINARY SKILL

For the purpose of this Preliminary Response, a person of ordinary skill in the art (a “POSITA”) in relation to the subject matter of the ’324 Patent would have had a bachelor’s degree in Mechanical Engineering, Computer Engineering, Electrical 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 ’324 Patent are unpatentable irrespective of the level of skill of a skilled artisan.

V. 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’”).

VI. APPLICABLE LEGAL STANDARDS

As explained above, institution of *inter partes* review is discretionary under 35 U.S.C. § 314. 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).

VII. THE PETITION DOES NOT SHOW THAT THE CLAIMS 1, 3, 5-7, 9-10, AND 19-22 ARE UNPATENTABLE UNDER GROUND 1A

A. Overview of *Mazumder* (EX1004)

Mazumder discloses a system and method for remote direct material deposition fabrication. EX1004 at Abstract, Title. *Mazumder's* “fabrication process is recorded by video or television camera and the shown in real-time on a screen display connected to the remote computer.” *Id.* at Abstract. The “video or TV

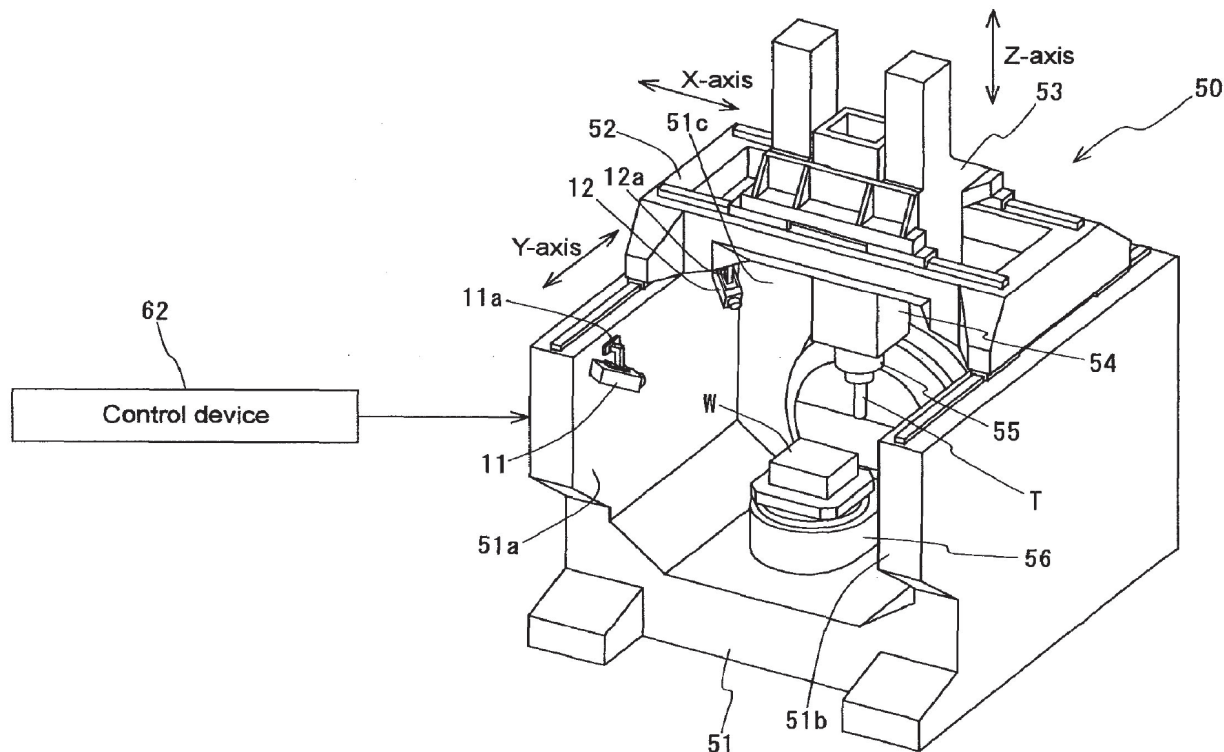
camera 65 records the laser-aided DMD process and transmits the images to the local computer 70” which then sends the images “to the remote computer 95 to be displayed preferably on a TV screen or shown on the remote computer monitor as streaming video.” *Id.* at 6:36-43. The remote computer has “two monitors, one with a graphical user interface and the other for image and video observation of the laser-aided direct material deposition process.” EX1004, 2:27-33.

B. Overview of *Mori* (EX1005)

Mori discloses a machine tool with a machining status monitoring apparatus. EX1005 at Abstract, Title. The apparatus has multiple CCD cameras, which are for imaging the machine tool and generating images, and virtual image generation in which the machining tool and workpiece are imaged by virtual CCD cameras and virtual image data. *Id.* at Abstract.

Figure 2 of *Mori* is “a perspective view showing a schematic configuration of a machine tool provided with the machining status monitoring apparatus of the embodiment.” *Id.* at ¶[0031].

Fig. 2



Id. at Fig. 2. The machining tool 50 includes a machining status monitoring apparatus called a machining center. *Id.* at ¶[0043].

C. *Mori* is an improper reference for an obviousness challenge

Petitioner relies on the combination of *Mazumder* and *Mori* in Ground 1A. Pet. at 10-13. 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.*

For *Mazumder* and *Mori*, Petitioner solely argues that they are analogous art because they are allegedly in the same field of endeavor as the claimed invention. Pet. at 12 ("the systems of *Mazumder* and *Mori* are each directed to 'three-dimensional fabrication' systems, which is the same field identified in the '324 patent") (citing EX1001 at 1:14-20); *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)). The Petition does not argue that *Mazumder* and *Mori* are allegedly analogous art under the "reasonably pertinent" test. *See, e.g.*, Pet. at 12.

With respect to *Mazumder*, the Petition provides a rationale for why it is in the same field of endeavor, arguing that "Mazumder discloses that similar computer-aided manufacturing software is used for additive 'deposition' manufacturing and 'conventional CNC machining' involving material removal." Pet. at 12-13. However, the Petition shortcuts its explanation for *Mori*. Rather than providing a rationale, the Petitioner simply concludes "[i]n this context, a POSITA was not an automaton and instead would have possessed ample skill to

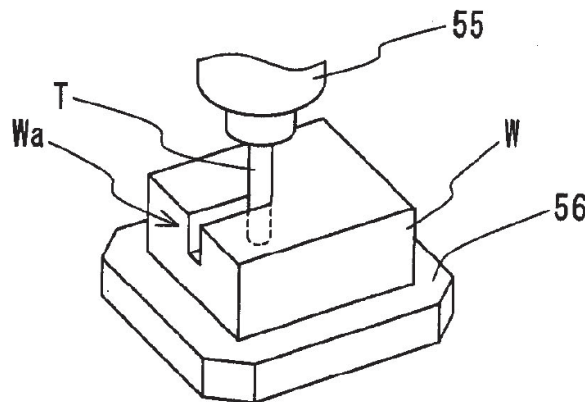
successfully implement the combination as described above and thus would have reasonably expected success achieving the combination.” Pet. at 13 (citing EX1003, ¶¶84-88). But, the cited portions of the declaration by Petitioner’s expert, Dr. Wolfe, merely discuss Petitioner’s arguments for combining *Mazumder* with *Mori*. See EX1003, ¶¶84-88. Mirroring the Petition’s brevity, there is no explanation in the declaration why *Mori* is in the same field of endeavor as the claimed invention. Petitioner’s failure to explain why *Mori* is in the same field of endeavor is fatal to its bare, unsupported assertion.

