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Paper 66
Entered: May 3, 2016

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 IPR2015-00085
Patent 7,771,153 B2

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

MURPHY, *Administrative Patent Judge*.

DECISION
Final Written Decision
35 U.S.C. § 318; 37 C.F.R. § 42.73

I. INTRODUCTION

Daifuku Co., Ltd. and Daifuku America Corp. (together, "Petitioner") filed a corrected Petition requesting *inter partes* review of claims 6–11 and 14 of U.S. Patent No. 7,771,153 B2 ("the '153 patent"). Paper 6 ("Pet."). Murata Machinery, Ltd. ("Patent Owner") filed a Preliminary Response to the Petition. Paper 8 ("Prelim. Resp."). On May 4, 2015, we instituted an *inter partes* review of claims 6–11 and 14 on the ground of obviousness over JPAP 213[1] and JPAP 237[2] pursuant to 35 U.S.C. § 103. Paper 9.

Patent Owner filed a Patent Owner Response (Paper 25, "PO Resp."), and Petitioner filed a Reply (Paper 39, "Reply"). Petitioner relies on the Declaration testimony of Professor Robert Sturges in support of its Petition (Ex. 1028) and a Second Declaration of Professor Sturges (Ex. 1040) and Declaration of Shuzo Nishino (Ex. 1039) in support of its Reply. Patent Owner relies on the Declaration testimony of Dr. Wilmer Bottoms (Ex. 2013), Mr. Toyu Yazaki (Ex. 2019), Mr. David Ben Meir (Ex. 2023), and Mr. Masahiro Hatashita (Ex. 2038) in support of its Response.[3]

Patent Owner filed a Motion for Observations on Cross-Examination of Petitioner's Reply Witness (Paper 47, "Mot. Observ.") and a Motion to Exclude Evidence (Paper 50, "Mot. Excl."). Petitioner filed a Response to Patent Owner's Motion for Observations (Paper 57, "Resp. Observ.") and an Opposition to Patent Owner's Motion to Exclude (Paper 59, "Opp. Mot.

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[1] Japanese Patent Application Publication No. 1998-45213, published February 17, 1998. Ex. 1005 ("JPAP 213").
[2] Japanese Patent Application Publication No. 2000-53237, published February 22, 2000. Ex. 1012 ("JPAP 237").
[3] Both parties rely on confidential information covered by a Protective Order entered in this proceeding. Paper 20; Ex. 1033.

Excl."). Patent Owner filed a Reply in support of its Motion to Exclude (Paper 61, "Reply Mot. Excl.").

For the reasons that follow, we determine Petitioner has not shown by a preponderance of the evidence that claims 6–11 and 14 of the '153 patent are unpatentable.

A. Related Proceedings

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

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");

IPR2015-00083 (the '172 patent); IPR2015-00084 (the '153 patent claims 6–14); IPR2015-00087 (the '927 patent); and IPR2015-00088 (the '927 patent);[4] 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 4; Paper 44.

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

[4] The Board instituted *inter partes* review proceedings in IPR2015-00083 and IPR2015-00088. The Board denied institution in IPR2015-00084 and IPR2015-00087.

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 describes conventional AMHS stockers as having "a plurality of active input/output ports that work in conjunction with an internal robotic arm . . . for loading and unloading the FOUPs."[5] *Id.* at 1:66–2:4. The '153 patent identifies the "time required for the robotic arm to access the FOUPs at the WIP stocker's active input/output ports" as a drawback of conventional AMHS stockers. *Id.* at 2:7–10. The '153 patent describes a more efficient AMHS operation with an overhead hoist configured to "load and unload Work-in-Process (WIP) parts directly to/from one or more WIP storage units." *Id.* at 2:37–41.

[5] FOUP is the acronym for "Front Opening Unified Pod," a type of semiconductor cassette pod used to transport semiconductor wafers around a wafer processing facility. Ex. 1002, 1:62–64.

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

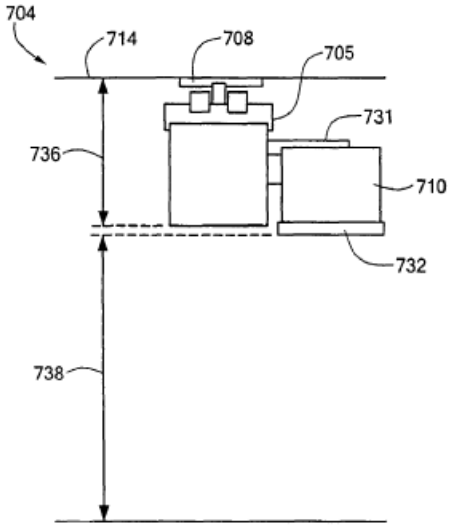


FIG. 5a

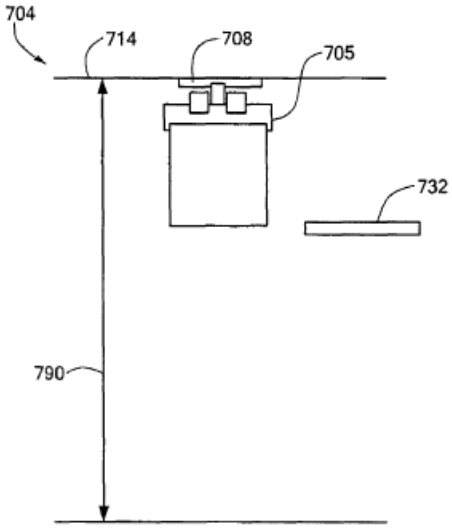
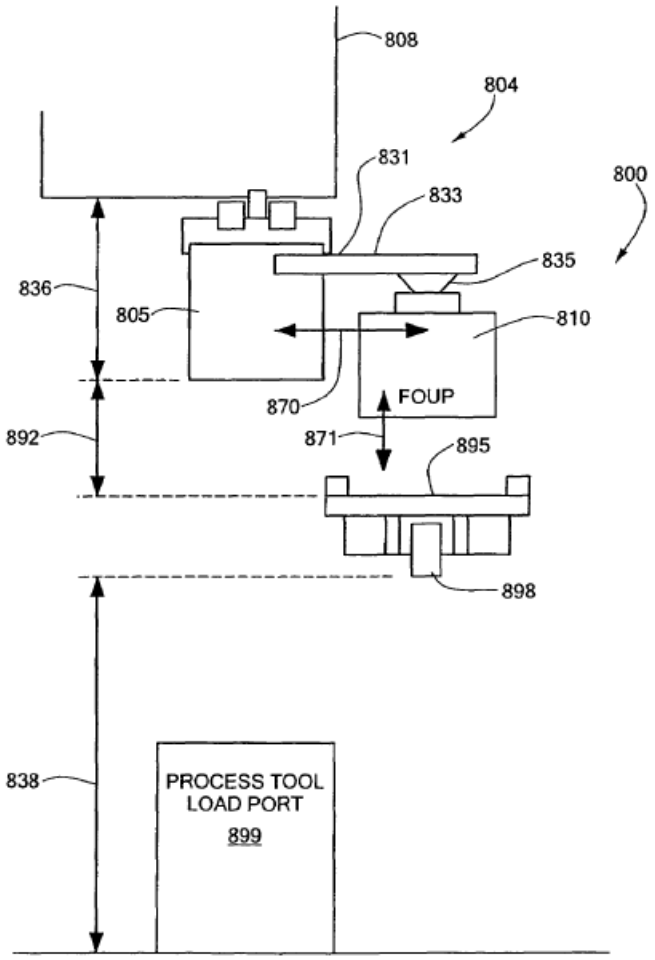


