

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CANON U.S.A., INC. and CANON INC.,
Petitioner,

v.

SLINGSHOT PRINTING LLC,
Patent Owner.

IPR2022-01416
Patent 7,938,523 B2

Before JO-ANNE M. KOKOSKI, GARTH D. BAER, and
JOHN D. HAMANN, *Administrative Patent Judges*.

BAER, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. *Background and Summary*

Canon U.S.A., Inc. and Canon Inc. (together, “Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–3, 5–7, 10–12, and 14–16 (“the challenged claims”) of U.S. Patent No. 7,938,523 B2 (Ex. 1001, “the ’523 patent”). Slingshot Printing LLC (“Patent Owner”) filed a Preliminary Response (Paper 5, “Prelim. Resp.”) to the Petition.

An *inter partes* review may not be instituted unless “the information presented in the petition . . . and any response . . . 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). Further, a decision to institute may not institute on fewer than all claims challenged in the petition. 37 C.F.R. § 42.108(a). Based on the arguments and evidence of record, Petitioner demonstrates a reasonable likelihood of prevailing in showing that at least one of the challenged claims of the ’523 patent is unpatentable. Accordingly, we institute an *inter partes* review as to the challenged claims of the ’523 patent on all the grounds of unpatentability in the Petition.

B. *Related Matters*

The parties indicate that the ’523 patent is the subject of the following district court cases: *Slingshot Printing LLC v. Canon U.S.A., Inc., et al.*, No. 2:22-cv-00123 (E.D.N.Y.) and *Slingshot Printing LLC v. HP Inc.*, No. 6:19-cv-00549, reassigned as No. 2:20-00187 (W.D. Tex.) (dismissed). Pet. 1; Paper 3, 1.

Patent Owner indicates that Petitioner has filed the following concurrent petitions against patents that are asserted along with the ’523

patent in the district court case: IPR2022-01414 (U.S. Patent 7,195,341) and IPR2022-01415 (U.S. Patent 7,559,629). Paper 3, 1.

C. The '523 patent

The '523 patent discloses “[a]n improved fluid supply tank for a micro-fluid ejection head and method for improving operation of a micro-fluid ejection device.” Ex. 1001, code (57). Specifically, the '523 patent purports to resolve, in devices such as ink jet printers, the problem of replaceable fluid supply tanks developing trapped air adjacent to a connection between the fluid supply tank and an ejection head structure. *Id.* at 1:21–24. Figure 6 is reproduced below.

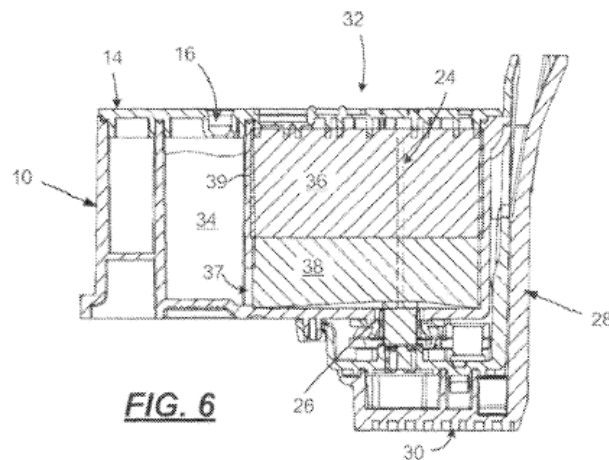


Figure 6 is a cross-sectional side view of a removable fluid supply tank and an ejection head structure. *Id.* at 2:65–66. Removable fluid supply tank 10 has body portion 12 (identified in Figure 1) and cover 14 in which cover 14 includes fluid fill port 16 and serpentine air removal vent path 18 (shown in Figure 1). *Id.* at 3:19–21. The wall of body portion 12 “may contain an internal vent conduit 24 disposed between the fluid outlet wall 22 [(shown in Figure 1)] and the cover 14.” *Id.* at 3:24–27. Vent conduit 24 “enables air adjacent the fluid outlet wall 22 or in an exit port 26 to flow to the cover 14

for exit through the serpentine vent path 18” and “may prevent entrapment of air or fluid in the tank’s exit port 26.” *Id.* at 3:28–31.