Further, the disclosures of the ’324 Patent and *Mori* make it clear that *Mori* is not in the same field of endeavor as the ’324 Patent. The ’324 Patent explains that its field of endeavor is specific to additive manufacturing. Specifically, the patent explains the field of invention is “additive” fabrication processes, such as “selective laser sintering, fused deposition modeling, three-dimensional printing.” EX1001 at 2:4-5; see also *id.* at 1:65-66 (“Described herein are devices and methods for using networked three-dimensional printers”); Pet. at 3 (“The system [of the ’324 Patent] includes a three-dimensional printer . . .”). Further, the ’324 Patent clarifies that “while the exemplary embodiments [] emphasize fabrication techniques using extrusion, the principles of the invention apply particularly to “*additive fabrication processes.*” *Id.* at 1:66-2:4. According to the ’324 Patent, 3-D printing refers to “any and all such *additive fabrication process* unless a different

meaning is explicitly stated or otherwise clear from the context” (*id.* at 2:8-13) and thus “a three-dimensional printer (or simply ‘printer’) . . . may be used in a networked three-dimensional printing environment” (*id.* at 2:13-16).

Unlike the '324 Patent that is directed to additive fabrication processes, *Mori* is directed to a *destructive machining tool*. See EX1005, Title, Abstract (“a machine tool”). For example, Figure 10 of *Mori* shows a machining tool (T) that destructively cuts a groove (Wa) into a workpiece (W).

Fig. 10



Id. at Fig. 10, ¶[0069]. As *Mori* explains, “the distal end of the tool is hidden by the workpiece” when “hole machining” or “groove machining” and thus “the operator cannot monitor the machining status of a workpiece through” actual images. *Id.* at ¶[0024]. In this circumstance, *Mori* teaches that “sectional image data generated by the sectional image generating section 26 is displayed on the

display device 65” so that “the operator can monitor the machining status” when groove machining. *Id.* at ¶[0085].

Notably, *Mori* does not describe, or even mention, additive fabrication, such as selective laser sintering, fused deposition modeling, or three-dimensional printing, as described in the '324 Patent. Nor is there any explanation in *Mori* of why an additive fabrication system, which does not destructively machine a hole or groove into a workpiece with a hidden tool, would need virtual sectional image data to monitor status. *See, e.g., id.* at ¶[0085]. Thus, *Mori* is not in the same field of invention as the '324 Patent as Petitioner asserts in a conclusory manner, and thus *Mori* is not a proper reference for an obviousness challenge.

D. Ground 1A does not teach or suggest “a video camera positioned to capture video of the build volume from a point of view” and “to present in the user interface an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera”

Even if *Mori* is a proper reference for an obviousness challenge (it is not), Petitioner's misguided understanding and interpretations fail to appreciate the scope of the infringement contentions, language of the claims, and teachings of the *Mazumder-Mori* combination, which does not teach all elements of independent claims 1 and 19. In particular, claim 1 requires “a video camera positioned to capture video of the build volume from a point of view” and “to present in the user interface an image of the build volume from the video camera and a two-

dimensional projection of the three-dimensional model from the point of view of the video camera.” EX1001 at 27:23-35. Similarly, claim 19 requires “a video camera positioned to capture video of the build volume from a point of view” and “the user interface presents an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.” *Id.* at 28:34-35, 28:42-46.

Regarding the video camera, Petitioner relies on the sensors at *Mazumder's* local site, which allegedly include “video or television camera 65” that “records the laser-aided DMD process and transmits the images to the local computer 70.” Pet. at 16. According to Petitioner, Mazumder's “local computer transmits the images ‘to the remote computer 95 to be displayed.’” *Id.* at 20. Petitioner states that “the combined video and sensor data is displayed on a ‘TV screen’” which is purportedly “a display device that does not include its own computing capability.” *Id.*

Regarding the two-dimensional projection, Petitioner asserts that the *Mazumder-Mori* combination would have provided the user interface with both the two-dimensional projection and image of the build volume from the video camera. See Pet. at 21 (citing EX1005 (*Mori*) at ¶¶[0043], [0049]-[0050]), 23 (asserting that “Mori describes that the user interface displays the actual image data from the actual CCD cameras, the virtual image date [sic], and the sectional image data

showing a virtual cross section of the workpiece.”) (citing EX1005 at ¶¶[0070], [0074]-[0076], FIGS. 4, 7, 10). In Petitioner’s view, *Mori* suggests that the combination would include “virtual image generating section 18’ to provide views of the workpiece and work environment based on the stored model of the workpiece” and the benefits of two types of imaging—video camera images and virtual images. Pet. at 22 (citing EX1005, ¶¶[0059]-[0065], [0079]-[0083]). On this basis, Petitioner presents three flawed theories: 1) Mazumder’s video satisfies both types of imaging under Petitioner’s interpretation of the infringement contentions (Pet. at 22 n.3), 2) the combination teaches the display of both types of imaging arranged at the same positions/orientations but not at the same time (Pet. at 22-23), and 3) a modification of the prior art references such that both types of imaging are displayed simultaneously (Pet. at 23-24 (citing EX1003, ¶112)).

Petitioner’s theories conflict with the actual content of the infringement contentions, the language of the claims, and the teachings of *Mazumder* and *Mori*. First, Petitioner’s theory that Mazumder alone teaches the claim elements (*see* Pet. at 5, 22 (citing to EX1016, 41-105)) is based on a misinterpretation of the infringement contentions used to manufacture an argument that the claims do not require a user interface that presents **both** an image from a video camera and a two-dimensional projection from the point of view of the video camera. According to Petitioner, the contentions assert that the same image(s) can satisfy both the image

and projection because they are based on video camera captures. *Id.* (asserting that claim elements “are fulfilled by merely displaying images captured by a video camera alone”). Under this flawed interpretation, Petitioner asserts that “Mazumder’s disclosure of video images . . . satisfies both of these requirements.” *Id.*

However, Petitioner’s view of the infringement contentions is incorrect and unsupported. For example, the contentions point to a “camera view” and “2-D projection of a 3-D model for [a] cute little dinosaur.” *See* EX1016 at 41-44. As another example, the contentions point to a “time lapse.” *Id.* at 46. Notably, there is no allegation that presenting the same image(s) or video satisfies presenting both an image and a 2-D projection. Thus, Petitioner has misconstrued the infringement contentions. *See* Pet. at 22 n.5. Accordingly, Petitioner’s assertion that “Mazumder’s disclosure of video images” satisfies the claim elements is incorrect because there is no basis for Petitioner to assert that presenting the same image(s) is sufficient. Thus, Petitioner’s first theory (that *Mazumder’s* video satisfies both the image of the build volume from the video camera and the two-dimensional projection of the three-dimensional model) fails to show that the combination teaches or suggests all elements of the independent claims.

