

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DAIFUKU CO., LTD. AND DAIFUKU AMERICA CORP.,
Petitioner,

v.

MURATA MACHINERY, LTD.,
Patent Owner.

Case IPR2015-00084 (Patent 7,771,153 B2)
Case IPR2015-00087 (Patent 7,165,927 B2)¹

Before KEN B. BARRETT, BARRY L. GROSSMAN, and
BRIAN P. MURPHY, *Administrative Patent Judges*.

MURPHY, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
37 C.F.R. § 42.108

¹ This Decision addresses the same legal and factual issues raised in IPR2015-00084 and IPR2015-00087. The patents at issue in both cases are related, and the claim limitations at issue are very similar. The arguments made by Petitioner and Patent Owner are largely the same in both cases. Therefore, we issue one Decision to be entered in each case.

I. INTRODUCTION

Daifuku Co., Ltd. and Daifuku America Corp. (together, “Petitioner”) filed a corrected Petition requesting *inter partes* review of claims 6–14 of U.S. Patent No. 7,771,153 B2 (“the ’153 patent”).² Paper 6 (“Pet.”). Murata Machinery, Ltd. (“Patent Owner”) filed a Preliminary Response to the Petition. Paper 8 (“Prelim. Resp.”). We have statutory authority under 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

Petitioner challenges claims 6–14 of the ’153 patent as unpatentable under 35 U.S.C. § 103 on multiple grounds. Pet. 3–4. Based on the information presented in the Petition and Preliminary Response, we are not persuaded there is a reasonable likelihood Petitioner would prevail with respect to at least one of the claims challenged in the Petition. Therefore, we decline to institute *inter partes* review.

A. Related Proceedings

The parties identify the following as related proceedings regarding the ’153 patent:

U.S. district court action titled *Murata Machinery USA, Inc. v. Daifuku Co., Ltd.*, No. 2:13-cv-00866 (D. Utah 2013), in which the ’153 patent and two related patents are at issue. The related patents are U.S. Patent No. 7,165,927 (“the ’927 patent”) and U.S. Patent No. 8,197,172 (“the ’172 patent”);

² For clarity and expediency, we treat IPR2015-00084 as representative of IPR2015-00084 and IPR2015-00087. All citations are to IPR2015-00084.

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IPR2015-00083 (the '172 patent); IPR2015-00085 (the '153 patent claims 6–11 and 14); IPR2015-00087 (the '927 patent); IPR2015-00088 (the '927 patent); and

Pending related U.S. Patent Application Nos. 10/682,809 (filed October 9, 2003), 13/492,341 (filed June 8, 2012), and 14/080,590 (filed November 14, 2013). Pet. 2–3; Paper 3, 1.

B. The '153 Patent

The '153 patent, titled “Automated Material Handling System for Semiconductor Manufacturing Based on a Combination of Vertical Carousels and Overhead Hoists,” issued August 10, 2010 from an application filed January 12, 2007, which claims priority to provisional applications filed on October 11, 2002 and June 19, 2002. Ex. 1002. The Automated Material Handling System (“AMHS”) described in the '153 patent includes an overhead hoist to load and unload work-in-process (“WIP”) parts, such as semiconductor wafers stored in cassette pods, for transport between various workstations during a semiconductor manufacturing process. *Id.* at 1:57–66. The '153 patent states that “[b]y configuring the AMHS to allow the overhead hoist to directly load and unload WIP parts to/from the carousel storage bins from a position above the respective storage bin, more efficient AMHS operation can be achieved.” *Id.* at 3:19–22.

Figures 5a and 5b of the '153 patent are reproduced below.

