

**United States Court of Appeals  
for the Federal Circuit**

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**B/E AEROSPACE, INC.,**  
*Appellant*

v.

**C&D ZODIAC, INC,**  
*Appellee*

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2019-1935, 2019-1936

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Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2017-01275, IPR2017-01276.

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Decided: June 26, 2020

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MORGAN CHU, Irell & Manella LLP, Los Angeles, CA, for appellant. Also represented by MICHAEL RICHARD FLEMING.

JOHN C. ALEMANNI, Kilpatrick Townsend & Stockton LLP, Raleigh, NC, for appellee. Also represented by MICHAEL T. MORLOCK, DAVID A. REED, Atlanta, GA; STEVEN MOORE, San Francisco, CA; ANDREW WILLIAM RINEHART, Winston-Salem, NC.

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Before LOURIE, REYNA, and HUGHES, *Circuit Judges*.

REYNA, *Circuit Judge*.

B/E Aerospace, Inc. appeals a final written decision of the Patent Trial and Appeal Board that found certain claims of B/E’s aircraft lavatory-related patents obvious. B/E contends that the Board’s decision is erroneous because the Board incorporated a claim limitation that is not present in the prior art. B/E also contends that the Board erred by relying on printed matter that does not qualify as prior art under 35 U.S.C. § 311(b). We conclude that the Board’s final determination of obviousness is correct, and we do not reach the § 311(b) issue. On that basis we affirm the Board’s final written decision.

#### BACKGROUND

This appeal arises from an inter partes review (“IPR”) proceeding. Petitioner, C&D Zodiac, Inc. (“Zodiac”), challenged two patents owned by B/E Aerospace, Inc. (“B/E”), U.S. Patent No. 9,073,641 (“the ’641 patent”) and U.S. Patent No. 9,440,742 (“the ’742 patent”) (collectively, “the challenged patents”).

The technology involved in this appeal is simple. The challenged patents relate to space-saving technologies for aircraft enclosures such as lavatory enclosures, closets, and galleys. *C&D Zodiac, Inc. v. B/E Aerospace, Inc.*, No. IPR2017-01275 at 4 (P.T.A.B. Oct. 23, 2018). Each patent contains a two-page written description that teaches an enclosure with contoured walls designed to “reduce or eliminate the gaps and volumes of space required between lavatory enclosures and adjacent structures.” ’641 patent at 1:52–56. In other words, the patents are directed to space-saving modifications to the walls of aircraft enclosures; they are not directed to the structures contained within those walls. *Id.*; see IPR2017-01275 at 15.

The parties agree that, for purposes of this appeal, the challenged patents and claims are not materially different

and that claim 1 of the '641 patent is representative of the challenged claims.

Claim 1 of the '641 patent provides:

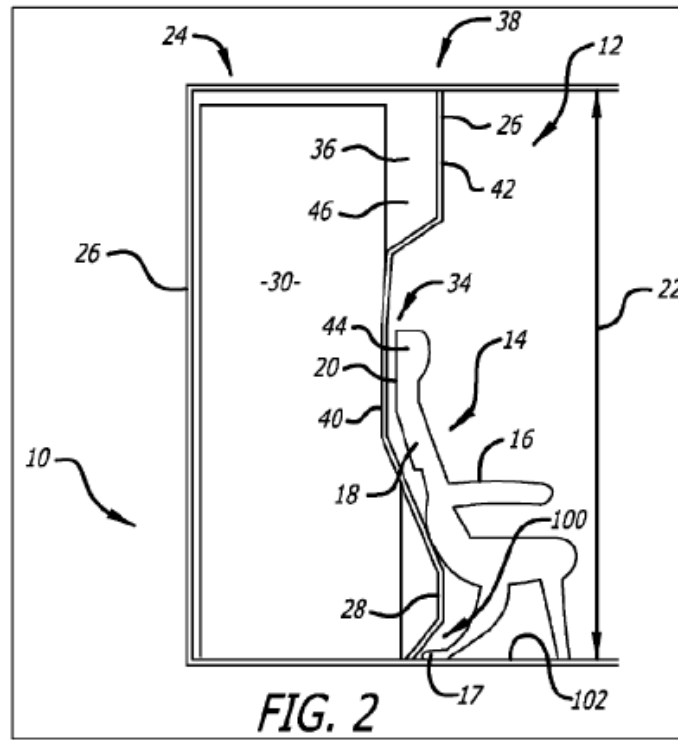
1. An aircraft lavatory for a cabin of an aircraft of a type that includes a forward-facing passenger seat that includes an upwardly and aftwardly inclined seat back and an aft-extending seat support disposed below the seat back, the lavatory comprising:

a lavatory unit including a forward wall portion and defining an enclosed interior lavatory space, said forward wall portion configured to be disposed proximate to and aft of the passenger seat and including an exterior surface having a shape that is substantially not flat in a vertical plane; and

wherein said forward wall portion is shaped to substantially conform to the shape of the upwardly and aftwardly inclined seat back of the passenger seat, and includes a **first recess** configured to receive at least a portion of the upwardly and aftwardly inclined seat back of the passenger seat therein, and further includes a **second recess** configured to receive at least a portion of the aft-extending seat support therein when at least a portion of the upwardly and aftwardly inclined seat back of the passenger seat is received within the first recess.

'641 patent at 4:63–5:17 (emphases added).

This appeal focuses on the “first recess” and “second recess” limitations, labeled as elements 34 and 100, respectively, in Figure 2 below.

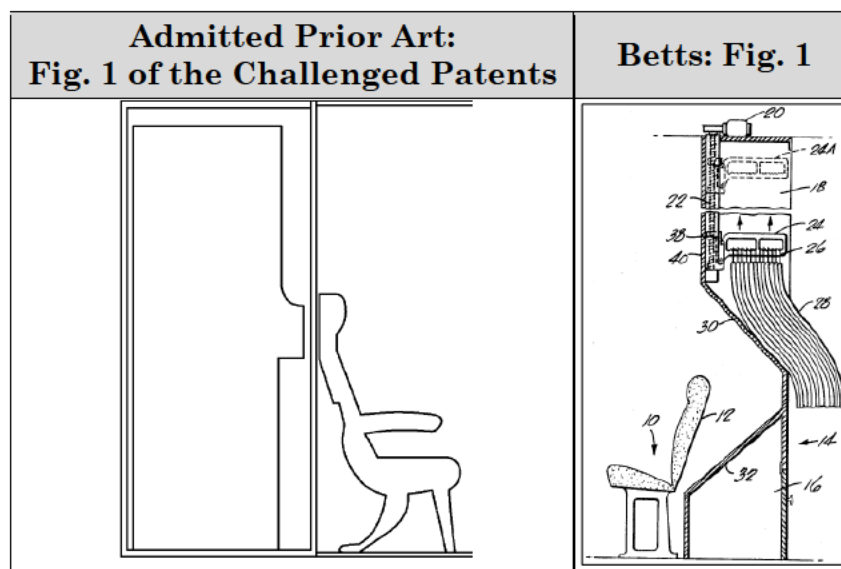


'641 patent at Fig. 2.

#### A. Prior Art

Zodiac's petition asserted two grounds of unpatentability. The Board instituted on both grounds. During the proceeding, Zodiac requested a partial adverse judgment, which the Board granted. This left only one instituted ground: that the challenged claims were obvious over the so-called "Admitted Prior Art" and U.S. Patent No. 3,738,497 ("Betts").

In its petition, Zodiac defined the "Admitted Prior Art" as certain portions of the challenged patents, including Figure 1. See '641 patent at 1:65-67. As shown below, Figure 1 of the Admitted Prior Art discloses a flat, forward-facing lavatory wall immediately behind a passenger seat that has a rear seat leg extending toward the back of the plane (referred to as an "aft-extending seat support").



Betts discloses an airplane passenger seat with a tilting backrest. Behind the seat is a coat closet that has luggage space along the floor and an overhead coat compartment. Betts at 2:8–14. Rather than a flat forward-facing wall, Betts discloses a contoured forward-facing wall to receive the tilted backrest. *Id.* at 2:19–24. The “lower portion 30 of the coat compartment 18” of Betts “slants rearwardly to provide a space for seatback 12 to be tilted rearwardly.” *Id.* The “top 32 of storage space 16 also slants rearwardly so as not to interfere with seatback 12 when tilted.” *Id.*

### B. Obviousness

In its final written decision, the Board concluded that Zodiac had proven that the challenged claims would have been “obvious over the Admitted Prior Art and Betts.” IPR2017-01275 at 39. The Board determined that Betts’s contoured wall design met the “first recess” claim

limitation. *Id.* at 17 (citing Betts at 2:19–24).<sup>1</sup> The Board also found that skilled artisans (airplane interior designers) would have been motivated to modify the flat forward-facing wall of the lavatory in the Admitted Prior Art with Betts’s contoured, forward-facing wall because skilled artisans were interested in adding space to airplane cabins, and Betts’s design added space by permitting the seat to be moved further aft. *Id.* at 14–17.