FIG. 5b

Figures 5a and 5b, above, depict an embodiment described as “translating hoist vehicle subsystem 704 [for] accessing fixed storage positions.” *Id.* at 7:13–14. Overhead hoist transport vehicle 705 includes “hoist gripper 731 mounted to a translating stage and configured to extend from the vehicle 705, pick up [] FOUP 710, and retract back to [] vehicle 705,” which moves FOUP 710 inside 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.

Figure 6 depicts a similar translating hoist vehicle subsystem capable of accessing FOUPs directly (“directly pick or place”) from an overhead rail-based conveyor. *Id.* at 7:39–43. Figure 6 is reproduced below.



In Figure 6, above, overhead transport vehicle 805 includes overhead hoist 831, translating stage 833, and hoist gripper 835. *Id.* at 7:57–59. Translating stage 833 is "configured to allow both horizontal and vertical motion, as indicated by [] directional arrows 870 and 871." *Id.* at 7:59–61. Translating stage 833 extends hoist gripper 835 laterally to a position directly above FOUP 810 on conveyor 895, lowers hoist gripper 835 to grip FOUP 810, raises hoist gripper 835 carrying FOUP 810, and then retracts such that FOUP 810 is moved within overhead transport vehicle 805. *Id.* at 7:61–8:2. The bi-directional movement capability of the overhead hoist, translating stage, and hoist gripper permits direct access to FOUP 810 on adjacent conveyor 895 and direct access to load port 899 below, from a

single location along the overhead rail. *Id.* at 8:2–5; Ex. 2013 ¶¶ 96, 97 (citing Ex. 2003, 1 [sic, Ex. 2002, 2[6]] (the system "allows the hoist to access tool load ports or other pick and place positions at the same stopping point as that used for the [storage] thus increasing the number of storage positions which could be installed in a given area")).

Claims 6 and 10 of the '153 patent are the independent claims under consideration. Claims 6 and 10 are both system claims, and claim 10 additionally recites a housing unit configured to house a plurality of storage bins. Claim 6 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 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.

[6] We presume the citation to Exhibit 2003 was a typographical error.

Id. at 9:23–43 (emphases added).

C. Asserted Ground of Unpatentability

Petitioner asserts that claims 6–11 and 14 of the '153 patent are unpatentable as obvious over JPAP 213 and JPAP 237. Pet. 4, 17–23, 39–52; Reply. Patent Owner opposes. Resp. 10–45.

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), *cert. granted sub nom. Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 890 (mem.) (2016). 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). 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).

We determine that none of the claim terms require express construction for purposes of this Decision.

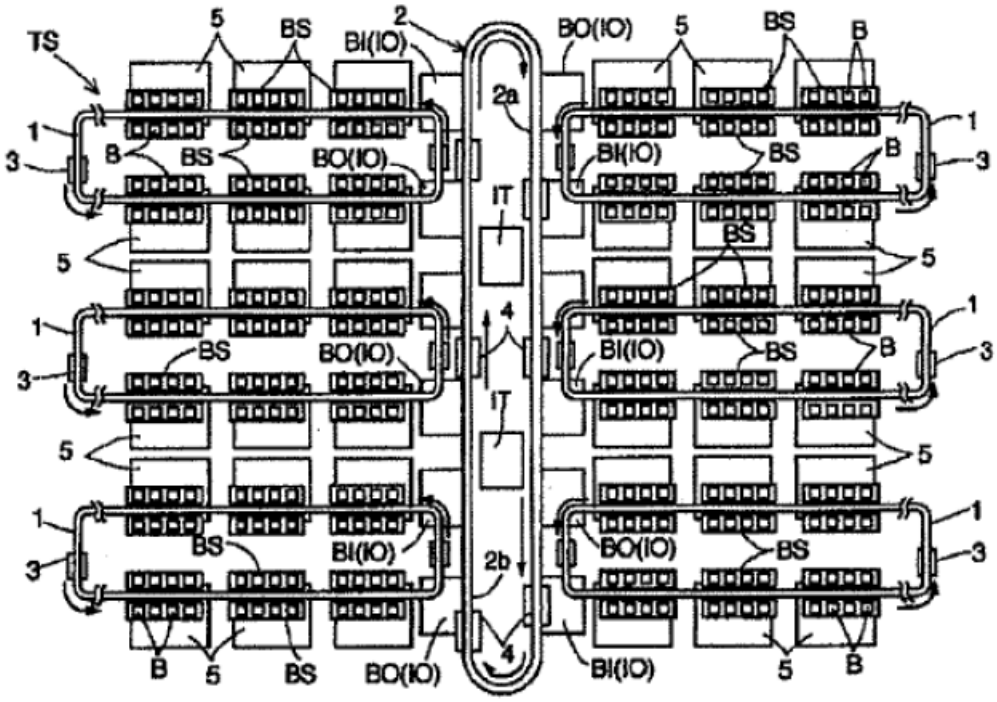
B. Asserted Obviousness of Claims 6–11 and 14 over JPAP 213 and JPAP 237

Petitioner asserts that claims 6–11 and 14 would have been obvious to a person of ordinary skill in the art over JPAP 213 and JPAP 237. Pet. 17–23, 39–52.[7] Petitioner provides English language translations of JPAP 213 and JPAP 237 as Exhibits 1005 and 1012, respectively. Patent Owner opposes, contests Petitioner's English language translation and interpretation of a disputed sentence in paragraph 7 of JPAP 213, and provides its own interpretation of that sentence. PO Resp. 10–45. We address the parties' arguments below.