D. Illustrative Claim

Of the challenged claims, claims 1 and 10 are independent. Claim 1 is reproduced below.

1. A fluid supply tank for a micro-fluid ejection head, the fluid supply tank comprising:

a body portion for holding a fluid to be ejected, the body portion having a fluid exit port on an exit end thereof and a cover on an opposing end thereof of the body portion, the cover having an opening in fluid communication with atmosphere;

an internal vent conduit disposed between the exit end and the cover for removing air adjacent to the fluid exit port and releasing the air through the cover to said atmosphere; and

an air space in the fluid exit port wherein the internal vent conduit is in air flow communication with the air space and the cover.

Ex. 1001, 5:52–65.

E. Evidence

Petitioner submits the following evidence:

Evidence	Exhibit No.
U.S. 6,739,708 B2, issued May 25, 2004 (“Studer ’708”)	1003
U.S. 2006/0164471 A1, published July 27, 2006 (“Studer ’471”)	1004
U.S. 2005/0212878 A1, published Sept. 29, 2005 (“Studer ’878”)	1005
U.S. 5,671,001, issued Sept. 23, 1997 (“Elliot”)	1006
Declaration of Stephen F. Pond, Ph.D.	1011

F. Asserted Grounds

Petitioner asserts the challenged claims are unpatentable on the following grounds:

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1, 3, 5, 10, 12, 14	102	Studer '708
1, 3, 5–7, 10, 12, 14–16	103	Studer '708
1–3, 5–7, 10–12, 14–16	103	Studer '708, Studer '471
6, 7, 15, 16	103	Studer '708, Studer '471, Elliot
6, 7, 15, 16	103	Studer '708, Studer '878

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner argues that a person of ordinary skill in the art would have had “at least a Bachelor’s or Master’s level college degree in Mechanical Engineering, Materials Science, Physics, Electrical Engineering, or a related field, and at least two years of training or experience in the design of inkjet cartridges and printheads.” Pet. 17 (citing Ex. 1011 ¶¶ 19–20). Patent Owner does not propose a description of the level of ordinary skill in the art or dispute Petitioner’s description. Prelim. Resp. 19–20. At this stage, we agree with and adopt Petitioner’s description.

B. Claim Construction

Neither party proposes an express construction for any claim terms. Pet. 17; Prelim. Resp. 20. We determine that no claim terms require express construction for purposes of this Decision. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

C. Description of Primary Prior Art References

1. Studer '708 (Ex. 1004)

Petitioner relies primarily on Studer '708. *See* Pet. 16–76.

Studer '708 discloses “mechanisms and methods for venting the fluid interconnect port of fluid container that is at least partially filled with a capillary material.” Ex. 1003, Code (57). Figure 5 of Studer '708 is reproduced below.

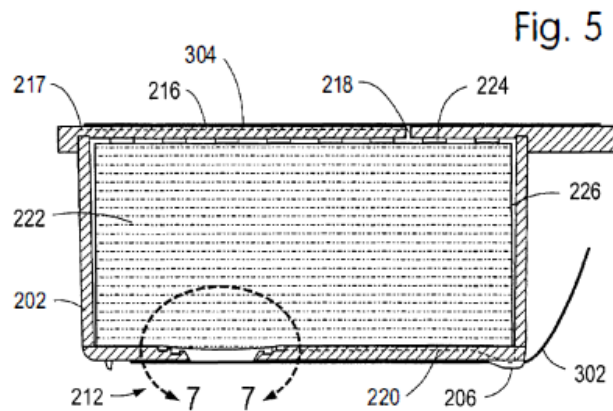


Figure 5 is a cross-sectional view of a replacement ink supply showing “fluid interconnect port venting features.” *Id.* at 2:31–33, 2:23–24. Studer '708 discloses that

[the] vent system [is] formed in the container lid (217, 216, 218), as is known in the art; provisions for allowing air passage around the end of the capillary material; redundant vent paths (206, 220) formed in the floor of the container to provide air from the end of the container to the fluid interconnect port region; and features adjacent to the fluid interconnect port 212 to facilitate and regulate the absorption of ink into the capillary material.