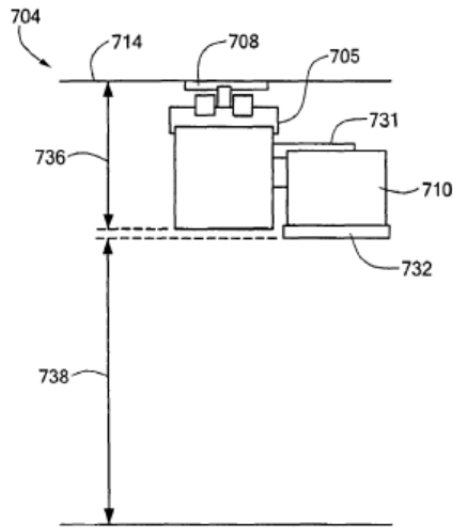


FIG. 5a

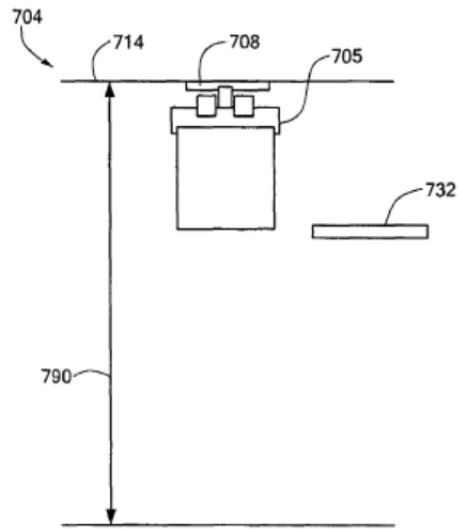


FIG. 5b

Figures 5a and 5b, above, depict a translating hoist vehicle subsystem. *Id.* at 7:13. In Figures 5a and 5b, overhead transport vehicle 705 includes “a hoist gripper 731 mounted to a translating stage and configured to extend from the vehicle 705, pick up the FOUP [front opening unified pod] 710, and retract back to the vehicle 705,” which moves FOUP 710 within the overhead transport vehicle (see FIG. 5b). *Id.* at 7:27–32. In a preferred embodiment, the translating stage is configured to allow hoist gripper 731 to extend and grip a pod on either side of overhead transport vehicle 705. *Id.* at 7:32–35. Overhead transport vehicle 705 transports the pod to a workstation, for example, on a semiconductor manufacturing floor. *Id.* at 7:35–38.

Claim 6 of the '153 patent is illustrative and reproduced below.

6. An automated material handling system, comprising:
an overhead transport subsystem including an overhead transport vehicle, a suspended track, an overhead hoist, a translating stage and a gripper, the suspended track forming at

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least one predetermined route and the overhead transport vehicle being configured to carry the overhead hoist, translating stage and gripper along the at least one predetermined route;

at least one storage bin located adjacent the suspended track, the at least one storage bin being configured to hold at least one unit of material; and

the translating stage being configured to laterally translate the gripper from a first position proximate to the overhead transport vehicle to a second position proximate to the at least one storage bin and the gripper being configured to directly access the at least one material unit from the at least one storage bin;

wherein the overhead transport vehicle transports the at least one material unit between various manufacturing equipment locations within a production manufacturing facility along the at least one predetermined route.

Id. at 9:23–43 (emphases added).

C. Asserted Grounds of Unpatentability

Petitioner asserts that claims 6, 7, 9–11, and 14 of the '153 patent are unpatentable as obvious over JPAP 216³ and JPAP 237.⁴ Pet. 3. Petitioner asserts that claim 8 is unpatentable as obvious over JPAP 216, JPAP 237, and Slutsky.⁵ *Id.* at 3–4. Petitioner further asserts that claims 12 and 13 are

³ Japanese Patent Application Publication No. 2001-31216, published February 6, 2001. Ex. 1007 (“JPAP 216”).

⁴ Japanese Patent Application Publication No. 2000-53237, published February 22, 2000. Ex. 1012 (“JPAP 237”).

⁵ U.S. Patent No. 3,770,137 issued Nov. 6, 1973 to Slutsky et al. Ex. 1010 (“Slutsky”).

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unpatentable as obvious over JPAP 216, JPAP 237, and JPAP 050.⁶ *Id.* at 4. Petitioner relies on the Declaration of Dr. Robert H. Sturges (Ex. 1028) in support of its arguments. We address Petitioner’s arguments below.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable interpretation in light of the patent specification. 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 778 F.3d 1271, 1279–81 (Fed. Cir. 2015). Claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). “The specification ‘is the single best guide to the meaning of a disputed term.’” *Id.* (quoting *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005)). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

1. *Claim 6: “the translating stage being configured to laterally translate the gripper from a first position proximate to the overhead transport vehicle to a second position proximate to the at least one storage bin”*

Petitioner argues for the broadest reasonable interpretation of the ’153 patent claim language, but does not otherwise propose any particular construction for any claim limitations. Pet. 16–17. Patent Owner construes

⁶ Japanese Patent Application Publication No. 1987-297050. Ex. 1008 (“JPAP 050”).

