UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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ATLAS COPCO TOOLS AND ASSEMBLY SYSTEMS LLC,
GENERAL MOTORS LLC, FAURECIA AUTOMOTIVE SEATING, LLC,
and MAGNA INTERNATIONAL INC.,
Petitioner,

v.

WILDCAT LICENSING WI LLC,
Patent Owner.

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IPR2020-00891
Patent RE47,220 E

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Before LYNNE H. BROWNE, HYUN J. JUNG, and JAMES A. TARTAL,
Administrative Patent Judges.

JUNG, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Denying Petitioner's Motion to Strike
Granting Patent Owner's Motion to Maintain Exhibits
Dismissing Petitioner's Motion to Exclude
35 U.S.C. § 318(a)

I.   INTRODUCTION

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Atlas Copco Tools and Assembly Systems LLC, General Motors LLC, Faurecia Automotive Seating, LLC, and Magna International Inc. (collectively, "Petitioner") have shown by a preponderance of the evidence that claims 31–55 of U.S. Patent No. RE47,220 E (Ex. 1001, "the '220 patent") are unpatentable. We also deny Petitioner's Motion to Strike Patent Owner's Sur-reply Evidence, dismiss as moot Petitioner's Motion to Exclude, and grant Patent Owner's Motion to Maintain Exhibits 2070–2080.

A.   Background and Summary

Petitioner filed a Petition (Paper 1, "Pet.") requesting institution of an *inter partes* review of claims 31–55 of the '220 patent. Wildcat Licensing WI LLC ("Patent Owner") filed a Preliminary Response (Paper 9). Pursuant to 35 U.S.C. § 314, we instituted an *inter partes* review of the '220 patent. Paper 11 ("Inst. Dec."). In particular, we instituted review of claims 31–55 on all presented challenges. Inst. Dec. 2, 22, 30.

After institution, Patent Owner filed a Response (Paper 31, "PO Resp."), to which Petitioner filed a Reply (Paper 39, "Pet. Reply"), and Patent Owner thereafter filed a Sur-reply (Paper 40, "PO Sur-reply").

Petitioner filed a Motion to Strike Patent Owner's Sur-reply Evidence. Paper 46 ("Mot. to Strike"). Patent Owner filed an Opposition to the Motion to Strike and in the alternative, a Motion to Maintain Exhibits 2070–2080 in the Record Under 37 C.F.R. § 42.5 (Paper 47, "Opp. to Mot. to Strike"), to which Petitioner filed a Reply in Support of Motion to Strike Patent Owner's Sur-Reply Evidence (Paper 48, "Reply for Mot. to Strike"). Petitioner also

filed a Motion to Exclude Pursuant to 37 C.F.R. § 42.64(c) (Paper 49, "Mot. to Excl."), and Patent Owner filed an Opposition to the Motion to Exclude (Paper 50, "Opp. to Mot. to Excl."). Petitioner subsequently filed a Reply in Support of Motion to Exclude Pursuant to 37 C.F.R. § 42.64(c). Paper 51 ("Reply for Mot. to Excl."). An oral hearing in this proceeding was held on August 3, 2021; a transcript of the hearing is included in the record. Paper 54.

B. Real Parties in Interest

Petitioner lists several entities as real parties in interest. Pet. 76–77; Paper 27, 2–3; Paper 32, 2–3. Petitioner also states that there are numerous related entities not believed to be real parties in interest, but "[t]o avoid any potential dispute and to show good faith, all Atlas Copco entities, Faurecia entities, General Motors entities, JRL entities, and Magna entities nonetheless agree to be estopped under the provisions of 35 U.S.C. § 315 to the same extent that Petitioners are estopped." Pet. 78; Paper 27, 5; Paper 32, 5. Petitioner further identifies all defendants in related litigation as possible real parties in interest "[o]ut of an abundance of caution given the fact intensive nature of [real party in interest] assessments." Pet. 78; Paper 27, 5–6; Paper 32, 5–6.

Patent Owner states that "[t]he real party-in-interest is Wildcat Licensing WI LLC." Paper 8, 1.

C. Related Matters

The parties identify nine co-pending suits in Delaware where, at least, the '220 patent was been asserted. Pet. 75–76; Paper 8, 1–2; Paper 27, 2–3; Paper 32, 2–3.

The application that issued as the '220 patent was the subject of *Ex parte Walt II and Walt*, Appeal No. 2018-003427 (PTAB Aug. 23, 2018).

Ex. 1018. Also, the '220 patent reissued from U.S. Patent No. 7,062,831
which was challenged in *Johnson Controls, Inc. v. Wildcat Licensing WI
LLC*, IPR2014-00305 ("305-IPR"). The Final Written Decision from the
305-IPR is filed as Exhibit 1015. The parties also identify IPR2020-00892
concerning U.S. Patent No. RE47,232 E as a related matter. Pet. 75;
Paper 8, 2; Paper 27, 2; Paper 32, 2.

   D. *The '220 Patent (Ex. 1001)*

       The '220 patent "particularly relates to monitoring fastening of
articles of assemblies in such assembly systems." Ex. 1001, 1:26–28.
According to the '220 patent, "[t]here are many industries where the
sequence of fastening operations and/or the applied torque of fastening
operations are critical in assembling an article of assembly," such as "the
automotive seat assembly industry." *Id.* at 1:31–36.

       The '220 patent "is directed towards a new more reliable method for
assembling an article of assembly . . . having multiple fastening locations in
spaced apart relation" and "comprises . . . providing at least two different
types of targets fixed relative to the article of assembly that correspond to
the individual fastening locations." *Id.* at 2:64–3:3. "When fastening is
occurring at one of the fastening locations, one of the targets is being
sensed" and "an electronic target output is generated that differentiates
between the different types of targets thereby indicating fastening location of
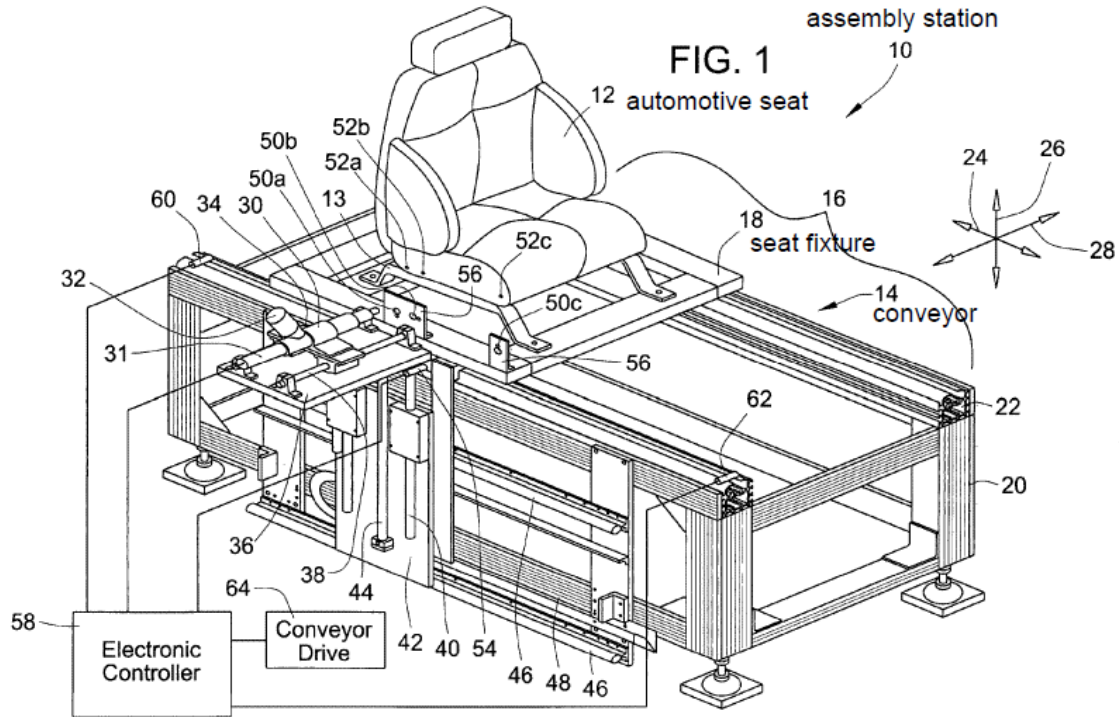the fastening tool." *Id.* at 3:5–10. Figure 1 of the '220 patent is reproduced
below.

Figure 1 "is an isometric and partly schematic view of a seat assembly station." *Id.* at 3:41–42. Assembly station 10 is for assembling automotive seat 12 on conveyor 14. *Id.* at 3:66–4:2, 4:8–10. Assembly station 10 includes a fastening tool, such as screw driver 30, for driving bolts into frame 13 of seat 12. *Id.* at 4:41–45. Screw driver 30 includes integral torque monitor 31 that provides an indication of the torque applied to a fastener. *Id.* at 4:48–51.

There are also a plurality of targets 50a–50c and machine vision camera 54 that senses targets 50a–50c and communicates an electronic output to processor or electronic controller 58. *Id.* at 5:10–15, 5:55–57. Electronic controller 58 is connected to screw driver 30 to activate driver 30 when it is in proper fastening position and disabling driver 30 when it is not. *Id.* at 6:25–28. Electronic controller 58 also receives an indication from torque monitor 31 of the torque applied at the fastening location. *Id.* at 6:30–32.

E. Illustrative Claim

The '220 patent includes claims 31–55, all of which Petitioner challenges. Claim 31, reproduced below, is the only independent claim.

31. A method for assembling components of an article of assembly, the method comprising the steps of:

providing at least first and second physically separate components that, when assembled together, form at least a portion of the article of assembly, wherein

(a) a single set of discrete portions of the first and second components, when placed together, form a single process site consisting of a plurality of fastening locations within the single process site including first and second fastening locations,

(b) each of the first and second fastening locations consists of a single opening for receiving a single fastener that, when fastened in the single opening, partially assembles the first and second components together, and

(c) wherein the article of assembly is structurally designed so that the first and second fastening locations are positioned within the single process site in spaced apart relation to each other such that a fastener must be inserted in the first fastening location before a fastener is inserted in the second fastening location to reduce the risk of structural failure of the assembled combination of the first and second components that would arise if a fastener were inserted in the second fastening location before a fastener were inserted in the first fastening location,

holding the first and second components of the article of assembly in a predetermined position in which the first and second components are placed together to form the single process site;

manually fastening fasteners into the first and second fastening locations of the article of assembly using a fastening tool;

providing an electronic controller having stored in a memory thereof before an operator has commenced any aspect of manually fastening fasteners using the fastening tool

(a) data representative of the location of the first fastening location within the single process site together with

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first order data indicating that a fastener must be inserted in the first fastening location at a point in time ***before*** a fastener is inserted in the second fastening location, and

(b) data representative of the location of the second fastening location within the single process site together with second order data indicating that a fastener must be inserted in the second fastening location at a point in time ***after*** a fastener has been inserted in the first fastening location,

wherein the location data and the first and second order data for the first and second fastening locations from[1] a ***predetermined fastening sequence*** that must be followed in order for the first and second components to be assembled together in a manner that reduces the risk of structural failure of the assembled combination that would arise if a fastener were inserted in the second fastening location before a fastener were inserted in the first fastening location;

sensing the position of the fastening tool;

electronically comparing the sensed position of the fastening tool with the data representative of the location of the first and second fastening locations to determine if the fastening tool is located in operative relation to one of the first and second fastening locations and then using the ***order data*** associated with the one of the first and second fastening locations to ensure the operator's use of the fastening tool conforms to the predetermined sequence of fastening among the first and second fastening locations by

(a) enabling the fastening tool, when it is positioned in operative relation to the first fastening location, to insert a fastener in the first fastening location only if the operator has not inserted a fastener in the second fastening location, and

(b) enabling the fastening tool, when it is positioned in operative relation to the second fastening location, only if the operator already has inserted a fastener in the first fastening location,

which reduces the risk of structural failure of the assembled combination that would arise if a fastener were inserted in the second fastening location before a fastener were inserted in the first fastening location;

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[1] Patent Owner indicates that the "from" should be "form." PO Resp. 5.

providing *a sequence output each time* that the operator attempts to fasten a fastener in one of the first and second fastening locations indicating whether the predetermined fastening sequence has been achieved;

wherein the electronic controller also has stored in its memory first and second predetermined torque values that represent torque values that the operator is supposed to apply to fasteners inserted in the first and second fastening locations when the operator's use of the fastening tool conforms to the predetermined sequence of fastening; and

when the operator's use of the fastening tool conforms to the predetermined sequence of fastening,

(a) measuring torque applied to fastener by the fastening tool as it is being fastened in the first fastening location and then comparing the measured torque to the first predetermined torque value,

(b) requiring that the torque applied to the fastener located in the first fastening location equal the first predetermined torque value before the operator is allowed to insert a fastener in the second fastening location, which reduces the risk of structural failure of the assembled combination that would result if the operator were allowed to insert a fastener in the second fastening location when the torque applied to the first fastener does not equal the first predetermined torque value,

(c) measuring torque applied to a fastener by the fastening tool as it is being inserted in the second fastening location and then comparing the measured torque to the second predetermined torque value, and

(d) requiring that the torque applied to the fastener located in the second fastening location equal the second predetermined torque value after the first fastener has been inserted in the first fastening location at the first predetermined torque value, which reduces the risk of structural failure of the assembled combination that would result if the operator were allowed to complete assembly of the first and second components when the torque applied to the fastener inserted in the second fastening location did not equal the second predetermined torque value.

Ex. 1001, 13:4–14:64 (emphases added).

F. Asserted Prior Art and Proffered Testimonial Evidence

Petitioner identifies the following references as prior art in the asserted grounds of unpatentability:

Name	Reference	Exhibit No(s).
Stimpson	US 5,415,418, issued May 16, 1995	1006
Fredrick	US 5,547,259, issued Aug. 20, 1996	1007
Becker	US 5,890,405, issued Apr. 6, 1999	1009
Gass	WO 00/17719, published Mar. 30, 2000	1004, 1005
IBM	Three Dimensional Tooling Position Sensing, IBM Technical Disclosure Bulletin, vol. 36, no. 12, December 1993, pp. 81–82	1003
Sabatini	Seat Time, Automotive Manufacturing & Production, January 2000	1008

All references to Gass in this Decision are to the certified translation filed as Exhibit 1005. Petitioner also provides a Declaration of Gregory W. Davis, Ph.D., P.E. (Ex. 1002), and Patent Owner provides a Declaration of Mark Lehnert (Ex. 2037). Deposition transcripts for Dr. Davis and Mr. Lehnert were also filed. Ex. 1039; Ex. 2062.

G. Asserted Grounds

Petitioner asserts that claims 31–55 are unpatentable on the following grounds:

Claims Challenged	35 U.S.C. §	References/Basis
31, 32, 34, 36–38, 45, 46	103(a)[2]	IBM, Stimpson
31, 32, 34, 36–38, 45, 46	103(a)	IBM, Stimpson, Becker
31, 32, 34, 36–40, 45–53, 55	103(a)	IBM, Stimpson, Sabatini, Gass
31, 32, 34, 36–40, 45–53,	103(a)	IBM, Stimpson, Becker,

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[2] The relevant sections of the Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112–29, 125 Stat. 284 (Sept. 16, 2011), took effect on March 16, 2013. Because the '220 patent claims priority to an application filed before that date, our citations to Title 35 are to its pre-AIA version.

Claims Challenged	35 U.S.C. §	References/Basis
55		Sabatini, Gass
31–38, 41, 42, 45, 46, 54	103(a)	IBM, Fredrick
31–38, 41, 42, 45, 46, 54	103(a)	IBM, Fredrick, Becker
31–55	103(a)	IBM, Fredrick, Sabatini, Gass
31–55	103(a)	IBM, Fredrick, Becker, Sabatini, Gass
31, 32, 34, 36–40, 45–53, 55	103(a)	Gass, Stimpson, Sabatini
31, 32, 34, 36–40, 45–53, 55	103(a)	Gass, Stimpson, Sabatini, Becker
31–55	103(a)	Gass, Fredrick, Sabatini
31–55	103(a)	Gass, Fredrick, Sabatini, Becker

II. ANALYSIS

A. Legal Standards

In an *inter partes* review, Petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail in its challenges, Petitioner must prove unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e) (2020); 37 C.F.R. § 42.1(d).

The U.S. Supreme Court set forth the framework for applying the statutory language of 35 U.S.C. § 103 in *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966):

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc.,

might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

As explained by the Supreme Court in *KSR International Co. v. Teleflex Inc.*:

> Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit.

550 U.S. 398, 418 (2007) (citing *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.")).

"Whether an ordinarily skilled artisan would have been motivated to modify the teachings of a reference is a question of fact." *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1327 (Fed. Cir. 2016). "[W]here a party argues a skilled artisan would have been motivated to combine references, it must show the artisan 'would have had a reasonable expectation of success from doing so.'" *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1360–61 (Fed. Cir. 2017) (quoting *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1068–69 (Fed. Cir. 2012)).

As described below, the parties' disputes are related to the scope and content of the asserted prior art, differences between claim 31 and the asserted prior art, and objective indicia of nonobviousness.

After reviewing the complete record, we conclude that Petitioner has shown by a preponderance of the evidence that IBM, Fredrick, Sabatini, and Gass teach or suggest the limitations of claims 31–55; that a person of ordinary skill in the art would have had a reason to combine these references with a reasonable expectation of success; and that nexus has not been demonstrated sufficiently for the asserted objective indicia of nonobviousness.

B. Level of Ordinary Skill in the Art

Petitioner asserts the same level of ordinary skill that was applied in the earlier 305-IPR. Pet. 20 (quoting Ex. 1015, 29–30). In particular, Petitioner contends that one of ordinary skill in the art would have had

> a Bachelor of Science degree in Mechanical Engineering or a related field, and at least two (2) years of professional or practical experience in the industry, or comparable combination of education and experience, such as Electrical Engineering, Industrial Engineering, Manufacturing Engineering, and at least two (2) years of professional or practical experience in the industry, or comparable combination of education and experience, such as ten years of practical experience in industry.

Id.

Patent Owner states that it "does not materially dispute Petitioners' definition of a person of ordinary skill in the art." PO Resp. 23 (citing Pet. 20). In our Decision granting institution, we preliminarily adopted Petitioner's unopposed proposal. Inst. Dec. 10.