Id. at 4:20–28.

2. Studer '471 (Ex. 1004)

Petitioner relies on Studer '471 for teaching “vent notches or the like that allow the formed air bubble to escape from the cavities” so that

“pressure within the ink chamber may be equalized as the air exits through one or more openings through the lid portion.” *See* Pet. 13 (citing Ex. 1004 ¶ 22), 47–60. Petitioner also relies on Studer ’471 for teaching channels that “are located vertically so that the ink and air may flow upward toward the lid portion . . . wherein air is then able to escape from chamber.” *See* Pet. 13 (citing Ex. 1004 ¶ 29), 47–60.

D. Unpatentability Analysis

1. Ground 1: Anticipation Based on Studer ’708

Petitioner argues that Studer ’708 anticipates claims 1, 3, 5, 10, 12, and 14. Pet. 18–37. Based on Petitioner’s analysis and for the reasons explained below, we find Petitioner has, at this stage, demonstrated a reasonable likelihood of prevailing on this challenge. Patent Owner raises several arguments contesting Petitioner’s challenge. We discuss those arguments below.

a. Studer ’708’s Internal Vent Conduit

Claim 1 requires “an internal vent conduit disposed between the exit end and the cover for removing air adjacent to the fluid exit port and releasing the air through the cover to said atmosphere.” Ex. 1001, 5:59–62. The other independent claim, claim 10, has a similar limitation reciting “trapped air . . . is urged to said atmosphere through the internal vent conduit.” *Id.* at 6:36–37. Petitioner asserts Studer ’708 teaches the claimed internal vent conduit because “vent system (yellow) allows for air to travel within the body portion 202 (purple) around the capillary material 222 between the cover end (green) of lid portion 204 and the exit end (red) of ink container 12.” Pet. 24 (emphasis omitted). Studer ’708’s Figures 3 and 5 are reproduced below, with Petitioner’s annotations in color.

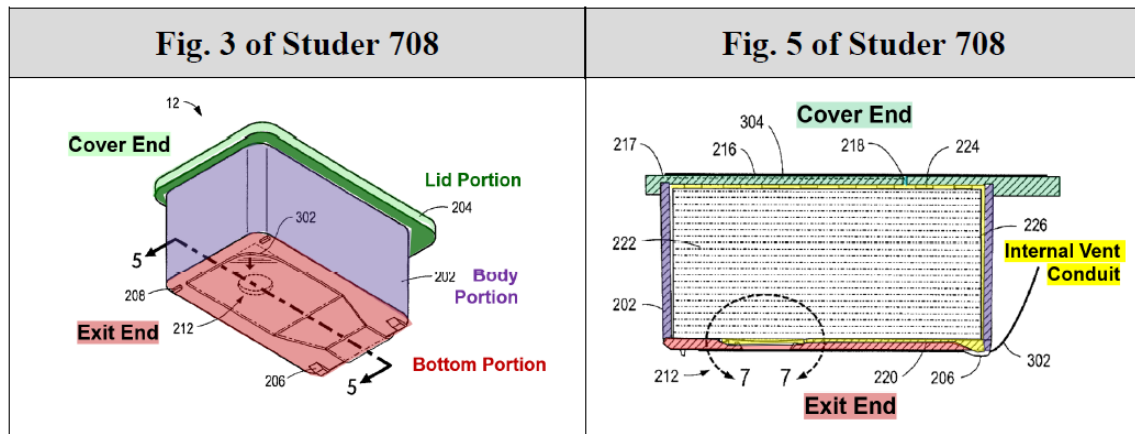


Figure 3 is “an exemplary replacement ink supply.” Ex. 1003, 2:23–24. Figure 5 is a cross-sectional view illustrating “the fluid interconnect port venting features” in Figure 3’s ink supply. *Id.* at 2:14–33. According to Petitioner,

[w]hile Studer 708 primarily discusses . . . internally venting to ambient air from a vent in the cover along a pathway to an internal location adjacent to the fluid interconnect port—a PHOSITA would understand that air travels in both directions along the venting pathway as dictated by air pressure and thus would also vent air from the interconnect port to the vent cover in the upper portion of the container and out to ambient air.