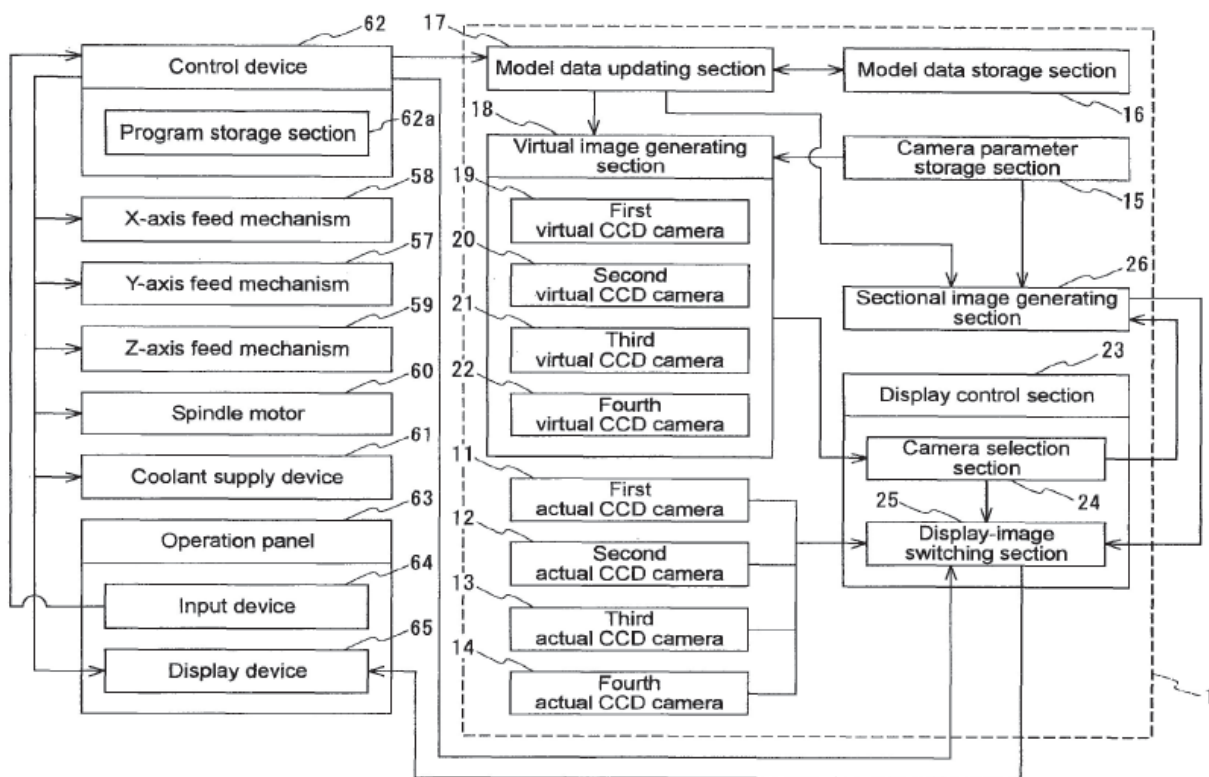
Second, Petitioner’s theory that the combination teaches the display of both types of imaging arranged at the same positions/orientations but not at the same

time (Pet. at 23) ignores the claim language and prosecution history and teachings of *Mori* and *Mazumder*. Each independent claim recites a user interface that presents both “an image of the build volume from the video camera” and “a two-dimensional projection of the three-dimensional model *from the point of view of the video camera*.” *Supra* Section III. Consistent with this language, the prosecution history confirms that the user interface must present both an image and projection from the same perspective to permit comparison by, for example, a remote user. *See* EX1002 at 160-61 (applicant's arguments); 174 (examiner's agreement with applicant regarding deficiencies of prior art); *supra* Section III.B (Summary of Prosecution History).

Contrary to the claim language and prosecution history, Petitioner's summary of the prosecution history misinterprets the record by mischaracterizing the applicant's argument as simply “a user interface with images from a video camera alone was not enough.” Pet. at 5. The applicant did not make this particular argument. Rather, both the applicant and the examiner confirmed that the user interface presents ***both*** an image from a video camera and a two-dimensional projection *from the point of view of the video camera*. Accordingly, the intrinsic record confirms that the user interface presents both an image and projection from the same point of view.

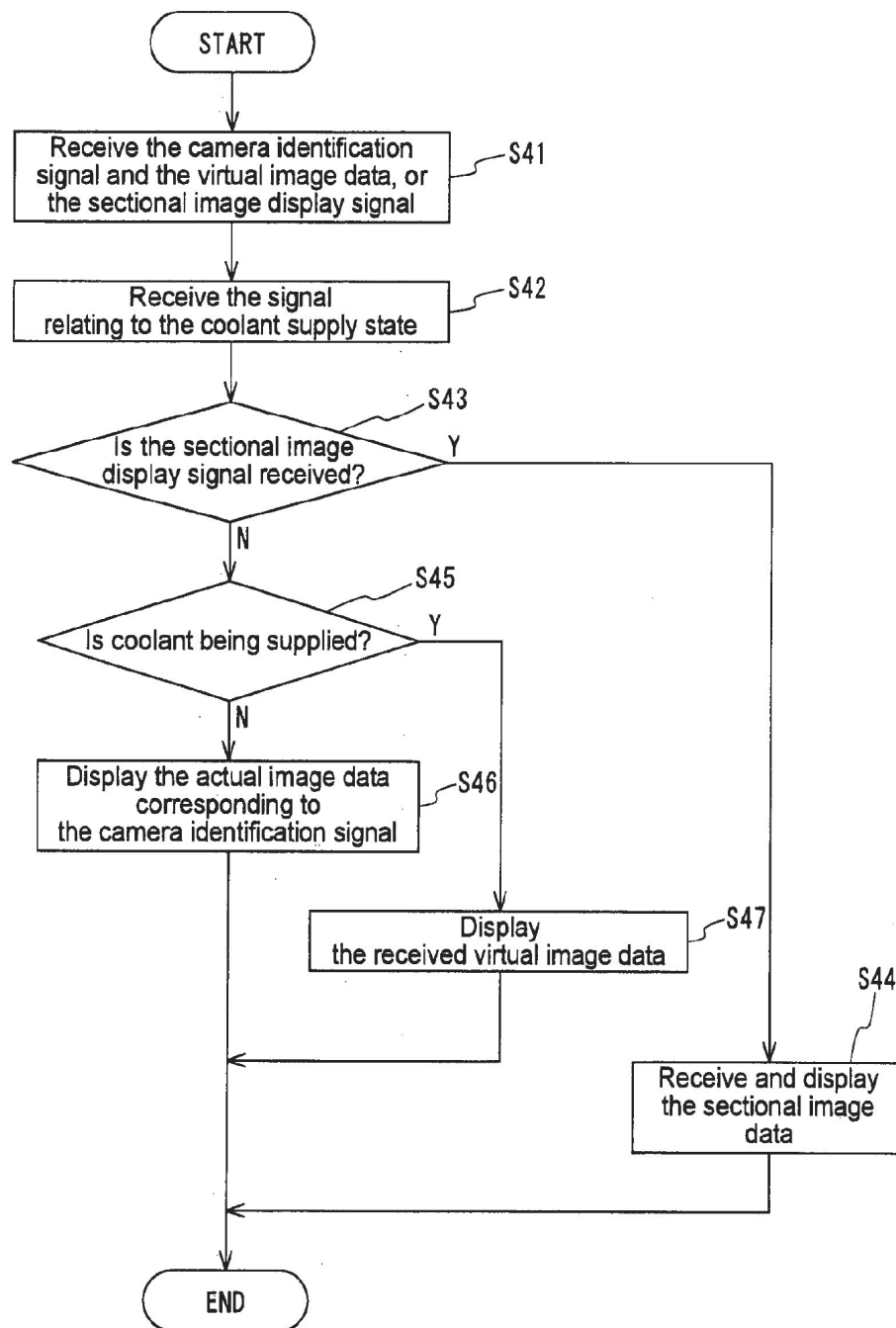
Under a proper understanding of the claims and intrinsic record, there is no teaching in *Mori* that the user interface presents both an image from a video camera and a two-dimensional projection from the point of view of the video camera. Contrary to Petitioner's assertion that "Mori describes that the user interface displays the actual image data," the "virtual image date [sic]," and "the sectional image data" (Pet. at 23), *Mori* teaches that the user interface only displays one type of image data. In particular, *Mori* provides a display-image switching section 25 that displays on the display device 65, one of three options—actual image data, virtual image data, or sectional image data.