1. JPAP 213

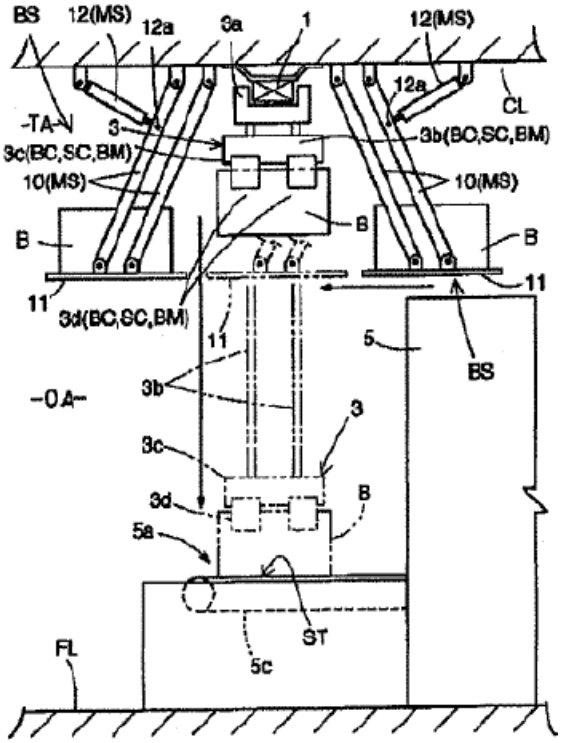
JPAP 213 Figure 7, reproduced below, depicts "article conveyance facility" TS, used to convey articles B to and from manufacturing process locations 5. Ex. 1005, ¶ 16, Fig. 7.

[7] JPAP 213 and JPAP 237 are 35 U.S.C. § 102(b) references cited during examination of the applications leading to issuance of the '153 patent. Ex. 1002, 2.



The article conveyance facility depicted in Figure 7, above, comprises six identical loops of guide rail 1 oriented horizontally. *Id.* Each loop of guide rail 1 guides "moving body" 3 in a certain direction (e.g., counterclockwise) for conveying articles B to and from process locations 5 around the loop (six process locations are depicted for each loop). *Id.* Another loop, formed by guide rail 2, is oriented vertically at the center of the six horizontal guide rail 1 loops. *Id.* The loop of guide rail 2 cooperates with each guide rail l loop to permit lateral transfer of incoming articles B for processing and outgoing articles B that have completed processing. *Id.* ¶¶ 23–25. Guiderail 2 guides moving body 4, which is constructed differently than moving body 3. *Id.*; *see also id.*, Figs. 4, 5.

JPAP 213 Figure 1, below, depicts a sectional view of suspended guiderail 1 and moving body 3 at manufacturing process location 5.



In JPAP 213 Figure 1, above, moving body 3 is suspended from guide rail 1 just below the ceiling. Ex. 1005 ¶ 17. The moving body is used to "transfer . . . article B between said moving body 3 and station ST . . . by elevating/lowering article B" using wind-up cords 3b, "vertically movable lifting unit" 3c, and "gripper" 3d. *Id.* ¶¶ 19, 20. JPAP 213 refers to these vertical elevating and lowering components as the "article transfer means" (BM). *Id.* ¶ 20. In operation, components 3b, 3c, and 3d lift article B from its double-dot line position at workstation ST to its solid line position immediately under moving body 3. *Id.* The operation can be reversed to lower article B onto workstation ST. *Id.*

With reference to Figure 1, above, "article retaining units" BS are elevated temporary storage locations on both sides of moving body 3 and guiderail 1. *Id.* ¶ 17. Article retaining units BS include article mounting tables 11 attached to the ceiling by mechanical linkages 10, which are

activated by hydraulic cylinders 12. *Id.* ¶ 21. Article mounting tables 11 are normally positioned laterally to the side of moving body 3 to allow i) unobstructed travel of moving body 3 along the rail, and ii) "elevation of lifting part 3c of moving body 3 to allow transfer of the article [B] with respect to station ST." *Id.* When needed for temporary storage of article B, article mounting tables 11 move horizontally in a back-and-forth motion between the positions shown in solid lines in Figure 1 and the position shown in double-dot lines directly below moving body 3. *Id.* ¶ 22.

Each pair of linkage 10 and hydraulic cylinder 12, used to move mounting table 11 laterally back-and-forth, is referred to as the "article movement means MS" that sets an article B "retained in the lateral direction of the guide rail at a transfer position with respect to moving body 3." *Id.* For example, hydraulic cylinder 12 activates linkage 10 to move table 11 (holding article B) laterally to a position directly under moving body 3 (to the double-dot line position depicted in Figure 1 for table 11). *Id.* Moving body 3 lowers lifting unit 3c to allow gripper 3d to grip article B. *Id.* Lifting unit 3c and article B are then elevated to allow table 11 (now empty) to move back to its storage position (to the solid line position depicted in Figure 1 for table 11). *Id.* Article B being gripped by moving body 3 may then be lowered to workstation ST or conveyed along guiderail 1. *Id.* The process may be reversed such that article B may be lifted from workstation ST by moving body 3 then placed onto mounting table 11 for temporary storage. *Id.*

2. The "translating stage" limitation

Independent claim 6 of the '153 patent recites "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 carries "the overhead hoist, translating stage and gripper along the . . . predetermined route" formed by the suspended track. *Id.* at 9:26–30. The translating stage is "configured to laterally translate the gripper." *Id.* at 9:34–35. Independent claim 10 is to like effect. *Id.* at 10:1–3, 11–12 ("the overhead hoist including a translating stage and a gripper . . . the translating stage is configured to move the gripper portion laterally"). As described above in connection with Figure 6 of the '153 patent, the translating stage (833) extends the hoist gripper (835) laterally to a position above the cassette pod (810) on the conveyor (895), lowers the hoist gripper to grip the cassette pod, raises the hoist gripper carrying the cassette pod, and then retracts laterally such that the cassette pod is placed within the overhead transport vehicle (805). *Id.* at 7:61–8:2. The bi-directional movement capability of the overhead hoist, translating stage, and hoist gripper mechanism provides direct access to the cassette pod located adjacent to the overhead transport subsystem, and also direct access to the load port located directly below the overhead transport subsystem, from a single location along the overhead rail. *Id.* at 8:2–5; Ex. 2013 ¶¶ 96, 97.

Thus, the claims recite an overhead transport subsystem that includes an overhead transport vehicle that moves along a suspended track or rail and transports an overhead hoist, lateral translating stage, and gripper mechanism configured to provide both vertical movement and lateral movement to "directly access [] at least one material unit" from a storage bin "located adjacent the suspended track." Ex. 1002, 9:31–32, 38–39; *see also id.* at 10:5–9, 16–19.

