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Paper 10
Date: March 26, 2020

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR CO.,
Petitioner,

v.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY,
Patent Owner.

IPR2020-00012
Patent 10,138,826 B2

Before KEN B. BARRETT, LYNNE H. BROWNE, and JAMES J. MAYBERRY, *Administrative Patent Judges.*

MAYBERRY, *Administrative Patent Judge.*

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background and Summary

Petitioner, Ford Motor Company, filed a Petition ("Pet.") requesting *inter partes* review of claims 1–8, 10–24, 26, 27, and 31–33 (the "Challenged Claims") of U.S. Patent No. 10,138,826 B2 (Ex. 1101, the "'826 patent"). Paper 2. Patent Owner, Massachusetts Institute of

Technology, filed a Preliminary Response ("Prelim. Resp.") to the Petition. Paper 7. We have authority under 35 U.S.C. § 314 to determine whether to institute review.

To institute an *inter partes* review, we must determine that the information presented in the Petition shows "a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a) (2018). For the reasons set forth below, upon considering the Petition, Preliminary Response, and evidence of record, we deny the Petition and do not institute an *inter partes* review.

B. Real Parties in Interest

Petitioner identifies itself as the sole real party-in-interest. Pet. 81. Patent Owner identifies itself and Ethanol Boosting Systems, LLC, the exclusive licensee of the '826 patent, as real parties-in-interest. Paper 9, 2.

C. Related Matters

Petitioner and Patent Owner indicate that the '826 patent is the subject of litigation in the U.S. District Court for the District of Delaware in a case styled *Ethanol Boosting Systems, LLC v. Ford Motor Company, LLC*, Case No. 1:19-cv-00196-CFC (D. Del.). Pet. 8; Paper 6, 2. Patent Owner identifies an appeal to the Federal Circuit, Appeal Number 2020-1472, from a final judgment in that case. Paper 9, 2; *see also* Ex. 3001 (providing Final Judgment for case No. 1:19-cv-00196-CFC); Ex. 3002 (providing Notice of Appeal for the case).

Petitioner also filed an earlier petition challenging the '826 patent (case IPR2019-01402) and petitions for *inter partes* review of three related patents, in cases numbered IPR2019-01399 and IPR2020-00010 (challenging US 9,810,166 B2), IPR2019-01400 and IPR2020-00013 (challenging US 8,069,839 B2), and IPR2019-01401 and IPR2020-00011

(challenging US 9,255,519 B2). Pet. 81; Paper 9, 2–3. Petitioner filed the petitions in IPR2020-00010, IPR2020-00011, and IPR2020-00013 concurrent to the present Petition. We instituted trial in IPR2019-01399, IPR2019-01401, and IPR2019-01402 and denied institution in IPR2019-01400. We, concurrently with the instant decision, are denying institution in IPR2020-00010, IPR2020-00011, and IPR2020-00013.

The parties indicate that the '826 patent is related to the following additional patents and pending patent applications: US 10,344,689; US 10,221,783; US 9,708,965; US 9,695,784; US 9,255,519; US 8,857,410; US 8,733,321; US 8,707,913; US 8,522,746; US 8,468,983; US 8,353,269; US 8,302,580; US 8,276,565; US 8,171,915; US 8,146,568; US 7,971,572; US 7,841,325; US 7,762,233; US 7,740,004; US 7,640,915; US 7,444,987; US 7,314,033; US 7,225,787; US App. 16/251,658; US App. 16/424,471. Pet. 81–83; Paper 9, 3–6.

D. The '826 Patent

The '826 patent, titled "Fuel Management System for Variable Ethanol Octane Enhancement of Gasoline Engines," issued November 27, 2018, from an application filed September 27, 2017, and ultimately claims priority, through several continuation applications, to an application filed November 18, 2004. Ex. 1101, codes (54), (45), (22), (63). The '826 patent is directed "to spark ignition gasoline engines utilizing an antiknock agent which is a liquid fuel with a higher octane number than gasoline such as ethanol to improve engine efficiency." *Id.* at 1:38–41. We reproduce Figure 1 from the '826 patent below.