Fig. 1



EX1005, ¶[0070], Fig. 1. While *Mori* can switch between these three options using the display-image switching section 25, there is no teaching in *Mori* that, for example, both the actual image data and virtual or sectional image data are presented together in the user interface.

As shown below in Figure 9 of *Mori*, the selection between the three options depends on specific conditions.

Fig. 9

Id. at Fig. 9. The sectional image data is displayed (at S44) when the sectional image display signal is received (at S43), the virtual image data is displayed (at

S47) when the coolant is being supplied (at S45), or the actual image data is displayed (at S45) when the sectional image display signal has not been received and no coolant is being supplied. *Id.* at Fig. 9, ¶¶[0071]–[0074]. Thus, *Mori* does not even suggest a user interface that presents multiple types of image data (the actual image data, virtual image data, sectional image data) together.

Mazumder does not remedy these deficiencies in *Mori* in the asserted combination. As Petitioner tacitly acknowledges, *Mazumder* does not disclose the display of virtual images from the same point of view as an image from a camera. *See* Pet. at 10 (attributing the provision of virtual images to *Mori*), Pet. at 21-25 (only citing to *Mazumder* (EX1004) when misinterpreting the infringement contentions on Pet. at 22 n.3).

Thus, Petitioner's second theory (that the combination teaches the display of both types of imaging arranged at the same positions/orientations but not at the same time) also fails to show that the combination teaches or suggests all elements of the independent claims.

Third, Petitioner's theory that both types of imaging would be displayed simultaneously in the combination misinterprets the teachings of *Mori* and its combination with *Mazumder*. In particular, the *Mazumder-Mori* combination fails to teach or suggest a user interface that presents an image and projection from the same point of view or that presenting the multiple types of such information from

the same point of view enables side-by-side comparison. Indeed, Petitioner's argument that the combination teaches side-by-side comparison is driven by impermissible hindsight. *See* Pet. at 23 ("Namely, the presentation of both image types would have beneficially aided the remote user to more easily visually compare the actual image and virtual image to quickly identify any defects or problems with the fabrication process.") (only citing to EX1003, ¶113).

As the Federal Circuit has explained, it is hindsight to use "the invention to define the problem the invention solves" because "when someone is presented with the identical problem and told to make the patented invention, it often becomes virtually certain that the artisan will succeed in making the invention." *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1377 (Fed. Cir. 2012); *see also AT&T Services Inc. et. Al. v. Innovative Sonic Ltd.*, IPR2024-001143 (PTAB Feb. 11, 2025) (denying institution after finding no motivation to combine because of an overly broad conclusion that "suffers from hindsight bias"). Petitioner asserts that "presenting the user of Mazumder's remote computer with both actual images . . . and virtual images" would have enabled the user to visually compare the two. Pet. at 11 (citing EX1004, 7:27-28, 2:34-42, 6:24-35; EX1005, ¶¶[0061]-[0062])); EX1003, ¶85 (mirroring the same arguments as the Petition); *see also* Pet. at 23-24; EX1003, ¶113 (mirroring the same argument as the Petition).

However, there is no evidence to support Petitioner's conclusion. *Mazumder* merely explains that “*metrological instruments* may also be used for perform accurate measurements *to monitor the fabrication process*,” that “local computer 70 communicates with a remote computer 95,” and that the remote computer 95 “receives input form [sic] a computer-aided design/computer-aided manufacturing (CAD/CAM) software program 105.” EX1004 at 2:34-42. *Mazumder* explains that non-video sensor data can be used for remote control of the process or modification of the product design (*id.* at 6:24-35) and that “manufacturing information includes visual images” (*id.* at 7:27-28). However, there is no teaching or suggestion in *Mazumder* that video image data is used for comparison or “make corresponding adjustments to the model” (*see* Pet at 11). Indeed, *Mazumder* teaches that sensor data, such as optical sensors and acoustic emission sensors, (and not video image data) are used to determine the need for corrective measures. *See* EX1004 at 2:43-50 (“Optical sensors at the manufacturing site continuously monitor the composition, temperature, and dimensions of the product. Acoustic emission sensors and strain gages at the manufacturing site monitor residual stress development in the product. Some or all of the information from the sensors is sent via a communications system to the remote computer at the designer site to determine the need for corrective measures.”), 6:30-35 (using “sensor data” for process control or modification of the product design).

Similarly, there is no evidence that *Mori* supports Petitioner's conclusion. As explained, *Mori* describes switching between one of three image types to display and thus, similar to *Mazumder* does not teach or suggest the comparison of actual and virtual/sectional images. See EX1005, ¶¶[0071]–[0074], Figs. 1, 9; see also EX1005, ¶¶[0060]–[0061] (describing virtual image generation and virtual camera arrangement).

Accordingly, the *Mazumder-Mori* combination fails to teach or suggest a user interface that presents an image and projection from the same point of view or that presenting multiple types of such information from the same point of view enables side-by-side comparison.

Thus, there is no evidence to support Petitioner's third theory that both types of imaging would be displayed simultaneously and thus, the combination fails to reach or suggest all elements of the independent claims.

For this additional reason, Ground 1A fails to teach or suggest all elements of independent claims 1 and 19.

Because dependent claims 3, 5-7, 9-10, and 20-22 depend from independent claims 1 or 19, Ground 1A also fails to teach or suggest all elements of the challenged dependent claims and thus fails to show unpatentability for any challenged claim.

VIII. THE PETITION DOES NOT SHOW THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUNDS 1B THROUGH 1G

In addition to Ground 1A, the Petition includes six additional grounds (Grounds 1B–1G) that rely on Ground 1A's combination of *Mazumder* and *Mori* in further view of additional asserted art to challenge claims that depend from independent claims 1 or 19. *See* Pet. at 1. Accordingly, Grounds 1B through 1G fail to teach all elements of dependent claims for at least the reasons discussed above for Ground 1A with respect to independent claims 1 and 19. Thus, Petitioner has also failed to show unpatentability for any of the claims challenged in Grounds 1B through 1G.

IX. THE PETITION DOES NOT SHOW THAT THE CLAIMS 1, 3, 5-7, 9-10, AND 19-22 ARE UNPATENTABLE UNDER GROUND 2A**A. Overview of *Kritchman* (EX1015)**

Kritchman discloses a three-dimensional printing process and apparatus. EX1015 at Title, Abstract. Figure 3A of *Kritchman* shows an apparatus. *Id.* at ¶[0046].