In determining the level of ordinary skill in the art, various factors may be considered, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active

workers in the field." *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation and internal quotation marks omitted).

Based on the full record before us, we see no reason to disturb our preliminary finding regarding the level of ordinary skill in the art. Accordingly, we maintain and reaffirm that one of ordinary skill in the art would have had

> a Bachelor of Science degree in Mechanical Engineering or a related field, and at least two (2) years of professional or practical experience in the industry, or comparable combination of education and experience, such as Electrical Engineering, Industrial Engineering, Manufacturing Engineering, and at least two (2) years of professional or practical experience in the industry, or comparable combination of education and experience, such as ten years of practical experience in industry.

Pet. 20; Inst. Dec. 10. This level of skill in the art is consistent with the disclosure of the '220 patent and the prior art of record.

C. Claim Construction

In an *inter partes* review based on a petition filed on or after November 13, 2018, the claims are construed

> using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

37 C.F.R. § 42.100(b) (2020); *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). Additionally, only terms that are in controversy need to be construed, and these need be construed only to the extent necessary to resolve the controversy. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that "only those terms need be construed that are in controversy, and only to the extent

necessary to resolve the controversy"); *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

Petitioner proposes an interpretation of "insert" and disputes Patent Owner's interpretation of "insert" from related litigation. Pet. 21–22. Petitioner also argues that "the Board need not resolve this dispute here because claims 31–55 are obvious under either construction." *Id.* at 22. We also note that, in its challenges based on IBM, Petitioner provides arguments regarding "sequence output." *Id.* at 31–32 (citing Ex. 1001, 7:63–67; Ex. 1014, 233; Ex. 1015, 13–18; Ex. 1016 ¶¶ 25–26, 34; Ex. 1018, 3). In our Decision granting institution, we did not need to interpret expressly any term at that stage of the proceeding. Inst. Dec. 11–12. Patent Owner states that "[n]o terms need be construed for the Board to reject Grounds A–F." PO Resp. 22 (citing Pet. 21–22); *see also id.* (indicating in a table that Grounds A–F include all the grounds listed above in Section I.G).

Petitioner's proposed combinations that include Becker are contingent on adopting Petitioner's interpretation of "insert." *See* Pet. 35–38, 55, 65–66, 70. We agree with the parties that we do not need to interpret this or any term to resolve the parties' disputes. Pet. 22; PO Resp. 22.

Therefore, in view of the full record before us, we determine that no claim terms require express construction. *Vivid Techs.*, 200 F.3d at 803.

D. *Scope and Content of the Asserted Prior Art*

1. *IBM (Ex. 1003)*

IBM comes from a "Technical Disclosure Bulletin" and is titled "Three Dimensional Tooling Position Sensing." Ex. 1003, ii, 81.[3] The only figure of IBM is reproduced below.
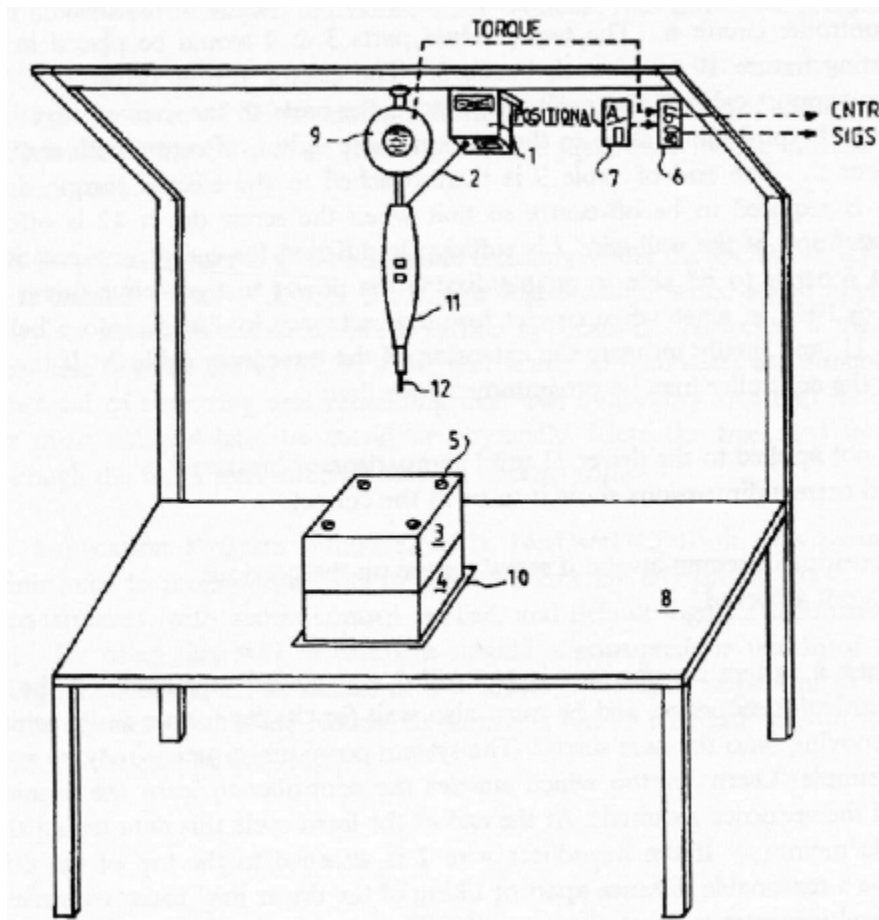
The figure shows a "screw torque sequence verification system." Ex. 1003, 82. IBM describes "[a]n example application for a screw torque sequence verification system" where "[t]he problem is to ensure that four screws 5 fixing two product parts 3 & 4 together are tightened to a specific torque in a specific sequence." *Id.*

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[3] Like Petitioner, we cite to the page numbers of IBM, not to its exhibit page numbers.

"An electric torque driver 11 and commercial 'pull-wire' position transducer 1 are both linked to a microcontroller circuit 6." Ex. 1003, 82. "The controller circuit 6 needs to be able to enable/disable the power to the torque driver 6 by use of a simple relay or FET to sense when correct torque is achieved by linking into a hall effect sensor in the driver 11." *Id.* "[T]he controller may be programmed" so that "[f]urther positions become invalid if screw torque on the previous position is not achieved." *Id.*

2. *Gass (Ex. 1005)*

Gass "relates to a process system and a process tool for processing a workpiece, more particularly in the field of automotive assembly." Ex. 1005 ¶ 1. This system, which ensures that an operator actually undertakes processing at programmed process sites on the workpiece, has

> a recognizing means . . . which identifies the location, i.e. the position of the process tool in the process station, the location, i.e. position of the workpiece in the process station and therefrom it is able to determine the location of the process tool relative to the process site in each case. Once the location of the process tool and the location of the workpiece ha[ve] been recognized then – since the process sites on the workpiece are always programmed (for example in a memory) – the system is always able to keep track of whether the process tool has been guided to the correct process site, also in the correct sequence, where several process sites are concerned, so that here . . . the system is able to assign the process tool not, for example, to each zone, as in the prior art, but to the process site itself. In other words, recognizing the process site is implemented implicitly via locationing.

Id. ¶ 15.

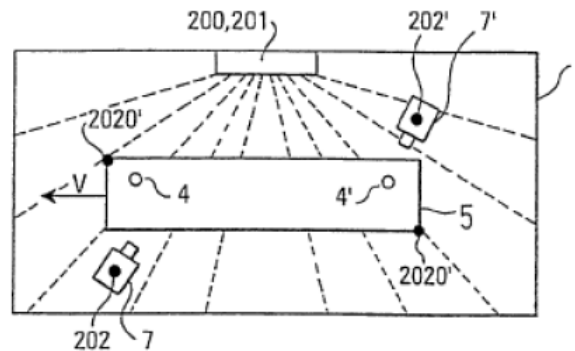Further defining the system, Gass refers to Figure 6, set forth below.

FIG.6

Figure 6 depicts that workpiece 5 is arranged in predefined process station 1, where processing at a plurality of process sites 4, 4' takes place with programmed process parameters by process tools 7, 7'. Ex. 1005 ¶ 64. As Gass explains,

> [a] recognizing means 200 is provided to identify the location and/or angular orientation of the process tool 7, 7' in the process station 1, the location of workpiece 7 in the process station 1 and to recognize therefrom the location of the process tool 7 relative to each process site 4.

Id.

With reference to Figure 5 (not reproduced), Gass further describes the system as follows.

> Once a programmed location of the workpiece (and/or a specific process site on the workpiece) relative to the tool has been recognized, the recognizing means 200 outputs the identification signal ES to the process parameter programming means 8 which . . . reads the corresponding design values from the memory 9 for outputting to each process tool 7, 7' and to the comparator means 10. During processing, the comparator means 10 compares the actual values to the design values and controls the process tool 7 . . . .

Id. When the actual and design values agree, comparator means 10 stops process tool 7, "so that in processing[,] the actual parameter is brought into

agreement with the design parameter." *Id.* ¶¶ 23, 43. Gass states that process tool 7 may be a screw driver or a nut runner, and the programmed process parameters may be bolting parameters, such as torque or a torsion angle of the screw driver or nut runner. *Id.* ¶ 90; *see also id.* ¶ 23 (stating process tool may be a screw driver or nut runner).

3. Fredrick (Ex. 1007)

Fredrick "relates to seat frames for automobiles." Ex. 1007, 1:6–7. Figure 1 of Fredrick is reproduced below.
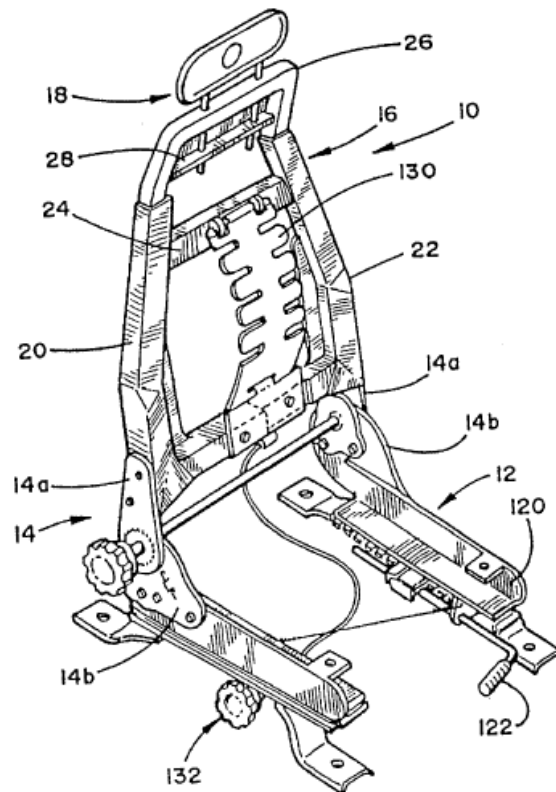

FIG. 1

Figure 1 "is a perspective view of the modular seat frame" of Fredrick. Ex. 1007, 2:35–36, 2:62–65. "The seat frame 10 is mounted on a conventional seat track 120 having a conventional adjuster assembly 122, and includes a lower seat assembly 12, a recliner assembly 14, a seat back frame 16, and a headrest assembly 18." *Id.* at 2:65–3:2. "The recliner

assembly 14 includes upper and lower mounting brackets 14a and 14b that are secured to the lower seat assembly 12 and seat back frame 16, respectively, by conventional means, such as bolts and/or welding." *Id.* at 3:9–12.

4. *Sabatini (Ex. 1008)*

Sabatini is an article titled "Seat Time." Ex. 1008, 54.[4] It describes a Johnson Controls facility for assembling seats for vehicles, such as the Lincoln LS. *Id.* "The LS seat line is actually two lines: one that builds the simple rear seats and another that builds the more complicated front seats," and the seats "are assembled entirely of subassembled components-tracks, foam cushions, back frames, leather covers, airbags, wiring harnesses, etc." *Id.* at 55, 56.

"Operators work in 'cells,' which are combinations of the 16 or so discrete steps in assembly," and "[e]ach cell has a measured takt time, which ensures that the line can run at an optimal speed." Ex. 1008, 55. "[A]s demand increases, more operators will be added" so as to "adapt production levels to Ford's demand." *Id.*; *see also id.* ("Operators will be moved from Port St.'s other seat line (Ford Expedition/ Lincoln Navigator seats) as demand fluctuates, adapting faster and cheaper than robots or other automation could."). "As more operators are added, work assignments in each cell are changed to reduce takt times." *Id.*

Also, according to Sabatini, "[o]perators use torque-sensing guns with visual indicators," and "[i]f fasteners are not run to the correct torque setting, a light above the line comes on and the line shuts down until an operator

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[4] Like Petitioner, we cite to the page numbers of Sabatini, not to its exhibit page numbers.

corrects the problem." Ex. 1008, 55. "Likewise, the continuity of the electrical system in the seat is tested as it moves on the conveyor by plugging a machine into the wiring harness." *Id.*

E. Obviousness Based on IBM, Fredrick, Sabatini, and Gass

With citations to the references and declarant testimony, Petitioner contends that claims 31, 32, 34, 36–38, 45, and 46 are unpatentable over IBM, Stimpson, and optionally Becker (Pet. 23–41); claims 31, 32, 34, 36–40, 45–53, and 55 are unpatentable over IBM, Stimpson, Sabatini, Gass, and optionally Becker (*id.* at 41–49); claims 31–38, 41, 42, 45, 46, and 54 are unpatentable over IBM, Frederick, and optionally Becker (*id.* at 49–59); and claims 31–55 are unpatentable over IBM, Fredrick, Sabatini, Gass, and optionally Becker (*id.* at 59–64).

Patent Owner responds that, for the obviousness challenges based on combinations with IBM, IBM fails to teach limitations related to storing predetermined torque values, measuring applied torque, comparing applied torque with predetermined torque values, and requiring the applied torque to equal a predetermined torque value before moving to a second fastening location. PO Resp. 2–5, 41–50. Patent Owner also responds that IBM fails to teach an electronic controller requiring an operator to use a fastening tool in a specific order. *Id.* at 5–7, 60.

Because Petitioner's challenge based on the proposed combination of IBM, Fredrick, Sabatini, and Gass addresses all of the challenged claims, we analyze that challenge in particular. For the reasons below, a preponderance of the evidence persuades us that IBM, Fredrick, Sabatini, and Gass teach or suggest the limitations of claims 31–55 and that one of ordinary skill in the art would have combined these references in the manner asserted by Petitioner with a reasonable expectation of success.

1. *Analysis of Claim 31*

a) *A method for assembling components of an article of assembly,
    the method comprising the steps of: providing at least first
    and second physically separate components that, when
    assembled together, form at least a portion of the article of
    assembly, wherein (a) a single set of discrete portions of the
    first and second components, when placed together, form a
    single process site consisting of a plurality of fastening
    locations within the single process site including first and
    second fastening locations, (b) each of the first and second
    fastening locations consists of a single opening for receiving a
    single fastener that, when fastened in the single opening,
    partially assembles the first and second components together,
    and (c) wherein the article of assembly is structurally designed
    so that the first and second fastening locations are positioned
    within the single process site in spaced apart relation to each
    other*

Patent Owner does not present an argument regarding the limitations

of claim 31 quoted above. *See* PO Resp. 23–62. For these limitations,

Petitioner argues that Fredrick teaches assembling lower seat assembly 12

and mounting bracket 14b by placing them together to form a single process

site with three fastening locations spaced apart that each receive a bolt to

fasten together lower seat assembly 12 and mounting bracket 14b. Pet. 25–

26 (citing Ex. 1002 ¶¶ 84–86; Ex. 1003, 81–82; Ex. 1006, 2:19–20), 49–50

(citing Ex. 1007, 2:65–3:12, Fig. 1); *see also id.* at 4–5 (referring to these

limitations as "31(1)").

We find that the relied-upon portion of IBM teaches "[a]n example

application for a screw torque sequence verification system" where "[t]he

problem is to ensure that four screws 5 fixing two product parts 3 & 4

together are tightened to a specific torque in a specific sequence." Ex. 1003,

82. We also find that the relied-upon portion of Fredrick teaches that seat

frame 10 "includes a lower seat assembly 12, a recliner assembly 14, a seat

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back frame 16, and a headrest assembly" (Ex. 1007, 2:67–3:2) and that
"recliner assembly 14 includes upper and lower mounting brackets 14a and
14b that are secured to the lower seat assembly 12 and seat back frame 16,
respectively, by conventional means, such as bolts" (*id.* at 3:9–12); *see also
id.* Fig. 1 (showing three bolts fastening bracket 14b to lower seat assembly
12).

Because IBM teaches a system for ensuring screws 5 fix together two
parts 3, 4 and Fredrick teaches mounting bracket 14b is physically separate
from lower seat assembly 12 and assembled to form a seat frame, and they
also form a single process site with three spaced apart fastening locations
that are openings that each receive a bolt, Petitioner persuades us that IBM
and Fredrick teach the above quoted limitations of claim 31.

> b) *such that a fastener must be inserted in the first fastening
>   location before a fastener is inserted in the second fastening
>   location to reduce the risk of structural failure of the
>   assembled combination of the first and second components that
>   would arise if a fastener were inserted in the second fastening
>   location before a fastener were inserted in the first fastening
>   location,*

Patent Owner does not present an argument regarding the limitations
of claim 31 quoted above. *See* PO Resp. 23–62. Petitioner argues that
Fredrick teaches these limitations of claim 31. Pet. 54–55 (citing Ex. 1002
¶¶ 173, 178); *see also id.* at 5 (referring to these limitations as "31(2)").

As discussed above, we find that Fredrick teaches that "recliner
assembly 14 includes upper and lower mounting brackets 14a and 14b that
are secured to the lower seat assembly 12 and seat back frame 16,
respectively, by conventional means, such as bolts" (Ex. 1007, 3:9–12) and
shows three bolts fastening bracket 14b to lower seat assembly 12 (*id.*
Fig. 1). Further, Dr. Davis explains how these components teach or suggest

the limitations, and we credit that testimony because Fredrick supports it.
Ex. 1002 ¶ 178.

Because Fredrick teaches at least two bolts securing lower mounting
bracket 14b to lower seat assembly 12, and as discussed below, Petitioner
proposes combining IBM and Fredrick to reduce the risk of structural
failure, Petitioner persuades us that IBM and Fredrick teach the above
quoted limitations of claim 31. *See* Pet. 49–53.