3. Differences between JPAP 213 and the claims of the '153 patent

Petitioner does not directly address differences between the '153 patent claims and the disclosure of JPAP 213, although Petitioner recognizes that JPAP 213 Figure 1 does not disclose a "translating stage" as recited in the '153 patent claims. Petitioner acknowledges that JPAP 213 Figure 1 depicts and describes the lateral movement of article B on table 11 as being carried out by mechanical linkage 10 and hydraulic cylinder 12, referred to as the "article movement means MS" in JPAP 213. Pet. 18–20 (citing Ex. 1005 ¶¶ 17, 21, 22, 35, Fig. 1; Ex. 1028 ¶¶ 107–110). Article movement means MS is structurally distinct from the vertical hoist apparatus (wind-up cords 3b, hoist 3c, and gripper 3d) on moving body 3. *Id.* (citing Ex. 1005 ¶¶ 21–22; Ex. 1028 ¶ 107). The mechanical linkage and hydraulic cylinder used to move table 11 laterally in JPAP 213 Figure 1 are attached directly to the ceiling at locations off to the sides of the suspended guide rail and moving body 3. The linkage and hydraulic cylinder, therefore, are not part of an overhead transport subsystem, are not transported by moving body 3, and are not the claimed "translating stage" recited in the '153 patent.

Petitioner's claim charts for independent claims 6 and 10 also do not identify a "translating stage" disclosed in JPAP 213 Figure 1; the "translating stage" limitation is identified as disclosed in JPAP 237. *Id.* at 43–44, 49 ("a translating stage *42*"[8]). We find, therefore, that the "translating stage" limitation of the '153 patent is not disclosed in JPAP 213 Figure 1.

[8] Petitioner uses italics in the claim charts to distinguish reference numerals in JPAP 237 from reference numerals in JPAP 213.

In sum, the overhead transport vehicle of the first embodiment in JPAP 213 (Figures 1–8) on which Petitioner relies, is configured to provide a vertical hoist but not the lateral "translating stage" recited in independent claims 6 and 10 of the '153 patent.

4. The disputed translation of JPAP 213 paragraph 7

Petitioner argues that JPAP 213 teaches a system where moving body 3 "do[es] the work of transferring the cassette pods B [laterally] to and from the article retaining units BS [tables 11], by providing the transferring mechanism '*on the side of*' *the hoist vehicles 3*." Pet. 20–21 (emphasis added) (citing Ex. 1005 ¶ 7); *id.* at 42 (citing Ex. 1005 ¶ 7). Petitioner relies, in particular, on a sentence in paragraph 7 of the English language translation of JPAP 213, the meaning of which is disputed by the parties. The translated sentence is as follows:

> When the apparatus having the configuration described in *Claim 4* is adopted, a *retaining unit transfer means* used for transferring articles between the article retaining unit and the moving body is provided *on the side of the moving body*.

Ex. 1005 ¶ 7 (emphases added). Petitioner asserts that the quoted sentence "expressly contemplates that the rail-mounted vehicle 3 itself may be configured to do the work of transferring pods B laterally to and from the tables 11." Pet. 42 (citing Ex. 1005 ¶ 7); Reply 7–8. Petitioner relies on its interpretation of JPAP paragraph 7 as providing motivation for one of ordinary skill to modify moving body 3 in JPAP 213 Figure 1 to include extendable arm 42 and hoist elements 43 (winch 46, wire 45, and chuck 47) of the conveyance truck transfer device disclosed in JPAP 237. Pet. 41–44

(citing Ex. 1028 ¶¶ 164–165, 168–169).[9] Petitioner further asserts the claimed "translating stage" and "gripper" are disclosed in the combined system of JPAP 213 Figure 1 and JPAP 237. *Id.* at 44–45, 49–51. In short, Petitioner argues that JPAP 213 paragraph 7 "expressly contemplates" an overhead transport vehicle (moving body 3 in Figure 1) configured to effect lateral movement of an overhead hoist and gripper. *Id.* at 42.

Patent Owner opposes Petitioner's interpretation of JPAP 213 paragraph 7, arguing that the quoted sentence from paragraph 7 does not "expressly contemplate" modifying the hoist vehicle of moving body 3 as argued by Petitioner. PO Resp. 12–19. Patent Owner argues, *inter alia*, that because Figure 1 already is an embodiment of the complete apparatus described in paragraph 7 there is no modification to be made. *Id.* at 13–15 (citing Ex. 1005 ¶¶ 7, 20, 22; Ex. 2013 ¶¶ 109–111). Patent Owner also argues that Petitioner is misreading paragraph 7, because the "retaining unit transfer means" in paragraph 7 refers to providing the hoist (wind-up cords 3b, lifting unit 3c, and gripper 3d) on the moving body for vertical transfer of the article. *Id.* at 14 (citing Ex. 1005 ¶ 22; Ex. 1034, 141:10–13; Ex. 2013 ¶¶ 109–111). Patent Owner asserts the hoist is used for elevating and lowering article B during transfer to and from station ST, not for lateral transfer. *Id.* According to Patent Owner, Petitioner's argument that paragraph 7 supports the concept of putting a lateral transfer mechanism on

[9] Although the parties argue for certain differences in the level of skill in the art, the differences are not material to our decision. Therefore, we apply Petitioner's proffered skill level of one having at least an undergraduate degree in industrial or systems engineering and 3–5 years of experience designing systems and processes using automated material handling systems. Pet. 26 n.7 (citing Ex. 1028 ¶ 36); PO Resp. 9 (citing Ex. 2013 ¶ 15).

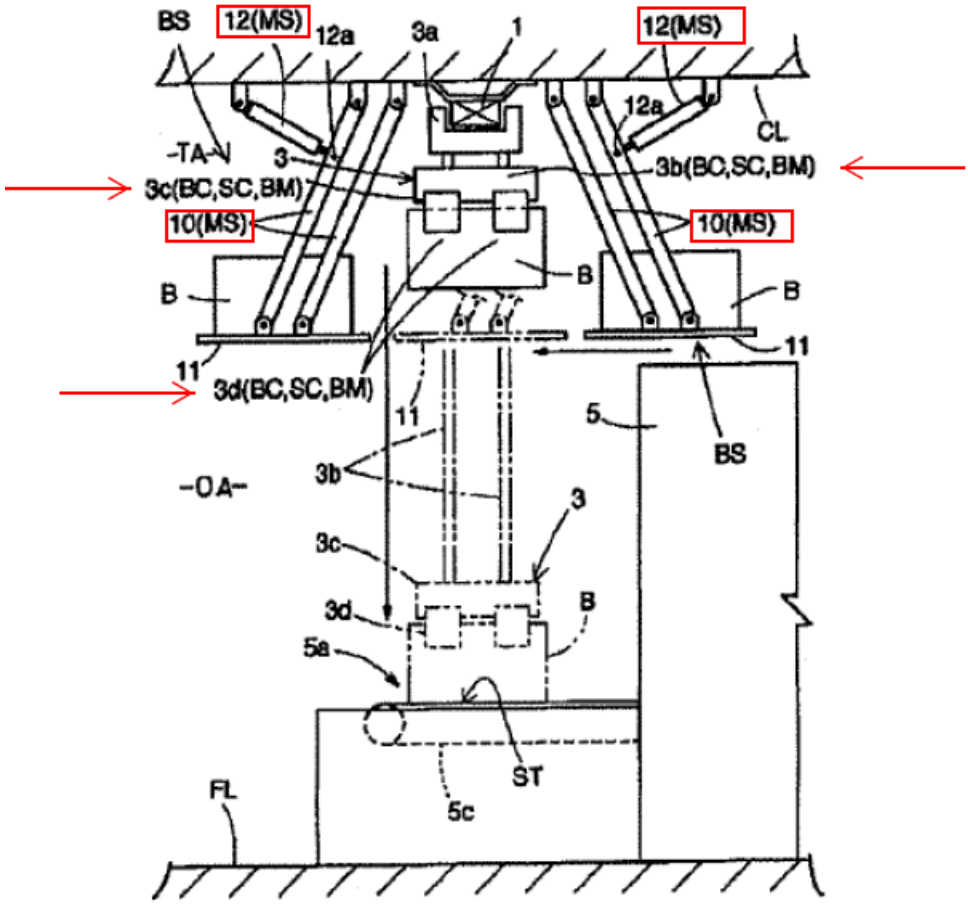
the side of an overhead hoist vehicle, such as moving body 3, is wrong. *Id.* at 16–17 (citing Ex. 1035, 30:23–31:18). Patent Owner further asserts that Petitioner's translator admitted that paragraph 7 does not suggest the retaining unit transfer means would move laterally. *Id.* Patent Owner also argues that its interpretation of JPAP 213 paragraph 7 is supported by a Japanese IP High Court review of JPAP 213 paragraph 7.[10] *Id.* at 14–15 (citing Ex. 2017).