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“translating” as “moving without rotation or angular displacement,” in reliance on a dictionary definition provided as Exhibit 1014. Prelim. Resp. 9–10. Patent Owner’s proposed definition, however, does not construe “translating” in the context of the claim language of independent claims 6 and 10 in light of the written description of the ’153 patent.

The claimed “translating stage” is recited as part of an “overhead transport subsystem including an overhead transport vehicle, a suspended track, an overhead hoist, a translating stage and a gripper.” Ex. 1002, 9:24–26. The overhead transport vehicle travels along a “predetermined route” defined by the suspended track that passes adjacent to “at least one storage bin.” *Id.* at 9:26–33. The translating stage is defined functionally in terms of how it controls the movement of the gripper when adjacent to the storage bin. The translating stage must be “configured to laterally translate the gripper” such that the gripper moves from a position “proximate to the overhead transport vehicle” to a position “proximate to” the storage bin in order to “directly access” “at least one material unit” (e.g., a semiconductor cassette pod) from the storage bin. *Id.* at 9:34–39. The overhead transport vehicle transports the material unit accessed by the gripper along the predetermined route to “various manufacturing equipment locations within a production manufacturing facility.” *Id.* at 9:40–43.

The claim language requires the translating stage to be configured to move the gripper laterally (horizontally) after the overhead transport vehicle has positioned the translating stage and gripper “adjacent to” the storage bin. The gripper moves laterally such that it can “directly access” the material unit in the adjacent storage bin. The claimed system, taken as a whole, is not defined in such a way as to prevent the gripper from having rotational or

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angular movement, as argued by Patent Owner, as long as the gripper moves laterally to grip the stored material unit.

The '153 patent describes “lateral translation” of the gripper in Figures 5a and 5b, such that the gripper is “configured to extend from . . . and retract back to the [overhead transport] vehicle” in order to move the semiconductor cassette pod out of the adjacent storage bin and into the overhead transport vehicle for transport to the desired location on the semiconductor manufacturing floor. *Id.* at 7:27–38. Figure 6 illustrates a translating stage and gripper capable of both “horizontal and vertical motion,” but the description and illustration of “lateral” translation of the gripper—“retracted [horizontally] via the translating stage 833” —is very similar to that of Figures 5a and 5b. *Id.* at 7:57–8:5. We note further that the '153 patent does not describe any particular structure for the translating stage, apart from rectangular arm 833 shown in Figure 6 as extending laterally from overhead transport vehicle 805. *Id.*

We perceive nothing in the description of the claimed invention that would limit lateral movement of the gripper to movement “without rotation or angular displacement,” and Patent Owner has pointed us to none. The '153 patent describes and illustrates “lateral translation” of the gripper as a sideways or horizontal extension and retraction movement that permits direct access of the stored material unit. Nothing further is required by the claim language in view of the description in the '153 patent.

For the reasons given above, we construe the claim phrase “the translating stage being configured to laterally translate the gripper from a first position proximate to the overhead transport vehicle to a second position proximate to the at least one storage bin” as “a mechanism

configured to extend and retract the gripper in a sideways or horizontal motion from a first position proximate to the overhead transport vehicle to a second position proximate to the at least one storage bin.”

2. *Claim 10: “the translating stage is configured to move the gripper portion laterally from a first position proximate to the overhead hoist transport vehicle past the outer peripheral border of the one of the plurality of storage bins to a second position proximate to the one of the plurality of storage bins”*

Claim 10 recites that the “translating stage is configured to move the gripper portion laterally,” using language similar to that used in claim 6. Although claim 10 requires the gripper to move past the outer peripheral border of the storage bin, from our review of the ’153 patent we do not discern any functional difference between the “translating stage” limitations of claims 6 and 10. Therefore, for the reasons given in section II.A.1., above, we construe the claim phrase:

the translating stage is configured to move the gripper portion laterally from a first position proximate to the overhead hoist transport vehicle past the outer peripheral border of the one of the plurality of storage bins to a second position proximate to the one of the plurality of storage bins

as

a mechanism configured to extend and retract the gripper in a sideways or horizontal motion from a first position proximate to the overhead hoist transport vehicle past the outer peripheral border of the one of the plurality of storage bins to a second position proximate to the one of the plurality of storage bins.

