



US008069839B2

(12) **United States Patent**
Cohn et al.

(10) **Patent No.:** **US 8,069,839 B2**
(45) **Date of Patent:** **Dec. 6, 2011**

(54) **FUEL MANAGEMENT SYSTEM FOR VARIABLE ETHANOL OCTANE ENHANCEMENT OF GASOLINE ENGINES**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **13/117,448**

(22) Filed: **May 27, 2011**

(65) **Prior Publication Data**
US 2011/0226210 A1 Sep. 22, 2011

Related U.S. Application Data
(63) Continuation of application No. 12/815,842, filed on Jun. 15, 2010, now Pat. No. 7,971,572, and a continuation of application No. 12/329,729, filed on Dec. 8, 2008, now Pat. No. 7,762,233, and a continuation of application No. 11/840,719, filed on Aug. 17, 2007, now Pat. No. 7,740,004, and a continuation of application No. 10/991,774, filed on Nov. 18, 2004, now Pat. No. 7,314,033.

(51) **Int. Cl.** **F02B 7/00** (2006.01)
(52) **U.S. Cl.** **123/431**; 123/198 A; 123/575
(58) **Field of Classification Search** 123/295, 123/299, 300, 525, 27 GE, 198 A, 575, 1 A, 123/559.1, 527

See application file for complete search history.

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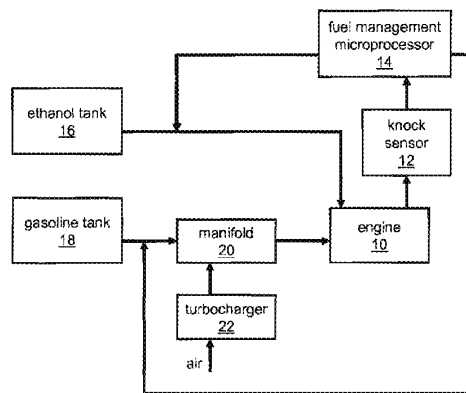
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(57) **ABSTRACT**

Fuel management system for efficient operation of a spark ignition gasoline engine. Injectors inject an anti-knock agent such as ethanol directly into a cylinder of the engine. A fuel management microprocessor system controls injection of the anti-knock agent so as to control knock and minimize that amount of the anti-knock agent that is used in a drive cycle. It is preferred that the anti-knock agent is ethanol. The use of ethanol can be further minimized by injection in a non-uniform manner within a cylinder. The ethanol injection suppresses knock so that higher compression ratio and/or engine downsizing from increased turbocharging or supercharging can be used to increase the efficiency of the engine.

20 Claims, 3 Drawing Sheets



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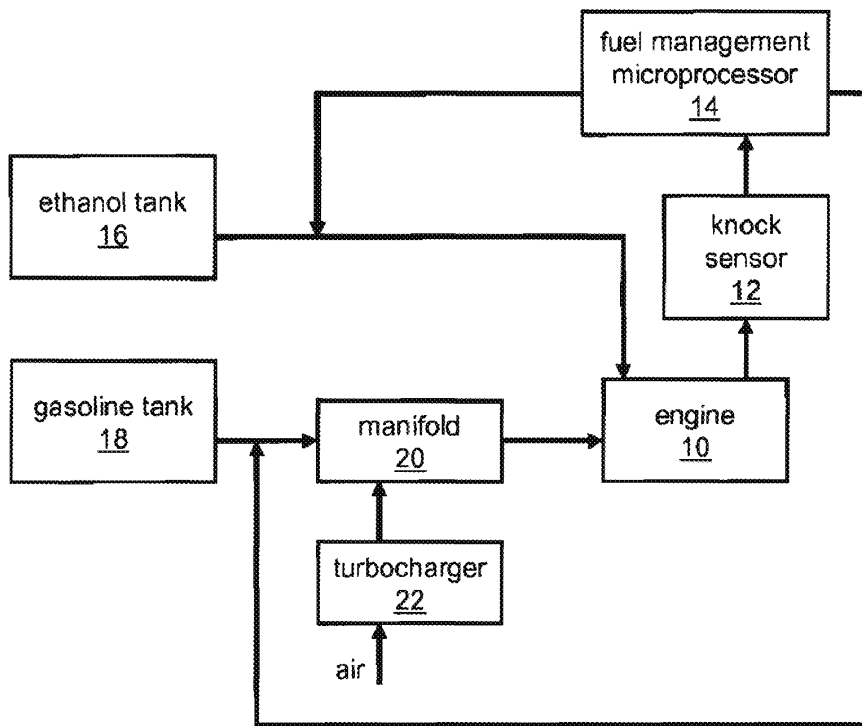


