Trials@uspto.gov
571-272-7822

Paper 11
Date: February 24, 2020

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY,
Petitioner,

v.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY,
Patent Owner.

IPR2019-01400
Patent 8,069,839 B2

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

BARRETT, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. Background and Summary

Ford Motor Company ("Petitioner")[1] filed a Petition requesting *inter partes* review of U.S. Patent No. 8,069,839 B2 ("the '839 patent," Ex. 1001). Paper 2 ("Pet."). The Petition challenges the patentability of claims 1–8 of the '839 patent. Massachusetts Institute of Technology ("Patent Owner")[2] filed a Preliminary Response to the Petition. Paper 7 ("Prelim. Resp.").

An *inter partes* review may not be instituted "unless . . . the information presented in the petition . . . shows that there is 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). Having considered the arguments and evidence presented by Petitioner and Patent Owner, we determine that Petitioner has not demonstrated a reasonable likelihood of prevailing in showing that at least one of the challenged claims of the '839 patent is unpatentable. We do not institute an *inter partes* review and the Petition is denied.

B. Related Proceedings

One or both parties identify, as matters involving or related to the '839 patent, *Ethanol Boosting Systems, LLC v. Ford Motor Company*, Civil Action No. 1:19-cv-00196-CFC-SRF (D. Del.), and Patent Trial and Appeal Board case IPR2020-00010. Pet. 55; Paper 8, 2–6. The parties also identify,

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[1] Petitioner identifies Ford Motor Company as the real party-in-interest. Pet. 55.

[2] Patent Owner identifies "Massachusetts Institute of Technology, the Patent Owner, and Ethanol Boosting Systems, LLC, the Exclusive Licensee," as real parties-in-interest. Paper 8, 2.

as involving challenges to related patents, IPR2019-01399 and IPR2020-00010 (US 9,810,166), IPR2020-00013 (US 8,069,839), IPR2019-01401 and IPR2020-00011 (US 9,255,519), and IPR2019-01402 and IPR2020-00012 (US 10,138,826). Pet. 55; Paper 6, 2–3.

C. The '839 Patent

The '839 patent, titled "Fuel Management System for Variable Ethanol Octane Enhancement of Gasoline Engines," issued December 6, 2011, from an application filed May 27, 2011, and ultimately claims priority to an application filed November 18, 2004. Ex. 1001, codes (54), (45), (22), (63). The '839 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 1:14–17. Figure 1 of the '839 patent is reproduced below.

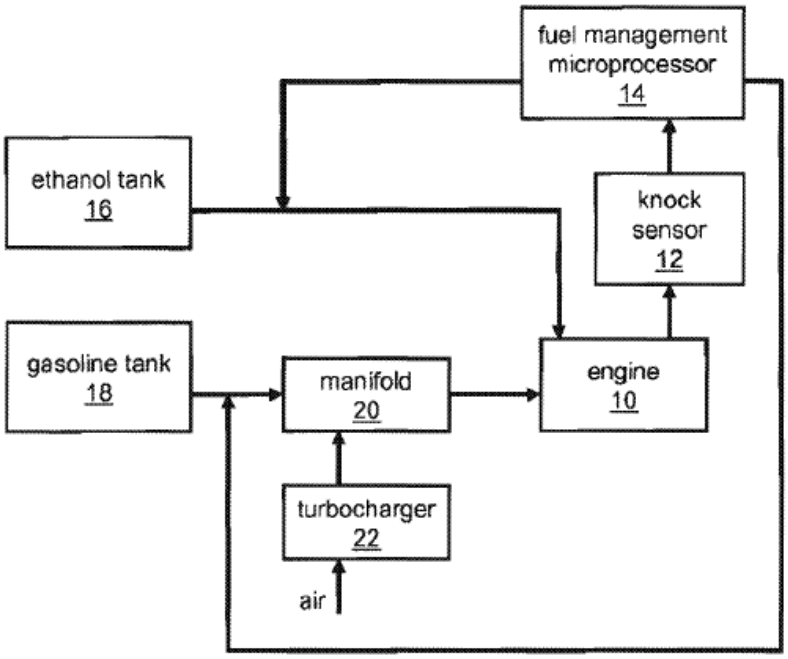

FIG. 1

Figure 1 depicts "a block diagram of one embodiment of the invention disclosed" in the '839 patent. *Id.* at 2:44–45. Spark ignition gasoline engine 10 includes knock sensor 12, fuel management microprocessor system 14, engine manifold 20, and turbocharger 22. *Id.* at 2:61–3:2. Ethanol tank 16 contains an anti-knock agent, such as ethanol, and gasoline tank 18 contains the primary fuel, such as gasoline. *Id.* at 2:63–3:1. 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 3:2–8. The fuel management system minimizes the amount of ethanol directly injected into the cylinder while still preventing engine knock. *Id.* at 3:8–10.

"Direct injection 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." *Id.* at 3:13–21. The amount of octane enhancement needed from the ethanol to prevent knocking is a function of the torque level. *Id.* at 5:42–53. In the embodiment of Figure 1, "port 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 3:22–27.

D. Illustrative Claims

Of the challenged claims of the '839 patent, claim 1 is the sole independent claim. The remaining challenged claims depend directly or indirectly from independent claim 1. Independent claim 1, reproduced below, is illustrative.

> 1. A spark ignition engine that is fueled both by direct injection and by port injection wherein above a selected torque value the ratio of fuel that is directly injected to fuel that is port injected increases; and wherein the engine is operated at a substantially stoichiometric fuel/air ratio.

Ex. 1001, 7:7–11.

E. Evidence

Petitioner relies on the following references:

Reference		**Dates**	**Exhibit No.**
Kobayashi	US 7,188,607 B2	Filed June 27, 2003; Issued March 13, 2007	1005
Rubbert	DE 198 53 799 A1	Filed Nov. 21, 1998; Published May 25, 2000	1007
Kinjiro	JP 2002-227697	Filed Jan. 31, 2001; Published Aug. 14, 2002	1008
Takehiko	JP S63-230920	Filed March 19, 1987; Published Sept. 27, 1988	1029
Bosch Automotive Handbook (Robert Bosch GmbH, 3rd ed. 1993) ("Bosch")			1031

Petitioner also relies on the Declaration of Dr. Nigel N. Clark (Ex. 1003) in support of its arguments. The parties rely on other exhibits as discussed below.

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