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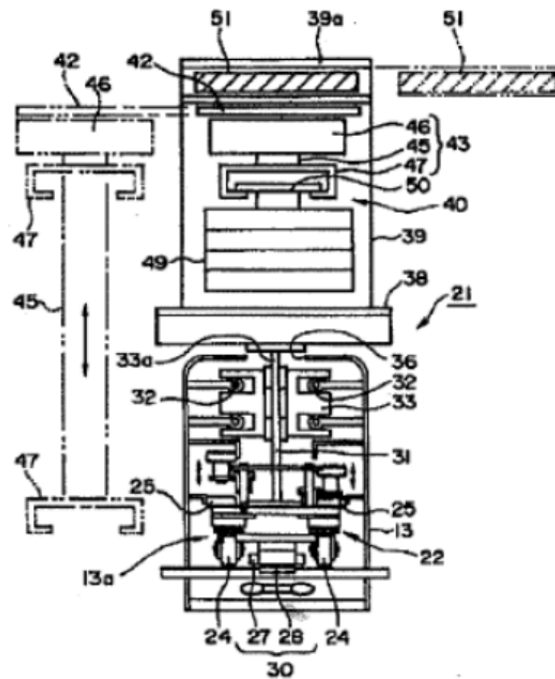
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In JPAP 216 Figure 1, above, storage shelves 20 are attached to main chain 14, which is looped around sprockets 10, 12 to raise and lower the storage shelves inside the stocker in the vertical direction. *Id.* at 19 (citing Ex. 1007 ¶¶ 8, 12; Ex. 1028 ¶ 50); *see also* Ex. 1007 ¶ 10 (“main chain 14 is circulated endlessly in the vertical plan”). Ceiling vehicle 36 contains transfer apparatus 38 that carries article 40 “in and out directly at the required shelf” 20 through transfer port 28 (opening in wall of stocker 2). Pet. 19 (citing Ex. 1007 ¶ 7); Ex. 1028 ¶ 51. JPAP 216 does not disclose the mechanism of transfer apparatus 38, and Petitioner does not discuss any specific differences between the ’153 patent claims and JPAP 216. *Id.* at 20 (“there is little difference between the ’216 publication and the claimed subject matter.”).

Petitioner’s claim chart for claim 6, however, does not identify “an overhead hoist,” “translating stage,” or a “gripper” in JPAP 216; those limitations are identified as disclosed in JPAP 237. *Id.* at 26. We infer, therefore, that the “overhead hoist,” “translating stage,” and “gripper” limitations of the ’153 patent are not disclosed in JPAP 216. Petitioner further asserts the functional recitations of the translating stage and gripper are disclosed in the “combined system” of JPAP 216 and JPAP 237. *Id.* at 28.

2. JPAP 237

JPAP 237 Fig. 1, below, discloses conveyance truck 21 for handling semiconductor cassette pods 49. Pet. 20 (citing Ex. 1012 ¶ 2).



JPAP 237 Fig. 1 semiconductor cassette conveyance truck

In JPAP 237 Figure 1, above, semiconductor cassette conveyance truck 21 loads and unloads cassette pods 49 to and from storage stockers 15 and manufacturing process stations 16 (shown in Figure 3). Pet. 20 (citing Ex. 1012 ¶¶ 2, 12, Fig. 3). The conveyance truck, which moves along a predetermined path on top of track 13, has extendable arm 42 that “advances and retreats freely in the horizontal direction” (double-dot lines) to move attached hoist 43 (winch 46, wire 45, and chuck 47) laterally to enable hoisting of the semiconductor cassette pods for loading and unloading the storage stockers. Pet. 21–22 (citing Ex. 1012 ¶ 22, Figs. 1, 2; Ex. 1028 ¶¶ 55, 56); Ex. 1012, Abstract, ¶¶ 2, 18, 19.

