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McDonnell Boehnen Hulbert & Berghoff LLP/BOEING 300 South Wacker Drive, Suite 3100 Chicago, IL 60606			HUTCHENS, CHRISTOPHER D.	
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MITHRA M.K.V. SANKRITHI, ARVIN SHAJANIAN,
SERGEY D. BARMICHEV, VICTOR KEN STUHR,
JOSHUA M. KUSNITZ, and ISMAIL ROBBANA

Appeal 2019-004286
Application 13/897,452
Technology Center 3600

Before JAMES P. CALVE, ANNETTE R. REIMERS, and
MICHAEL L. WOODS, *Administrative Patent Judges*.

REIMERS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant¹ appeals under 35 U.S.C. § 134(a) from the Examiner's decision to reject under 35 U.S.C. § 103 claims 1–4, 6–18, 20, and 22 as unpatentable over Epstein (US 2014/0026597 A1, published Jan. 30, 2014), Lee (US 2005/0051666 A1, published Mar. 10, 2005), and Tichborne (US 2012/0248251 A1, published Oct. 4, 2012). Claims 5, 19, and 21 have been canceled. We have jurisdiction under 35 U.S.C. § 6(b).

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as “The Boeing Company.” Appeal Brief (“Appeal Br.”) 1, filed Nov. 30, 2018.

We REVERSE.

CLAIMED SUBJECT MATTER

The claimed subject matter “relate[s] to aircraft fuel systems.” Spec.

¶ 1, Figs. 6, 15. Claims 1, 15, and 20 are independent.

Claim 1 is illustrative of the claimed subject matter and recites:

1. A hybrid fuel airplane comprising:
 - an airplane body conformed to an outer mold line;
 - an airplane wing coupled to the airplane body and operable to generate aerodynamic lift;
 - an airplane propulsor operable to generate thrust; and
 - an airplane fuel system operable to carry fuel usable by the airplane propulsor and comprising:
 - at least one cryogenic fuel tank including (i) a first portion located behind an aft pressure bulkhead of the airplane body, forward of an aft tailcone, and below a vertical tail portion of the airplane body, and (ii) a second portion located in the vertical tail portion of the airplane body behind the aft pressure bulkhead, wherein the first portion of the at least one cryogenic fuel tank and the second portion of the at least one cryogenic fuel tank comprise different portions of a single cryogenic fuel tank, wherein the entirety of the at least one cryogenic fuel tank is located behind the aft pressure bulkhead of the airplane body, and wherein the at least one cryogenic fuel tank is in direct fluid communication with the airplane propulsor; and
 - a jet fuel tank operable to carry jet fuel and located in the airplane wing;
 - wherein the at least one cryogenic fuel tank comprises a cooling system to maintain the cryogenic fuel contained therein at a sufficiently low temperature.

ANALYSIS

Independent claim 1 is directed to a hybrid fuel airplane including an airplane body with an aft pressure bulkhead and an airplane fuel system having at least one cryogenic fuel tank, “wherein the entirety of the at least one cryogenic fuel tank is located behind the aft pressure bulkhead of the airplane body.” Appeal Br. 2 (Claims App.).²

The Examiner finds that Epstein discloses the hybrid fuel airplane of claim 1 including at least one cryogenic fuel tank 123. Final Act. 2–3³. The Examiner also finds that Epstein does not disclose, among other things, that “the entirety of the at least one cryogenic fuel tank is located behind the aft pressure bulkhead of the airplane body.” *Id.* at 3. The Examiner finds that “Lee teaches an aircraft with a plurality of fuel tanks (202) (fig. 2A) having a first portion (214) in the empennage, which is understood to be located behind an aft pressure bulkhead.” *Id.* The Examiner reasons that it would have been obvious to a skilled artisan “to have modified Epstein to include the teachings of Lee to have the tank located in an aircraft empennage section, since Epstein states the tank (123) may be located in an aft portion of the fuselage, and doing so would provide space for components forward of the empennage.” *Id.*⁴

Appellant contends that “fuel tanks 214, 216 of Lee are not shown to be positioned [‘]behind an aft pressure bulkhead of the airplane’ as recited in

² Claims Appendix (“Claims App.”), filed Jan. 3, 2019.