Id. at 23.

Patent Owner argues that Petitioner’s anticipation challenge fails because Studer ’708’s venting mechanism is “designed to introduce air into the air path ring 230 of Studer’s ink retention system near the exit port of an ink container rather than remove air trapped adjacent the expert port as described and claimed in the ’523 patent.” Prelim. Resp. 24–25. According to Patent Owner, “Studer ’708 consistently discloses movement of air into the top of the container and then toward the exit port,” rather than in the opposite direction, as the challenged claims require. *Id.* at 25. In addition, Patent Owner asserts, Petitioner does not “indicate what conditions would

purportedly lead to passage of air through the identified vent structures all the way from the fluid connect port to the top cover and out the serpentine pathway to ambient air.” *Id.* at 29–30.

We disagree with Patent Owner’s arguments. Studer ’708’s focus on venting air towards, rather than away from, its fluid interconnect port does not undermine Petitioner’s assertion that the system would vent in the opposite direction, as well. Petitioner’s expert, Dr. Pond, presents testimony explaining when and how that would be so: “Studer 708’s air vents, air channels, and air spaces are open to the ambient atmosphere for the movement of air both to and from all such spaces.” Ex. 1011 ¶ 109. Further, “a PHOSITA would understand that the direction of this air flow is governed by air pressure inside and outside of the container and necessarily flows both internally and externally.” *Id.* ¶ 110. With this yet-unrebutted explanation, Petitioner has, at this stage, shown sufficiently that Studer ’708 discloses the claimed internal vent conduit for removing and releasing air, as the challenged claims require.

b. Petitioner’s Analysis of Claim 10

Patent Owner criticizes Petitioner’s analysis of independent claim 10 because “Petitioners simply state that each limitation of independent claim 10 other than the preamble is ‘analogous’ to a limitation of claim 1, and on that basis alone conclude that the method of claim 10 is anticipated for the same reasons that it articulated with respect to claim 1.” Prelim. Resp. 37. For this reason, according to Patent Owner, the Petition fails to adequately specify its challenges as required under our governing statute and rules. *See* Prelim Resp. 37 (citing 35 U.S.C. § 312(a)(3) (requiring petitions to identify their grounds “with particularity”); 37 C.F.R. § 42.22(a)(2) (requiring

petitions to include “a detailed explanation of the significance of the evidence”)).

We disagree with Patent Owner’s argument. Based on our review of claim 10, we agree with Petitioner that claim 10’s non-preamble limitations parallel those in claim 1. Patent Owner does not identify any non-preamble limitations that are materially different between claim 1’s apparatus and claim 10’s method. In these circumstances, we find the Petitioner’s challenge to claim 10 is sufficiently clear under our statute and rules.

c. Ground 1 Summary

Other than the arguments addressed above, Patent Owner does not additionally challenge Petitioner’s anticipation analysis in its Preliminary Response. We have reviewed Petitioner’s arguments and the underlying evidence cited in support (*see* Pet. 18–37) and are persuaded that, at this stage, Petitioner demonstrates a reasonable likelihood of prevailing in showing that Studer ’708 anticipates claims 1, 3, 5, 10, 12, and 14.

2. Ground 2: Obviousness Based on Studer ’708

For Ground 2, Petitioner argues that claims 1, 3, 5–7, 10, 12, and 14–16 would have been obvious over Studer ’708. Pet. 37–47. Petitioner adds this ground to address additional limitations in dependent claims 6, 7, 15, and 16 and “[t]o the extent that the Board does not find that Ground 1 relies upon the same (preferred) embodiment of Studer 708 but rather different embodiments of ink container 12.” *Id.* at 37.

Patent Owner does not dispute that Studer ’708 teaches the additional limitations in claims 6, 7, 15, and 16. *See* Prelim. Resp. 39–41. Rather, Patent Owner asserts that Petitioner’s Ground-2 challenge fails because “[t]he Petition does not clearly explain what separate embodiments are

allegedly being combined in this Ground 2 theory, and in what manner, and provides only conclusory assertions regarding any purported motivation to combine.” *Id.* at 40. We disagree.