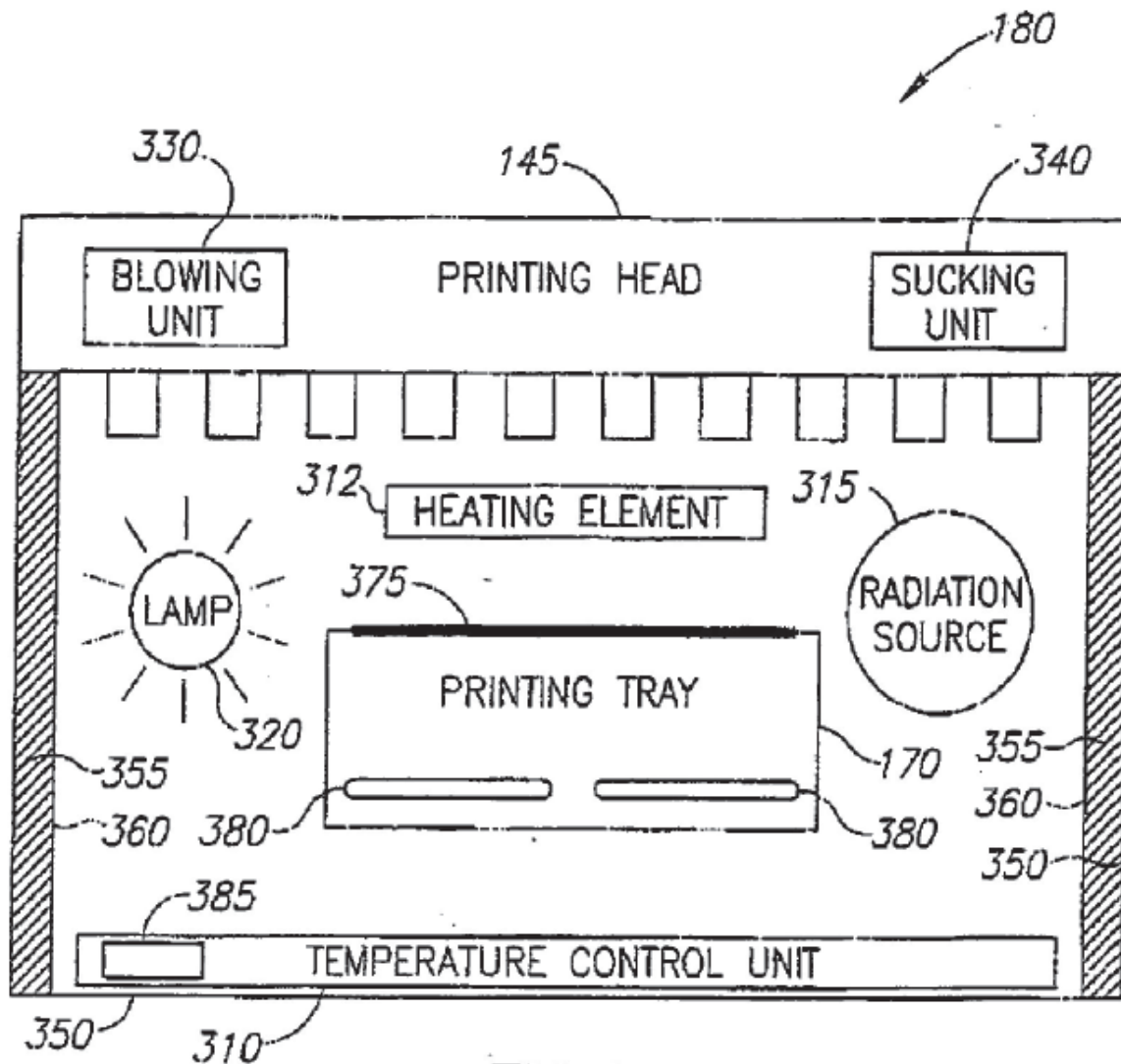


FIG. 3A

Id. at Fig. 3A. The printing sub-system 180 includes a print tray 170 and temperature sensing unit 385. *Id.* at ¶[0099].

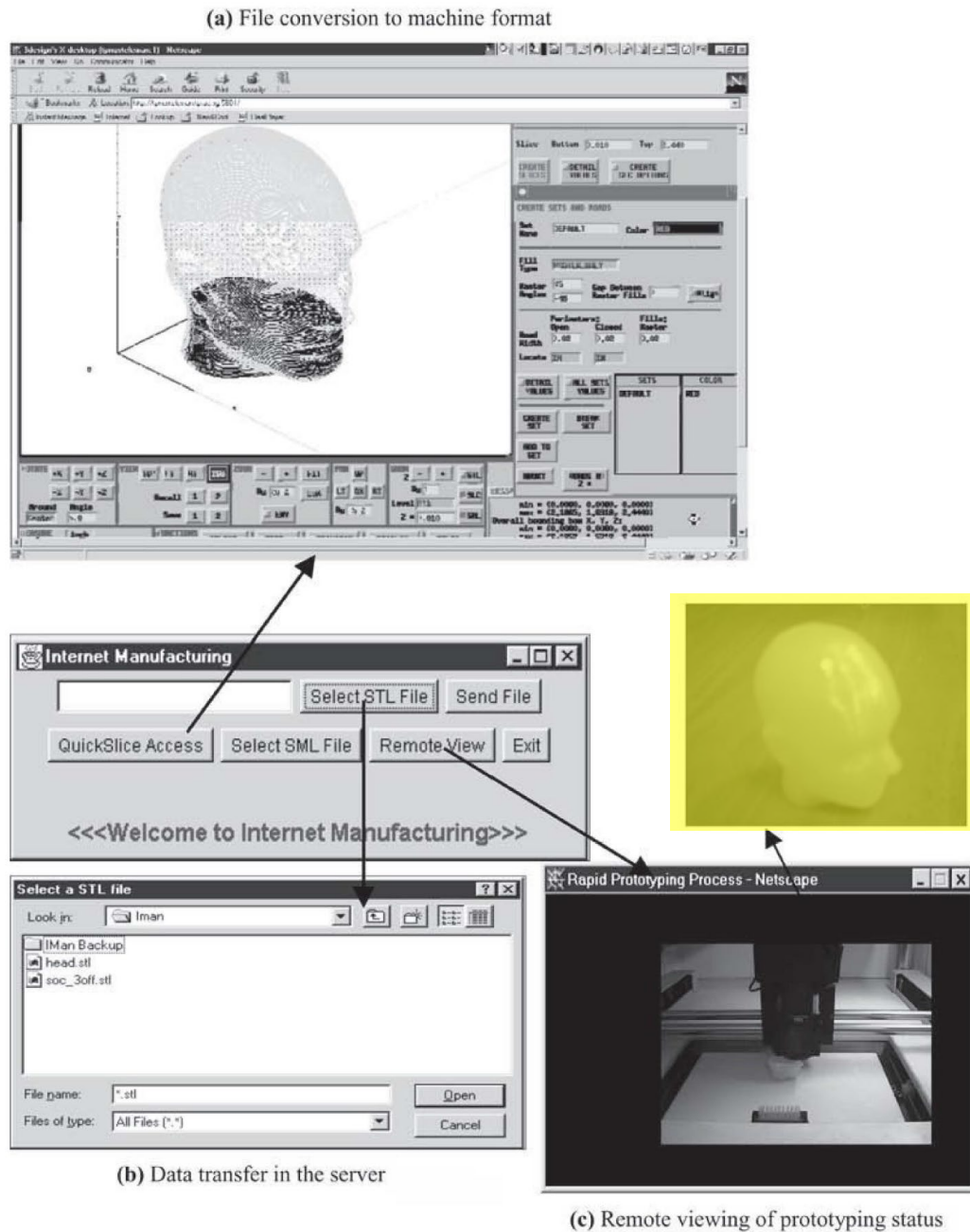
B. Overview of *Tay* (EX1013)

Tay discloses a distributed rapid prototyping framework. EX1013. It describes distributed rapid prototyping via the Internet (*id.* at 1-2), provides a brief description of an Internet Manufacturing (IMAN) system (*id.* at 2-3), describes an

object-oriented architecture of the IMAN system (*id.* at 3-4), and tests and results (*id.* at 4-5). Figure 3 of *Tay* shows several distinct steps with the resulting, completed object annotated in yellow.