> c) *holding the first and second components of the article of
> assembly in a predetermined position in which the first and
> second components are placed together to form the single
> process site;*

Petitioner shows, and Patent Owner does not dispute, that IBM
teaches that "two product parts 3 & 4 would be placed in position on a
suitable locating fixture 10 on a work bench 8." Pet. 5 (referring to these
limitations as "31(3)"), 27–28 (citing Ex. 1002 ¶¶ 92–97; Ex. 1003, 81–82),
53; Ex. 1003, 82; *see also* Ex. 1002 ¶¶ 92–94 (we credit Dr. Davis's
testimony regarding this limitation because he shows how IBM supports his
opinion) (citing Ex. 1003, 81–82).

Because IBM teaches parts 3, 4 on locating fixture 10, Petitioner
persuades us that IBM teaches the above quoted limitation of claim 31.

> d) *manually fastening fasteners into the first and second fastening
> locations of the article of assembly using a fastening tool;*

Petitioner shows, and Patent Owner does not dispute, that IBM
teaches electric torque driver 11 and that "an operator is compelled and
guided into applying the driver to the screws in a particular sequence, and he
must also wait for the set torque to be achieved on each screw before
moving onto the next screw." Pet. 5 (referring to these limitations as
"31(4)"), 28 (citing Ex. 1002 ¶ 98), 53; Ex. 1003, 82; *see also* Ex. 1002 ¶ 98

(we credit Dr. Davis's testimony regarding this limitation because he shows how IBM supports his opinion) (citing Ex. 1003, 81–82).

Because IBM teaches electric torque driver 11 for fastening screws into parts 3, 4, Petitioner persuades us that IBM teaches the above quoted limitation of claim 31.

> e) *providing an electronic controller having stored in a memory thereof before an operator has commenced any aspect of manually fastening fasteners using the fastening tool (a) data representative of the location of the first fastening location within the single process site together with first order data indicating that a fastener must be inserted in the first fastening location at a point in time before a fastener is inserted in the second fastening location, and (b) data representative of the location of the second fastening location within the single process site together with second order data indicating that a fastener must be inserted in the second fastening location at a point in time after a fastener has been inserted in the first fastening location, wherein the location data and the first and second order data for the first and second fastening locations from a predetermined fastening sequence . . . electronically comparing the sensed position of the fastening tool with the data representative of the location of the first and second fastening locations to determine if the fastening tool is located in operative relation to one of the first and second fastening locations and then using the order data associated with the one of the first and second fastening locations to ensure the operator's use of the fastening tool conforms to the predetermined sequence of fastening among the first and second fastening locations by (a) enabling the fastening tool, when it is positioned in operative relation to the first fastening location, to insert a fastener in the first fastening location only if the operator has not inserted a fastener in the second fastening location, and (b) enabling the fastening tool, when it is positioned in operative relation to the second fastening location, only if the operator already has inserted a fastener in the first fastening location, . . . providing a sequence output each time that the operator attempts to fasten a fastener in one*

> *of the first and second fastening locations indicating whether*
> *the predetermined fastening sequence has been achieved;*

For the limitations starting with "providing an electronic controller," Petitioner contends that IBM and Stimpson teach the limitations. Pet. 5–6 (referring to these limitations as "31(5)"), 29–30 (citing Ex. 1002 ¶¶ 99–101; Ex. 1003, 81–82; Ex. 1006, 2:43–49), 53. For the limitations starting with "electronically comparing," Petitioner argues that IBM teaches the limitations. *Id.* at 7 (referring to these limitations as "31(8)"), 30–31 (citing Ex. 1002 ¶ 104; Ex. 1003, 82), 53. For the limitations starting with "providing a sequence output," Petitioner argues that IBM teaches the limitations. *Id.* at 8 (referring to these limitations as "31(10)"), 31–33 (citing Ex. 1002 ¶¶ 106–107), 53.

(1) Patent Owner's Response

Patent Owner refers to these limitations together as the "Claimed Sequence Requirements." PO Resp. 5–6 (quoting Ex. 1001, 13:38–56, 14:1–15, 14:21–24). Patent Owner responds that IBM does not teach or suggest enforcing a "predetermined fastening sequence," "using . . . order data," or "providing a sequence output . . . each time that the operator attempts to fasten a fastener." *Id.* Patent Owner also responds that Fredrick, Sabatini, and Gass do not remedy the asserted deficiencies. *Id.*

Patent Owner argues that ordinary skilled artisans "would have known that 'sequence' in *IBM* refers to operators fastening screws consecutively one after another in any order without 'rehitting' an already-fastened screw" and would not have understood "*IBM* as disclosing the far-advanced concepts of (and components required for) the Claimed Torque Requirements." PO Resp. 3–4.

In particular, Patent Owner argues that IBM "monitor[s] the position of a clutch-controlled tool on a pull-wire and count[s] fastenings based on clutch disengagement at programmed extension dimensions of the pull-wire to ensure all screws were applied" to "prohibit[] 'rehits' of the same screws." PO Resp. 42 (citing Ex. 2037 ¶ 152). Patent Owner also argues that "[i]f the clutch disengaged at a programmed extension dimension, the system would count that hole as fastened and not enable the tool there again." *Id.* (citing Ex. 2037 ¶ 152).

Patent Owner contends that "IBM says nothing about programming the controller to force operators to achieve one dimension of the pull-wire before any other dimension or that an operator must start fastening at any specific programmed dimension." PO Resp. 42–43 (citing Ex. 1003, 82; Ex. 2037 ¶ 153). Patent Owner also contends that IBM's use of "particular sequence" and "sequence" would have been understood to "mean fastening one screw after another consecutively to prohibit rehitting the same screw and ensure that no hole is missed." *Id.* at 43 (citing Ex. 2037 ¶ 153). Patent Owner further contends that IBM was meant for assembling computer components and designed to count screws. *Id.* (citing Ex. 2037 ¶ 153).

Patent Owner argues that IBM sends only "POSITIONAL" and "TORQUE" data and has a "CNTR" for counting clutch disengagements. PO Resp. 43 (citing Ex. 1003, 81). Patent Owner also argues that IBM uses "sequence of operations" and "sequence of use," not sequence of fastening, so ordinary skilled artisans would not have understood that IBM was implementing a fastening order. *Id.* (citing Ex. 2037 ¶ 154). Patent Owner further argues that Dr. Davis does not testify to the contrary, never saw the IBM apparatus, did not know if a prototype was built, and first saw IBM for

this proceeding. *Id.* at 44 (citing Ex. 1002 ¶¶ 99–101, 104; Ex. 2062, 77:4–
6, 78:5–21, 79:11–14, 80:1–7, 84:12–85:12, 86:2–6, 131:15–133:2).

Specific to the Claimed Sequence Requirements, Patent Owner
responds, by referring to arguments about comparing measured torque and
predetermined torque, that "*IBM* does not force a fastening order" and that
the "*IBM* apparatus assigned each screw hole a distance that the pull-wire
had to be extended to force operators to perform sequential (one after
another) fastening to prohibit 'rehits' of the same screw." PO Resp. 60.
According to Patent Owner, "*IBM* contains no disclosure requiring operators
to fasten one hole first and before any other hole." *Id.*

(2) Petitioner's Reply

For the Claimed Sequence Requirements, Petitioner replies that Patent
Owner relies on an apparatus that is irrelevant, and IBM expressly teaches
"correct process sequence" and preventing "incorrect sequences."
Pet. Reply 19 (citing PO Resp. 42–44, 58–60; Ex. 1003, 81–82; Ex. 2062,
93:9–94:10, 120:14–122:6, 131:3–133:15). Petitioner also replies that IBM
teaches a controller that learns a "sequence" and "sequence required." *Id.* at
19 (citing Ex. 1003, 82). Petitioner argues that the '220 patent provides
minimal details about its forced-sequence fastening. *Id.* (citing Ex. 1001,
7:57–67). Petitioner further replies that IBM's "CNTR SIGS" refers to
"control signals" and IBM does not merely count without enforcing a
sequence, as argued by Patent Owner. *Id.* at 20 (citing PO Resp. 28;
Ex. 2049, 1).

(3) Patent Owner's Sur-Reply

For the Claimed Sequence Requirements, Patent Owner replies that
IBM's tool would not be disabled if there was a fastening order. PO Sur-
reply 22. Patent Owner also argues that Petitioner's reply arguments

"present nothing new" and only attorney arguments about "sequence," as used in IBM, that fails to rebut Mr. Lehnert's testimony that the term indicates using IBM's tool to fasten consecutively so that no fastener is missed. *Id.* (citing Ex. 1003, 81–82). According to Patent Owner, IBM says nothing about locations or order and "does not describe requiring that torque applied at a specific first location equal a specific torque **before** the operator may apply torque at a second specific location." *Id.* at 22–23. Patent Owner contends that IBM merely states "[f]urther positions become invalid," and so "operators could go to any other hole—any 'further positions'—not one specific next hole." *Id.* at 23 (citing Ex. 1003, 82). Patent Owner also contends that "*IBM* does not say that a sequence is stored in memory" and only pull-wire dimensions are discussed. *Id.* (citing Ex. 1003, 82). According to Patent Owner, the "operator decides the order, but is 'compelled and guided' to apply the driver to specific holes depending on what hole(s) he already fastened." *Id.* (citing Ex. 1003, 82; Ex. 2037 ¶ 153). Patent Owner also asserts that Petitioner's reply arguments about "CNTR" are attorney arguments and contradicts both parties' declarant testimony. *Id.* at 23–24 (citing Ex. 2037 ¶ 125; Ex. 2062, 127:7–128:5, 142:2–15).

(4) *Petitioner Shows that IBM Teaches or Suggests the Claimed Sequence Requirements*

For the limitations regarding the step of "providing an electronic controller having stored in a memory thereof . . . " (limitation "31(5)"), we find that the relied-upon portions of IBM teach that "system positions/sequence may be set dynamically by having a simple 'Learn' button which enables the controller to learn the nominal positions, tolerance, and the sequence required." Ex. 1003, 82. We also credit Dr. Davis's

testimony regarding these limitations because IBM supports it. Ex. 1002 ¶ 99 (citing Ex. 1003, 82).

For the limitations regarding the step of "electronically comparing the sensed position . . . " (limitation "31(8)), we find that the relied-upon portion of IBM teaches that "[w]ith such a system an operator is compelled and guided into applying the driver to the screws in a particular sequence, and he must also wait for the set torque to be achieved on each screw before moving onto the next screw." Ex. 1003, 82. We also credit Dr. Davis's testimony regarding these limitations because IBM supports it. Ex. 1002 ¶ 104 (citing Ex. 1003, 82).

For the limitations regarding the step of "providing a sequence output" (limitation "31(10)"), we find that the relied-upon portion of IBM teaches that "the intel 8097 microcontroller with a small amount of I/O logic and a display suffices." Ex. 1003, 81–82. We also credit Dr. Davis's testimony regarding these limitations because IBM supports it. Ex. 1002 ¶ 104 (citing Ex. 1003, 81–82).

In view of the above and the parties' dispute regarding these limitations, we find that the relied-upon portion of IBM explicitly describes "a screw torque sequence verification system," that addresses the "problem" of "ensur[ing] screws 5 . . . are tightened to a specific torque in a specific sequence" and that compels "an operator . . . into applying the driver to the screws in a particular sequence." Ex. 1003, 82. IBM's system also "enables the controller to learn . . . the sequence required." *Id.* Based on our findings above, Petitioner shows that IBM enforces a predetermined sequence. We also credit Dr. Davis's testimony regarding these limitations because record evidence supports it. Ex. 1002 ¶¶ 99–101 (citing Ex. 1003,

81–82), 104 (citing Ex. 1003, 82); Ex. 2062, 93:9–94:10, 120:14–122:6, 131:3–133:15.

We also find that the relied-upon portion of IBM teaches that "controller circuit 6 needs to be able to enable/disable the power to the torque driver 6 by use of a simple relay or FET to sense when correct torque is achieved by linking into a hall effect sensor in the driver 11," "[f]urther positions become invalid if screw torque on the previous position is not achieved," and that "an operator is compelled . . . into applying the driver to the screws in a particular sequence, and he must also wait for the set torque to be achieved on each screw before moving onto the next screw." Ex. 1003, 81–82. We credit Dr. Davis's testimony regarding these limitations because IBM supports it. Ex. 1002 ¶ 111 (citing Ex. 1003, 81–82).

Further, as discussed below, Petitioner persuades us that one of ordinary skill in the art would have applied IBM's "screw torque sequence verification system" to Fredrick's vehicle to "reduc[e] the risk of structural failure that would occur if *Fredrick's* bolts were fastened in the wrong order or to the wrong torque." Pet. 53. Dr. Davis explains how these components teach or suggest the limitations quoted above and referred to as "31(8)" and "31(10)," and we credit that testimony because IBM and Fredrick support it. Ex. 1002 ¶ 178 (citing Ex. 1003, 82; Ex. 1007, 3:11–12, Fig. 1).

Patent Owner offers another interpretation of IBM that is used to avoid "rehits" by tracking pull dimensions of driver 11 as it tightens screws 5. *See* PO Resp. 3, 41–42 (citing Ex. 2037 ¶ 152), 60; PO Sur-reply 22–23. In view of our factual findings above and cited evidence, we credit Dr. Davis's testimony over Mr. Lehnert's testimony because IBM better

supports Dr. Davis's testimony. *See* Ex. 1002 ¶¶ 99–101, 178; Ex. 2037
¶¶ 152–154 (citing Ex. 1003, 81–82).

For the reasons stated above, Petitioner persuades us that IBM and
Fredrick teach the above quoted limitations of claim 31. Patent Owner also
provides the bases for these arguments in its responsive arguments for the
later recited "Claimed Torque Requirements," which we analyze below. *See*
PO Resp. 2–4, 41–50.

> f) *that must be followed in order for the first and second
> components to be assembled together in a manner that reduces
> the risk of structural failure of the assembled combination that
> would arise if a fastener were inserted in the second fastening
> location before a fastener were inserted in the first fastening
> location;*

Petitioner shows, and Patent Owner does not dispute, that Fredrick
teaches the limitations quoted above. Pet. 6 (referring to these limitations as
"31(6)"), 53 (citing Ex. 1002 ¶¶ 174, 178), 54–55 (citing Ex. 1002 ¶¶ 173,
178).

As discussed above, we find that Fredrick teaches that "recliner
assembly 14 includes upper and lower mounting brackets 14a and 14b that
are secured to the lower seat assembly 12 and seat back frame 16,
respectively, by conventional means, such as bolts" (Ex. 1007, 3:9–12) and
shows three bolts fastening bracket 14b to lower seat assembly 12 (*id.*
Fig. 1). Further, Dr. Davis explains how these components teach or suggest
the limitations, and we credit that testimony because Fredrick supports it.
Ex. 1002 ¶ 178.

Because Fredrick teaches at least two bolts securing lower mounting
bracket 14b to lower seat assembly 12, and as discussed below, Petitioner
proposes combining IBM and Fredrick to reduce the risk of structural

failure, Petitioner persuades us that IBM and Fredrick teach the above quoted limitations of claim 31. As discussed below, Petitioner proposes combining IBM and Fredrick to reduce the risk of structural failure. *See* Pet. 49–53.

> g) *sensing the position of the fastening tool;*

Petitioner shows, and Patent Owner does not dispute, that IBM teaches that "transducer 1 is required to be off-centre so that when the screw driver 12 is offered up to the screws the extension of the pull-wire 2 is sufficiently different for each screw position" and that "[i]f the transducer wire 2 is attached to the top of the driver then the screws must be a reasonable distance apart or tilting of the driver may cause incorrect positions to be measured." Pet. 6–7 (referring to this limitation as "31(7)"), 30 (citing Ex. 1002 ¶¶ 102–103; Ex. 1003, 81–82), 53; Ex. 1003, 82; Ex. 1002 ¶ 102 (we credit Dr. Davis's testimony regarding this limitation because he shows how IBM supports his opinion) (citing Ex. 1003, 81–82).

Because IBM teaches a wire attached to its driver that provides its position, Petitioner persuades us that IBM teaches the above quoted limitation of claim 31.

> h) *which reduces the risk of structural failure of the assembled combination that would arise if a fastener were inserted in the second fastening location before a fastener were inserted in the first fastening location;*

Petitioner argues that Fredrick teaches the limitation quoted above. Pet. 54–55 (citing Ex. 1002 ¶¶ 173, 178); *see also id.* at 8 (referring to these limitations as "31(9)").

As discussed above, we find that Fredrick teaches that "recliner assembly 14 includes upper and lower mounting brackets 14a and 14b that are secured to the lower seat assembly 12 and seat back frame 16,

respectively, by conventional means, such as bolts" (Ex. 1007, 3:9–12) and shows three bolts fastening bracket 14b to lower seat assembly 12 (*id.* Fig. 1). Further, Dr. Davis explains how these components teach or suggest the limitations, and we credit that testimony because Fredrick supports it. Ex. 1002 ¶ 178.

Because Fredrick teaches at least two bolts securing lower mounting bracket 14b to lower seat assembly 12, and as discussed below, Petitioner proposes combining IBM and Fredrick to reduce the risk of structural failure, Petitioner persuades us that IBM and Fredrick teach the above quoted limitations of claim 31. *See* Pet. 49–53.

> i) *wherein the electronic controller also has stored in its memory first and second predetermined torque values that represent torque values that the operator is supposed to apply to fasteners inserted in the first and second fastening locations when the operator's use of the fastening tool conforms to the predetermined sequence of fastening; and when the operator's use of the fastening tool conforms to the predetermined sequence of fastening, (a) measuring torque applied to fastener by the fastening tool as it is being fastened in the first fastening location and then comparing the measured torque to the first predetermined torque value, (b) requiring that the torque applied to the fastener located in the first fastening location equal the first predetermined torque value before the operator is allowed to insert a fastener in the second fastening location, . . . (c) measuring torque applied to a fastener by the fastening tool as it is being inserted in the second fastening location and then comparing the measured torque to the second predetermined torque value, and (d) requiring that the torque applied to the fastener located in the second fastening location equal the second predetermined torque value after the first fastener has been inserted in the first fastening location at the first predetermined torque value,*

For the limitations quoted above, Petitioner argues that Fredrick evidences that predetermined fastening sequence and predetermined torque

values "were known to reduce the risk of structural failure of *Fredrick's* seat." Pet. 8 (referring to these limitations as "31(11)"), 8–9 (referring to these limitations as "31(12)" and "31(12) (continued)"), 34–35 (citing Ex. 1002 ¶ 111; Ex. 1003, 81–82), 53 (citing Ex. 1002 ¶¶ 174, 178).