³ Final Office Action (“Final Act.”), dated May 25, 2018.

⁴ In the Answer, the Examiner clarifies that the teachings of Tichborne are not relied upon for disclosing “the entirety of the at least one cryogenic fuel tank [being] located behind the aft pressure bulkhead of the airplane body.” Examiner’s Answer (“Ans.”) 5, dated Mar. 15, 2019.

claim 1. In fact, the disclosure of Lee does not mention an aft pressure bulkhead at all.” Reply Br. 4⁵; *see also* Appeal Br. 5–9. Appellant further contends that “[t]he Examiner submits that the aft fuselage tank 214 is located in the empennage. However, Lee does not make this assertion.” Reply Br. 4. Instead, according to Appellant, “Lee states that ‘[t]he aft body fuel tank 214 is located between the main landing gear wheel well and the [Auxiliary Power Unit (APU)]’” and “Lee makes no mention of an aft pressure bulkhead with respect to the location of the fuel tanks 214, 216.” *Id.* (citing Lee ¶ 47).

Appellant has the better position here. Lee discloses that “[t]he illustrative aircraft has an empennage 114 in the form of an inverted V-tail that includes a vertical stabilizer 120 and inverted stabilizers 121” and that “[t]he empennage 114 includes a tail structure section 502, a vertical stabilizer to inverted stabilizer joint section 504, and an inverted stabilizer to nacelle joint section 506.” Lee ¶¶ 36, 77 (both emphasis omitted), Figs. 1A, 5A. There is no discussion in Lee of an “aft pressure bulkhead” let alone that empennage 114 is located “behind an aft pressure bulkhead.” *See* Final Act. 3; *see also* Reply Br. 4; Lee, *generally*. Further, as correctly pointed out by Appellant, Lee discloses that “aft body fuel tank 214 is located between the main landing gear wheel well and the APU.” Reply Br. 4; *see also* Lee ¶ 47 (emphasis omitted).

Although Epstein discloses that fuel tank 123 “may be located *in an aft portion* of the fuselage of the aircraft system, such as for example shown schematically in [Figure 1]” (*see* Epstein ¶ 20 (emphasis added)), there is no

⁵ Reply Brief (“Reply Br.”), filed May 10, 2019.

discussion in Epstein of fuel tank 123 being located “behind the aft pressure bulkhead,” as claimed. *See* Appeal Br. 5–6; *see also* Reply Br. 4; Epstein, *generally*. Moreover, the Examiner does not establish that Epstein’s fuel tank 123 is necessarily located behind an aft pressure bulkhead. *See* Final Act. 2–3; *see also* Ans. 3. In fact, the Examiner acknowledges in the Final Office Action that Epstein fails to disclose that the entirety of fuel tank 123 is located behind the aft pressure bulkhead of the airplane body and relies on Lee for this teaching. *See* Final Act. 3. For these reasons, the Examiner does not establish by a preponderance of the evidence that the combined teachings of Epstein and Lee disclose that the entirety of the at least one cryogenic fuel tank is structurally located “*behind the aft pressure bulkhead* of the airplane body,” as set forth in claim 1. Final Act. 2–3; *see also* Ans. 3; Reply Br. 4; Appeal Br. 2 Claims App. (emphasis added).

Accordingly, we do not sustain the Examiner’s rejection of claims 1–4, 6–18, 20, and 22 as unpatentable over Epstein, Lee, and Tichborne.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–4, 6–18, 20, and 22	103	Epstein, Lee, and Tichborne		1–4, 6–18, 20, and 22

REVERSED