In its Ground-1 analysis, Petitioner relies on all 7 of Studer ’708’s figures in explaining how the reference discloses the challenged claims’ limitations. *See* Pet. 18–37. In its Ground-2 analysis, Petitioner explains that one skilled in the art would have been motivated to “combine [the] various embodiments to arrive at the ink container 12 relied upon in Ground 1.” *Id.* at 37. This explanation is sufficiently clear that the alleged combination is the combination of features outlined in Ground 1, as disclosed in Studer ’708’s figures. We also disagree with Patent Owner that Petitioner’s rationale is insufficient. Petitioner explains that one skilled in the art would have been motivated to combine the asserted features because they “are disclosed in adjacent figures, and Studer 708 itself indicates the interchangeable nature of the various embodiments.” *Id.* at 37 (citing Ex. 1011 ¶ 153; Ex. 1003, 7:62–67). In addition, Petitioner explains, Studer 708’s “embodiments not only share the same basic components . . . they also use those components to perform the same basic functions,” and the components are thus “standardized and interchangeable.” *Id.* at 38. Last, Petitioner explains, one skilled in the art would have been motivated to use different capillary materials because Studer ’708 expressly suggests doing so. *Id.* at 38–39. Given this analysis, at this stage, Petitioner has articulated sufficient reasoning with rational underpinning to support the legal conclusion that its proffered combination of teachings would have been obvious to one skilled in the art. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

Other than the arguments addressed above, Patent Owner does not additionally challenge Petitioner's obviousness analysis in its Preliminary Response. We have reviewed Petitioner's arguments and the underlying evidence cited in support (*see* Pet. 37–47) and are persuaded that, at this stage, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claims 1, 3, 5–7, 10, 12, and 14–16 would have been obvious over Studer '708.

3. Ground 3: Obviousness Based on Studer '708 and Studer '471

For Ground 3, Petitioner argues that claims 1–3, 5–7, 10–12, and 14–16 would have been obvious over Studer '708 and Studer '471. Pet. 47–60. Petitioner relies on Studer '471 for its disclosure of “vent channels located vertically along the interior side wall and having ‘a depth of approximately 0.5 mm [and] a width of approximately 3.0 mm.’” *Id.* at 48 (emphasis omitted). According to Petitioner, a skilled artisan would have been motivated to add Studer '471's side vent channels “to allow for sufficient air flow around the capillary material.” *Id.* at 60.

Patent Owner raises two arguments in contesting Petitioner's showing. First, Patent Owner argues Studer '708 and Studer '471 are not analogous art because “Studer '471 addresses the problem of air pockets being trapped within the capillary material, while Studer '708 is directed to the entirely different issue of channeling air toward a fluid interconnect port to prevent leakage.” Prelim. Resp. 42. We disagree with Patent Owner's argument because Studer '708 and Studer '471 are both within the same field of endeavor and address the same problem as the '523 patent. Specifically, as Petitioner explains, “[j]ust like the '523 patent, Studer 708 and Studer 471 are generally directed to capillary-filled ink containers that

are removably connected to a printhead, and more specifically, to managing the air pressure and air pockets within capillary-filled ink containers.”

Pet. 57; *see In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004).

Second, Patent Owner argues Petitioner “makes no showing that it would have been obvious to connect Studer ’471’s [side] ink channels to the vents at the bottom of Studer ’708,” because “Studer ’471 actually teaches away from extending the channels all the way to the floor of the container.” Prelim. Resp. 43; *see id.* at 43–44 (citing Ex. 1004 ¶ 27). Although we agree with Patent Owner that Studer ’471’s vertical channels do not extend to the container’s floor, it is unclear whether Petitioner’s proposed combination requires them to do so. *See* Pet. 50–51. In addition, neither party has addressed whether the challenged claims require such a configuration. We invite the parties to explore this issue further at trial.

Other than the arguments addressed above, Patent Owner does not additionally challenge Petitioner’s obviousness analysis in its Preliminary Response. We have reviewed Petitioner’s arguments and the underlying evidence cited in support (*see* Pet. 47–60) and are persuaded that, at this stage, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claims 1–3, 5–7, 10–12, and 14–16 would have been obvious over Studer ’708 and Studer ’471.