(1) Patent Owner's Response

Patent Owner refers to the limitations quoted above as the "Claimed Torque Requirements." PO Resp. 2–3 (quoting Ex. 1001, 14:25–42). Patent Owner responds that "no cited reference teaches the heart of the invention— an electronic controller that requires an operator to apply specific preprogrammed torque values with a fastening tool in a specific predefined (not operator-defined) order," as required by these limitations. *Id.* at 2. According to Patent Owner, "[t]hese limitations establish that an operator must start at a first predetermined fastening location and measure, compare and apply a preprogrammed torque value at that location before being allowed to move to a next fastening location." *Id.* at 3; *see also id.* at 41 (arguing that the Claimed Torque Requirements enforce similar operator actions).

Patent Owner argues that IBM and Gass do not teach the Claimed Torque Requirements because "[n]either one enforces a 'predetermined sequence of fastening,' let alone while also 'measuring' torque, 'comparing' measured torque to a 'stored' predetermined torque value and 'requiring' that a predetermined torque value be reached at a first fastening location before an operator can go to the next one in a predefined order." PO Resp. 3; *see also id.* at 41 (arguing that "*IBM* does not teach 'stor[ing]' predetermined torque values and enforcing a 'predetermined fastening sequence' while 'measuring torque,' 'comparing the measured torque to [stored] predetermined torque values' and 'requiring' that the torque applied

to one fastener equal a stored torque value before the operator can fasten another fastener").

In Patent Owner's view, IBM discloses, and would have been understood to disclose, "a counting apparatus with a clutch-controlled screwdriver." PO Resp. 3. Patent Owner argues that IBM "executed a 'counting program' that allowed the user to start at any hole, did not measure the torque applied, did not compare torque measurements and did not require the applied torque to be equal to a torque value retrieved from memory" (*id.* at 41) and "skilled artisans would have understood *IBM* as teaching a counting apparatus – not a method of enforcing a 'predetermined fastening sequence'" (*id.* at 42 (citing Ex. 2037 ¶ 152)). Patent Owner also argues that ordinary skilled artisans would not have understood "*IBM* as disclosing the far-advanced concepts of (and components required for) the Claimed Torque Requirements." *Id.* at 3–4.

Specific to the Claimed Torque Requirements, Patent Owner argues that IBM "monitor[s] the position of a clutch-controlled tool on a pull-wire and count[s] fastenings based on clutch disengagement at programmed extension dimensions of the pull-wire to ensure all screws were applied" to "prohibit[] 'rehits' of the same screws." PO Resp. 42 (citing Ex. 2037 ¶ 152). Patent Owner also argues that "[i]f the clutch disengaged at a programmed extension dimension, the system would count that hole as fastened and not enable the tool there again." *Id.* (citing Ex. 2037 ¶ 152).

Patent Owner contends that "IBM says nothing about programming the controller to force operators to achieve one dimension of the pull-wire before any other dimension or that an operator must start fastening at any specific programmed dimension." PO Resp. 42–43 (citing Ex. 1003, 82; Ex. 2037 ¶ 153). Patent Owner also contends that IBM's use of "particular

sequence" and "sequence" would have been understood to "mean fastening one screw after another consecutively to prohibit rehitting the same screw and ensure that no hole is missed." *Id.* at 43 (citing Ex. 2037 ¶ 153). Patent Owner further contends that IBM was meant for assembling computer components and designed to count screws. *Id.* (citing Ex. 2037 ¶ 153).

Patent Owner argues that IBM sends only "POSITIONAL" and "TORQUE" data and has a "CNTR" for counting clutch disengagements. PO Resp. 43 (citing Ex. 1003, 81). Patent Owner also argues that IBM uses "sequence of operations" and "sequence of use," not sequence of fastening, so ordinary skilled artisans would not have understood that IBM was implementing a fastening order. *Id.* (citing Ex. 2037 ¶ 154). Patent Owner further argues that Dr. Davis does not testify to the contrary, never saw the IBM apparatus, did not know if a prototype was built, and first saw IBM for this proceeding. *Id.* at 44 (citing Ex. 1002 ¶¶ 99–101, 104; Ex. 2062, 77:4–6, 78:5–21, 79:11–14, 80:1–7, 84:12–85:12, 86:2–6, 131:15–133:2).

Patent Owner also responds that "[t]he 'set torque' in *IBM* refers to the spring force on the clutch," "[t]he 'hall effect sensor' in *IBM* detects when that force is exceeded and reports clutch disengagement as a binary signal to the controller," and "[t]he controller did not store or force a preprogrammed fastening order—it stored pullwire extension dimensions, which an operator could achieve in any order, and counted clutch disengagements when an operator extended the pull-wire to match a stored dimension." PO Resp. 3.

Specifically, Patent Owner argues that "*IBM* necessarily discloses a clutch-controlled tool and simple microcontroller that – whether alone or together – did not ***and could not*** measure and compare torque." PO Resp. 44 (citing Ex. 2037 ¶ 156); *see also id.* at 25 (arguing that IBM has a

clutch-controlled tool and torque refers to a clutch setting) (citing Ex. 2037
¶¶ 114–117; Ex. 2001; Ex. 2002; Ex. 2003; Ex. 2004). Patent Owner also
argues that Dr. Davis admitted that IBM did not measure and compare. *Id.*
(citing Ex. 2062, 56:1–9, 57:1–2, 57:13–21, 106:4–9, 140:16–19, 145:11–
16, 146:21–24, 152:8–21). Patent Owner further argues that Petitioner's
arguments depends on IBM having a torque transducer tool, but that
contradicts the state of the art at the time. *Id.* at 44–45 (citing Ex. 2037
¶ 156; Ex. 2062, 103:25–104:3, 136:6–16, 140:16–19, 145:7–16, 146:6–24,
151:13–21, 152:14–21); *see also id.* at 8–20 (arguing what the state of the art
was at the time).

Patent Owner asserts that ordinary skilled artisans would have
necessarily understood that IBM's screw driver with "hall effect sensor"
refers to a Hall effect sensor used to detect clutch disengagement of the
screw driver, not a torque transducer tool as asserted by Petitioner's
arguments, because such tools were used in low-torque applications and
torque transducer tools were not available until later. PO Resp. 45–46
(citing Ex. 2037 ¶ 159). Patent Owner also asserts that Dr. Davis lacks
knowledge and experience with such tools. *Id.* at 46 (citing Ex. 2062,
34:15–35:6, 54:22–55:5, 102:16–18, 103:8–104:7, 163:9–15).

As for IBM's 8097 microcontroller, Patent Owner asserts that such a
microcontroller did not have the computing power to be used with a torque
transducer tool, was not compatible with a torque transducer tool, and would
not be paired with such a tool by ordinary skilled artisans. PO Resp. 46–47
(citing Ex. 2037 ¶¶ 63–65, 119–121, 160, 161; Ex. 2049); *see also id.* at 26–
27 (arguing that the 8097 microcontroller could not be used with a torque
transducer tool, receives a clutch disengagement signal, and outputs a
counter for dimension matches and clutch disengagements) (citing Ex. 1003,

81–82; Ex. 2037 ¶¶ 119, 122–126). Regarding IBM's use of "torque,"
Patent Owner asserts that the term was used to describe clutch-controlled
tools, and Dr. Davis is mistaken when he opines that it applied to torque
transducer tools. *Id.* at 47–48 (citing Ex. 2037 ¶ 162; Ex. 2054; Ex. 2055;
Ex. 2056; Ex. 2058; Ex. 2059; Ex. 2062, 101:13–20, 103:10–15, 104:21–24,
110:16–21, 136:6–16, 137:1–10, 139:1–7, 150:7–151:21, 153:10–21).
Patent Owner also asserts that IBM's only figure shows a clutch-controlled
tool. *Id.* at 48–49 (citing Ex. 2037 ¶ 165; Ex. 2063). Patent Owner further
asserts that Dr. Davis's testimony is inconsistent with Mr. Lehnert's
personal observation of the IBM apparatus. *Id.* at 49 (citing Ex. 2037 ¶ 165;
Ex. 2062, 127:2–6).

According to Patent Owner, Petitioner's arguments fail because IBM
does not disclose comparing sensed torque to set torque, IBM's
microcontroller could not perform such a comparison, and IBM only
measures pull-wire lengths and compares it to stored dimensions. PO
Resp. 49 (citing Pet. 33; Ex. 1003, 81–82; Ex. 2037 ¶ 166). Patent Owner
also argues that it would not have been obvious to store set torque because
IBM's set torque is spring force on the clutch, not a stored value. *Id.* at 49–
50 (citing Pet. 33; Ex. 2037 ¶ 167). Patent Owner further argues that IBM
did not force or require any torque because it simply stopped power to the
tool when the clutch disengaged, and Dr. Davis's testimony is mistaken. *Id.*
at 50 (citing Pet. 34; Ex. 1002 ¶ 111; Ex. 2037 ¶ 168).

(2) Petitioner's Reply

Petitioner replies that IBM ensures that "fasteners are tightened 'to a
specific torque in a specific sequence.'" Pet. Reply 4 (citing Ex. 1003, 81–
82). Petitioner argues that Patent Owner relies on a different and irrelevant
IBM apparatus that Mr. Lehnert allegedly once saw, differs from IBM, is not

shown to be prior art, and has not been corroborated. *Id.* at 4–5 (citing PO Resp. 43; Ex. 2037 ¶¶ 73, 74, 76, 77, 153).

Petitioner also replies that IBM teaches that its Hall effect sensor senses torque. Pet. Reply 5–6 (citing Pet. 34; Ex. 1002 ¶¶ 108–111; Ex. 1003, 81–82). Petitioner argues that Dr. Davis confirmed that ordinary skilled artisans would have understood that IBM teaches a Hall effect torque transducer. *Id.* at 6–7 (citing Ex. 2062, 104:11–105:9, 110:4–113:8, 136:6–139:13). Petitioner also argues that Patent Owner relies on an irrelevant IBM apparatus and provides no evidence showing that "torque" would have meant a clutch disengagement signal. *Id.* at 7 (citing PO Resp. 17, 28; Ex. 1040, 4:46–49; Ex. 1043, 3:58–59; Ex. 2062, 136:6–139:13). Petitioner further argues that IBM's torque driver is not limited to a low-torque screwdriver or the example application. *Id.* (citing Ex. 1003, 82; Ex. 2037 ¶ 116). Petitioner additionally provides examples of screwdrivers with torque sensors from the 1990's to refute Patent Owner's argument. *Id.* at 7–9 (citing PO Resp. 13; Ex. 1005 ¶ 50, Figs. 1b, 3b; Ex. 1040, 4:46–5:35, Fig. 1; Ex. 1041, 3:2–28, Fig. 3; Ex. 1042, Fig. 3; Ex. 1043, 3:14–68, Fig. 1; Ex. 1046, 1:30–40, 8:51–9:2).

Petitioner argues that IBM does not limit its torque driver to any particular brand or type. Pet. Reply 9 (citing PO Resp. 48–49; Ex. 1003, 82; Ex. 2062, 118:4–13, 115:4–8). Petitioner also argues that IBM ensures screws are fastened to "the correct torque" so the Hall effect sensor must measure torque to meet IBM's goal. *Id.* at 9 (citing Ex. 1003, 82; Ex. 2062, 56:22–57:22, 106:7–10, 140:10–25, 145:7–148:14), 10 (citing Ex. 2062, 105:10–106:23). According to Petitioner, clutch-controlled tools with sensors to verify correct torque were known at the time. *Id.* at 9–10 (citing Ex. 1039, 32:4–20, 42:2–5; Ex. 2037 ¶¶ 24–26). Petitioner contends that

IBM's microcontroller facilitated comparing with "sensed data" so the Hall effect sensor must measure torque. *Id.* at 10 (citing Ex. 1002 ¶¶ 108–111; Ex. 2062, 105:10–106:23, 139:16–140:25, 147:9–25, 155:2–6, 157:4–158:12). Petitioner, thus, contends that IBM would have confirmed to a person of ordinary skill in the art that its Hall effect sensor measures torque. *Id.* at 11 (citing Ex. 2062, 141:4–22, 145:1–147:25, 151:7–153:9).

Petitioner also replies that Hall effect torque sensors were well known at the time of invention. Pet. Reply 11–12 (citing PO Resp. 45–46; Ex. 1039, 53:16–54:22; Ex. 1044, 3:12–25, 5:11–14, 7:57–59, 8:27–9:31; Ex. 1045, 3:31–63, 5:52–61; Ex. 1048, 6:53–60, 17:66–67; Ex. 1050, Abstract, 2:52-57, 4:14–19, 4:47–48; Ex. 1051, 7:30, 8:20; Ex. 1052, 6:65–66; Ex. 1053, Abstract, 21:34–35; Ex. 2062, 44:1–47:11, 48:19–50:7, 49:17–53:19, 110:4–113:8, 159:6–160:12). According to Petitioner, Mr. Lehnert knew of Hall effect torque sensors used with tools before the priority date. *Id.* at 12–14 (citing Ex. 1039, 45:4–48:22, 49:15–51:9, 53:21–54:22, 58:20–60:11, 60:22–62:16; Ex. 1044, 3:12–25, 8:51–9:31; Ex. 1045, 3:34–43; Ex. 1046, 9:35–36; Ex. 1049, 3649, 4631; Ex. 2037 ¶¶ 33, 37, 39; Ex. 2062, 49:17–51:3). Petitioner, thus, argues that, because Hall effect torque sensors were known, one of ordinary skill in the art would have understood that IBM's Hall effect sensor senses torque. *Id.* at 14 (citing Ex. 1002 ¶¶ 108–111; Ex. 2062, 110:16–113:8).

Petitioner further replies that IBM's microcontroller uses the Hall effect sensor to control torque and torque controllers with torque transducer tools were common. Pet. Reply 15 (citing PO Resp. 45–47; Ex. 1002 ¶¶ 108–111; Ex. 1003, 82; Ex. 1009, 9:42–47; Ex. 1042, claim 1; Ex. 1043, 3:14–68; Ex. 1040, 4:36–5:35; Ex. 2037 ¶¶ 66, 121, 136, 160). Petitioner also argues that the '220 patent does not include details of how it controls

torque. *Id.* at 15–16 (citing PO Resp. 46–47; Ex. 1039, 133:19–21; Ex. 2037 ¶¶ 63–65, 119–121, 161; Ex. 2062, 155:17–156:22). Petitioner further argues that Mr. Lehnert underestimated the computing power of IBM's microcontroller. *Id.* at 16–17 (citing PO Resp. 46–47; Ex. 1039, 51:13– 52:1, 101:10–102:20; Ex. 2037 ¶ 120; Ex. 2049, 1). In Petitioner's view, IBM's microcontroller receives an accurate analog torque signal, monitors tool position, and could control torque similarly. *Id.* at 17–19 (citing Pet. 33–34; PO Resp. 34; Ex. 1002 ¶¶ 108–111; Ex. 1003, 81–82; Ex. 1046, 8:51–9:2; Ex. 1054 § 5.3.1; Ex. 2049, 1; Ex. 2062, 100:6–101:22, 137:11– 138:25, 144:10–22, 148:15–152:13, 188:3–190:20).

Petitioner additionally argues that IBM describes how to overcome position sensing errors. Pet. Reply 20–21 (citing PO Resp. 18, 59; Ex. 1002 ¶¶ 102, 168, 178). According to Petitioner, Mr. Lehnert conceded that IBM's tool can be used on high-torque bolts. *Id.* at 21–22 (citing PO Resp. 59; Ex. 1039, 64:5–67:5, 71:17–73:15, 139:21–140:7; Ex. 1056, 1:7– 12, 2:16–6:16, Fig. 1; Ex. 1057, 1:34–39, 3:54–4:10, Fig. 1). Petitioner argues that Mr. Lehnert provides no evidence that applying IBM to Fredrick would require high-torque, IBM is not limited to low-torque applications, and ordinary skilled artisans would have selected an appropriate tool. *Id.* at 22 (citing Ex. 1002 ¶ 98; Ex. 1003, 82; Ex. 1039, 64:5–70:15, 73:18– 74:10; Ex. 2062, 89:20–90:23, 118:4–13, 115:4–8). Petitioner also argues that conventional tools controlled high torque and angle netrunners would not cause tilt-induced errors. *Id.* at 23 (citing PO Resp. 39; Ex. 1003, 81–82; Ex. 1039, 55:1–58:10; Ex. 1044, 3:12–35, 8:27–9:31; Ex. 1045, 3:31–63, 5:52–61).

(3) Patent Owner's Sur-Reply

For the Claimed Torque Requirements, Patent Owner replies that IBM's labels in its only figure states "TORQUE" and "POSITIONAL" and would indicate to one of ordinary skill in the art that they are not numerical data. PO Sur-reply 7–8 (citing Ex. 1003; Ex. 2037 ¶ 113). Patent Owner also argues that IBM "says nothing about 'torque transducers'" and describes "linking into a hall effect sensor in the driver," not a torque transducer. *Id.* at 9 (citing Ex. 1003, 82). Patent Owner asserts that "hall effect sensor" indicates a clutch tool. *Id.* (citing Ex. 2037 ¶ 58). According to Patent Owner, others, including Petitioner, use "torque" to describe a clutch output. *Id.* at 9–10 (citing Ex. 2001, 1:54–60, 2:14-20; Ex. 2068, 5; Ex. 2070; Ex. 2071, 11:8–27; Exs. 2054–2059).

Patent Owner also replies that the 8097 microcontroller indicates a clutch tool, and "at the time that all torque transducer tools were designed with proprietary controllers and cabling." PO Sur-reply 11 (citing Ex. 2037 ¶¶ 63–66, 161). Patent Owner argues that Petitioner does not rebut that ordinary skilled artisans would not have used a torque transducer tool with the 8097 microcontroller, which would have exceeded the relevant skill level, and that the only related reply argument is attorney argument. *Id.* (citing Pet. Reply 15). According to Patent Owner, turning an 8097 microcontroller into a torque controller was not feasible at the time of invention. *Id.* at 12–13 (citing Reply 16–18; Ex. 2037 ¶ 29; Ex. 2072; Ex. 2073; Ex. 2074). Patent Owner also contends that Dr. Davis does not understand the capabilities of the 8097 microprocessor. *Id.* at 13 (citing Ex. 2062, 99:10–15, 101:13–20, 105:10–106:23, 148:15–150:6).

