

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY

Petitioner

v.

ETHANOL BOOSTING SYSTEMS, LLC, and MASSACHUSETTS INSTITUTE

OF TECHNOLOGY,

Patent Owner

Case: IPR2020-00013

U.S. Patent No. 8,069,839

DECLARATION OF DR. NIGEL N. CLARK

TABLE OF CONTENTS

LIST OF EXHIBITS	1
I. Professional Background	4
II. Scope of the Engagement	6
III. Legal Understandings	8
A. Claim Interpretation	8
B. Prior Art.....	9
C. Anticipation	10
D. Obviousness.....	10
1. Motivation to Combine	12
E. Date of Invention.....	14
IV. Technical Background.....	15
V. The '839 Patent.....	19
A. Disclosure of the '839 Patent	19
1. Background of the Invention	19
2. Summary of the Invention	20
3. Detailed Description	22
B. Challenged Claims of the '839 Patent.....	28
VI. File History	30
A. U.S. Patent No. 8,069,839.....	30
B. U.S. Patent No. 7,971,572.....	31
C. U.S. Patent No. 7,762,233	32

D.	U.S. Patent No. 7,740,004	34
E.	U.S. Patent No. 7,314,033	36
VII.	Litigation related to the '839 Patent	42
VIII.	Claim Construction	43
A.	“Selected Torque Value” (Claim 1) / “some value of torque” (Claims 7, 8)	43
B.	“Port Injection” / “Direct Injection” (Claims 1-5, 7, 8)	45
IX.	PRIORITY ANALYSIS	48
A.	The disclosure in the specification does not disclose the use of single fuel	52
B.	The common specification distinguishes “anti-knock agents” from “gasoline”	60
C.	Disclosure of a single fuel system was made during an amendment during the prosecution of the '839 patent application	62
X.	GROUND 1: BROMBERG ANTICIPATES CLAIMS 1, 2, 3, 4, 5, 6, 7, 8	65
A.	Bromberg Overview	65
B.	Analysis	73
i.	Claim 1: [1.Pre] A spark ignition engine that is fueled both by direct injection and by port injection	73
ii.	Claim 1: [1.A] wherein above a selected torque value the ratio of fuel that is directly injected to fuel that is port injected increases;	75
iii.	Claim 1: [1.B] and wherein the engine is operated at a substantially stoichiometric fuel/air ratio.	79

iv.	Claim 2: The spark ignition engine of claim 1 where the ratio of directly injected fuel to port injected fuel increases with increasing torque.	79
v.	Claim 3: The spark ignition engine of claim 2 where the ratio of directly injected fuel to port injected fuel is determined by a signal from a knock detector.....	83
vi.	Claim 4: The spark ignition engine of claim 3 further including a microprocessor that controls the ratio of the directly injected fuel to the port injected fuel based on the signal from the knock detector.....	85
vii.	Claim 5: The spark ignition engine of claim 2 where open loop control is used to determine the ratio of the directly injected fuel to the port injected fuel.	89
viii.	Claim 6: The spark ignition engine of claim 1 where the engine operates at a substantially stoichiometric fuel/air ratio at the highest loads.	91
ix.	Claim 7: The spark ignition engine of claim 1 where the engine operates at some value of torque with port fuel injection alone.	92
x.	Claim 8: The spark ignition engine of claim 1 where the engine operates at some value of torque with direct injection alone.	94
XI.	GROUND 2: LEWIS ANTICIPATES CLAIMS 1, 2, 3, 4, 5, 6, 7, 8.....	94
A.	Lewis Overview	94
B.	Analysis	101
i.	Claim 1: [1.Pre] A spark ignition engine that is fueled both by direct injection and by port injection	101
ii.	Claim 1: [1.A] wherein above a selected torque value the ratio of fuel that is directly injected to fuel that is port injected increases;	103

iii.	Claim 1: [1.B] and wherein the engine is operated at a substantially stoichiometric fuel/air ratio.	107
iv.	Claim 2: The spark ignition engine of claim 1 where the ratio of directly injected fuel to port injected fuel increases with increasing torque.	110
v.	Claim 3: The spark ignition engine of claim 2 where the ratio of directly injected fuel to port injected fuel is determined by a signal from a knock detector.	113
vi.	Claim 4: The spark ignition engine of claim 3 further including a microprocessor that controls the ratio of the directly injected fuel to the port injected fuel based on the signal from the knock detector.	115
vii.	Claim 5: The spark ignition engine of claim 2 where open loop control is used to determine the ratio of the directly injected fuel to the port injected fuel.	118
viii.	Claim 6: The spark ignition engine of claim 1 where the engine operates at a substantially stoichiometric fuel/air ratio at the highest loads.	121
ix.	Claim 7: The spark ignition engine of claim 1 where the engine operates at some value of torque with port fuel injection alone.	124
x.	Claim 8: The spark ignition engine of claim 1 where the engine operates at some value of torque with direct injection alone.	125
XII.	REVISION OR SUPPLEMENTATION	127

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.