Figure 3

(a) File conversion to machine format (b) Data transfer in the server (c) Remote viewing of prototyping status



Id. at Fig. 3. As shown, step (a) converts the file to machine format with QuickSlice. *Id.* at 4 (“front-end terminal intensive tasks such as data conversion to machine format with the QuickSlice.”), 5 (“(a) File conversion to machine format”). Next, step (b) transfers data in the server. *Id.* at 4 (“From the viewpoint of the client application, the socket connection is active only for data transfer and invocation of the rapid prototyping hardware” and “To validate the reliability of data transfer, network performance reliability was monitored in the rapid prototyping laboratory.”); 5 (“(b) Data transfer in the server”). Then, step (c) concerns remote viewing of the prototyping status. *Id.* at 4 (“a distributed system where the active process needs to be instantaneously viewed by several people at different client stations for concurrency”); 5 (“(c) Remote viewing of prototyping status”). *Tay* explains that multiple remote individuals can concurrently view the prototyping status. *Id.* at 4 (“These are critical tasks such as data transfer to the front-end terminal via the server and noncritical ones such as video conferencing and *concurrently viewing* of the rapid prototyping status.”), 1 (“parties involved in product development” can view “the prototyping concurrently”). As a result of the fabrication, *Tay* “show[s] that the quality of the prototype fabricated using the IMAN system,” as shown by the image annotated in yellow above in Figure 3, “is not susceptible to varying conditions of the network link, especially the data transfer mode.” *Id.* at 4.

C. Overview of *Henke* (EX1014)

Henke discloses modules for remote engineering applications. *Id.* at 1-2.

Henke's solution is designed for students to use simulation tools and existing hardware to “test a designed control algorithm.” *Id.* at 2. *Henke*'s “paper starts with an introduction into the design process and describes the tool set, which is provided to the students.” *Id.* *Henke* explains that “[s]imulation and visual prototyping help to find functional errors.” *Id.* at 3 (emphasis in original). For instance, the “physical behaviour of the actual model, and its environment as well, will be emulated (e.g., as [a] simulation model).” *Id.* Figure 2 is an example of a visual model for simulating “[w]ater level control.”

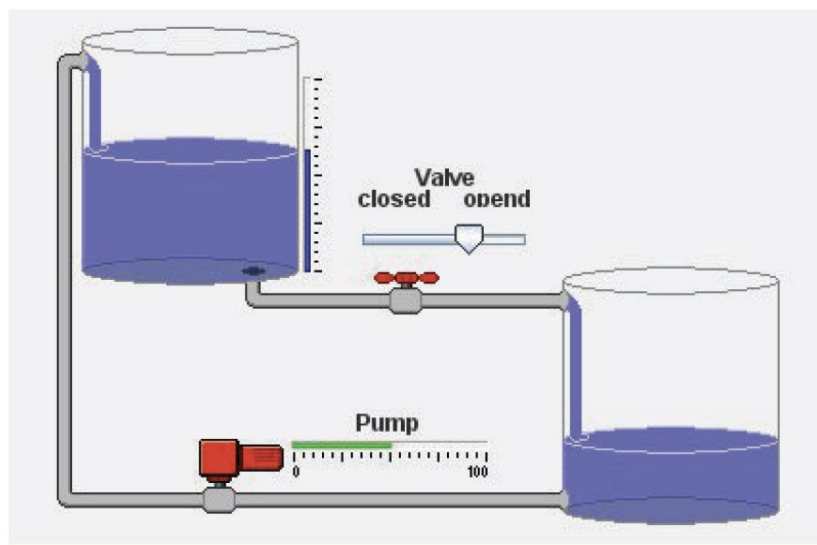


Figure 2. Visual model of the Water level control task

Id. at Fig. 2. *Henke* explains that “a fault free design algorithm finally should be tested on real electro-mechanical models,” such as the “[w]ater level control unit” in Figure 3.

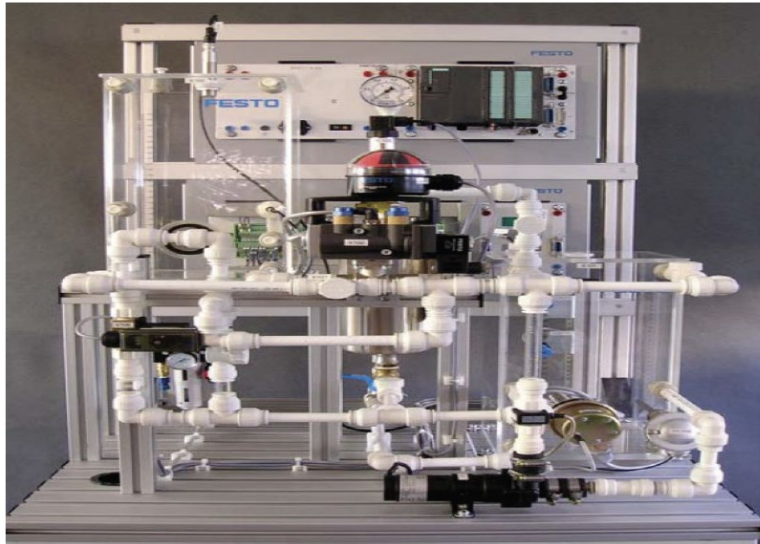


Figure 3. Hardware model of the Water level control unit

Id. at 3. With respect to using existing hardware, *Henke's* “implementation enables a Web-based access to control electro-mechanical models.” *Id.* at 1. “The electromechanical models can be controlled by different platforms.” *Id.* “Students have the possibility to test a designed control algorithm directly within a hardware environment by uploading a source file to the Remote Lab server. That way the students can compare architectures of different control-platforms as well as different design approaches to control electro-mechanical models.” *Id.*

Henke's tool set includes the Remote and Applications Laboratory (REAL) system. *Id.* at 5. The REAL system's features include “[v]isualization and animation [to] allow observing and testing the properties of the design.” *Id.* REAL offers an environment for “verification and simulation features to generate and execute a design within visual prototypes.” *Id.* Figure 7 shows a visual prototype of the water level control for verification and simulation.

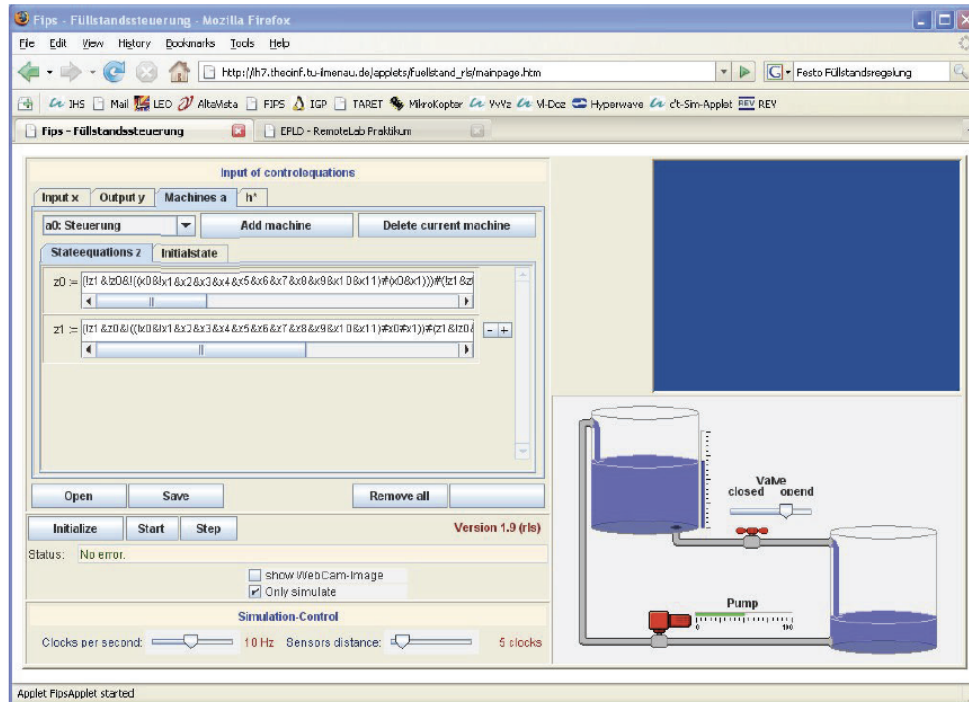


Figure 7. Visual Prototyping (offline control) of the Water level control - without Internet connectivity to the Remote Lab

Id. at Fig. 7. A student can “test their design under real environmental conditions.”