3. Analysis

Petitioner argues a person of ordinary skill in the art would have recognized that transfer apparatus 38 in JPAP 216 “must have the capability to move horizontally (laterally) *and vertically* to effect transfer of articles 40

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to and from port 28 and station 56.” Pet. 22 ((emphasis added) citing Ex. 1028 ¶ 58). Petitioner argues it would have been obvious for a person of ordinary skill to modify the transfer apparatus of JPAP 216 to provide it “with the laterally translating stage 42 and hoist 43 for transferring a cassette pod 49 to and from the rail-mounted vehicle 21” as disclosed in JPAP 237, one of a “finite number of possibilities” “yielding no more than one would expect from such an arrangement.” *Id.* at 23–24 (citing Ex. 1028 ¶¶ 59–62).

Patent Owner responds that JPAP 216 does not disclose an overhead vehicle that can move articles vertically to a processing station as stated by Petitioner. Prelim. Resp. 18–19. We agree with Patent Owner. In JPAP 216 Figure 1, vertical movement of the storage shelves is performed by the vertical carousel stocker. *Id.* at 19–20 (citing Ex. 1007, Fig. 3); Ex. 1007, ¶ 10, Fig. 1. Vertical movement of the ceiling vehicle is not necessary, or in any way indicated, to move the pods vertically from port 28 to work station 56 as argued by Petitioner. *Id.* at 19–20 (citing Ex. 1007, Fig. 3); Ex. 1007 ¶¶ 13, 15, 17–19. Petitioner’s reliance on paragraph 58 of Dr. Sturges’s Declaration (Pet. 22) is not persuasive, because it makes the conclusory statement that a person skilled in the art would have recognized that transfer device 38 “must have the capability to move . . . vertically to effect transfer of the article 40 to both port 28 and station 56,” without explaining why. Ex. 1028 ¶ 58. The quoted statement, moreover, appears to be at odds with the drawings and description of JPAP 216, as explained by Patent Owner. Prelim. Resp. 19–20. In the absence of any engineering and design analysis of the AMHS disclosed in JPAP 216 to support the quoted statement, we give it no weight.

Patent Owner also argues that Petitioner’s posited “design problem” – how to move semiconductor cassette pods “back and forth between a rail-mounted hoist vehicle and a stocker and a processing machine” utilizing horizontal and vertical motion of a hoist vehicle (Pet. 24–25) – is illusory, because JPAP 216 “does not use a rail-mounted *hoist* vehicle at all.” Prelim. Resp. 20–21. As further noted by Patent Owner, JPAP 216 discloses using automated ground vehicles and the stocker itself to move semiconductor cassette pods to the work stations, not the overhead ceiling vehicle. *Id.* at 21 (citing Ex. 1007 ¶¶ 12, 13, Fig. 3). We agree that Petitioner does not address the absence of an overhead hoist in JPAP 216 or explain why it would have been obvious to modify the ceiling vehicle in JPAP 216 to include the hoist mounted to a conveyance truck disclosed in JPAP 237. Petitioner also has not provided persuasive evidence of a particular design problem or inadequacy with the use of a vertical carousel stocker and ground transport vehicles to move semiconductor cassette pods to processing stations in a wafer fabrication facility, as described in JPAP 216. Therefore, we do not credit the “design problem” premise for Petitioner’s “finite possibilities” test as articulated in *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007) (hereafter, “*KSR*”).

The Supreme Court has made clear that we apply “an expansive and flexible approach” to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming the combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. To reach this conclusion, however, requires more than a mere showing that the prior art includes separate references covering each

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separate limitation in a claim under examination. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention. *Id.*