4. *Ground 4: Obviousness Based on Studer ’708, Studer ’471, and Elliot*

For Ground 4, Petitioner argues that claims 6, 7, 15, and 16 would have been obvious over Studer ’708, Studer ’471, and Elliot. Pet. 61–67. Petitioner relies on Elliot “to determine an appropriate range of sizes for the vent channels and used the cross-sectional dimensions disclosed by Elliot—i.e., **‘1 mm wide and 0.7 mm deep’**—to ensure that ‘[t]he balance of forces

acting upon the ink thus remain in equilibrium even during environmental changes and the backpressure of the foam continues to prevent drool from the printhead orifi.” *Id.* at 61 (quoting Ex. 1006, 5:61–63).

Patent Owner argues Petitioner’s obviousness ground fails because Elliot “addresses a problem that is totally unrelated to the problem addressed by Studer ’708,” namely “air bubbles trapped in pores of a foam member expanding and displacing ink.” Prelim. Resp. 45–46. To the extent that Patent Owner is asserting Elliot is not analogous art, we disagree. Elliot, Studer ’708, and Studer ’471 are all within the same field of endeavor and address the same problem as the ’523 patent. *See Bigio*, 381 F.3d at 1325. Specifically, as Petitioner explains, “[j]ust like the ’523 patent, Elliot, Studer 708, and Studer 471 are generally directed to capillary-filled ink containers that are connected to a printhead,” and all three address “venting mechanisms to regulate pressure within the ink container.” Pet. 65–66.

Other than the arguments addressed above, Patent Owner does not additionally challenge Petitioner’s obviousness analysis in its Preliminary Response. We have reviewed Petitioner’s arguments and the underlying evidence cited in support (*see* Pet. 61–67) and are persuaded that, at this stage, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claims 6, 7, 15, and 16 would have been obvious over Studer ’708, Studer ’471, and Elliot.

5. Ground 5: Obviousness Based on Studer ’708 and Studer ’878

For Ground 5, Petitioner argues that claims 6, 7, 15, and 16 would have been obvious over Studer ’708 and Studer ’878. Pet. 67–76. Petitioner relies on Studer ’878’s thread fibers “to determine an appropriate location

and dimension for the additional vent channels needed to compensate for the added capillary force of melamine, as taught by Studer 708.” *Id.* at 67–68.

Patent Owner argues Petitioner’s obviousness challenge fails because Studer ’878’s thread is not a conduit as the claims require. Specifically, according to Patent Owner, Studer ’878’s “thread . . . does not form a passage in the same manner as a channel or tube, and therefore is not a ‘conduit’ within the meaning of that term.” Prelim. Resp. 48. Based on the current record, we disagree with Patent Owner’s argument. As Petitioner notes, Studer ’878’s thread is a vent conduit because it “provides a **path for entrapped air or gas to travel more easily**” through, and ultimately out of, the fluid supply tank. Pet. 69 (quoting Ex. 1005 ¶ 29). At this stage, Patent Owner has not proposed a claim construction for conduit that requires a hollow tube or otherwise precludes Studer ’878’s thread. Although the parties may wish to explore this issue further at trial, at this stage, Petitioner has shown sufficiently that Studer ’878’s thread fiber teaches the claimed conduit.

Other than the arguments addressed above, Patent Owner does not additionally challenge Petitioner’s obviousness analysis in its Preliminary Response. We have reviewed Petitioner’s arguments and the underlying evidence cited in support (*see* Pet. 67–76) and are persuaded that, at this stage, Petitioner demonstrates a reasonable likelihood of prevailing in showing that claims 6, 7, 15, and 16 would have been obvious over Studer ’708 and Studer ’878.

III. CONCLUSION

Petitioner demonstrates a reasonable likelihood of prevailing in showing the unpatentability of at least one of the challenged claims of the

'523 patent. At this stage of the proceeding, we have not made a final determination with respect to the patentability of any of the challenged claims.

IV. ORDER

It is hereby

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–3, 5–7, 10–12, and 14–16 of the '523 patent is instituted with respect to all grounds of unpatentability set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '523 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

IPR2022-01416
Patent 7,938,523 B2

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