We begin our analysis with claim 4 referenced in JPAP 213 paragraph 7. Claim 4, as translated, recites "wherein a retaining unit transfer means used for transferring the articles with respect to said article retaining unit is provided *on* said moving body." Ex. 1005, 3. Claim 4, as translated, characterizes the retaining unit transfer means as located "on" the moving body rather than "on the side of" the moving body as stated in translated paragraph 7. Therefore, we look to the detailed description of the retaining unit transfer means for clarification. JPAP 213 describes the retaining unit transfer means as a vertical hoist mechanism used when articles B are moved between swinging storage tables 11 and workstation ST located directly below moving body 3. Referring to Figures 1 and 2, JPAP 213 explains that "retaining unit transfer means BC" and "station transfer means SC" are "constituted with a single article transfer means BM *mainly comprising cord 3b, lifting part 3c, and gripper 3d*." *Id.* ¶ 20 (emphasis added). Petitioner's expert, Dr. Sturges, agrees that the hoist in Figure 1 of

[10] For the reasons given by Petitioner in its Reply, which raise significant uncertainties concerning the context and import of the Japanese IP High Court decision relied upon by Patent Owner in Exhibit 2017, we do not give that decision any weight in our analysis. Reply 10–11.

JPAP 213 is the retaining unit transfer means being described in paragraph 7. Ex. 1034, 141:10–13.

We reproduce below an enlarged view of JPAP Figure 1, annotated by us with three arrows and four boxes.



Focusing first on the three arrows in annotated JPAP 213 Figure 1, above, Figure 1 consistently uses the acronyms BC, SC, and BM (the retaining unit transfer means) in parentheses following the alphanumeric designators for wind-up cords 3b, vertically movable lifting unit 3c, and gripper 3d. *Id.* ¶¶ 19–20. The structures designated 3a, 3b, and 3c are part of a hoist mechanism located on moving body 3 and designed for vertical movement. *Id.* The description and depiction of the retaining unit transfer

means as referring to hoist components for effecting vertical movement, rather than components for effecting lateral movement, is reinforced by the description in paragraph 22 of JPAP 213. JPAP 213 paragraph 22 distinguishes the vertical lifting and lowering structures of the retaining unit transfer means from the lateral movement linkages and hydraulic cylinders of the article movement means MS. *Id.* ¶ 22. The indication of article movement means MS in parentheses following elements 10 and 12, shown in the four boxes of annotated Figure 1, further underscores the distinction being vertical and lateral movement components. Thus, the "retaining unit transfer means" in claim 4 of JPAP 213, as referenced in paragraph 7, refers to vertical hoist movement, not lateral transfer movement.

We also credit the Declaration testimony of Dr. Bottoms and Patent Owner's translator, Mr. Yazaki, and the deposition testimony of Petitioner's translator, Mr. Chu. Mr. Chu testifies that JPAP 213 paragraph 7 does not "say anything about the transfer means moving an article laterally." Ex. 1035, 30:23–31:5. Mr. Yazaki's Declaration states that paragraph 7 expresses only that "the transfer means is on the moving body side, as opposed to being on the article retaining unit side" of the conveyance system and "not . . . that the transfer means is on a lateral surface of the moving body facing the article retaining unit." Ex. 2019 ¶ 5. Dr. Bottoms testifies that a person of ordinary skill would have understood the translated phrase "on the side of the moving body" in paragraph 7 to refer to the transfer means (the hoist) being located on the moving body side of the system rather than the storage side of the system, not physically positioning the transfer means on the lateral side of moving body 3. Ex. 2013 ¶ 114.

Dr. Bottoms also explains how JPAP 213 distinguishes between vertical movement of the retaining unit transfer means and lateral movement of the article movement means MS. *Id.* ¶ 116 (citing Ex. 1005 ¶ 22). Contrary to Petitioner's argument, Dr. Bottoms' deposition testimony is not inconsistent with his declaration testimony clarifying the interpretation of JPAP 213 paragraph 7, as discussed above. Reply 9 (citing Ex. 1043, 109:7–14). His deposition testimony is consistent with the disclosure of the retaining unit transfer means as a vertical hoist, not a lateral transfer mechanism. Dr. Sturges' Declaration testimony, relied upon by Petitioner to rebut Patent Owner's argument and evidence (Reply 9), provides no analysis of paragraph 7, claim 4, or the relevant description in JPAP 213. Rather, it mimics the error of the Petition in asserting that JPAP 213 "already contemplates modifying the Fig. 1 system . . . to do the work of moving [articles] B to and from the overhead locations BS, 11." Ex. 1028 ¶ 165.[11]

Therefore, for the reasons given above, we find that JPAP 213 paragraph 7 does not expressly contemplate or teach an overhead transport vehicle (moving body 3 in Figure 1) configured to effect lateral movement of an overhead hoist and gripper.