Patent Owner further replies that "skilled artisans would have known that using a torque transducer tool in *IBM* would have negated its concept"

of avoiding rehits, a concept known to Petitioner. PO Sur-reply 14–15 (citing PO Resp. 41–43; Ex. 1040, 8:32–40, Fig. 4; Ex. 2041, 124; Ex. 2068, 6–7; Ex. 2075, 15, 42, 108, 139, 182; Ex. 2076; Ex. 2079, 45, 56, 71). Patent Owner argues that IBM's 8097 microcontroller, Hall effect sensor, and pull-wire position sensing would have been understood to be related to a clutch tool. *Id.* at 16. Patent Owner also argues that both parties' declarants testified that Hall effect sensors sense magnetic field changes, and Dr. Davis explained that they do not measure torque. *Id.* (citing Ex. 2037 ¶¶ 57–58; Ex. 2062, 45:23–46:16, 50:17–51:2, 52:1–13, 58:14–19, 110:25–111:10, 158:13–160:12).

Patent Owner further argues that IBM never uses the terms Hall effect torque sensor or Hall effect torque transducer, and the terms only appear in the Reply. PO Sur-reply 17 (citing Pet. Reply 6–7). Patent Owner additionally argues that ordinary skilled artisans would have understood that IBM connects to a proximity switch in a clutch tool when it states "linking into a hall effect sensor." *Id.* at 17–18 (citing Ex. 2037 ¶ 58). According to Patent Owner, a torque transducer with a Hall effect sensor is a complex circuit (*id.* at 18–19 (citing Ex. 2077, 4:27–44, 5:7–9, Figs. 4–8)), and Petitioner's arguments about such a sensor are unsupported and incorrect because such a sensor was developed in the mid-2000's (*id.* at 19–20 (citing Ex. 2037 ¶¶ 37, 116, 159)). Patent Owner asserts such sensors would not have been considered for IBM. *Id.* at 20. Patent Owner also asserts that Dr. Davis was not sure if Hall effect sensors alone were used in tools. *Id.* (citing Ex. 2062, 54:22–55:5, 55:10–18).

Regarding additionally cited references, Patent Owner contends none of them uses the term Hall effect torque sensor, and they instead confirm that Hall effect sensors measure magnetic field changes. PO Sur-reply 20

(citing Exs. 1044–1048, 1050–1053). Patent Owner also contends that Hall effect torque transducers are expensive. *Id.* at 21 (citing Pet. Reply 9; Ex. 1046, 8:51–60; Ex. 2078). Patent Owner further contends that Petitioner's remaining reply arguments do not show that a transducer tool and controller would have been used in IBM. *Id.* (citing Pet. Reply 9–10, 13; Ex. 2037 ¶¶ 26, 39).

(4) Petitioner Shows that IBM Teaches or Suggests the Claimed Torque Requirements

For the wherein clause requiring the "electronic controller also has stored in its memory first and second predetermined torque values . . . ," (limitation "31(11)"), we find that IBM teaches "sens[ing] when correct torque is achieved" and shows "TORQUE" is sent to microcontroller 6. Ex. 1003, 81–82. We also credit Dr. Davis's testimony regarding "set torque" must be stored in IBM's memory because IBM supports it. Ex. 1002 ¶¶ 108, 110 (citing Ex. 1003, 81–82). We further credit Dr. Davis's testimony that it would have also been obvious to store "set torque" so that IBM can determine "when correct torque is achieved" because IBM supports it. *Id.* (citing Ex. 1003, 82). Additionally, as discussed below, we determine that one of ordinary skill in the art would have applied IBM to assembling Fredrick's seat. Ex. 1003 ¶¶ 109, 165–167.

As discussed above, we find that IBM teaches that "controller circuit 6 needs to be able to enable/disable the power to the torque driver 6 by use of a simple relay or FET to sense when correct torque is achieved by linking into a hall effect sensor in the driver 11," "[f]urther positions become invalid if screw torque on the previous position is not achieved," and that "an operator is compelled . . . into applying the driver to the screws in a particular sequence, and he must also wait for the set torque to be achieved

on each screw before moving onto the next screw." Ex. 1003, 81–82; *see also* Ex. 1002 ¶ 111 (citing Ex. 1003, 81–82).

IBM also explicitly describes "a screw torque sequence verification system," that addresses the "problem" of "ensur[ing] screws 5 . . . are tightened to a specific torque in a specific sequence" and makes "an operator . . . wait for the set torque to be achieved on each screw before moving onto the next screw." Ex. 1003, 82. IBM's system also "enables the controller to learn . . . the sequence required." *Id.*

Even if we agreed with Patent Owner that IBM uses a clutch-controlled tool, IBM does not exclude the use of a tool that can measure torque. Pet. Reply 7, 9. Petitioner also shows that clutch-controlled tools with sensors to verify correct torque were known at the time. *Id.* at 9–10; Ex. 1039, 32:4–20, 42:2–5, 45:4–48:22, 49:15–51:9, 53:21–54:22, 58:20–60:11, 60:22–62:16; Ex. 2037 ¶¶ 24–26; *see also* Pet. Reply 11–12 (arguing that Hall effect torque sensors were well known at the time); Ex. 1039, 45:4–48:22, 49:15–51:9, 53:21–54:22, 58:20–60:11, 60:22–62:16. Based on record evidence indicating knowledge at the time about tools with torque sensors and IBM's express statement about "sens[ing] when correct torque is achieved," IBM, at least, suggests the use of such tools in its system.

Also, because IBM ensures screws are fastened to the "correct torque," IBM's Hall effect sensor must measure torque so that IBM can address the stated problem of "ensur[ing] screws 5 . . . are tightened to a specific torque in a specific sequence." Ex. 1003, 82 (emphasis added); Ex. 2062, 56:22–57:22, 105:10–106:23, 140:10–25, 145:7–148:14, 155:2–6, 157:4–158:12.

In view of the full record, we credit Dr. Davis's testimony regarding IBM's sensed torque because IBM expressly supports it. Ex. 1002 ¶¶ 108

(citing Ex. 1003, 82), 111 (citing Ex. 1003, 81–82); Ex. 2062, 104:11–105:9, 110:4–113:8, 136:6–139:13. We also give minimal weight to Mr. Lehnert's testimony regarding an apparatus that he saw and claims was the apparatus described in IBM. Ex. 2037 ¶¶ 73–77, 153.

Regarding whether IBM's 8097 microcontroller can be made to work with a tool with a torque transducer, IBM states that "[t]he microcontroller circuit only needs to be basic - the intel 8097 microcontroller with a small amount of I/O logic and a display suffices." Ex. 1003, 81–82. IBM does not limit microcontroller circuit 6 to just the 8097 microcontroller. *See* Pet. Reply 7 (arguing that IBM is not limited to the application shown). Thus, given the evidence in the record about known controllers at the time, IBM, at least, suggests an electronic controller that can work with a tool having a torque transducer.

Further, the parties' declarants cite to Exhibit 2049 and give conflicting testimony about whether the 8097 microcontroller was powerful enough to work a tool with a torque transducer, and the parties do not point to other evidence about the capabilities of the 8097 microcontroller. Ex. 2037 ¶¶ 63–65, 119–121, 161; Ex. 2062, 155:17–156:22. Given IBM's express description of "sens[ing] when correct torque is achieved by linking into a hall effect sensor in the driver 11" and that "intel 8097 microcontroller . . . suffices," we find that one of ordinary skill in the art would have understood that IBM uses the 8097 microcontroller as an example of microcontroller circuit 6 and would not have understood that microcontroller circuit 6 must be the 8097 microcontroller. Ex. 1003, 82. Therefore, in view of IBM's statements, such as "sens[ing] when correct torque is achieved by linking into a hall effect sensor in the driver 11," we find that

IBM teaches or suggests a tool with a torque transducer and appropriate
controller, if the 8097 microcontroller itself would have been inadequate.

Based on the full record, because IBM teaches "controller circuit 6
needs to be able to enable/disable the power to the torque driver 6 by use of
a simple relay or FET to sense when correct torque is achieved by linking
into a hall effect sensor in the driver 11" and "describes "a screw torque
sequence verification system" to address the "problem" of "ensur[ing]
screws 5 . . . are tightened to a specific torque in a specific sequence,"
Petitioner persuades us that IBM and Fredrick teach or suggest the Claimed
Torque Requirements.

> j) *which reduces the risk of structural failure of the assembled
> combination that would result if the operator were allowed to
> insert a fastener in the second fastening location when the
> torque applied to the first fastener does not equal the first
> predetermined torque value, . . . which reduces the risk of
> structural failure of the assembled combination that would
> result if the operator were allowed to complete assembly of the
> first and second components when the torque applied to the
> fastener inserted in the second fastening location did not equal
> the second predetermined torque value.*

Petitioner argues that Fredrick teaches the limitations quoted above.
Pet. 9 (referring to these limitations as "31(13)"), 10 (referring to these
limitations as "31(13) (continued)"), 54–55 (citing Ex. 1002 ¶¶ 173, 178).

As discussed above, we find that Fredrick teaches that "recliner
assembly 14 includes upper and lower mounting brackets 14a and 14b that
are secured to the lower seat assembly 12 and seat back frame 16,
respectively, by conventional means, such as bolts" (Ex. 1007, 3:9–12) and
shows three bolts fastening bracket 14b to lower seat assembly 12 (*id.*
Fig. 1). Further, Dr. Davis explains how these components teach or suggest

the limitations, and we credit that testimony because Fredrick supports it. Ex. 1002 ¶ 178.

Because Fredrick teaches at least two bolts securing lower mounting bracket 14b to lower seat assembly 12, and as discussed below, Petitioner proposes combining IBM and Fredrick to reduce the risk of structural failure, Petitioner persuades us that IBM and Fredrick teach the above quoted limitations of claim 31.

k) Reason to Combine

Petitioner proposes applying IBM to three bolts in Fredrick that fasten bracket 14b to lower seat assembly 12. Pet. 49–50 (citing Ex. 1007, 2:65–3:12, Fig. 1). Petitioner provides an annotated Figure 1 from Fredrick, reproduced below, that emphasizes these parts.
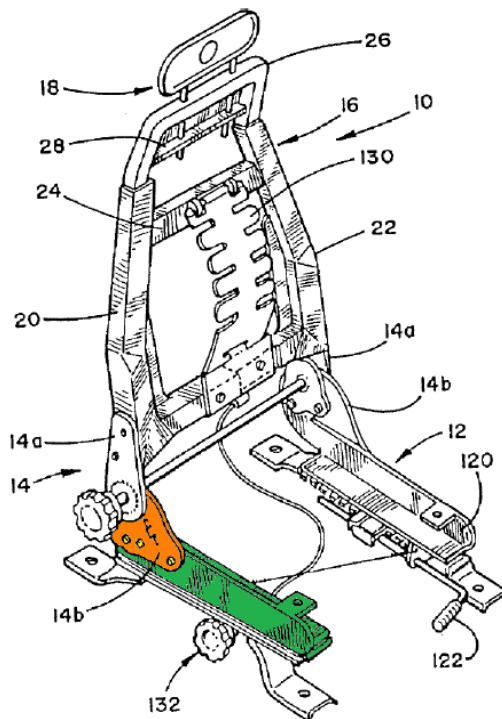
Fredrick (Ex. 1007), FIG. 1 (colored)

Annotated Figure 1 is a perspective view of Fredrick's modular seat frame, with bracket 14b in orange and lower seat assembly 12 in green.

Pet. 50. The three bolts are at the lower part of bracket 14b. Petitioner also contends that Sabatini and Gass confirm that it would have been obvious to apply IBM to Fredrick. *Id.* at 59.

According to Petitioner, one of ordinary skill in the art "would have known that a particular sequence for *Fredrick's* three bolts . . . would reduce the risk of structural failure through warping, mistorqued bolts or residual stresses." Pet. 51 (citing Ex. 1011 (declarant testimony from the 305-IPR) ¶¶ 48–49; Ex. 1013 (Applicant's Reply Brief from the '220 patent prosecution history), 22; Ex. 1014 (deposition transcript from the 305-IPR), 95–97, 102–103). According to Petitioner,

> to compensate for variations in hole/fastening locations in assemblies like vehicle seats (e.g., *Fredrick's* bracket 14b and lower seat assembly 12), it was well-known to provide a smaller locating/datum hole at the first fastening location and progressively larger holes at the second and third fastening locations, and then sequentially insert/fasten the bolts in the first through third fastening locations.

Id. at 51–52 (citing Ex. 1002 ¶ 164; Ex. 1011 ¶ 20; Ex. 1012 (deposition transcript from the 305-IPR), 55:10–56:10; Ex. 1014, 205–206).

Petitioner, thus, argues that "[i]t was obvious to have used such locating/datum holes on *Fredrick's* bracket 14b to compensate for variations in hole locations due to tolerances" and that "[o]nce datum/locating holes are used on *Fredrick's* seat assembly, [persons of ordinary skill in the art] knew that the correct order of inserting/fastening (from small hole to progressively larger holes) would reduce the risk of structural failure." Pet. 52 (citing Ex. 1002 ¶ 165; Ex. 1011 ¶ 20; Ex. 1014, 102–103; Ex. 1019 ¶¶ 3–5). Petitioner also argues that persons of ordinary skill in the art "knew that such seat-assembling bolts must be tightened to a 'predetermined torque' to reduce risk of bolts coming loose or being over-stressed" (*id.* (citing

Ex. 1002 ¶ 166)), and "[i]t was therefore obvious to apply *IBM's* forced-sequence system to the sequenced fastening of *Fredrick's* bolts" so as "to 'ensure' that *Fredrick's* bolts are fastened 'to a specific torque in a specific sequence,' thereby reducing the risk of structural failure that would occur if *Fredrick's* bolts were fastened in the wrong order or to the wrong torque" (*id.* at 53 (citing Ex. 1002 ¶ 167; Ex. 1003, 82)).

Petitioner further argues that "*Sabatini* teaches the benefits of assembling vehicle seats on an assembly line" and that "*Gass* (¶ [0006]) also teaches the use of conveyors to streamline vehicle component production." Pet. 60 (citing Ex. 1008, 55). Petitioner asserts that "[i]t was therefore obvious to assemble *Fredrick's* seat assembly using *Sabatini's* or *Gass's* assembly line to achieve those benefits." *Id.* (citing Ex. 1002 ¶¶ 190–193).

Patent Owner does not respond specifically to Petitioner's asserted reason for combining IBM and Fredrick. *See* PO Resp. 2–6, 41–50, 60.

Based on the full record before us, Petitioner persuades us that one of ordinary skill in the art would have applied IBM's "screw torque sequence verification system" to Fredrick's vehicle to "reduc[e] the risk of structural failure that would occur if *Fredrick's* bolts were fastened in the wrong order or to the wrong torque." Pet. 53. Petitioner's citations to record evidence support its arguments that Fredrick's bolts used to fasten together bracket 14b and lower seat assembly 12 would have each been tightened to a specific torque in a specific sequence. Ex. 1003, 82 ("The problem is to ensure that four screws 5 fixing two product parts 3 & 4 together are tightened to a specific torque in a specific sequence."); Ex. 1011 ¶¶ 20, 48–49; Ex. 1012, 55:10–56:10; Ex. 1013, 22; Ex. 1014, 95–97, 102–103, 205–206; Ex. 1019 ¶¶ 3–5; *see also* Ex. 1015, 30–31 (determining in the 305-IPR that it "would have yielded the predictable and improved result of

facilitating the assembly of a vehicle seat and lowering defects by allowing the sequence of fasteners to be controlled when assembling the vehicle seat"). We also credit Petitioner's declarant testimony regarding the asserted reason to combine IBM and Fredrick because it also finds support in the record. *See* Ex. 1002 ¶¶ 165–167 (citing Ex. 1003, 82; Ex. 1011 ¶¶ 20, 49; Ex. 1012, 55:10–56:10; Ex. 1014, 102:22–103:02).

Also, based on the full record, Petitioner persuades us that one of ordinary skill in the art would have further modified the application of IBM to Fredrick's seat by using the assembly line of Sabatini or Gass to achieve the benefits of such assembly described by Sabatini and Gass. Ex. 1005 ¶ 6 (indicating that "an automobile production line" can accommodate different standards "[s]ince automobile bodies may be subject to different standards, for example a US version or EU version"); Ex. 1008, 55 (describing that "[e]ach cell has a measured takt time, which ensures that the line can run at an optimal speed" and that adding operators "can adapt production levels to Ford's demand" and "reduce takt time"). We credit Petitioner's declarant testimony regarding the further modification because it finds support in the record. *See* Ex. 1002 ¶¶ 190–193 (citing Ex. 1003, 81, 82; Ex. 1005 ¶ 6; Ex. 1008, 55; Ex. 1023, 27–28). Regarding reasonable expectation of success in making the proposed modification, IBM, Sabatini, and Gass indicate that it was within ordinary skill in the art to compel tightening screws to specific torque in a specific sequence and to tighten fasteners of a seat on an assembly line. Ex. 1003, 81–82; Ex. 1005 ¶ 6; Ex. 1008, 55.

For the reasons above, Petitioner persuades us that one of ordinary skill in the art would have combined IBM, Fredrick, Sabatini, and Gass in the manner asserted with a reasonable expectation of success.

2. *Analysis of Claim 32*

Claim 32 depends from claim 31 and recites "wherein the electronic comparison step also includes disabling the fastening tool from performing a fastening operation when it is located at the first fastening location if the operator already has applied a first fastener in the first fastening location with a torque that equals the first predetermined torque." Ex. 1001, 14:65–15:3.

Petitioner argues that IBM satisfies claim 32 for the same reasons presented in the challenge based on IBM and Stimpson and that "Ground D otherwise applies to dependent claims 32, 34, 36–38, and 45–46 in the same way that Ground C already shows." Pet. 55, 61. In Ground C, Petitioner asserts that "*IBM* satisfies claims 32 and 34 (involving enabling/disabling the tool) for the same reasons as in Ground A." *Id.* at 55 (citing also Ex. 1002 ¶ 180). In Ground A, the challenge based on IBM and Stimpson, Petitioner argues that IBM teaches the limitations of claim 32. *Id.* at 38 (citing Ex. 1002 ¶ 121; Ex. 1003, 82).