Id. at 5. Specifically, the student downloads their “synthesized hardware and/or software design algorithms,” “handle[s] the laboratory procedure,” “change[s] environmental variables if necessary,” and “watch[es] the laboratory procedure by supervising the model and environmental variables inside an I/O monitor or by observing the hardware model directly via a Web-Cam.” *Id.* Henke explains that “[a]t any time the student has the chance to adjust his algorithm in case of fault” and thus “is able to achieve a fault free solution (a validated control algorithm) step by step.” *Id.*

D. *Henke* is an improper reference for an obviousness challenge

Petitioner relies on the combination of *Kritchman*, *Tay* and *Henke* in Ground 2A. Pet. at 54-64. However, as explained below, *Henke* is an improper reference for an obviousness challenge as it is not analogous art.

For a reference to be proper for an obviousness analysis, the reference must be analogous art to the claimed invention. *Bigio*, 381 F.3d at 1325. One of the tests for establishing analogous art is if the reference is from the same “field of endeavor” as the claimed invention (even if it addresses a different problem). *See id.* “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.’” *Airbus*, 941 F.3d at 1380-81 (quoting *Bigio*, 381 F.3d at 1325). Another test for establishing analogous art is if the reference is “reasonably pertinent” to the problem faced by the inventor, as described in the specification of the patent. *Bigio*, 381 F.3d at 1325. For a reference to be “reasonably pertinent” to the problem, it must “logically [] have commended itself to an inventor's attention in considering his problem.” *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1379-80 (Fed. Cir. 2007) (quoting *In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992)).

Petitioner completely fails to address why *Henke* is analogous art under any theory. *See, e.g.*, Pet. at 58-59. First, *Henke* is not in the same field of endeavor as

the '324 Patent. As discussed above, the '324 Patent explains that its field of endeavor is specific to additive manufacturing. *Supra* Sections III.A, VII.C; *see also* EX1001 at 1:65-2:4, 2:8-16. By contrast, *Henke* discloses a solution designed for students to use simulation tools and existing hardware to *test control algorithms*. *Supra* Section IX.C (Overview of *Henke*). In particular, *Henke* describes testing a water-level control algorithm using a simulated system and a real, existing hardware system. *See* EX1014 at 1, 3, 5. *Henke* does not describe, or even mention, additive fabrication, such as selective laser sintering, fused deposition modeling, or three-dimensional printing. Nor is there any explanation in *Henke* of why an additive fabrication system, which fabricates new 3-D hardware objects and is not for designing and testing new control algorithms on existing hardware, would need to test a designed control algorithm. Thus, *Henke* is not in the same field of invention as the '324 Patent.

Second, *Henke* is not “reasonably pertinent” to the problem faced by the inventor of the '324 Patent, which among other things, describes a user interface to provide both an image of the build volume from the video camera (which is positioned to capture video of the build volume from a point of view) and a two-dimensional projection of a three-dimensional model from the same point of view, so as to enable comparison, such as by a user. *See, e.g.*, EX1001, Fig. 7, 24:24-25:17; EX1002 at 160-62; *supra* Section III. There is no explanation in *Henke* or

the Petition of why the simulation and use of existing hardware to test control algorithms designed by students in *Henke* would logically have commended itself to an inventor's attention is considering the problem of a user interface to provide an image of a build volume and a two-dimensional projection of the three-dimensional mode, from the same point of view, which enables a side-by-side comparison. Thus, *Henke* is not "reasonably pertinent" to the problem that faced the inventor of the '324 Patent.

In summary, *Henke* is an improper reference for an obviousness challenge as it is not in the same field of invention as the '324 Patent and is not reasonably pertinent to the problem that faced the inventor of the '324 Patent and thus is not analogous art.

E. Ground 2A does not teach or suggest "a video camera positioned to capture video of the build volume from a point of view" and "to present in the user interface an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera"

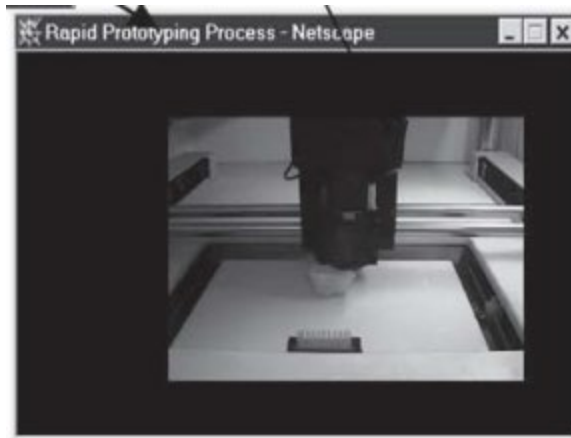
Even if *Henke* is a proper reference for an obviousness challenge (it is not), the *Kritchman-Tay-Henke* combination as asserted by Petitioner fails to appreciate the language of the claims and teachings of *Tay* and *Henke* in the combination, which does not teach all elements of independent claims 1 and 19. In particular, claim 1 requires "a video camera positioned to capture video of the build volume from a point of view" and "to present in the user interface an image of the build

volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.” EX1001 at 27:23-35. Similarly, claim 19 requires “a video camera positioned to capture video of the build volume from a point of view” and “the user interface presents an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.” *Id.* at 28:34-35, 28:42-46.

First, Petitioner asserts *Tay* discloses these claim elements under a flawed view that the claimed user interface can present *either* the image or projection but not *both* the image and projection at the same time. *See* Pet. at 72. As explained above for Ground 1A, the plain language of the claims and the intrinsic record indicate that the claims require a user interface that presents both an image of the build volume from the video camera and a projection from the same point of view of the video camera, which permits comparison by a user. *Supra* Section VII.D; *see also* EX1001, 27:20-35, 28:31-46; EX1002 at 160-61, 174. Thus, Petitioner's conclusion regarding *Tay* is based on a flawed understanding of the claims and intrinsic record.