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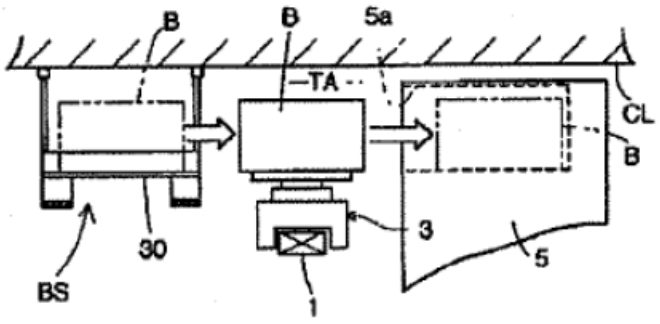
[11] Patent Owner argues that other translations produced by Petitioner in the co-pending district court case are inconsistent with the translation relied upon by Petitioner in this *inter partes* review proceeding. PO Resp. 18 (citing Ex. 2019 [we presume cite is to Ex. 2016]; Ex. 2020 [we presume cite is to Ex. 2017]). We note that the provenance of the other translations is not clear, and Patent Owner has neither clarified the context of their production nor cited to an affidavit attesting to the accuracy of the translations on which Patent Owner attempts to rely. 37 C.F.R. § 42.63(b). Regardless, the differences in the translations of paragraph 7 among the several translations do not add meaningfully to our analysis of the import of the disputed language.

5. JPAP 213 Figures 12 and 18

Petitioner argues that JPAP 213 Figures 12 and 18 disclose alternative embodiments of moving body 3 that have "an 'article transfer means' 'on the side of' the hoist vehicle." Pet. 21 (citing Ex. 1005 ¶¶ 35, 39; Ex. 1028 ¶ 112). This argument builds on Petitioner's incorrect interpretation of JPAP 213 paragraph 7. Petitioner gives the analogy of a flight attendant who picks up a backpack from the floor (a hoisting movement), carries it down the aisle (conveyance along a predetermined path) and then "transfers the backpack laterally toward and into the overhead compartment." *Id.* (citing Ex. 1028 ¶ 112). In its Reply, Petitioner again relies on the "lateral transfer means" shown in Figures 12 and 18 in support of the argument. Reply 9. Petitioner and Dr. Sturges, however, do not analyze the structure of moving body 3 in Figures 12 and 18, which has "the same configuration as moving body 4 . . . to move article B in the lateral direction" without a hoist. Ex. 1005 ¶¶ 35, 39, Figs. 12, 18; *see* PO Resp. 27–28 (citing Ex. 1005, Fig. 12; Ex. 2013 ¶ 121). Dr. Bottoms explains that moving body 3 in Figure 12 "runs on top of the rail" to move articles laterally, but does not teach or suggest combining the different embodiments of Figures 1 and 12. Ex. 2013 ¶ 121.

All of the embodiments of moving body 4 described in JPAP 213 are depicted as a lateral transfer unit (designated 17 in Figures 4–6 and designated 20 in Figures 9–11) without a hoist and gripper. Ex. 1005 ¶¶ 24, 25, 32–34. This is consistent with the purpose of moving body 4. Moving body 4 is designed to provide only lateral transfer of articles B between suspended rails 1 and 2, as the articles move into production processing and then exit from production processing. Ex. 1005 ¶¶ 16, 23, 30, Fig. 7. There

is no indication of a need for a hoist and gripper on moving body 4 when transferring articles laterally between suspended rails 1 and 2. The embodiment of Figure 12 (Figure 18 is to like effect), below, depicts lateral transfer of articles B on top of moving body 3 without a hoist.



As explained by Dr. Bottoms with respect to Figure 12, above, there is no teaching or suggestion in JPAP 213 that the vertical hoist mechanism of moving body 3 in Figure 1 should be combined with the lateral transfer mechanism of moving body 4 (depicted as moving body 3 in Figures 12 and 18), which are designed for different functions in the disclosed conveyance system. Ex. 2013 ¶ 121.[12] This conclusion is confirmed by the descriptions of Figures 12 and 18. Ex. 1005 ¶¶ 35 (Moving body 3 in Figure 12 has "the same configuration as moving body 4 . . . to move article B in the lateral direction of the moving body to transfer article B."), 39 ("[A]n article transfer means BM is provided to move article B on moving body 3 in the width [lateral] direction of the moving body to transfer article B.").

Petitioner, moreover, does not analyze the lateral transfer mechanism disclosed and described in JPAP 213 Figures 12 and 18 or provide evidence of how one skilled in the art would understand such a mechanism to work.

[12] We do not rely on Dr. Bottoms' discussion of the Japanese IP High Court decision referenced in paragraph 121 of his Declaration.

Pet. 20–21 (citing Ex. 1028 ¶¶ 110–112); Reply 9. In particular, Dr. Sturges' opinion, that cost and efficiency would have provided reasons for one of ordinary skill to have "the vehicle do the work of transferring the cassette pods B to and from the storage locations, by providing the transferring mechanism 'on the side of' the *hoist* vehicle 3," is misplaced. Ex. 1028 ¶ 110 (emphasis added). Not only does Dr. Sturges base his opinion on an incorrect interpretation of JPAP 213 paragraph 7, but he does not analyze or discuss the transfer mechanism ("article transfer means") actually shown and described in Figures 12 and 18. *Id.* ¶¶ 111–112. In the absence of a more particularized analysis to explain the lateral transfer mechanism disclosed in the context of the various embodiments of JPAP 213, we are not persuaded by Petitioner's evidence or argument.

For the reasons given above, we are not persuaded that Figures 12 and 18 support Petitioner's argument that JPAP 213 discloses, teaches, or expressly contemplates a lateral transfer mechanism on the side of moving body 3 in Figure 1.

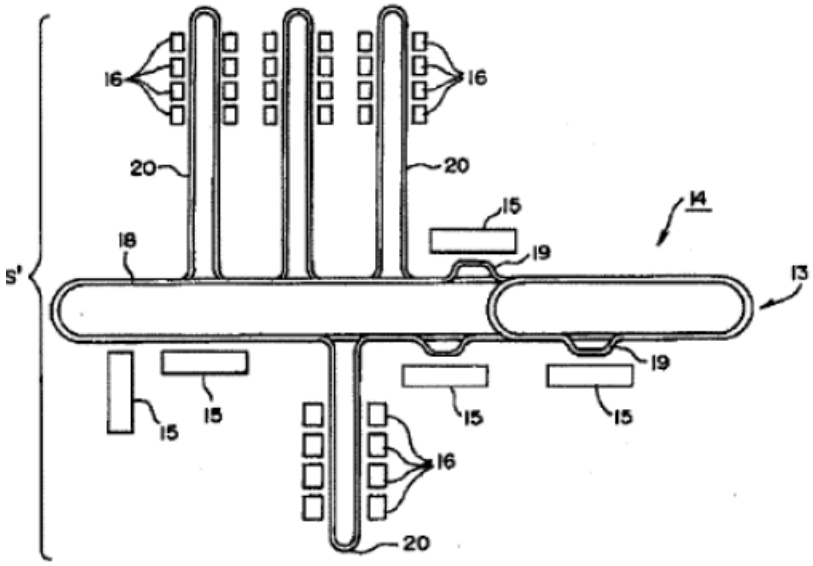
6. Petitioner's motivation-to-combine argument