The Board found that a skilled artisan would have found it “obvious to further modify the Admitted Prior Art/Betts combination to include the ‘second recess’ to receive passenger seat supports.” *Id.* at 22. The Board used two separate approaches presented by Zodiac to reach that conclusion.<sup>2</sup>

First, Zodiac argued that “the logic of using a recess to receive the seat back applies equally to using another recess to receive the aft extending seat support.” *Id.* At 18. The Board found Zodiac’s arguments and testimony “credible and convincing.” *Id.* at 22. The Board agreed with Zodiac that creating a recess in the wall to receive the seat support was an obvious solution to a known problem. The Board relied on the testimony of Zodiac’s expert, Mr. Anderson, who opined that the addition of a second recess “is nothing more than the application of a known technology (i.e., Betts) for its intended purpose with a predictable result (i.e., to position the seat as far back as possible).” *Id.* at 18, 23. Mr. Anderson explained that a skilled artisan “would be motivated to modify an enclosure, such as a lavatory, to include a second recess to receive aft facing seat supports”; that this “modification is nothing more than the

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<sup>1</sup> B/E does not challenge the Board’s finding that Betts teaches the “first recess” limitation.

<sup>2</sup> The Board stated that it reached its obviousness conclusion through a “traditional approach” and a “common sense” approach. J.A. 156 n.1.

application of known technology for its intended purpose”; and that the “result of such a modification is predictable, allowing the seat to be positioned further aft in an aircraft.” J.A. 1850 ¶ 191; *see also* IPR2017-01275 at 23, 26.

Second, the Board found that Zodiac “established a strong case of obviousness based on the Admitted Prior Art and Betts, coupled with common sense and the knowledge of a person of ordinary skill in the art.” IPR2017-01275 at 34. Relying on the testimony of Mr. Anderson, the Board found that recesses configured to receive seat supports “were known in the art” and that “it would have been a matter of common sense” to incorporate a second recess in the Admitted Prior Art/Betts combination. *Id.* at 26.

### C. Design Drawings

Zodiac attached to its petition three “design drawings” that undisputedly depict “enclosures that include a lower recess to receive a seat support,” i.e., a “second recess.” *Id.* at 19. Zodiac did not identify these design drawings as prior art references for any of the enumerated grounds of unpatentability. Instead, Zodiac asserted the drawings as evidence that lower recesses to receive a seat support were “known in the art.” *Id.* at 21.

B/E moved to exclude the design drawings and the related testimony on the basis that Zodiac had not shown that the drawings were “patents” or “printed publications” within the meaning of 35 U.S.C. § 311(b). J.A. 513–18. Section 311(b) provides that, in an IPR proceeding, claims may be cancelled as unpatentable only on the basis of prior art consisting of “patents or printed publications.”

The Board denied the motion to exclude. IPR2017-01275 at 22–23, 40–41. The Board determined that two of the designs, the SAS MD-90 and the 737 Storage, were in public use or on sale prior to the critical date of the challenged patents. *Id.* But the Board explained that it considered the design drawings only for the purpose of

“identify[ing], specifically, the knowledge of those skilled in the art.” *Id.* at 24. When used for those purposes, the Board explained, the drawings “need not be ‘printed publication’ prior art.” *Id.* at 41-42; *see also id.* at 24.

B/E requested a rehearing of the Board’s determination regarding the design drawings. B/E argued that the Board “misapprehended and/or overlooked the statute defining the scope of IPRs, 35 U.S.C. § 311(b).” J.A. 652. B/E argued that the design drawings and the related testimony “fall[] outside the scope of IPRs, which are instituted only on the basis of prior art consisting of patents or printed publications.” *Id.* B/E also challenged the Board’s reliance on “common sense” in finding obviousness. The Board denied the request for rehearing.