We further agree with Patent Owner that Petitioner has not provided persuasive evidence of a reason why a person skilled in the art of AMHS would have been motivated to combine JPAP 216 and JPAP 237 in the manner asserted by Petitioner, with a reasonable expectation of success. Prelim. Resp. 21–26. Petitioner generally describes how the two references could be combined to meet the claim limitations, but Petitioner does not explain why a person of ordinary skill in the art *would have* combined JPAP 216 and JPAP 237 “in the way the claimed invention does.” *Id.* at 22 (citing *ActiveVideo Networks, Inc. v. Verizon Communications, Inc.*, 694 F.3d 1312, 1328 (Fed. Cir. 2012)). In particular, we are not persuaded that Petitioner has explained why a person of skill in the art would want to add an overhead hoist to the AMHS of JPAP 216. The AMHS of JPAP 216 utilizes the vertical motion of the storage carousel to move the pods, and there is no indication in JPAP 216, JPAP 237, or Petitioner’s analysis of why an overhead hoist would be necessary or beneficial to the functioning of an AMHS of the type disclosed in JPAP 216. *Id.* at 27–28. Although Petitioner consistently paraphrases the tests for obviousness set forth by the Supreme Court in *KSR*, we agree with Patent Owner that such paraphrasing cannot substitute for factual analysis and application of the particular facts

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and evidence of this case according to the analytical framework set out in *KSR*. *Id.* at 22.

For example, Petitioner argues that modifying the system disclosed in JPAP 216 to use the extendable arm and hoist disclosed in JPAP 237 “would have been merely an arrangement of old elements with each performing the same function it had been known to perform, yielding no more than one would expect from such an arrangement, and this conclusion is supported by logic, judgment, and common sense.” Pet. 23 (citing Ex. 1028 ¶ 61).

Although the quoted statement is consistent with *KSR*, neither Petitioner nor Dr. Sturges provides the important analysis of explaining *why*, based on the particular facts and evidence of the present case, one of ordinary skill would have made the suggested modification or *why* the logic, judgment, and common sense of such a person would have led to the asserted combination with a reasonable expectation of success. A review of the cited testimony from paragraphs 60 and 61 of Dr. Sturges’s Declaration reveals similarly conclusory testimony, unsupported by a specific engineering and technical analysis of how the asserted combination would have worked and why it would have been an obvious combination to one of skill in the art. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”) (*Quoted with approval in KSR*, 550 U.S. at 418).

Perhaps the most relevant evidence relied upon by Petitioner is found in one sentence from paragraph 62 of Dr. Sturges’s Declaration. “[T]he motivation to modify is self-evident from the problem that needed to be

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resolved – moving article 40 from port 28 to station 56.” Pet. 24 (citing Ex. 1028 ¶ 62). Dr. Sturges, however, does not explain why such a problem existed – JPAP 216 does not indicate such a problem – or precisely how and why it would have been resolved by a person of skill in the art in the manner claimed in the ’153 patent. The quoted sentence, by itself, is far from sufficient to satisfy Petitioner’s burden of persuasion on the question of obviousness. We find that “[t]he expert failed to explain how specific references could be combined, which combination(s) of elements in specific references would yield a predictable result, or how any specific combination would operate or read on the asserted claims.” *ActiveVideo Networks*, 694 F.3d at 1327.

For the reasons given above, we are not persuaded by a preponderance of the evidence that Petitioner has shown a reasonable likelihood of prevailing in its challenge that claims 6, 7, 9–11, and 14 of the ’153 patent would have been obvious to a person of ordinary skill in the art at the time of the invention over JPAP 216 and JPAP 237.

C. Other grounds

Petitioner’s remaining grounds challenge claims 8, 12, and 13 of the ’153 patent based on the combination of JPAP 216, JPAP 237, and either Slutsky or JPAP 050. Pet. 3–4. For the reasons given in section II.B.3., above, we have determined that Petitioner has not satisfied its burden of establishing that independent claims 6 and 10 would have been unpatentable for obviousness over JPAP 216 and JPAP 237. Claim 8 depends from claim 6 and claims 12 and 13 depend from claim 10. Slutsky and JPAP 050 do not cure the deficiencies of the combination of JPAP 216 and JPAP 237, articulated above, with respect to claims 6 and 10. Therefore, we determine

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Petitioner has not provided persuasive evidence that claims 8, 12, and 13 would have been unpatentable for obviousness to a person of ordinary skill in the art at the time of the invention over JPAP 216, JPAP 237, and either Slutsky or JPAP 050.

III. CONCLUSION

Petitioner has failed to demonstrate a reasonable likelihood of prevailing with respect to at least one of the claims challenged in this Petition, based on the grounds asserted and information presented therein.

IV. ORDER

For the reasons given, it is

ORDERED that the Petition is denied.

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