Petitioner argues that a person of ordinary skill in the art would have been motivated to modify moving body 3 of JPAP 213 Figure 1 to incorporate the lateral transfer device of JPAP 237, because JPAP 213 "expressly contemplates" modifying the Figure 1 system to configure "rail-mounted vehicle 3 . . . to do the work of transferring pods B laterally to and from the tables 11." *Id.* at 42–43 (citing Ex. 1005 ¶ 7; Ex. 1028 ¶ 165). Dr. Sturges emphasizes that because JPAP 213 "already contemplates" modifying moving body 3 in Figure 1 such that it could move articles B (cassette pods) laterally to and from the storage tables, it would have been

obvious to one of skill in the art to modify moving body 3 "to apply that concept to the rail-mounted vehicle system of the [JPAP] '213 publication." Ex. 1028 ¶¶ 165–66. Dr. Sturges, however, does not explain why such an application would have been obvious to one of ordinary skill. Dr. Sturges merely re-emphasizes that "the [JPAP] '213 publication itself acknowledges the concept (Ex. 1005 ¶ 7) [that] makes it even more clear that it would have been obvious to apply the teachings of the [JPAP] '237 publication to the system that is disclosed in the [JPAP] '213 publication." Ex. 1028 ¶ 166.

a. JPAP 237

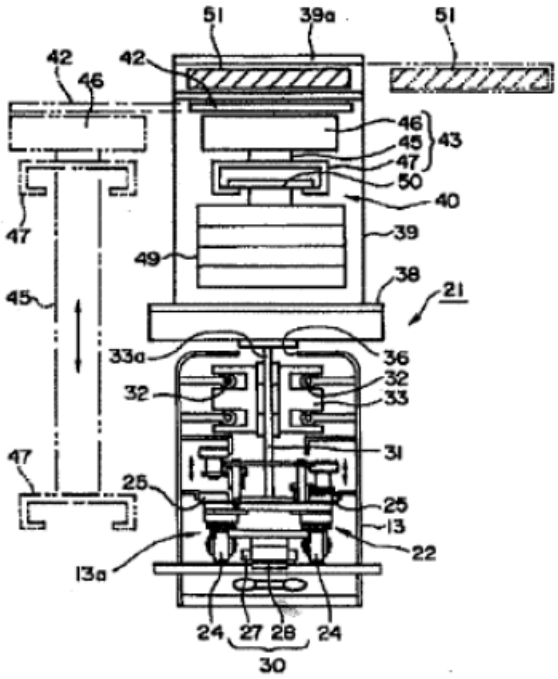
JPAP 237 Figure 3, below, depicts a conveyance system for transporting cassette boxes of semiconductor wafers in a manufacturing facility. Ex. 1012 ¶ 12.



The conveyance system of JPAP 237 Figure 3, above, like the conveyance system depicted in JPAP 213 Figure 7, may be an overhead system "disposed at the ceiling" that comprises central loop 18 of track 13 and several loops of branch tracks 20 oriented orthogonally to the central

loop. *Id.* ¶¶ 12, 13. Each loop of track guides a "conveyance truck" (not shown) for conveying semiconductor cassettes to and from manufacturing process locations 16, which are located adjacent to each of the branch loops. *Id.* Stockers 15 house semiconductor cassettes and are arranged adjacent to smaller track branches 19.

JPAP 237 Figure 1, below, depicts a sectional view of conveyance truck 21 "running on" track 13. *Id.* ¶ 14.



The lower part of the conveyance truck shown in Figure 1, above, comprises truck body 22 housed within track 13, including wheels 24, linear motor 30, and support strut 31 for supporting "goods stand" 38 and semiconductor cassette housing 39. *Id.* ¶¶ 14–17. The upper portion of the conveyance truck depicts "transfer device" 40 that includes extendable arm 42, fixed to the top of cassette housing 39a, which "advances and retreats freely in the horizontal direction . . . orthogonal to the running direction of the conveyance truck [shown in double-dot lines]." *Id.* ¶ 18. Transfer

device 40 also includes hoist 43 (winch 46, wire 45, and chuck 47) for gripping semiconductor cassette box 49 at grip 50. *Id*. ¶ 19. When arm 42 is extended laterally "to the side of the conveyance truck 21 [double-dot lines]," the transfer device lowers chuck 47, grips semiconductor cassette box 49 (Figure 2), hoists the cassette box up, and retracts arm 42 such that semiconductor cassette pod 49 is housed within cassette housing 39 and ready for transport to storage stockers 15 and manufacturing process locations 16. *Id.* ¶¶ 12, 20, 22. Counterweight 51 "advances and retreats freely in the direction opposite the extending direction of the arm 42" to stabilize the transfer device during operation. *Id.* ¶ 21.

Thus, transfer device 40 is configured to provide lateral and vertical movement of chuck 47, which acts as a gripper for semiconductor cassette pod 49.

b. Analysis

Dr. Sturges relies on an incorrect interpretation of JPAP 213 paragraph 7 as providing the motivation for one of ordinary skill in the art to add the lateral transfer device from the conveyance truck of JPAP 237 to moving body 3 in JPAP 213 Figure 1. Dr. Sturges, moreover, does not provide a reasoned analysis based on the disclosures and embodiments of JPAP 213 and JPAP 237, in the context of the knowledge and skill level of a degreed engineer with 3–5 years of experience developing automated material handling systems. Dr. Sturges does not explain why and how one of ordinary skill would have selected the lateral transfer device from the conveyance truck of JPAP 237 for use with moving body 3 in JPAP 213 Figure 1. Ex. 1028 ¶¶ 163–166, 169, 174. For example, there is no explanation of why one of ordinary skill would use the lateral transfer device

from JPAP 237, given that mechanically moveable storage tables already are used to effect lateral transfer of articles B on both sides of moving body 3 in JPAP 213 Figure 1. *See id.* Even if the proposed modification were to be made, Dr. Sturges does not account for counterweight 51 in JPAP 237, which extends laterally to the *opposite* side of extendable arm 42, or explain why the counterweight would not interfere with the articles and storage tables located on the opposite side of moving body 3 in JPAP 213 Figure 1. *Id.*; Mot. Observ. 2–3 (citing Ex. 2039, 70:22–71:15 ("Q. [Y]ou did not provide any testimony that the hoist vehicle of the JPAP '213 reference can utilize the robotic arm on one side while maintaining the swinging shelves on the other side; correct? A. That's correct.")). To the extent Petitioner argues that Dr. Sturges has provided evidence on this point (Tr. 83:9–13), such evidence has not been cited in the Petition or the Reply, nor have we located such evidence. Pet. 41–45 (citing Ex. 1028 ¶¶ 162–165, 169, 174); Reply 15–16; Mot. Observ. 1 (citing Ex. 2039, 71:23–72:9 ("Q. [Y]ou did not address whether it would have been necessary to change the functional relationship between the swinging shelf and the hoist vehicle of the JPAP '213 reference; correct? A. That's accurate.")).[13]