We find that the relied-upon portion of IBM teaches that the "controller circuit 6 needs to be able to enable/disable the power to the torque driver 6 by use of a simple relay or FET to sense when correct torque is achieved by linking into a hall effect sensor in the driver 11" and "may be programmed" so that "[f]urther positions become invalid if screw torque on the previous position is not achieved." Ex. 1003, 82. We also credit the testimony of Dr. Davis for claim 32 because IBM supports it. Ex. 1002 ¶ 121 (citing Ex. 1003, 82).

Patent Owner does not provide an argument specifically for claim 32. *See* PO Resp. 23–62. Because IBM teaches its controller disabling power to

driver 11 once correct torque is achieved, Petitioner persuades us that IBM teaches the limitations of claim 32.

3. *Analysis of Claim 33*

Claim 33 depends from claim 32 and recites "wherein the article of assembly comprises a vehicle seat." Ex. 1001, 15:4–5.

In the challenge based on IBM and Fredrick, Petitioner argues that Fredrick's vehicle seat satisfies the features recited in claim 33. Pet. 57–58 (citing Ex. 1002 ¶ 183; Ex. 1007, 2:65–3:12, Fig. 1).

We find that the relied-upon portions of Fredrick teach and show a seat frame for a vehicle. Ex. 1007, 2:65–3:12, Fig. 1; *see also id.* at 2:35–36, 2:62–65. We credit the testimony of Dr. Davis regarding claim 33 because Fredrick supports it. Ex. 1002 ¶ 183 (citing Ex. 1007, 2:65–3:12, Fig. 1).

Patent Owner does not provide an argument specifically for claim 33. *See* PO Resp. 23–62. Because Fredrick teaches and shows a seat frame for a vehicle, Petitioner persuades us that IBM, Fredrick, Gass and Sabatini teach the limitations of claim 33 and that, for the reasons above, one of ordinary skill in the art would have combined these references in the manner asserted.

4. *Analysis of Claim 34*

Claim 34 depends from claim 31 and recites "further comprising the step of disabling the fastening tool when it is not disposed in operative relation to a fastening location." Ex. 1001, 15:6–8.

Petitioner argues that IBM satisfies claim 34 for the same reasons presented in the challenge based on IBM and Stimpson and that "Ground D otherwise applies to dependent claims 32, 34, 36–38, and 45–46 in the same way that Ground C already shows." Pet. 55, 61. In Ground C, Petitioner asserts that "*IBM* satisfies claims 32 and 34 (involving enabling/disabling

the tool) for the same reasons as in Ground A." *Id.* at 55 (citing also Ex. 1002 ¶ 180). In Ground A, the challenge based on IBM and Stimpson, Petitioner argues that IBM teaches the limitations of claim 32. *Id.* at 38 (citing Ex. 1002 ¶ 122; Ex. 1003, 82).

We find that the relied-upon portion of IBM teaches that the "controller circuit 6 needs to be able to enable/disable the power to the torque driver 6 by use of a simple relay or FET to sense when correct torque is achieved by linking into a hall effect sensor in the driver 11" and "may be programmed" so that "[f]urther positions become invalid if screw torque on the previous position is not achieved." Ex. 1003, 82. We also credit the testimony of Dr. Davis for claim 34 because IBM supports it. Ex. 1002 ¶ 121 (citing Ex. 1003, 82).

Patent Owner does not provide an argument specifically for claim 34. *See* PO Resp. 23–62. Because IBM teaches its controller disabling power to driver 11 once correct torque is achieved, Petitioner persuades us that IBM teaches the limitations of claim 34.

5. *Analysis of Claim 35*

Claim 35 depends from claim 31 and recites "wherein the first component comprises a seat track." Ex. 1001, 15:9–10.

In the challenge based on IBM and Fredrick, Petitioner argues that Fredrick's vehicle seat satisfies the features recited in claim 35. Pet. 57–58 (citing Ex. 1002 ¶ 183; Ex. 1007, 2:65–3:12, Fig. 1).

We find that the relied-upon portion of Fredrick teaches and shows that "seat frame 10 is mounted on a conventional seat track 120 having a conventional adjuster assembly 122, and includes a lower seat assembly 12, a recliner assembly 14, a seat back frame 16, and a headrest assembly 18." Ex. 1007, 2:65–3:2, Fig. 1. We also credit the testimony of Dr. Davis

regarding claim 35 because Fredrick supports it. Ex. 1002 ¶ 183 (citing
Ex. 1007, 1:65–2:12, 2:65–3:15, Fig. 1).

Patent Owner does not provide an argument specifically for claim 35.
See PO Resp. 23–62. Because Fredrick teaches and shows a seat track,
Petitioner persuades us that IBM, Fredrick, Gass and Sabatini teach the
limitations of claim 35 and, for the reasons above, that one of ordinary skill
in the art would have combined these references in the manner asserted.

6.   Analysis of Claim 36

Claim 36 depends from claim 31 and recites "wherein the first
component comprises a base frame." Ex. 1001, 15:11–12.

Petitioner argues that "Ground D otherwise applies to dependent
claims 32, 34, 36–38, and 45–46 in the same way that Ground C already
shows." Pet. 61. In the challenge based on IBM and Fredrick, Petitioner
argues that Fredrick's vehicle seat satisfies the features recited in claim 36.
Pet. 57–58 (citing Ex. 1002 ¶ 183; Ex. 1007, 2:65–3:12, Fig. 1).

We find that the relied-upon portion of Fredrick teaches and shows
that "seat frame 10 is mounted on a conventional seat track 120 having a
conventional adjuster assembly 122, and includes a lower seat assembly 12,
a recliner assembly 14, a seat back frame 16, and a headrest assembly 18."
Ex. 1007, 2:65–3:2, Fig. 1. We also credit the testimony of Dr. Davis
regarding claim 36 because Fredrick supports it. Ex. 1002 ¶ 183 (citing
Ex. 1007, 1:65–2:12, 2:65–3:15, Fig. 1).

Patent Owner does not provide an argument specifically for claim 36.
See PO Resp. 23–62. Because Fredrick teaches and shows seat back frame
16, Petitioner persuades us that IBM, Fredrick, Gass and Sabatini teach the
limitations of claim 36 and, for the reasons above, that one of ordinary skill
in the art would have combined these references in the manner asserted.

7. *Analysis of Claim 37*

Claim 37 depends from claim 31 and recites "wherein each fastener consists of a threaded fastener." Ex. 1001, 15:13–14.

Petitioner argues that Fredrick's threaded bolt teaches the threaded fastener. Pet. 55 (citing Ex. 1002 ¶ 181; Ex. 1007, 3:12, Fig. 1). Petitioner also argues that "Ground D otherwise applies to dependent claims 32, 34, 36–38, and 45–46 in the same way that Ground C already shows." *Id.* at 61.

We find that the relied-upon portion of Fredrick teaches and shows that "recliner assembly 14 includes upper and lower mounting brackets 14a and 14b that are secured to the lower seat assembly 12 and seat back frame 16, respectively, by conventional means, such as bolts." Ex. 1007, 3:9–12, Fig. 1. We also credit the testimony of Dr. Davis regarding claim 37 because Fredrick supports it. Ex. 1002 ¶ 181 (citing Ex. 1007, 3:9–12, Fig. 1).

Patent Owner does not provide an argument specifically for claim 37. *See* PO Resp. 23–62. Because Fredrick teaches and shows bolts, Petitioner persuades us that IBM, Fredrick, Gass and Sabatini teach the limitations of claim 37 and, for the reasons above, that one of ordinary skill in the art would have combined these references in the manner asserted.

8. *Analysis of Claim 38*

Claim 38 depends from claim 37 and recites "wherein each threaded fastener consists of a threaded bolt." Ex. 1001, 15:15–16.

Petitioner argues that Fredrick teaches a threaded bolt. Pet. 55 (citing Ex. 1002 ¶ 181; Ex. 1007, 3:12, Fig. 1). Petitioner also argues that "Ground D otherwise applies to dependent claims 32, 34, 36–38, and 45–46 in the same way that Ground C already shows." *Id.* at 61. Patent Owner does not provide an argument specifically for claim 38. *See* PO Resp. 23–62.

For the reasons stated above for claim 37, because the record supports finding that Fredrick teaches and shows bolts, Petitioner persuades us that IBM, Fredrick, Gass and Sabatini teach the limitations of claim 38 and, for the reasons above, that one of ordinary skill in the art would have combined these references in the manner asserted.

9. Analysis of Claim 39

Claim 39 depends from claim 31 and recites "wherein the first and second components of the article of assembly are provided by means of a continuous moving line conveyor." Ex. 1001, 15:17–19.

Petitioner refers to its previous arguments for claims 31–38, 41, 42, 45, 46, and 54 that it would have been obvious to assemble Fredrick's seat on a conveyor and to arguments from its challenge based on IBM, Stimpson, Sabatini, and Gass that it would have been obvious to use an intermittent or continuous conveyor. Pet. 63–64 (citing Ex. 1002 ¶ 199; Ex. 1005 ¶¶ 6, 15). In previous arguments, Petitioner argues that continuous and intermittent conveyors were well known in the prior art and thus, obvious and within ordinary skill to use with IBM. *Id.* at 47–49 (citing Ex. 1002 ¶¶ 146–153; Ex. 1005 ¶ 6; Ex. 1014, 60–62; Ex. 1017, 12; Ex. 1023, 28–30; Ex. 1029 ¶ 51).

We find that Sabatini and Gass describe conveyor lines. Ex. 1002 ¶ 199; Ex. 1005 ¶¶ 6, 15. We also credit Dr. Davis's testimony that it would have been obvious to use an intermittent or continuous conveyor because record evidence supports it. Ex. 1002 ¶¶ 146–152, 199 (citing Ex. 1005 ¶¶ 6, 68, 74–79, Figs. 8–10; Ex. 1014, 60–62; Ex. 1017, 12; Ex. 1023, 28–30; Ex. 1029 ¶ 51).

Patent Owner does not provide an argument specifically for claim 39. *See* PO Resp. 23–62. Based on the relied-upon record evidence, Petitioner

persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 39 and one of ordinary skill in the art would have combined these references in the manner asserted.

10. Analysis of Claim 40

Claim 40 depends from claim 31 and recites "wherein the first and second components of the article of assembly are provided by means of an intermittent conveyor line." Ex. 1001, 15:20–22.

Petitioner refers to its previous arguments for claims 31–38, 41, 42, 45, 46, and 54 that it would have been obvious to assemble Fredrick's seat on a conveyor and to arguments from its challenge based on IBM, Stimpson, Sabatini, and Gass that it would have been obvious to use an intermittent or continuous conveyor. Pet. 63–64 (citing Ex. 1002 ¶ 199; Ex. 1005 ¶¶ 6, 15).

Patent Owner does not provide an argument specifically for claim 40. *See* PO Resp. 23–62. For the reasons stated above for claim 39, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 40 and that one of ordinary skill in the art would have combined these references in the manner asserted.

11. Analysis of Claim 41

Claim 41 depends from claim 31 and recites "wherein the first and second components are mounted on an unassembled base frame." Ex. 1001, 15:23–24.

In the challenge based on IBM and Fredrick, Petitioner argues that Fredrick's vehicle seat satisfies the features recited in claim 41. Pet. 57–58 (citing Ex. 1002 ¶ 183; Ex. 1007, 2:65–3:12, Fig. 1).

We find that the relied-upon portion of Fredrick teaches and shows that "seat frame 10 is mounted on a conventional seat track 120 having a conventional adjuster assembly 122, and includes a lower seat assembly 12,

a recliner assembly 14, a seat back frame 16, and a headrest assembly 18."
Ex. 1007, 2:65–3:2, Fig. 1. We also credit the testimony of Dr. Davis
regarding claim 41 because Fredrick supports it. Ex. 1002 ¶ 183 (citing
Ex. 1007, 1:65–2:12, 2:65–3:15, Fig. 1).

Patent Owner does not provide an argument specifically for claim 41.
See PO Resp. 23–62. Because Fredrick teaches and shows seat track 20 that
is a base frame for Fredrick's seat components, Petitioner persuades us that
IBM, Fredrick, Gass, and Sabatini teach the limitations of claim 41,and that,
for the reasons above, one of ordinary skill in the art would have combined
these references in the manner asserted.

12. Analysis of Claim 42

Claim 42 depends from claim 41 and recites "wherein the holding step
comprises clamping the unassembled base frame into a fixture." Ex. 1001,
15:25–27.

Petitioner argues that it would have been obvious to clamp the lower
portions of Fredrick's seat track 120 to IBM's fixture "to (1) ensure accurate
sensing of the position of *IBM's* driver 11 relative to *Fredrick's* fastening
locations, (2) give the operator secure and safe access to *Fredrick's*
fastening locations, and/or (3) provide an easy way to mount/release
Fredrick's seat components to/from *IBM's* fixture." Pet. 58–59 (citing
Ex. 1002 ¶¶ 184–185; Ex. 1003, 81–82). Petitioner also argues that Sabatini
and Gass confirm that it would have been obvious to clamp Fredrick's seat
to Sabatini's or IBM's frame. *Id.* at 62–63 (citing Ex. 1002 ¶ 198; Ex. 1005
¶ 6; Ex. 1008, 55).

As discussed above, we find that the relied-upon portion of IBM
teaches that "two product parts 3 & 4 would be placed in position on a
suitable locating fixture 10 on a work bench 8." Ex. 1003, 82. We also find

that Fredrick teaches and shows seat track 20 that is a base frame for Fredrick's seat components. Ex. 1002 ¶ 183; Ex. 1007, 2:65–3:2, Fig. 1. We further credit Dr. Davis's testimony that it would have been obvious to use an intermittent or continuous conveyor because record evidence supports it. Ex. 1002 ¶ 198 (citing Ex. 1003, 81–82; Ex. 1005 ¶ 6; Ex. 1008, 55; Ex. 1017, 11; Ex. 1023, 27–30).

Patent Owner does not provide an argument specifically for claim 42. *See* PO Resp. 23–62. Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 42 and that one of ordinary skill in the art would have combined these references in the manner asssserted.

13. Analysis of Claim 43

Claim 43 depends from claim 42 and recites "wherein the fixture and unassembled base frame are provided by means of a continuous moving line conveyor." Ex. 1001, 15:28–30.

Petitioner refers to its previous arguments for claims 31–38, 41, 42, 45, 46, and 54 that it would have been obvious to assemble Fredrick's seat on a conveyor and to arguments from its challenge based on IBM, Stimpson, Sabatini, and Gass that it would have been obvious to use an intermittent or continuous conveyor. Pet. 63–64 (citing Ex. 1002 ¶ 199; Ex. 1005 ¶¶ 6, 15).

Patent Owner does not provide an argument specifically for claim 43. *See* PO Resp. 23–62. For the reasons stated above for claim 39, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 43 and that one of ordinary skill in the art would have combined these references in the manner asserted.

14. Analysis of Claim 44

Claim 44 depends from claim 42 and recites "wherein the fixture and unassembled base frame are provided by means of an intermittent conveyor line." Ex. 1001, 15:31–33.

Petitioner refers to its previous arguments for claims 31–38, 41, 42, 45, 46, and 54 that it would have been obvious to assemble Fredrick's seat on a conveyor and to arguments from its challenge based on IBM, Stimpson, Sabatini, and Gass that it would have been obvious to use an intermittent or continuous conveyor. Pet. 63–64 (citing Ex. 1002 ¶ 199; Ex. 1005 ¶¶ 6, 15).

Patent Owner does not provide an argument specifically for claim 44. *See* PO Resp. 23–62. For the reasons stated above for claim 39, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 44 and that one of ordinary skill in the art would have combined these references in the manner asserted.

15. Analysis of Claim 45

Claim 45 depends from claim 31 and recites "wherein a third fastening location is positioned in spaced apart relation to the first and second fastening locations, the third fastening location consisting of a single opening for receiving a single fastener." Ex. 1001, 15:34–37.

Petitioner argues that "Ground D otherwise applies to dependent claims 32, 34, 36–38, and 45–46 in the same way that Ground C already shows." Pet. 61. In that ground, Petitioner argues that it would have been obvious to provide a third fastening location or opening with reference to its previous arguments for claims 31–38, 41, 42, 45, 46, and 54. *Id.* at 56 (citing Ex. 1002 ¶ 182).

As discussed above, we find that Fredrick teaches that "recliner assembly 14 includes upper and lower mounting brackets 14a and 14b that

are secured to the lower seat assembly 12 and seat back frame 16, respectively, by conventional means, such as bolts" (Ex. 1007, 3:9–12) and shows three bolts fastening bracket 14b to lower seat assembly 12 (*id.* Fig. 1). We also credit Dr. Davis's testimony for claim 45 because Fredrick supports it. Ex. 1002 ¶ 182 (citing Ex. 1007, 3:10–12, Fig. 1).

Patent Owner does not provide an argument specifically for claim 45. *See* PO Resp. 23–62. Because Fredrick teaches and shows three bolts spaced apart, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 45 and, for the reasons above, that one of ordinary skill in the art would have combined these references in the manner asserted.

16. Analysis of Claim 46

Claim 46 depends from claim 45 and recites "wherein the predetermined sequence of fastening is for all of the first, second, and third fastening locations." Ex. 1001, 15:38–40.

Petitioner also argues that "Ground D otherwise applies to dependent claims 32, 34, 36–38, and 45–46 in the same way that Ground C already shows." Pet. 61. In that ground, Petitioner argues that it would have been obvious to provide a third fastening location or opening with reference to its previous arguments for claims 31–38, 41, 42, 45, 46, and 54. *Id.* at 56 (citing Ex. 1002 ¶ 182).

As discussed above, we find that Fredrick teaches or suggests three fastening locations. Ex. 1002 ¶ 182; Ex. 1007, 3:9–12, Fig. 1. We also credit Dr. Davis's testimony for claim 46 because Fredrick supports it. Ex. 1002 ¶ 182 (citing Ex. 1007, 3:10–12, Fig. 1).

