

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GENERAL ELECTRIC COMPANY,
Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,
Patent Owner.

Case IPR2016-00526
Patent 7,966,807 B2

Before HYUN J. JUNG, SCOTT A. DANIELS, and
GEORGE R. HOSKINS, *Administrative Patent Judges*.

JUNG, *Administrative Patent Judge*.

DECISION

35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

General Electric Company (“Petitioner”) filed a Petition (Paper 1, “Pet.”), requesting institution of an *inter partes* review of claims 1–20 of U.S. Patent No. 7,966,807 B2 (Ex. 1001, “the ’807 patent”). United Technologies Corporation (“Patent Owner”) timely filed a Preliminary Response (Paper 6, “Prelim. Resp.”). Upon considering these submissions, we instituted *inter partes* review of claims 1–20 of the ’807 patent. Paper 9 (“Dec. on Inst.”).

After institution, Patent Owner filed a Disclaimer in Patent Under 37 C.F.R. § 1.321(a) that disclaimed claims 1–3 (Ex. 2025) and filed a Response (Paper 17, “PO Resp.”). Petitioner filed a Reply (Paper 31, “Pet. Reply”). Petitioner proffered a Declaration of Magdy Attia, Ph.D. (Ex. 1003, “Attia Declaration” or “Attia Decl.”) with its Petition and a Reply Declaration of Dr. Attia (Ex. 1024, “Attia Reply Decl.”) with its Reply. Patent Owner proffered a Declaration of Zoltán S. Spakovszky, Ph.D. (Ex. 2017, “Spakovszky Decl.”) and a Declaration of Dr. Amir Faghri (Ex. 2023, “Faghri Decl.”). Also, deposition transcripts were filed for Dr. Spakovszky (Ex. 1025), Dr. Faghri (Ex. 1027), and Dr. Attia (Ex. 2020).

An oral hearing in this proceeding was held on May 8, 2017; a transcript of the hearing is included in the record (Paper 38, “Tr.”).

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 Petitioner has not shown by a preponderance of the evidence that claims 4–20 of the ’807 patent are unpatentable.

A. Grounds of Unpatentability at Issue

We instituted *inter partes* review on the grounds that, under 35 U.S.C. § 103, (1) claims 1–14 are unpatentable over U.K. Patent Application GB2041090 A to Young, published September 3, 1980 (Ex. 1005, “Young”) and (2) claims 1, 4, 8, and 15–20 are unpatentable over U.K. Patent GB1516041 to McGarry, published June 28, 1978 (Ex. 1006, “McGarry”). Dec. on Inst. 20, 28–29.

Because Patent Owner has filed a Disclaimer in Patent Under 37 C.F.R. § 1.321(a) that disclaims claims 1–3 of the ’807 patent (Ex. 2025), we agree with the parties that only claims 4–20 are at issue. *See* PO Resp. 4 (stating “only claims 4–20 are at issue”); Tr. 3:22–23 (Petitioner’s counsel stating “[c]laims 1 to 3 were disclaimed by Patent Owner and so what remains at issue is 4 through 20”).

B. Related Proceedings

The parties indicate that there are no related proceedings involving the ’807 patent. Pet. 1; Paper 5, 1.

C. The ’807 Patent (Ex. 1001)

The ’807 patent relates to “a system for cooling static structures of gas turbine engines.” Ex. 1001, 1:6–7. Figure 2 of the ’807 patent is reproduced below.