B/E timely appealed. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

#### ANALYSIS

We review final written decisions of the Board in accordance with the Administrative Procedure Act, 5 U.S.C. § 706(2) (2012). *HTC Corp. v. Cellular Commc’ns Equip., LLC*, 877 F.3d 1361, 1367 (Fed. Cir. 2017). Obviousness is a question of law with underlying factual findings relating to the scope and content of the prior art; differences between the prior art and the claims at issue; the level of ordinary skill in the pertinent art; the presence or absence of a motivation to combine or modify prior art with a reasonable expectation of success; and any objective indicia of non-obviousness. *Acoustic Tech., Inc. v. Itron Networked Sols., Inc.*, 949 F.3d 1366, 1373 (Fed. Cir. 2020). We review *de novo* the Board’s legal conclusions of obviousness and its factual findings for substantial evidence. *HTC Corp. v. Cellular Commc’ns Equip., LLC*, 877 F.3d 1361, 1369 (Fed. Cir. 2017). Substantial evidence is “such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938). We do not reweigh evidence on appeal. *Impax*



*Labs. Inc. v. Lannett Holdings Inc.*, 893 F.3d 1372, 1382 (Fed. Cir. 2018).

B/E raises two general issues on appeal. First, B/E argues that the Board’s obviousness determination is erroneous because it improperly incorporated a second recess limitation not disclosed in the prior art. Second, B/E contends that the Board erred by relying on the design drawings, which are not prior art “patents or printed publications” under 35 U.S.C. § 311(b).

#### A. Obviousness

The Board found that Zodiac established a “strong case of obviousness.” We agree. There is no dispute that Betts’s contoured wall design meets the “first recess” claim limitation. Nor do the parties dispute that a skilled artisan would have been motivated to modify the Admitted Prior Art with Betts’s contoured wall because skilled artisans were interested in maximizing space in airplane cabins. IPR2017-01275 at 14–17. Only the “second recess” limitation is at issue.

We find no error in the Board’s conclusion that—under both approaches it employed—“it would have been obvious to further modify the Admitted Prior Art/Betts combination to include the claimed ‘second recess’ to receive passenger seat supports.” *Id.* at 22.

First, we affirm the Board’s conclusion that the challenged claims would have been obvious because modifying the Admitted Prior Art/Betts combination to include a second recess was nothing more than the predictable application of known technology. *Id.* at 23. The prior art yields a predictable result, the “second recess,” because a person of skill in the art would have applied a variation of the first recess and would have seen the benefit of doing so. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007) (“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield

predictable results. . . . If a person of ordinary skill in the art can implement a predictable variation § 103 likely bars its patentability.”). The Board’s conclusion is supported by substantial evidence, namely the expert testimony of Mr. Anderson, who opined:

[A] person of ordinary skill in the art would recognize that as a seat is moved further aft the seat support necessarily is also moved further aft. As the seat is moved aft the feet of the seat support may come into contact with the lower section of the wall. Creating one or more recesses to accommodate whatever portion(s) of the seat support that would contact the forward wall of the enclosure is the obvious solution to this known problem.

J.A. 1787 ¶ 74.

Second, we also affirm the Board’s conclusion that the challenged claims would have been obvious because “it would have been a matter of common sense” to incorporate a second recess in the Admitted Prior Art/Betts combination. IPR2017-01275 at 26, 38. B/E asserts that the Board legally erred by relying on “an unsupported assertion of common sense” to “fill a hole in the evidence formed by a missing limitation in the prior art.” Appellant Br. 14. B/E argues that the Board acted contrary to our precedent in *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361 (Fed. Cir. 2016), because the Board failed to provide a “reasoned explanation and record evidence to support its position.” *Id.* at 25. We disagree.

In *KSR*, the Supreme Court opined that common sense serves a critical role in determining obviousness. 550 U.S. at 421. As the Court explained, common sense teaches that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle. *Id.* (“A person of ordinary skill is also a person of ordinary creativity, not an automaton.”). The

Court held that “rules that deny factfinders recourse to common sense” are inconsistent with our case law. *Id.*

After *KSR*, we recognized that courts must “consider common sense, common wisdom, and common knowledge in analyzing obviousness.” *Arendi*, 832 F.3d at 1361. However, we cautioned that common sense cannot be used as a “wholesale substitute for reasoned analysis and evidentiary support, especially when dealing with a limitation missing from the prior art references specified.” *Id.* at 1362. Likewise, in *Perfect Web Techs, Inc. v. InfoUSA, Inc.*, we reiterated that “[c]ommon sense has long been recognized to inform the analysis of obviousness if explained with sufficient reasoning.” 587 F.3d 1324, 1328 (Fed. Cir. 2009).

