

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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GENERAL ELECTRIC COMPANY,  
Petitioner,

v.

UNITED TECHNOLOGIES CORPORATION,  
Patent Owner.

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Case IPR2016-00531  
Patent 8,511,605 B2

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

DANIELS, *Administrative Patent Judge*.

FINAL WRITTEN DECISION  
*35 U.S.C. § 318(a) and 37 C.F.R. § 42.73*

## I. INTRODUCTION

### A. Background

General Electric Company (“Petitioner” or “GE”) filed a Petition requesting *inter partes* review of claims 1, 2, and 7–11 of U.S. Patent No. 8,511,605 B2 (Ex. 1001, “the ’605 patent”). Paper 1 (“Pet.”). GE’s Petition is supported by declarations from Dr. Reza Abhari (Ex. 1003, “Abhari Declaration,” and Ex. 1036, “Abhari Reply Declaration”). Pet. 4. United Technologies Corp. (“Patent Owner” or “UTC”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). On June 30, 2016, the Board instituted a trial, determining that GE had shown a reasonable likelihood of prevailing on at least one of the challenged claims of the ’605 patent. Paper 7 (“Inst. Dec.”) 2.

After institution of trial, UTC filed a Patent Owner Response, along with declarations by Dr. Jack Mattingly (Ex. 2009, “Mattingly Declaration”) and Mr. Paul Duesler (Ex. 2022, “Duesler Declaration”). Paper 15 (“PO Resp.”). GE entered subsequently a Reply (Paper 24, “Pet. Reply”). In a motion authorized by the Board, UTC also moves to strike certain portions of the Abhari Reply Declaration and GE’s Reply. Paper 30. GE provided a rebuttal to UTC’s motion. Paper 34.

Notably, UTC disclaimed claims 1 and 2 of the ’605 patent leaving only claims 7–11 at issue in this proceeding. PO Resp. 5.<sup>1</sup>

A hearing for IPR2016-00531 was held on May 4, 2017. The transcript of the hearing has been entered into the record. Paper 41 (“Tr.”).

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<sup>1</sup> UTC filed a Disclaimer under 37 C.F.R. 1.321 of claims 1–6 and 12–14 in the ’605 patent with the USPTO on October 14, 2016. For completeness of the record, we enter the Disclaimer as Exhibit 3001.

We have jurisdiction under 35 U.S.C. § 6(c). This final written decision is issued pursuant to 35 U.S.C. § 318(a).

GE has not shown by a preponderance of the evidence that claims 7–11 of the '605 patent are unpatentable, and UTC's motion to strike is denied.

### *B. Additional Proceedings*

In addition to this petition, GE has filed a petition challenging the patentability of claims 1–6 and 12–16 of the '605 patent. *See* IPR2016-00533. GE indicates that they are unaware of any litigation involving the '605 patent. Pet. 1; *see also* Paper 5, 2 (Patent Owner indicating the same).

### *C. The '605 Patent*

The '605 patent issued August 20, 2013 from an application filed May 31, 2012, and claims priority as a continuation-in-part from application No. 12/131,876, filed June 2, 2008, now U.S. Pat. No. 8,128,021. Ex. 1001, cover page. The '605 patent is titled “Gas Turbine Engine With Low Stage Count Low Pressure Turbine.” *Id.* at 1:1–2. Figure 1A, reproduced below, illustrates the invention:

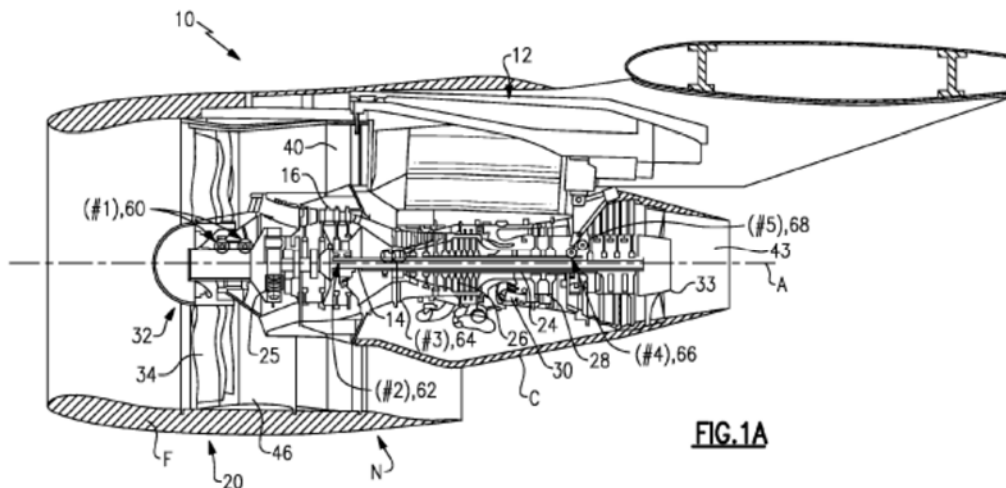


Figure 1A depicts a partial fragmentary schematic view of gas turbofan engine 10 suspended from engine pylon 12. *Id.* at 3:32–34.

Turbofan 10 includes fan section 20 within fan nacelle F and a core engine within core nacelle C. *Id.* at 3:36–39, Fig. 1A. In operation, airflow enters fan nacelle F, which at least partially surrounds core nacelle C. *Id.* at 3:66–67. The fan passes air both into the core engine (core air flow) and around the core engine (bypass air flow). *Id.* The bypass air flow provides a certain amount of the engine thrust as does the core engine, and the low pressure turbine in the core drives the fan. *See id.* at 4:2–12, 4:42–43.

In one described embodiment relevant to the remaining ground in this proceeding, a Variable Area Fan Nozzle, (“VAFN”), varies the fan nozzle exit area in order to adjust the pressure ratio of the fan bypass airflow. *Id.* at 4:31–34. We note the VAFN mechanism is not, apparently, depicted in any of the figures in the ’605 patent. *See Ex. 1001, Figs. 1–5, and see Tr. 5:2.* According to the ’605 patent, the VAFN’s ability to selectively adjust the pressure ratio of the bypass air flow, “allows the engine to change to a more favorable fan operating line at low power, avoiding the instability region, and still provide the relatively smaller nozzle area necessary to obtain a high-efficiency fan operating line at cruise.” *Id.* at 4:37–41.

#### *D. Illustrative Claims*

The remaining challenged claims are claims 7–11. Claims 1 and 7 illustrate the claimed subject matter and are reproduced below:

1. A gas turbine engine comprising:
  - a gear train defined along an engine centerline axis;
  - a spool along said engine centerline axis which drives said gear train, said spool includes a low stage count low pressure turbine
  - a fan rotatable at a fan speed about the centerline axis and driven by the low pressure turbine through the gear train, wherein the fan speed is less than a speed of the low pressure turbine;

- a core surrounded by a core nacelle defined about the engine centerline axis;
  - a fan nacelle mounted at least partially around said core nacelle to define a fan bypass airflow path for a fan bypass airflow, wherein a bypass ratio defined by the fan bypass passage airflow divided by airflow through the core is greater than about ten (10).
7. The engine as recited in claim 1, further comprising:
- a fan variable area nozzle *axially movable* relative said fan nacelle to *vary a fan nozzle exit area* and *adjust the fan pressure ratio* of the fan bypass airflow during engine operation.

Ex. 1001, 7:43–8:7, 8:19–23 (emphasis added). Claims 8–11 depend directly or indirectly from claim 7.

*E. The Alleged Ground of Unpatentability*

GE contends that the challenged claims are unpatentable on the following specific ground.<sup>2</sup>

References	Basis	Claims Challenged
Willis <sup>3</sup> and Duesler <sup>4</sup>	§ 103	7–11

## II. CLAIM CONSTRUCTION

UTC asserts no construction for any claim terms. *See* PO Resp. Although GE proposed constructions for a number of claim terms in its Petition (Pet. 12–22), neither party disputes our initial determination that no claim term requires construction. *See* Inst. Dec. 5, *and see Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (only those

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<sup>2</sup> GE supports its challenge with the Abhari Declarations (Exs. 1003, 1036). *See infra*.

<sup>3</sup> William S. Willis, *Quiet Clean Short-Haul Experimental Engine (QCSEE) Final Report* (Aug. 1979) (Ex. 1011).

<sup>4</sup> US 5,778,659 (July 14, 1998) (Ex. 1006 or Duesler ’659).

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