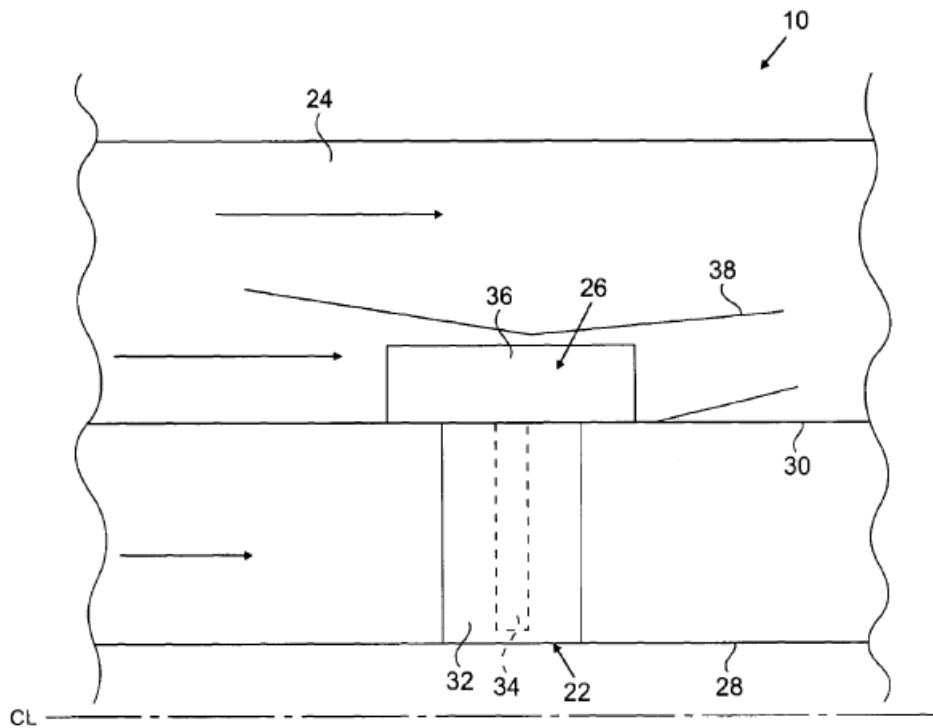


FIG. 2

Figure 2 is a schematic view of a portion of a gas turbine engine. *Id.* at 1:37–38. Engine 10 includes low-pressure turbine section 22 that includes vane 32. *Id.* at 1:64–2:1, 2:24–26. Vane 32 is a static component of engine 10. *Id.* at 2:24–27. First boundary wall 28 and second boundary wall 30 define a gas flowpath (*id.* at 2:13–15), and fan bypass duct 24 defines a fan bypass flowpath (*id.* at 2:15–16).

Engine 10 also includes vapor cooling assembly 26 at low-pressure turbine section 22. *Id.* at 2:9–10. Vapor cooling assembly 26 includes vaporization section 34 that extends into vane 32 and condenser section 36 that is located away from the gas flowpath. *Id.* at 2:30–33. Condenser section 36 extends fully or at least partially into fan bypass duct 24. *Id.* at 2:33–35. Vapor cooling assembly 26 is sealed and contains a working medium. *Id.* at 2:56–57. Vaporization section 34 absorbs thermal energy

from the gas flowpath, which causes the working medium in vaporization section 34 to evaporate, and relatively cooler air in fan bypass duct 24 causes the vaporized working medium to condense. *Id.* at 2:63–3:2. The working medium, thus, moves between vaporization section 34 and condenser section 36, “in order to transfer the thermal energy between the locations where evaporation and condensation occur.” *Id.* at 3:2–5. “Thermal energy added to air in the fan bypass flowpath raises the temperature and pressure of that air, which contributes to thrust output of the engine 10.” *Id.* at 4:3–6.

C. Illustrative Claim

The '807 patent has 20 claims, all of which Petitioner challenges, and Patent Owner disclaims claims 1–3. Of the remaining claims, claims 4 and 8 are independent. Claim 4 is reproduced below:

4. A heat transfer system for use in a gas turbine engine, the system comprising:
 - a turbine flowpath defined by at least one boundary wall;
 - a non-rotating component that extends into the turbine flowpath;
 - a vapor cooling assembly comprising:
 - a vaporization section configured to accept thermal energy from the non-rotating component;
 - a condenser section located outside the turbine flowpath; and
 - a working medium sealed within the vapor cooling assembly, wherein cyclical evaporation and condensation of the working medium transports thermal energy from the vaporization section to the condenser section; and
 - a fan bypass flowpath defined by at least one duct wall, wherein the condenser section of the vapor cooling assembly is at least partially exposed to the fan bypass flowpath such that thermal energy is dissipated from the condenser section to air in the fan bypass flowpath.

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