Patent Owner does not provide an argument specifically for claim 46. *See* PO Resp. 23–62. Because Fredrick teaches and shows three bolts

spaced apart and Petitioner persuades us that one of ordinary skill in the art would have applied IBM to Fredrick, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 46 and that one of ordinary skill in the art would have combined these references in the manner asserted.

17. Analysis of Claim 47

Claim 47 depends from claim 31 and recites:

> wherein the fastening tool forms a part of an assembly station, the method further comprising the step of requiring the first and second components to remain in the assembly station until after it is verified that (a) the operator's use of the fastening tool conformed to the predetermined sequence of fastening for the single process site, and (b) torque values equal to the first and second predetermined torque values were applied to fasteners located in the first and second fastening locations when the operator's use of the fastening tool conformed to the predetermined sequence of fastening for the single process site.

Ex. 1001, 15:41–16:9.

Petitioner refers to its arguments and evidence for the challenge of the same claim in view of IBM, Stimpson, Sabatini, and Gass. Pet. 61 (citing also Ex. 1002 ¶ 197). In that challenge, Petitioner argues that "*Gass* and *Sabatini* teach the benefits of bolting together automobile components . . . on an assembly line," IBM would have been applied to the fastening, and it would have been obvious to use an indication to prevent conveyor movement until the sequenced fastening is completed correctly "to ensure the recognition and correction of an incorrect fastening operation. Pet. 43– 47 (citing Ex. 1002 ¶¶ 133–145, 149–152; Ex. 1003, 81–82; Ex. 1005 ¶¶ 6, 7, 46; Ex. 1008, 54–55; Ex. 1011 ¶ 14; Ex. 1017, 27–30; Ex. 1023, 27–30).

As discussed above, we find that Gass and Sabatini teach the use of conveyors and that one of ordinary skill in the art would have applied IBM

to Fredrick's seat on a conveyor. We also find that Sabatini describes using a "cell" in an assembly line and its associated benefits. Ex. 1008, 55. We further credit Dr. Davis's testimony for this claim because record evidence supports it. Ex. 1002 ¶¶ 133–145, 149–152 (citing Ex. 1003, 81–82; Ex. 1005 ¶¶ 2, 6, 7, 46, 68, 74–79, Figs. 8–10; Ex. 1008, 54–55; Ex. 1011 ¶¶ 14–17; Ex. 1014, 233; Ex. 1017, 12–13, 27–30; Ex. 1023, 27–30; Ex. 1031, 16–17).

Patent Owner does not provide an argument specifically for claim 47. *See* PO Resp. 23–62. Based on the relied-upon record evidence, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 47 and one of ordinary skill in the art would have combined these references in the manner asserted.

18. Analysis of Claim 48

Claim 48 depends from claim 47 and recites:

> further comprising the step of producing an alarm simultaneously with when an attempt is made to remove the first and second components from the assembly station before it is verified that (a) the operator's use of the fastening tool conforms to the predetermined sequence of fastening for the single process site, and (b) torque values equal to the first and second predetermined torque values were applied to fasteners located in the first and second fastening locations when the operator's use of the fastening tool conformed to the predetermined sequence of fastening for the single process site.

Ex. 1001, 16:10–20.

Petitioner refers to its arguments and evidence for the challenge of the same claim in view of IBM, Stimpson, Sabatini, and Gass. Pet. 61 (citing also Ex. 1002 ¶ 197). In that challenge, Petitioner argues that "*Gass* and *Sabatini* teach the benefits of bolting together automobile components . . . on an assembly line," IBM would have been applied to the fastening, and it

would have been obvious to use an indication to prevent conveyor movement until the sequenced fastening is completed correctly "to ensure the recognition and correction of an incorrect fastening operation." Pet. 43–47 (citing Ex. 1002 ¶¶ 133–145, 149–152; Ex. 1003, 81–82; Ex. 1005 ¶¶ 6, 7, 46; Ex. 1008, 54–55; Ex. 1011 ¶ 14; Ex. 1017, 27–30; Ex. 1023, 27–30).

We find that IBM teaches a display (Ex. 1003, 81) and Sabatini teaches that "[o]perators use torque-sensing guns with visual indicators," and "[i]f fasteners are not run to the correct torque setting, a light above the line comes on and the line shuts down until an operator corrects the problem" (Ex. 1008, 55). We further credit Dr. Davis's testimony regarding the teachings of these references and the reason why one of ordinary skill in the art would have combined the references in the manner asserted because record evidence supports his opinion. Ex. 1002 ¶¶ 133–145 (citing Ex. 1003, 81–82; Ex. 1005 ¶¶ 2, 6, 46, ; Ex. 1008, 55; Ex. 1011 ¶¶ 14–17; Ex. 1014, 233; Ex. 1017, 12–13; Ex. 1023, 27–30; Ex. 1031, 16–17, 19), 149–152 (citing Ex. 1003, 81–82; Ex. 1005 ¶¶ 68, 74–79, Figs. 8–10; Ex. 1023, 29), 197 (citing Ex. 1005 ¶¶ 6, 7, 46; Ex. 1008, 55; Ex. 1014, 233:2–9; Ex. 1017, 12–13), 200.

Patent Owner does not provide an argument specifically for claim 48. *See* PO Resp. 23–62. Based on the relied-upon record evidence, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 48 and one of ordinary skill in the art would have combined these references in the manner asserted.

19. Analysis of Claim 49

Claim 49 depends from claim 48 and recites "wherein the assembly system further comprises a stop mechanism that requires the first and second components to remain in the assembly station." Ex. 1001, 16:21–23.

Petitioner refers to its arguments and evidence for the challenge of the same claim in view of IBM, Stimpson, Sabatini, and Gass. Pet. 61 (citing also Ex. 1002 ¶ 197). In that challenge, Petitioner argues that "*Gass* and *Sabatini* teach the benefits of bolting together automobile components . . . on an assembly line," IBM would have been applied to the fastening, and it would have been obvious to use an indication to prevent conveyor movement until the sequenced fastening is completed correctly "to ensure the recognition and correction of an incorrect fastening operation." Pet. 43–47 (citing Ex. 1002 ¶¶ 133–145, 149–152; Ex. 1003, 81–82; Ex. 1005 ¶¶ 6, 7, 46; Ex. 1008, 54–55; Ex. 1011 ¶ 14; Ex. 1017, 27–30; Ex. 1023, 27–30).

Our findings for claim 48 above show that IBM, Gass, and Sabatini teach these limitations. Ex. 1008, 55 ("[i]f fasteners are not run to the correct torque setting, a light above the line comes on and the line shuts down until an operator corrects the problem"). We also credit Dr. Davis's testimony regarding the teachings of these references and the reason why one of ordinary skill in the art would have combined the references in the manner asserted because record evidence supports his opinion. Ex. 1002 ¶¶ 133–145 (citing Ex. 1003, 81–82; Ex. 1005 ¶¶ 2, 6, 46; Ex. 1008, 55; Ex. 1011 ¶¶ 14–17; Ex. 1014, 233; Ex. 1017, 12–13; Ex. 1023, 27–30; Ex. 1031, 16–17, 19), 149–152 (citing Ex. 1003, 81–82; Ex. 1005 ¶¶ 68, 74–79, Figs. 8–10; Ex. 1023, 29), 197 (citing Ex. 1005 ¶¶ 6, 7, 46; Ex. 1008, 55; Ex. 1014, 233:2–9; Ex. 1017, 12–13), 200.

Patent Owner does not provide an argument specifically for claim 49. *See* PO Resp. 23–62. Based on the relied-upon record evidence, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 49 and one of ordinary skill in the art would have combined these references in the manner asserted.

20. Analysis of Claim 50

Claim 50 depends from claim 49 and recites "wherein the stop mechanism prevents removal of the first and second components from the assembly station." Ex. 1001, 16:24–26.

Petitioner refers to its arguments and evidence for the challenge of the same claim in view of IBM, Stimpson, Sabatini, and Gass. Pet. 61 (citing also Ex. 1002 ¶ 197). In that challenge, Petitioner argues that "*Gass* and *Sabatini* teach the benefits of bolting together automobile components . . . on an assembly line," IBM would have been applied to the fastening, and it would have been obvious to use an indication to prevent conveyor movement until the sequenced fastening is completed correctly "to ensure the recognition and correction of an incorrect fastening operation." Pet. 43–47 (citing Ex. 1002 ¶¶ 133–145, 149–152; Ex. 1003, 81–82; Ex. 1005 ¶¶ 6, 7, 46; Ex. 1008, 54–55; Ex. 1011 ¶ 14; Ex. 1017, 27–30; Ex. 1023, 27–30).

Our findings for claims 48 and 49 above show that IBM, Gass, and Sabatini teach these limitations. We also credit Dr. Davis's testimony regarding the teachings of these references and the reason why one of ordinary skill in the art would have combined the references in the manner asserted because record evidence supports his opinion. Ex. 1002 ¶¶ 133–145 (citing Ex. 1003, 81–82; Ex. 1005 ¶¶ 2, 6, 46; Ex. 1008, 55; Ex. 1011 ¶¶ 14–17; Ex. 1014, 233; Ex. 1017, 12–13; Ex. 1023, 27–30; Ex. 1031, 16–17, 19), 149–152 (citing Ex. 1003, 81–82; Ex. 1005 ¶¶ 68, 74–79, Figs. 8–10; Ex. 1023, 29), 197 (citing Ex. 1005 ¶¶ 6, 7, 46; Ex. 1008, 55; Ex. 1014, 233:2–9; Ex. 1017, 12–13), 200.

Patent Owner does not provide an argument specifically for claim 50. *See* PO Resp. 23–62. Based on the relied-upon record evidence, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of

claim 50 and one of ordinary skill in the art would have combined these references in the manner asserted.

21. Analysis of Claim 51

Claim 51 depends from claim 50 and recites "wherein the first and second components are carried by a conveyor into and out of the assembly station the movement of which is stopped by the stop mechanism." Ex. 1001, 16:27–30.

Petitioner refers to its arguments and evidence for the challenge of the same claim in view of IBM, Stimpson, Sabatini, and Gass. Pet. 61 (citing also Ex. 1002 ¶ 197). In that challenge, Petitioner argues that "*Gass* and *Sabatini* teach the benefits of bolting together automobile components . . . on an assembly line," IBM would have been applied to the fastening, and it would have been obvious to use an indication to prevent conveyor movement until the sequenced fastening is completed correctly "to ensure the recognition and correction of an incorrect fastening operation." Pet. 43–47 (citing Ex. 1002 ¶¶ 133–145, 149–152; Ex. 1003, 81–82; Ex. 1005 ¶¶ 6, 7, 46; Ex. 1008, 54–55; Ex. 1011 ¶ 14; Ex. 1017, 27–30; Ex. 1023, 27–30).

Our findings for claims 48–50 also show that IBM, Gass, and Sabatini teach these limitations. We also credit Dr. Davis's testimony regarding the teachings of these references and the reason why one of ordinary skill in the art would have combined the references in the manner asserted because record evidence supports his opinion. Ex. 1002 ¶¶ 133–145 (citing Ex. 1003, 81–82; Ex. 1005 ¶¶ 2, 6, 46; Ex. 1008, 55; Ex. 1011 ¶¶ 14–17; Ex. 1014, 233; Ex. 1017, 12–13; Ex. 1023, 27–30; Ex. 1031, 16–17, 19), 149–152 (citing Ex. 1003, 81–82; Ex. 1005 ¶¶ 68, 74–79, Figs. 8–10; Ex. 1023, 29), 197 (citing Ex. 1005 ¶¶ 6, 7, 46; Ex. 1008, 55; Ex. 1014, 233:2–9; Ex. 1017, 12–13), 200.

Patent Owner does not provide an argument specifically for claim 51. *See* PO Resp. 23–62. Based on the relied-upon record evidence, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 51 and one of ordinary skill in the art would have combined these references in the manner asserted.

22. Analysis of Claim 52

Claim 52 depends from claim 51 and recites "wherein the conveyor comprises an intermittent conveyor." Ex. 1001, 16:31–32.

Petitioner refers to its previous arguments for claims 31–38, 41, 42, 45, 46, and 54 that it would have been obvious to assemble Fredrick's seat on a conveyor and to arguments from its challenge based on IBM, Stimpson, Sabatini, and Gass that it would have been obvious to use an intermittent or continuous conveyor. Pet. 63–64 (citing Ex. 1002 ¶ 199; Ex. 1005 ¶¶ 6, 15).

Patent Owner does not provide an argument specifically for claim 52. *See* PO Resp. 23–62. For the reasons stated above for claim 39, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 52 and that one of ordinary skill in the art would have combined these references in the manner asserted.

23. Analysis of Claim 53

Claim 53 depends from claim 51 and recites "wherein the conveyor comprises a continuous conveyor." Ex. 1001, 16:33–34.

Petitioner refers to its previous arguments for claims 31–38, 41, 42, 45, 46, and 54 that it would have been obvious to assemble Fredrick's seat on a conveyor and to arguments from its challenge based on IBM, Stimpson, Sabatini, and Gass that it would have been obvious to use an intermittent or continuous conveyor. Pet. 63–64 (citing Ex. 1002 ¶ 199; Ex. 1005 ¶¶ 6, 15).

Patent Owner does not provide an argument specifically for claim 53. *See* PO Resp. 23–62. For the reasons stated above for claim 39, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 53 and that one of ordinary skill in the art would have combined these references in the manner asserted.

24. Analysis of Claim 54

Claim 54 depends from claim 31 and recites "wherein the first and second components comprise components of a vehicle seat." Ex. 1001, 16:35–36.

In the challenge based on IBM and Fredrick, Petitioner argues that Fredrick's vehicle seat satisfies the features recited in claim 54. Pet. 57–58 (citing Ex. 1002 ¶ 183; Ex. 1007, 2:65–3:12, Fig. 1).

We find that the relied-upon portions of Fredrick teaches and shows a seat frame for a vehicle. Ex. 1007, 2:65–3:12, Fig. 1; *see also id.* at 2:35–36, 2:62–65. We credit the testimony of Dr. Davis regarding claim 54 because Fredrick supports it. Ex. 1002 ¶ 183 (citing Ex. 1007, 2:65–3:12, Fig. 1).

Patent Owner does not provide an argument specifically for claim 54. *See* PO Resp. 23–62. Because Fredrick teaches and shows a seat frame for a vehicle, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 54 and that, for the reasons above, one of ordinary skill in the art would have combined these references in the manner asserted.

25. Analysis of Claim 55

Claim 55 depends from claim 48 and recites "herein the alarm is given as a result of the attempt to remove the first and second components of the assembly station." Ex. 1001, 16:37–39.

Petitioner refers to its arguments and evidence for the challenge of the same claim in view of IBM, Stimpson, Sabatini, and Gass. Pet. 61 (citing also Ex. 1002 ¶ 197). In that challenge, Petitioner argues that "*Gass* and *Sabatini* teach the benefits of bolting together automobile components . . . on an assembly line," IBM would have been applied to the fastening, and it would have been obvious to use an indication to prevent conveyor movement until the sequenced fastening is completed correctly "to ensure the recognition and correction of an incorrect fastening operation." Pet. 43–47 (citing Ex. 1002 ¶¶ 133–145, 149–152; Ex. 1003, 81–82; Ex. 1005 ¶¶ 6, 7, 46; Ex. 1008, 54–55; Ex. 1011 ¶ 14; Ex. 1017, 27–30; Ex. 1023, 27–30).

Our findings discussed above for claims 48–51 also show that IBM, Gass, and Sabatini teach these limitations. We also credit Dr. Davis's testimony regarding the teachings of these references and the reason why one of ordinary skill in the art would have combined the references in the manner asserted because record evidence supports his opinion. Ex. 1002 ¶¶ 133–145 (citing Ex. 1003, 81–82; Ex. 1005 ¶¶ 2, 6, 46; Ex. 1008, 55; Ex. 1011 ¶¶ 14–17; Ex. 1014, 233; Ex. 1017, 12–13; Ex. 1023, 27–30; Ex. 1031, 16–17, 19), 149–152 (citing Ex. 1003, 81–82; Ex. 1005 ¶¶ 68, 74–79, Figs. 8–10; Ex. 1023, 29), 197 (citing Ex. 1005 ¶¶ 6, 7, 46; Ex. 1008, 55; Ex. 1014, 233:2–9; Ex. 1017, 12–13), 200.

Patent Owner does not provide an argument specifically for claim 55. *See* PO Resp. 23–62. Based on the relied-upon record evidence, Petitioner persuades us that IBM, Fredrick, Sabatini, and Gass teach the limitations of claim 55 and that, for the reasons above, one of ordinary skill in the art would have combined these references in the manner asserted.

F. *Objective Indicia of Nonobviousness*

Patent Owner contends that "abundant evidence of copying of the claimed method by industry leader, Johnson Controls, as well as additional undisputed widespread commercial success of the claimed method over the past decade, highlight the weaknesses in Petitioners' grounds and supports the nonobviousness of the challenged claims." PO Resp. 7.

1. *Nexus*

Objective indicia of nonobviousness are "only relevant to the obviousness inquiry 'if there is a nexus between the claimed invention and the [objective indicia of nonobviousness].'" *In re Affinity Labs of Tex., LLC*, 856 F.3d 883, 901 (Fed. Cir. 2017) (quoting *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006)). For objective indicia of nonobviousness to be accorded substantial weight, their proponent must establish a nexus between the evidence and the merits of the claimed invention. *ClassCo, Inc., v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016). "[T]here is no nexus unless the evidence presented is 'reasonably commensurate with the scope of the claims.'" *Id.* (quoting *Rambus Inc. v. Rea*, 731 F.3d 1248, 1257 (Fed. Cir. 2013)).

A patentee is entitled to a presumption of nexus "when the patentee shows that the asserted objective evidence is tied to a specific product and that product 'embodies the claimed features, and is coextensive with them.'" *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019) (quoting *Polaris Indus., Inc. v. Arctic Cat, Inc.*, 882 F.3d 1056, 1072 (Fed. Cir. 2018) (quoting *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1130 (Fed. Cir. 2000))); *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 33, 32 (PTAB January 24, 2020) (precedential, designated April 14, 2020). On the other hand, the patentee is not entitled to

a presumption of nexus if the patented invention is only a component of a commercially successful machine or process. *Fox Factory*, 944 F.3d at 1373 (reaffirming the importance of the "coextensiveness" requirement).