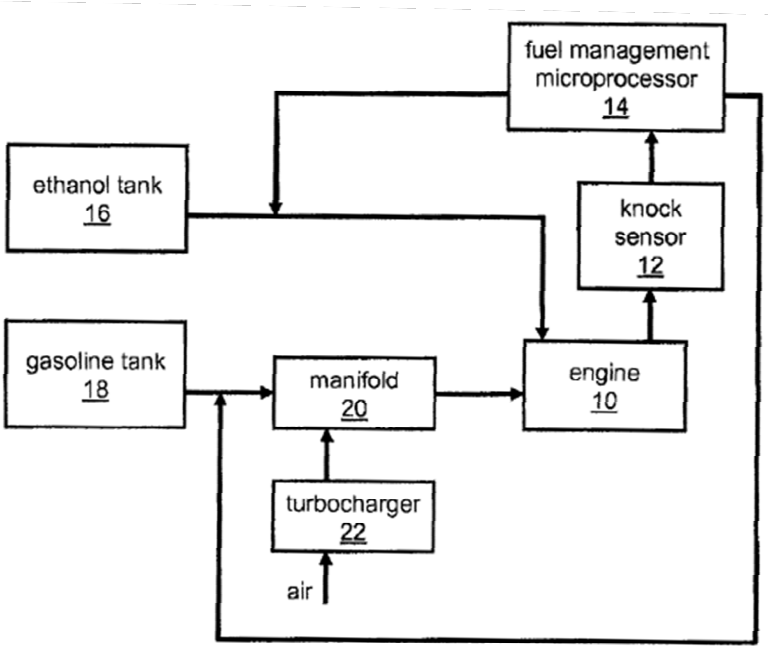

FIG. 1

Figure 1 depicts "a block diagram of one embodiment of the invention disclosed" in the '826 patent. Ex. 1101, 3:7–8. Spark ignition gasoline engine 10 includes knock sensor 12, fuel management microprocessor system 14, engine manifold 20, and turbocharger 22. *Id.* at 3:24–32. Ethanol tank 16 contains an anti-knock agent, such as ethanol, and gasoline tank 18 contains the primary fuel, such as gasoline. *Id.* at 3:26–31. Fuel management microprocessor system 14 controls the direct injection of the anti-knock agent into engine 10 and the injection of gasoline into engine manifold 20. *Id.*

> The amount of ethanol injection is dictated either by a predetermined correlation between octane number enhancement and fraction of fuel that is provided by ethanol in an open loop system or by a closed loop control system that uses a signal from the knock sensor 12 as an input to the fuel management microprocessor 14.

Id. at 3:32–38. The fuel management system minimizes the amount of ethanol directly injected into the cylinder while still preventing engine knock. *Id.* at 3:38–40.

"Direct injection [into the cylinder] substantially increases the benefits of ethanol addition and decreases the required amount of ethanol. . . . Because ethanol has a high heat of vaporization there will be substantial cooling when it is directly injected into the engine 10," which "further increases knock resistance." Ex. 1101, 3:44–52. The amount of octane enhancement needed from the ethanol to prevent knocking is a function of the torque level. *Id.* at 6:6–10. "[P]ort fuel injection of the gasoline in which the gasoline is injected into the manifold rather than directly injected into the cylinder is preferred because it is advantageous in obtaining good air/fuel mixing and combustion stability that are difficult to obtain with direct injection." *Id.* at 3:53–57.

E. Illustrative Claims

Of the Challenged Claims, claims 1, 12, 21, and 31 are independent claims. Claim 1, reproduced below, is representative.

> 1. A fuel management system for a spark ignition engine that has
>
> a first fueling system that uses direct injection and also has a second fueling system that uses port fuel injection; and
>
> where the fueling is such that there is a first torque range where both the first and second fueling system are used throughout the range; and
>
> where the fraction of fueling provided by the first fueling system is higher at the highest value of torque in the first torque range than in the lowest value of torque in the first torque range; and

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