Tay does not disclose a user interface that presents both “an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.” Petitioner asserts

that in *Tay*'s Figure 3, the reference shows a "view of the completed object and the displayed two-dimensional projection of the three-dimensional model appear to be from the same point of view." Pet. at 72; *see also* EX1003, ¶226 (parroting the Petition's assertions without any explanation). However, Figure 3 of *Tay* does not show or describe a user interface that presents both an image from a video camera and projection from the same point of view as the camera. Rather, it teaches several distinct steps. Step (a) converts a file to machine format with the QuickSlice software, step (b) transfers data in the server, and step (c) concerns remote viewing of the prototyping status. *See* EX1013 at 4-5. Figure 3 of *Tay* also shows the completed object which "show[s] that the quality of the prototype fabricated using the IMAN system is not susceptible to varying conditions of the network link, especially the data transfer mode." *Id.* at 4. Notably, *Tay* does not describe these distinct steps as presenting both, for example, the QuickSlice view shown in step (a) of Figure 3 and remote camera view as shown in step (c) of Figure 3, nor does it show or disclose that the two views are from the same point of view. In fact, *Tay* does not describe the point of view of the remote view at all. Rather, it only provides a small, darkened image of the remote view.



EX1013 at Fig. 3 (excerpt of Figure for step (c) remote viewing of prototyping status). There is no teaching that the remote view is from the same point of view as a projection or even the distinct image of the completed object. Thus, *Tay* does not teach alone or in the combination of Ground 2A, a user interface that presents “an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.”

Acknowledging *Tay*'s deficiencies, the Petitioner relies on the teachings of *Henke* in the combination of Ground 2A. *See* Pet. at 72-73. According to Petitioner, “Henke discloses a user interface in which the video image of the actual automated process and the model of the process are shown concurrently and from the same point of view to allow the user of the resulting combination to easily compare the actual process to the model.” Pet. at 72-73 (citing EX1014, 5 and Section V.H.4 of the Petition). Petitioner contends that “[m]ultiple reasons would have prompted a POSITA to further apply Henke's suggestions to the Kritchman-

Tay system to (1) display both the actual video images of Tay's fabrication process and the virtual model of the process simultaneously and from the same viewing perspective, and (2) include additional control functionality in the user interface to control the fabrication process." Pet. at 61. Relying on *Henke's* purported suggestions, Petitioner concludes "a POSITA would have recognized that simultaneously displaying actual images of the fabrication process and the visual representation of the model (and from the same perspective) on the client device beneficially allowed an onscreen comparison to quickly identify whether the fabrication process is proceeding correctly and that the object matches the model." *Id.* However, as explained below, the *Tay* and *Henke* references in the *Kritchman-Tay-Henke* combination both fail to teach or suggest a user interface the presents both an image of the build volume from the video camera and a two-dimensional projection from the same point of view as the camera.

First, as discussed, *Tay* does not teach these elements of the claims as Petitioner has a flawed understanding of the intrinsic record and the disclosure of *Tay*, which among other things, fails to teach presenting an image and projection from the same point of view.

Second, *Henke* has its own deficiencies that fail to remedy *Tay's* shortcomings. The model in *Henke* is not even a three-dimensional model that is fabricated by a three-dimensional printer. Rather, the model is a functional

simulation of a student-designed control algorithm, such as one for an existing controller that functions to control a water level. *Supra* Section IX.C; *see, e.g.*, EX1014 at 3. As such, *Henke's* model is a simulation of functionality and not a three-dimensional model (or two-dimensional projection of a three-dimensional model) that is fabricated by a three-dimensional printer. *See, e.g.*, EX1014 at 4, Fig. 2. Consistent with *Henke's* model being directed only to control system functionality, the model in Figure 2 of *Henke* only shows two water levels with a valve and pump whereas the hardware in Figure 3 shows a complex system with many components. Thus, not only is Figure 2 of *Henke* not a two-dimensional projection of the three-dimensional model fabricated by a three-dimensional printer, it is not even a two-dimensional projection of what is shown in Figure 3 of *Henke*. In light of this, a POSITA would not have been motivated to modify *Kritchman* and/or *Tay* to present a two-dimensional projection of a three-dimensional model, as claimed.

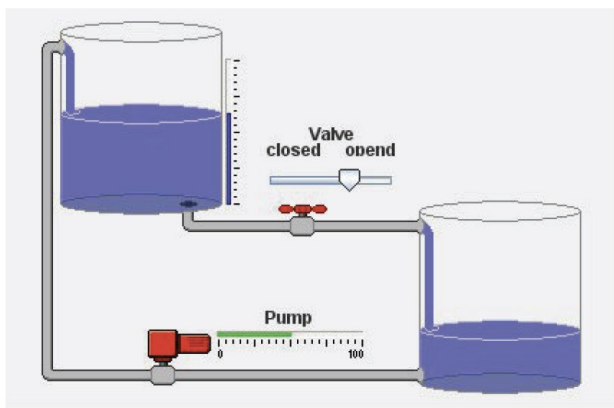


Figure 2. Visual model of the Water level control task

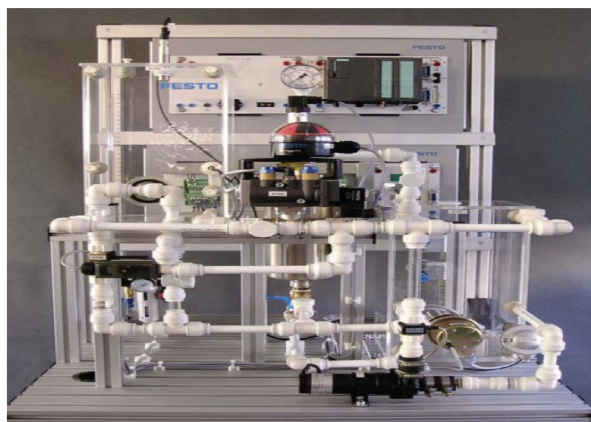


Figure 3. Hardware model of the Water level control unit

Id. at Figs. 2 and 3.

Further, there is no teaching or suggestion in *Henke* that its simulation (Figure 2) and pre-existing hardware (Figure 3) are provided from the same point of view. Indeed, *Henke* is concerned with testing a function (i.e., a control system algorithm) and not fabrication of a three-dimensional model by a three-dimensional printer. EX1014 at 1, 3, 5, Figs. 2, 3, 8. Thus, there is no rationale for providing a simulation and a video of the hardware from the same point of view or to compare the simulation to the video of the hardware, as opposed to just “observing the hardware [] directly via a Web-Cam” as *Henke* teaches. *Id.* at 5. Thus, *Henke* as applied in the combination with *Kritchman* and *Tay* does not teach “a video camera positioned to capture video of the build volume from a point of view” and “to present in the user interface an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera”

For these reasons, Ground 2A fails to teach or suggest all elements of independent claims 1 and 19. And because dependent claims 3, 5-7, 9-10, and 20-22 depend from independent claims 1 or 19, Ground 2A also fails to teach or suggest all elements of the challenged dependent claims and thus fails to show unpatentability for any challenged claim.

X. THE PETITION DOES NOT SHOW THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUNDS 2B THROUGH 2G

In addition to Ground 2A, the Petition includes six additional grounds (Grounds 2B–2G) that rely on Ground 2A's combination of *Kritchman*, *Tay*, and *Henke* in further view of additional asserted art to challenge claims that depend from independent claims 1 or 19. *See* Pet. at 1–2. Accordingly, Grounds 2B through 2G fail to teach all elements of dependent claims for at least the reasons discussed above for Ground 2A with respect to independent claims 1 and 19. Thus, Petitioner has also failed to show unpatentability for any of the claims challenged in Grounds 2B through 2G.

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 in this Preliminary Response.

XII. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board decline to institute *inter partes* review of the '324 Patent.

Respectfully submitted,

Dated: March 20, 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 12,516 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 Preliminary Response.

Dated: March 20, 2025

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e)(4), the undersigned certifies that on March 20, 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: IPR56224-0014IP1@fr.com

Dated: March 20, 2025

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