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## *The Director*

*of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.*

*Therefore, this United States*

# *Patent*

grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

*Katherine Kelly Vidal*

DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

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If the application for this patent was filed on or after December 12, 1980, maintenance fees are due three years and six months, seven years and six months, and eleven years and six months after the date of this grant, or within a grace period of six months thereafter upon payment of a surcharge as provided by law. The amount, number and timing of the maintenance fees required may be changed by law or regulation. Unless payment of the applicable maintenance fee is received in the United States Patent and Trademark Office on or before the date the fee is due or within a grace period of six months thereafter, the patent will expire as of the end of such grace period.

## Patent Term Notice

If the application for this patent was filed on or after June 8, 1995, the term of this patent begins on the date on which this patent issues and ends twenty years from the filing date of the application or, if the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121, 365(c), or 386(c), twenty years from the filing date of the earliest such application ("the twenty-year term"), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b), and any extension as provided by 35 U.S.C. 154(b) or 156 or any disclaimer under 35 U.S.C. 253.

If this application was filed prior to June 8, 1995, the term of this patent begins on the date on which this patent issues and ends on the later of seventeen years from the date of the grant of this patent or the twenty-year term set forth above for patents resulting from applications filed on or after June 8, 1995, subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b) and any extension as provided by 35 U.S.C. 156 or any disclaimer under 35 U.S.C. 253.



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(12) **United States Patent**  
**Kuo**

(10) **Patent No.:** **US 11,713,737 B1**  
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(54) **FUEL-EFFICIENT AND FUEL-SAVING  
DEVICE**

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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.

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**F02M 37/00** (2006.01)  
**C04B 33/04** (2006.01)  
**F02M 29/04** (2006.01)  
**B01F 23/21** (2022.01)  
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(2022.01); **B01F 33/251** (2022.01); **C04B**  
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**F02M 29/04** (2013.01); **F02M 37/0047**  
(2013.01); **F02M 37/0082** (2013.01); **B01F**  
**2101/503** (2022.01)

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**33/251**; **B01F 2101/503**; **C04B 33/04**;  
**C04B 33/121**

See application file for complete search history.

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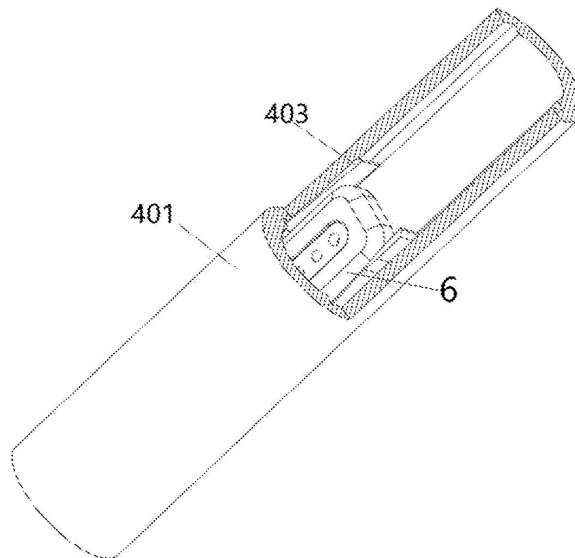
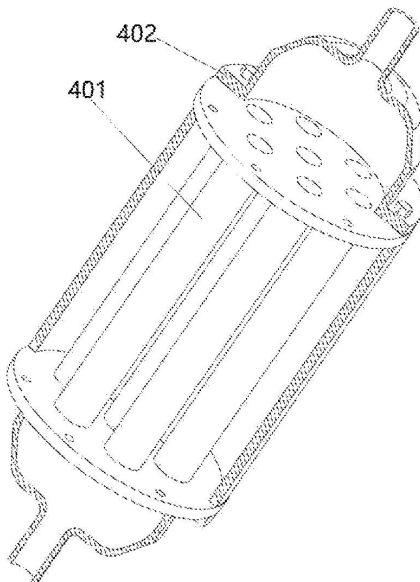
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**ABSTRACT**

A fuel-efficient and fuel-saving device is provided and includes a first fuel-modification device, an air-refining device, and a tubing-type fuel-modification device. The first fuel-modification device is arranged in a fuel tank. The air-refining device is arranged under a filter screen of an air filter of an internal combustion engine, and the tubing-type fuel-modification device is arranged above a pipeline between the internal combustion engine and the fuel tank. The first fuel-modification device includes a first metal box body and a plurality of nano far-infrared ceramic particles. The surface of the first metal box body has a plurality of uniformly arranged air holes. The plurality of nano far-infrared ceramic particles is arranged in the first metal box body. The ball diameter of the nano far-infrared ceramic particles is larger than the diameter of the air holes.

**9 Claims, 4 Drawing Sheets**



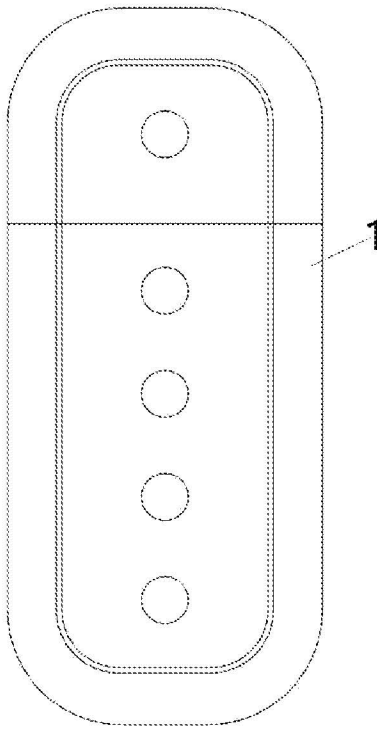


FIG. 1

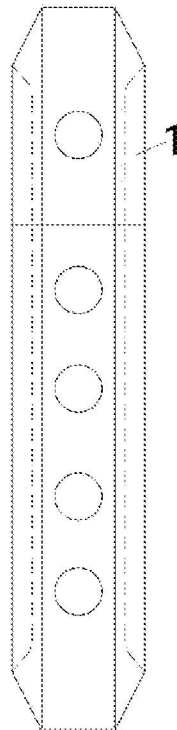


FIG. 2