Here, the Board’s invocation of common sense was properly accompanied by reasoned analysis and evidentiary support. The Board dedicated more than eight pages of analysis to the “second recess” limitation and relied on Mr. Anderson’s detailed expert testimony. IPR2017-01275 at 21 (citing J.A. 1786–88 ¶¶ 74–75, J.A. 1849–50 ¶¶ 189–92). The Board noted Mr. Anderson’s opinion that a “person of ordinary skill in the art would recognize that as a seat is moved further aft the seat support necessarily is also moved further aft.” *Id.* (citing J.A. 1786–87 ¶¶ 74–75). The Board also cited Mr. Anderson’s opinion that “lower recesses were a well-known solution to provide space for seat supports where a recess for a seat back in the forward wall of the enclosure unit permitted the seat to be located further aft.” *Id.*; J.A. 1787–88 ¶ 75.

In *Perfect Web*, we affirmed a district court’s invocation of common sense to supply a missing claim limitation. 587 F.3d at 1338. The missing limitation was step D of steps A–D of a method for delivering a predetermined quantity of emails. *Id.* at 1328. The record showed that the technology was simple and that “step (D) merely involves repeating earlier steps” until success is achieved. *Id.* at 1330.

We also determined that the district court “adequately explained its invocation of common sense.” *Id.*

Here, just like in *Perfect Web*, the evidence shows that the technology of the claimed invention is simple. The patents relate to contoured walls that “reduce or eliminate the gaps and volumes of space required between lavatory enclosures and adjacent structures.” ’641 patent at 1:52–56. *See also* IPR2017-01275 at 23 (rejecting B/E’s argument that the enclosures at issue are quite complex); J.A. 403. The missing claim limitation (the “second recess”) involves repetition of an existing element (the “first recess”) until success is achieved. IPR2017-01275 at 18 (reasoning that the logic of using a recess to receive the seat back applies equally to using another recess to receive the aft extending seat support).

We find no error in the Board’s conclusion that a skilled artisan would have used common sense to incorporate a second recess in the Admitted Prior Art/Betts combination. We therefore affirm the Board’s obviousness conclusion under both of its approaches.

### B. Design Drawings

B/E asserts that the Board violated 35 U.S.C. § 311(b) by relying on the design drawings because they are neither patents nor printed publications. The Board, however, did not rely on the design drawings when it found the challenged claims obvious. When the Board found the challenged claims obvious under a “traditional obviousness approach,” it relied on expert testimony:

While we found Petitioner’s common sense rationale persuasive, Petitioner’s argument and evidence, including the testimony of Petitioner’s expert, support the conclusion that the challenged claims are obvious under a traditional obviousness approach that does not rely on the “common sense” rationale supported by [the design drawings].

J.A. 156 n.1. Likewise, when the Board separately found the challenged claims obvious based on “common sense,” its conclusion did not rest on its consideration of those drawings:

We concluded that Petitioner met [the *Arendi* common sense] standard based not only on the citation to second recesses in the [design drawings], but also on the rationale and related analysis provided by Petitioner’s expert that we credited and found convincing before addressing the public use/on sale references. We also credited the testimony of Petitioner’s expert that the proposed modification would have been predictable. Accordingly, because our analysis relied on the analysis and reasoning of Petitioner’s expert regarding why it would have been obvious and a matter of common sense to add a second recess, . . . [the design drawings] were instead used as further evidence in support of the common sense argument.

. . .

Because we found the expert analysis credible apart from its reliance on the [design drawings], we need not reach whether supplying a missing limitation via a “common sense” argument, based solely on public uses/sales, runs afoul of § 311(b).

J.A. 165–66, n.2.

We agree that the Board’s obviousness conclusions are independently supported by “Petitioner’s argument and evidence, including the testimony of Petitioner’s expert.” J.A. 156 n.1. The Board instituted on grounds supported by the Admitted Prior Art and Betts. The Board fully articulated its conclusion of obviousness, and we conclude that substantial evidence supports the Board’s determination of obviousness independent of the design drawings. Accordingly, we need not reach the issues raised by B/E on

whether the Board ran afoul of § 311(b) by considering the design drawings.

CONCLUSION

We have considered B/E's other arguments and find them unpersuasive. For the reasons stated above, we affirm the Board's determination that claims 1, 3-10, and 12-17 of U.S. Patent No. 9,073,641, and claims 8 and 10-16 of U.S. Patent No. 9,440,742, are invalid as obvious.

**AFFIRMED**