FIG. 1

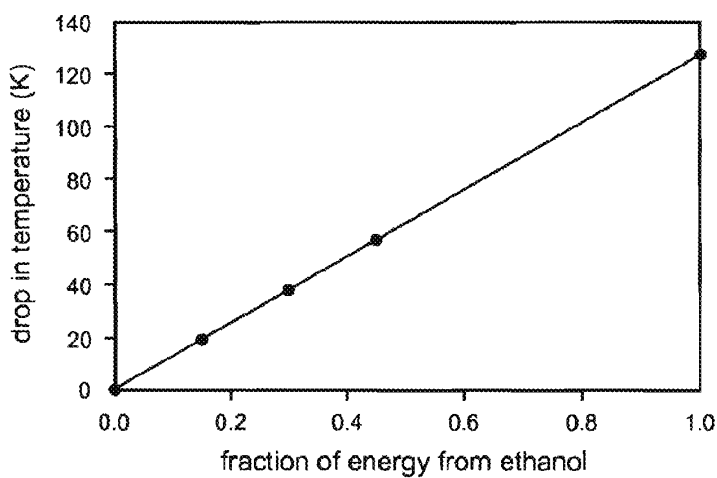


FIG. 2

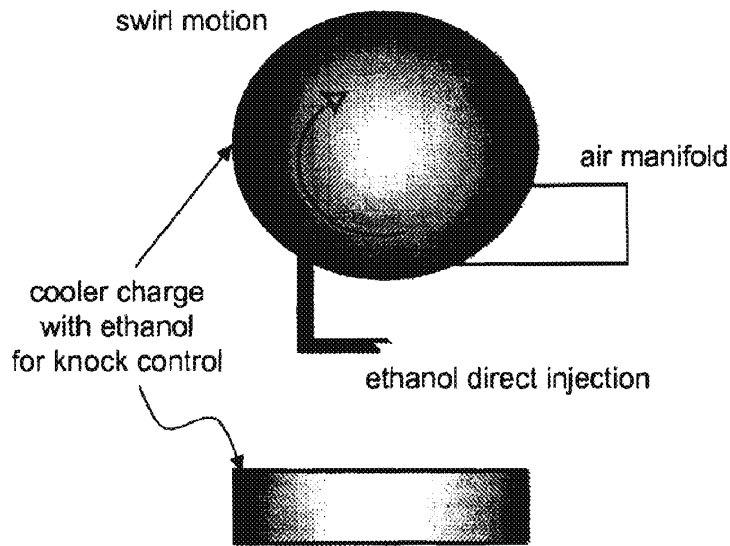


FIG. 3

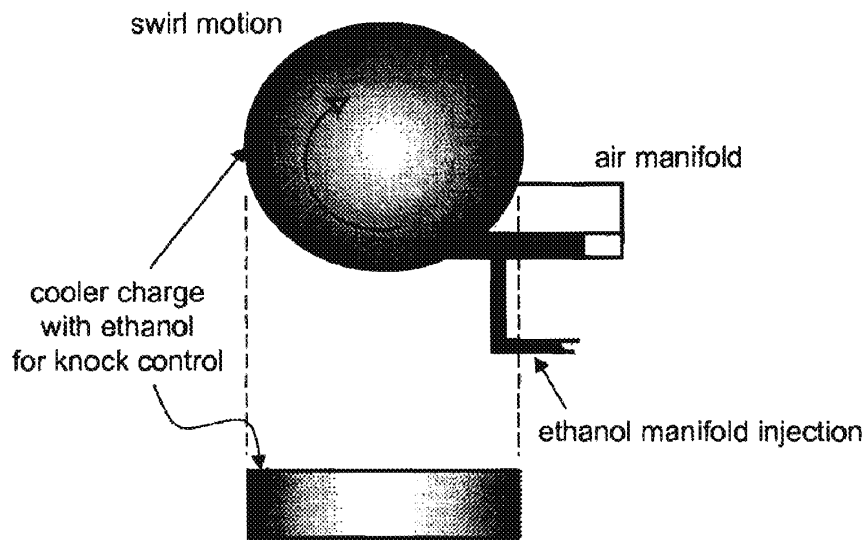


FIG. 4

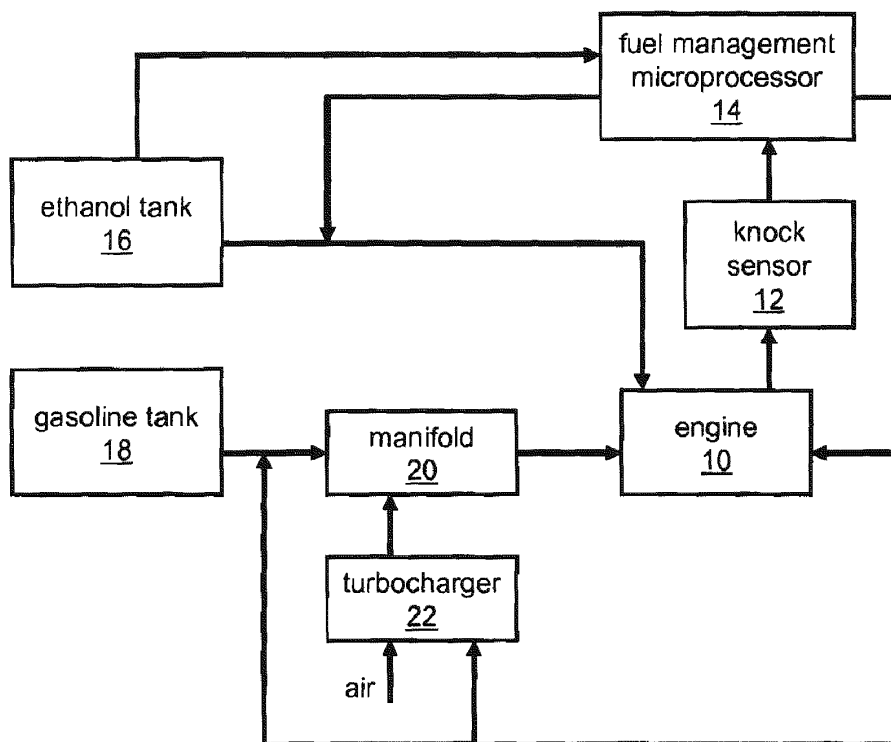


FIG. 5

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