"[T]he purpose of the coextensiveness requirement is to ensure that nexus is only presumed when the product tied to the evidence of secondary considerations 'is the invention disclosed and claimed.'" *Fox Factory*, 944 F.3d at 1374 (quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988)). "[T]he degree of correspondence between a product and a patent claim falls along a spectrum. At one end of the spectrum lies perfect or near perfect correspondence. At the other end lies no or very little correspondence." *Id.* "A patent claim is not coextensive with a product that includes a 'critical' unclaimed feature that is claimed by a different patent and that materially impacts the product's functionality." *Id.* at 1375.

However, "[a] finding that a presumption of nexus is inappropriate does not end the inquiry into secondary considerations." *Fox Factory*, 944 F.3d at 1375. "To the contrary, the patent owner is still afforded an opportunity to prove nexus by showing that the evidence of secondary considerations is the 'direct result of the unique characteristics of the claimed invention.'" *Id.* at 1373–74 (quoting *In re Huang*, 100 F.3d 135, 140 (Fed. Cir. 1996)). "Where the offered secondary consideration actually results from something other than what is both claimed and *novel* in the claim, there is no nexus to the merits of the claimed invention," meaning that "there must be a nexus to some aspect of the claim not already in the prior art." *In re Kao*, 639 F.3d 1057, 1068–69 (Fed. Cir. 2011) (emphasis in original). On the other hand, there is no requirement that "objective evidence must be tied exclusively to claim elements that are not disclosed in

a particular prior art reference in order for that evidence to carry substantial weight." *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1331 (Fed. Cir. 2016). A patent owner may show, for example, "that it is the claimed combination as a whole that serves as a nexus for the objective evidence; proof of nexus is not limited to only when objective evidence is tied to the supposedly 'new' feature(s)." *Id.* at 1330.

Ultimately, the fact finder must weigh the secondary considerations evidence presented in the context of whether the claimed invention as a whole would have been obvious to a skilled artisan. *Id.* at 1331–32. Once the patentee has presented a prima facie case of nexus, the burden of coming forward with evidence in rebuttal shifts to the challenger "to adduce evidence to show that the commercial success was due to extraneous factors other than the patented invention." *Demaco*, 851 F.2d at 1393.

Patent Owner contends that Petitioner "use[s] the [Atlas Copco ("AC")] Systems and other tooling to assemble engines, seats and other automotive components in a manner coextensive with the Claimed Torque and Sequence Requirements." PO Resp. 64 (citing Exs. 2016–2023, 2025–2027, 2029, 2031). Patent Owner also contends that "[t]he Claimed Torque and Sequence Requirements practiced by the systems is the direct reason," and a "presumptive nexus therefore exists between Petitioner-Defendants' use of the AC Systems and other systems and the challenged claims." *Id.* at 64–65 (citing Paper 23, 7, 9–10; Ex. 2066). Patent Owner further contends that a Johnson Controls International ("JCI") assembly process control system is coextensive with the Claimed Torque and Sequence Requirements. *Id.* at 66 (citing Paper 23, 7–8; Ex. 2009).

Petitioner replies that Patent Owner "concedes that it has not shown that any accused instrumentality includes every limitation of its two-column

long claim 31, much less commercial success of or copying by the unidentified accused instrumentality, much less a nexus." Pet. Reply 33. Patent Owner does not provide a reply argument regarding its objective indicia of nonobviousness. *See generally* PO Sur-reply.

Patent Owner "bears the burden of showing that a nexus exists." *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999). "To determine whether the patentee has met that burden, we consider the correspondence between the objective evidence and the claim scope." *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019) (quoting *Demaco*, 851 F.2d at 1392).

We agree with Petitioner that Patent Owner does not provide credible arguments or evidence that shows nexus between the challenged claims and asserted commercial success and copying. *See* Pet. Reply 33. Exhibits 2016–2022 are complaints from related litigation, and Exhibits 2023, 2025–2027, 2029, and 2031 are redacted responses, objections, or answers to interrogatories in related litigation. Patent Owner does not argue how these exhibits show nexus between the challenged claims and asserted objective indicia of nonobviousness. *See* PO Resp. 64–65.

We also determined previously that Patent Owner did not satisfy its burden of showing that documents it sought from Petitioner would show nexus because those documents lacked technical details for comparing to the challenged claims and Patent Owner did not sufficiently show that the documents would support a showing of nexus, commercial success, or copying. Paper 37, 9–10, 14–15, 18.

For the reasons above, Patent Owner has not satisfied its burden that nexus exists.

2. *Commercial Success*

Regarding commercial success, Patent Owner asserts that "Atlas Copco has experienced great commercial success by selling the AC Systems worldwide . . . for use in implementing the Claimed Torque and Sequence Requirements." PO Resp. 65 (citing Exs. 2016–2027, 2029). Patent Owner points to the number of seats assembled annually and the percentage of seats assembled globally by Atlas Copco.

Patent Owner does not argue convincingly that AC Systems are coextensive with the challenged claims. *See* PO Resp. 65. Patent Owner also has not sufficiently demonstrated that this "great commercial success" can fairly be attributed to the Claimed Torque and Sequence Requirements. The number of seats assembled annually and the percentage of seats assembled globally by Atlas Copco does not indicate how they are related to the challenged claims. Exhibits 2016–2027 and 2029 are complaints or redacted responses, objections, or answers to interrogatories from related litigation. Patent Owner does not argue or explain how these exhibits show nexus to the alleged commercial success. Thus, we determine that there is no nexus to the asserted commercial success.

Even if we assume nexus, Patent Owner has not sufficiently demonstrated commercial success. Because the relied-upon exhibits cite to other evidence that is not in the record, they provide insufficient evidence of commercial success, and Patent Owner does not explain how the exhibits show that a system sold by Atlas Copco experienced "great commercial success." *See* PO Resp. 65. If we further assumed that the documents that Patent Owner sought showed what Patent Owner asserted, they would still be insufficient to show commercial success for reasons previously stated. *See* Papers 23, 37.

3. *Copying*

Regarding copying, Patent Owner contends that JCI copied the Claimed Torque and Sequence Requirements into its own assembly process control system. PO Resp. 66. Patent Owner argues that JCI gained knowledge from one of the named inventors and "developed its own assembly system for torqueing bolts in a predetermined sequence." *Id.* at 66–67 (citing Paper 23, 7–8; Ex. 2009; Ex. 2067, 3–6).

Patent Owner does not argue convincingly that JCI's assembly process control system includes features corresponding to the Claimed Torque and Sequence Requirements. *See* PO Resp. 66. Even if nexus could be shown, Patent Owner does not explain how Exhibits 2009 and 2067 tend to show JCI copied the Claimed Torque and Sequence Requirements. Also, if we further assumed that the documents that Patent Owner sought showed what Patent Owner asserted, they would still be insufficient to show copying for reasons previously stated. *See* Papers 23, 37.

4. *Determination as to Indicia of Nonobviousness*

Having considered all the indicia of nonobviousness submitted by Patent Owner, we do not find sufficient evidence of nexus to copying and commercial success.

G. *Weighing the* Graham *Factors*

"Once all relevant facts are found, the ultimate legal determination [of obviousness] involves weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan." *Arctic Cat*, 876 F.3d at 1361. Above, based on full record before us, we provide our factual findings regarding (1) the level of ordinary skill in the art, (2) the scope and content of the prior art, (3) any differences between the

claimed subject matter and the prior art, and (4) objective evidence of nonobviousness.

In particular, we find that (1) Petitioner's proposed level of ordinary skill in the art is consistent with the prior art of record; (2) IBM, Fredrick, Sabatini, and Gass teach or suggest each of the limitations of claims 31–55; (3) one of ordinary skill in the art would have had a reason to combine IBM, Fredrick, Sabatini, and Gass with a reasonable expectation of success; and (4) there is insufficient demonstration of nexus to objective evidence of nonobviousness in the record.

Weighing these findings with our determinations of level of ordinary skill and objective evidence of nonobviousness in the record, a preponderance of the evidence persuades us that claims 31–55 of the '220 patent are unpatentable over IBM, Fredrick, Sabatini, and Gass. Further, even if nexus to objective evidence of nonobviousness were established and we reweighed Patent Owner's evidence directed to alleged copying and commercial success, we would come to the same determination for the reasons provided above—that copying and commercial success have not been persuasively shown and that claims 31–55 of the '220 patent would have been obvious to one of ordinary skill in the art at the time of the invention over the asserted prior art in this proceeding.

H. Remaining Challenges

Petitioner also challenges claims 31, 32, 34, 36–38, 45, and 46 as unpatentable over IBM, Stimpson, and optionally Becker (Pet. 23–41); claims 31, 32, 34, 36–40, 45–53, and 55 as unpatentable over IBM, Stimpson, Sabatini, Gass, and optionally Becker (*id.* at 41–49); and claims 31–38, 41, 42, 45, 46, and 54 as unpatentable over IBM, Frederick, and optionally Becker (*Id.* at 49–59). With citations to the record and declarant

testimony, Petitioner further contends that claims 31, 32, 34, 36–40, 45–53, and 55 are unpatentable over Gass, Stimpson, Sabatini, and optionally Becker (*id.* at 65–73); and claims 31–55 are unpatentable over Gass, Fredrick, Sabatini, and optionally Becker (*id.* at 73–74).

Because we determine that the same claims are unpatentable over the proposed combination of IBM, Fredrick, Sabatini, and Gass, we do not reach these additional challenges to these claims. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding a petitioner "is entitled to a final written decision addressing all of the claims it has challenged"). Additionally, as discussed above in Section II.C., Petitioner's proposed combinations that include Becker are contingent on adopting Petitioner's interpretation of "insert" (*see* Pet. 35–38, 55, 65–66, 70), and, as the parties argued (Pet. 22; PO Resp. 22), we do not need to interpret any term to resolve the parties' disputes. Thus, for this additional reason, we do not reach the challenges that include Becker.

III. PETITIONER'S MOTION TO STRIKE AND PATENT OWNER'S ALTERNATE MOTION TO MAINTAIN EXHIBITS 2070–2080

Petitioner moves to strike Patent Owner's Sur-reply Exhibits 2070–2080 and portions of the Sur-reply that quote or cite to those exhibits based on the Consolidated Trial Practice Guide November 2019 ("CTPG") (available at https://www.uspto.gov/TrialPracticeGuideConsolidated). Mot. to Strike 1. Petitioner notes that it timely objected. *Id.* (citing Paper 41, 3). The moving party "has the burden of proof to establish that it is entitled to the requested relief." 37 C.F.R. § 42.20(c).

Petitioner contends that the Board routinely grants such requests. Mot. to Strike. 1 (citing several Board proceedings). Petitioner also contends that

> Patent Owner's new evidence and the arguments that rely upon that new evidence should be struck now because (1) it is "beyond dispute" that it "is belatedly presented" (CTPG, p. 81), (2) not striking encourages others to ignore the PTAB's procedural restrictions with expected impunity, and (3) Petitioners would be prejudiced by having to respond to and address Patent Owner's new sur-reply evidence at oral argument.

Id. at 1–2.

Petitioner also contends that authorizing a sur-reply does not also authorize new evidence, neither does the filing of proper rebuttal evidence with the Reply. Mot. to Strike 2, 3. Petitioner further contends that arguments that the CTPG is not binding have been rejected. *Id.* at 2. Petitioner additionally contends that Patent Owner could have sought to file a motion to submit new information. *Id.* at 3–4. Petitioner also argues that it did not withhold evidence and allowing the exhibits would encourage other parties to file more papers and evidence. *Id.* at 4–5.

Patent Owner contends that the exhibits are highly relevant to the issue of what one of ordinary skill in the art would have understood from IBM's disclosure and rebuts asserted arguments in Petitioner's Reply about Hall effect sensors and torque transducers. Opp. to Mot. to Strike 1–4. Patent Owner, therefore, also moves to maintain the exhibits "for procedural fairness and a fulsome record." *See id.* Patent Owner also argues that Petitioner's arguments are meritless and provides Board cases that are asserted to support Patent Owner's position. *Id.* at 4–5.

Petitioner replies that Patent Owner does not show good cause for accepting the sur-reply evidence or that it is in the interests of justice

because Patent Owner was on notice that these issues were in dispute. Reply for Mot. to Strike 1–4. Petitioner also argues that a lack of reply declaration and the cited Board cases do not allow the disputed exhibits. *Id.* at 4–5.

Exhibits 2070–2080 provide additional limited context for the technical field on undisputed issues. Under the circumstances, we find good cause to permit them to be included in the record.

Accordingly, we deny Petitioner's Motion to Strike and grant Patent Owner's Alternate Motion to Maintain Exhibits 2070–2080.

IV. PETITIONER'S MOTION TO EXCLUDE

Petitioner moves to exclude Exhibits 2038–2048, 2054–2061, 2063–2068, 2071–2076, 2078, and 2079. Mot. to Excl. 2. Petitioner notes that objections to these exhibits were timely made. *Id.* (citing Paper 35, 2), 6 (citing Paper 41, 3). Petitioner, as the "moving party," "has the burden of proof to establish that it is entitled to the requested relief." 37 C.F.R. § 42.20(c).

Petitioner argues that Exhibits 2038–2048, 2054–2061, and 2063–2068 should be excluded based on foundation, authentication, hearsay, or relevance under Federal Rules of Evidence ("FRE") 602 and 901(a). Mot. to Excl. 2. According to Petitioner, Patent Owner only identifies the websites where they were found or if they were available before the priority date. *Id.* at 2–5 (citing Ex. 2069 ¶¶ 2–12, 18–25, 27–32). Petitioner also contends that Exhibits 2038–2044, 2054–2060, 2063, 2064, and 2066–2068 should be excluded under FRE 801(c) as inadmissible hearsay. *Id.* at 4–5. Petitioner again argues that Patent Owner fails to show that they are prior art. *Id.* at 5.

Petitioner also argues that Exhibit 2071 should be excluded as irrelevant because it is not prior art. Mot. to Excl. 6. Petitioner further

argues that Exhibits 2072–2076, 2078, and 2079 should be excluded as unauthenticated, irrelevant, and hearsay. *Id.* Petitioner contends that Patent Owner lacks first-hand knowledge to authenticate these exhibits and only identifies the source website. *Id.* at 7 (citing Ex. 2080 ¶¶ 4–8, 10, 11). Petitioner also contends that they are irrelevant because they were from websites after the priority date and are hearsay without an applicable hearsay exception. *Id.* at 8.

Patent Owner contends that the disputed exhibits are highly relevant, establish a reasonable probability that they are what they purport to be on their face, and provide relevant evidence to demonstrate what was or was not in the prior art. Opp. to Mot. to Excl. 1–5, 7, 10, 13–15. Patent Owner also contends that Petitioner's arguments should go to the weight afforded to the exhibits. *Id.* at 5, 6. Patent Owner further contends that they are not hearsay because they are used to show how ordinary skilled artisans understood clutch components or torque or to show what they describe. *Id.* at 6, 7–8, 15. Patent Owner additionally contends that Exhibits 2047, 2060 and 2063 support Mr. Lehnert's testimony or the asserted objective indicia of nonobviousness. *Id.* at 8–12.

Petitioner replies that Patent Owner fails to provide corroborating evidence for authentication and the disputed exhibits are not relevant. Reply for Mot. to Excl. 1–2, 4. Petitioner argues that Patent Owner also relies on these exhibits for the truth of the matter asserted. *Id.* at 3.

We cite these exhibits to indicate where Patent Owner believes support can be found for its arguments. We do not, however, rely on these exhibits in our analysis. Accordingly, we dismiss as moot the Motion to Exclude.

V. CONCLUSION[5]

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
31, 32, 34, 36–38, 45, 46	103(a)	IBM, Stimpson[6]		
31, 32, 34, 36–38, 45, 46	103(a)	IBM, Stimpson, Becker[7]		
31, 32, 34, 36–40, 45–53, 55	103(a)	IBM, Stimpson, Sabatini, Gass[8]		
31, 32, 34, 36–40, 45–53, 55	103(a)	IBM, Stimpson, Becker, Sabatini, Gass[9]		
31–38, 41, 42,	103(a)	IBM, Fredrick[10]		

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[5] Should Patent Owner wish to pursue amendment of the challenged claim in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

[6] As explained above in Section II.I., we do not reach this challenge.

[7] As explained above in Section II.I., we do not reach this challenge.

[8] As explained above in Section II.I., we do not reach this challenge.

[9] As explained above in Section II.I., we do not reach this challenge.

[10] As explained above in Section II.I., we do not reach this challenge.

45, 46, 54				
31–38, 41, 42, 45, 46, 54	103(a)	IBM, Fredrick, Becker[11]		
31–55	103(a)	IBM, Fredrick, Sabatini, Gass	31–55	
31–55	103(a)	IBM, Fredrick, Becker, Sabatini, Gass[12]		
31, 32, 34, 36–40, 45–53, 55	103(a)	Gass, Stimpson, Sabatini[13]		
31, 32, 34, 36–40, 45–53, 55	103(a)	Gass, Stimpson, Sabatini, Becker[14]		
31–55	103(a)	Gass, Fredrick, Sabatini[15]		
31–55	103(a)	Gass, Fredrick, Sabatini, Becker[16]		
31, 32, 34, 36–40, 45–53, 55	103(a)	Gass, Stimpson, Sabatini[17]		
Overall Outcome			31–55	

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[11] As explained above in Section II.I., we do not reach this challenge.

[12] As explained above in Section II.I., we do not reach this challenge.

[13] As explained above in Section II.I., we do not reach this challenge.

[14] As explained above in Section II.I., we do not reach this challenge.

[15] As explained above in Section II.I., we do not reach this challenge.

[16] As explained above in Section II.I., we do not reach this challenge.

[17] As explained above in Section II.I., we do not reach this challenge.

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 31–55 of U.S. Patent No. RE47,220 E have been shown, by a preponderance of the evidence, to be unpatentable;

FURTHER ORDERED that Petitioner's Motion to Strike Patent Owner's Sur-reply Evidence (Paper 46) is denied;

FURTHER ORDERED that Patent Owner's Motion to Maintain Exhibits 2070–2080 (Paper 47) is granted;

FURTHER ORDERED that Petitioner's Motion to Exclude (Paper 49) is dismissed as moot; and

FURTHER ORDERED that, because this is a Final Written Decision, the 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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