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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GENERAL ELECTRIC COMPANY,
Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,
Patent Owner.

Case IPR2017-01096
Patent 8,572,943 B1

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

DANIELS, *Administrative Patent Judge.*

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

A. Background

General Electric Company ("Petitioner") filed a Petition to institute an *inter partes* review of claims 1–7, 10–14, and 16–20 of U.S. Patent No. 8,572,943 B1 ("the '943 patent"). Paper 1 ("Pet."). United Technologies Company ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp.").

We have authority to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). Upon consideration of the Petition and the Preliminary Response, we determine that Petitioner has established a reasonable likelihood of prevailing on the claims challenged in the Petition. For the reasons expressed below, we institute an *inter partes* review of claims 1–7, 10–14, and 16–20 of the '943 patent.

B. Additional Proceedings

Petitioner states that to its knowledge, the '943 patent is not asserted in any lawsuit. Pet. 1. Petitioner has also challenged certain claims of the '943 patent in separate proceeding IPR2017-01097. *Id.*

C. The '943 Patent

The '943 patent (Ex. 1001), titled "Fundamental Gear System Architecture," describes a gear system for driving the fan of a gas turbine engine. Ex. 1001, 1:1–18. Figure 2 of the '943 patent is reproduced below.

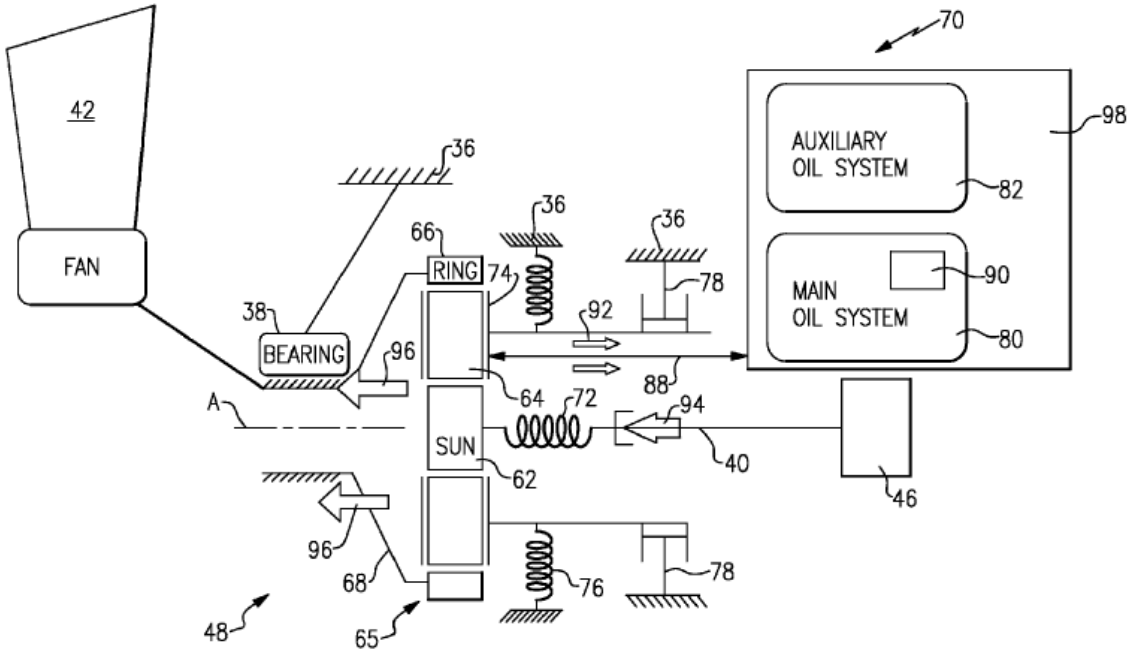

FIG.2

Figure 2 of the '943 patent, above, depicts gear assembly 65 with input shaft 40 and sun gear 62 driving intermediate gears 64, which in turn intermesh with ring gear 66 to drive fan 42. *Id.* at 5:61–6:2. Lubrication system 98, through main oil system 80, supplies lubrication to gears 62, 64, and 66 and in doing so, also cools the gears by removing heat generated in gear assembly 65 via line 88.[1] *Id.* at 6:28–40.

Also illustrated in Figure 2 is a flexible mount system designed to isolate gear assembly 65 and its components from misalignment due to externally applied forces. *Id.* at 6:3–5. Power is input to gear assembly 65 from shaft 40 through flexible coupling 72 to sun gear 62, and flexible

[1] The '943 patent refers to element 65 as both "gear box" and "gear assembly." *Compare* Ex. 1001, 6:3 *with id.* at 6:45. We understand no substantive difference between the terminologies, so for purposes of consistency, we use "gear assembly 65" in this Decision.

mounts 76 support gear assembly 65 relative to external frame 36 so that forces applied by the external frame are not transferred to gears 62, 64, and 66. *Id.* at 6:5–17.

D. Illustrative Claim

Of the challenged claims, claims 1 and 10 are independent. Each of the challenged dependent claims 2–7, 11–14, and 16–20 depend from respective independent claims 1 and 10. Claim 1 illustrates the claimed subject matter and is reproduced below:

> 1. A fan drive gear system for a gas turbine engine comprising:
>
> a gear system configured to provide a speed reduction between a fan drive turbine and a fan;
>
> a mount flexibly supporting portions of the gear system radially extending from a static structure of the gas turbine engine with respect to a central axis to accommodate radial movement between the gear system and the static structure; and
>
> a lubrication system configured to provide lubricant to the gear system and remove thermal energy produced by the gear system, wherein the lubrication system includes a maximum capacity for removing thermal energy from the gear system greater than zero and less than about 2% of power input into the gear system during operation of the engine.

Ex. 1001, 8:25–40.

E. The Alleged Grounds of Unpatentability

Petitioner contends that the challenged claims are unpatentable on the following specific grounds.[2]

[2] Petitioner supports its challenge with Declarations of Dr. Magdy Attia, Ph.D (Ex. 1003) and Raymond Drago, PE (Ex. 1005). *See infra*.

References	Basis	Claim(s) Challenged
Daly[3] and Sheridan '516[4]	§ 103	1–3, 5–7, 10–12, 14, 16–18, and 20
Daly, Sheridan '516, and Sheridan '009[5]	§ 103	4 and 13
Daly, Sheridan '516, and Wilfert[6]	§ 103	19

II. CLAIM CONSTRUCTION

A. Legal Standards

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard).

Claim terms are given their ordinary and customary meaning as would be understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). If the specification "reveal[s] a special definition given to a claim term by the patentee that

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[3] Ex. 1031, Mark Daly, Bill Gunston, JANE'S AERO-ENGINES, (2010), Iss. 27, *Pratt & Whitney PW1000G (formerly GTF Geared Turbofan)* ("Daly").
[4] Ex. 1032, U.S. Patent Appl'n Publication No. 2010/0105516 A1 (Apr. 29, 2010) ("Sheridan '516").
[5] Ex. 1009, U.S. Patent Appl'n Publication No. 2008/0116009 A1 (May 22, 2008) ("Sheridan '009").
[6] Ex. 1033, Dr. Günter Wilfert, AERO-ENGINE DESIGN: FROM STATE OF THE ART TURBOFANS TOWARDS INNOVATIVE ARCHITECTURES, Lecture Series, von Karman Institute for Fluid Dynamics (2008), *MTU Aero Engines, Geared Fan* ("Wilfert").

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