Dr. Sturges' deposition testimony, regarding his motivation-to-combine testimony at paragraphs 164 and 165 of his Declaration, does not persuade us to take a different view. Ex. 1034, 163:12–166:10. Dr. Sturges acknowledges that in paragraph 165 of his Declaration he relies only on Petitioner's interpretation of JPAP 213 paragraph 7 as "expressly

[13] To the extent Petitioner relies on "reasonable inferences" to be drawn from the disclosure of the prior art references, we are not persuaded by Petitioner's argument. Resp. Observ. 4–5.

contemplat[ing]" the modification of moving body 3 in Figure 1 to transfer articles B laterally to and from storage tables 11. Ex. 1034, 165:9–17. Dr. Sturges further testifies that in paragraph 164 of his Declaration he provides "a pretty good example" of the teaching, suggestion, or motivation for one of ordinary skill to make the asserted modification of JPAP 213 based on JPAP 237. *Id.* at 165:18–166:10. A review of Dr. Sturges' Declaration paragraph 164, however, reveals nothing more than a conclusory paraphrasing of *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007). There is no technical analysis of the prior art or discussion of why one of ordinary skill in the art, without the benefit of hindsight, would have been motivated to make the asserted modification of moving body 3 in JPAP 213 Figure 1, or how such a modification might work with a reasonable expectation of success. Ex. 1028 ¶ 164.

A conclusion of obviousness requires more than a mere showing that the prior art includes separate references covering each 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 the prior art elements in the normal course of their work to yield the claimed invention. *Id.* We have rejected Petitioner's interpretation of JPAP Paragraph 7 that underpins its motivation to combine argument and Dr. Sturges' corresponding testimony. *See* Section II.B.3–4 above. Although Petitioner and Dr. Sturges do provide evidence of known alternatives for laterally transferring semiconductor cassette pods in overhead rail conveyance systems (Pet. 41 (citing Ex. 1028 ¶ 162)), their analysis of a reason or motivation to combine the systems in the manner

claimed in the ’153 patent is lacking. The insufficiency of the evidence and analysis is particularly acute when the assertion that JPAP 213 paragraph 7 “expressly contemplates” such a combination is removed from the analysis.

Petitioner’s remaining argument, that it would have been obvious for a person of ordinary skill to make the asserted modification because it was one of a “finite number of identified, predictable solutions” and “an arrangement of old elements . . . yielding no more than one would expect from such an arrangement,” is little more than a conclusory summary of *KSR* without the incumbent analysis based on the facts and evidence of the present case. Pet. 41–42 (citing Ex. 1028 ¶ 164); Reply 6–7, 11–13 (citing Ex. 1028 ¶¶ 162–165). For example, Petitioner argues that “any mechanical engineer would have understood that the number of moving mechanisms should always be reduced when possible” in support of its motivation to combine argument. Reply 11 (citing Ex. 1005 ¶ 7; Ex. 1028 ¶ 165). Petitioner’s cited evidence does not support the statement; rather it relies on an incorrect interpretation of JPAP 213 paragraph 7. Dr. Sturges also acknowledges in his deposition that paragraph 165 of his Declaration relies only on Petitioner’s incorrect interpretation of JPAP 213 paragraph 7. Ex. 1034, 165:9–17 (“Q. [L]ooking at paragraph 165, I don’t see any reference to anything besides paragraph 7 of the ’213 reference. Right? A. No. 165 doesn’t have any other cite.”). Neither Petitioner nor Dr. Sturges, moreover, provides a meaningful mechanical analysis or explanation beyond citing JPAP 213 paragraph 7 in support of Petitioner’s motivation to combine argument.

In short, Petitioner’s conclusory paraphrasing of *KSR* is insufficient to satisfy its burden, particularly without the support of Petitioner’s

interpretation of JPAP 213 paragraph 7. *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). Therefore, for the reasons given above, we determine that Petitioner has not satisfied its burden of proving the asserted obviousness of claims 6–11 and 14 over JPAP 213 and JPAP 237 by a preponderance of the evidence.[14]

C. Patent Owner's Motion to Exclude Evidence

Patent Owner seeks to exclude Exhibit 1038 and ¶¶ 3–4 of Exhibit 1040 filed by Petitioner with Petitioner's Reply. Mot. Excl. 1 (Paper 50). Patent Owner's objections to Exhibits 1038 and 1040 were timely filed within five business days of service of the exhibits. Paper 41; *see* 37 C.F.R. § 42.64(b)(1) ("Once a trial has been instituted, any objection must be filed within five business days of service of evidence."). Petitioner opposes the motion to exclude. Opp. Mot. Excl. 5–14.

Exhibit 1038 is a confidential product development plan dated September 25, 2002 and produced by Petitioner in this proceeding. Exhibit 1040 is a Second Declaration of Dr. Sturges, and paragraphs 3–4 contain his testimony explaining aspects of the confidential product development plan

[14] In view of our determination, we need not consider Patent Owner's objective evidence of nonobviousness. *See Transocean Offshore Deepwater Drilling, Inc., v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1349 (Fed. Cir. 2012) ("objective evidence of nonobviousness . . . may be sufficient to disprove or rebut a prima facie case of obviousness"). PO Resp. 30–45; Reply 17–24.

of Exhibit 1038. Petitioner relies on Exhibit 1038 and paragraphs 3–4 of Exhibit 1040 to rebut Patent Owner's argument that Petitioner copied Patent Owner's invention claimed in the '153 patent. Reply 18–19, 21, 23. Patent Owner seeks to exclude Exhibit 1038 and paragraphs 3–4 of Exhibit 1040 as irrelevant (Fed. R. Evid. 401, 402), inadmissible hearsay (Fed. R. Evid. 801(c)), and unauthenticated (Fed. R. Evid. 901). Mot. Excl. 2–8. We do not rely on or address Patent Owner's asserted objective evidence of nonobviousness or Petitioner's rebuttal evidence in our Decision. Therefore, Patent Owner's motion to exclude Exhibits 1038 and paragraphs 3–4 of Exhibit 1040 is *dismissed as moot.*

III. CONCLUSION

For the reasons given above, we are not persuaded Petitioner has shown by a preponderance of the evidence that claims 6–11 and 14 of the '153 patent are unpatentable.

IV. ORDER

It is

ORDERED that claims 6–11 and 14 of the '153 patent have not been shown by a preponderance of the evidence to be unpatentable; and

FURTHER ORDERED that Patent Owner's Motion to Exclude Evidence is dismissed as moot.

This is a Final Written Decision. Parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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