(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 November 2009 (12.11.2009)

PCT

(10) International Publication Number
WO 2009/137710 A2

(51) International Patent Classification:
F02M 27/04 (2006.01) ***F02B 51/04*** (2006.01)
F02M 37/22 (2006.01) ***B01D 35/06*** (2006.01)

(21) International Application Number: PCT/US2009/043191

(22) International Filing Date: 7 May 2009 (07.05.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
12/116,495 7 May 2008 (07.05.2008) US

(71) Applicant *(for all designated States except US)*: **HITOR GROUP, INC.** [US/US]; 13221 Redmond Way, Redmond, WA 98052 (US).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **MARTIN, Kenneth, F.** [US/US]; 13221 Redmond Way, Redmond, WA 98052-6408 (US). **XIAO, Lin** [DE/DE]; cn (DE).

(74) Agents: RUSYN, Paul, F. et al.; Graybeal Jackson LLP, 155 108th Ave, Suite 350, Bellevue, WA 98004-5973 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

(54) Title: APPARATUS FOR IMPROVING FUEL EFFICIENCY AND REDUCING EMISSIONS IN FOSSIL-FUEL BURNING ENGINES

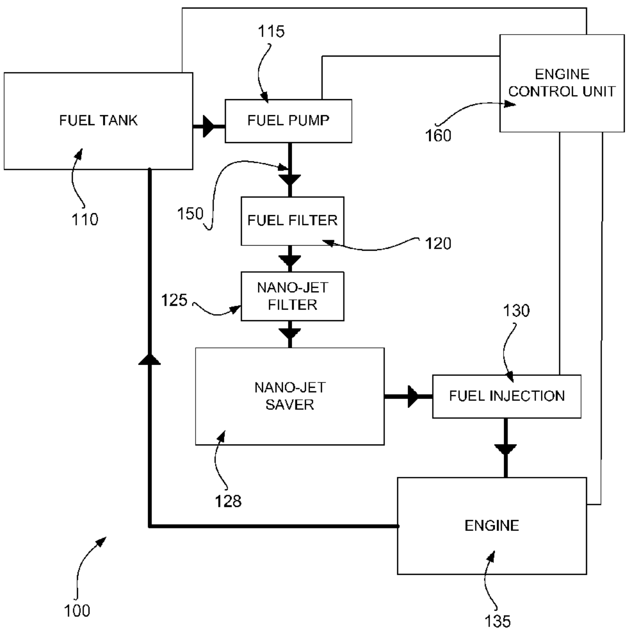

FIG. 1

(57) Abstract: A system for realizing improved fuel efficiency and reduced fuel emissions in an internal combustion engine. The system comprises a nano-jet filter includes a fuel channeling chamber having a set of aligned magnetic members such that the flow of fuel passes through a magnetic field created by the set of aligned magnetic members. The system further comprises a nano-jet saver, having a chamber equipped with additional sets of magnets in order to magnetize larger fuel molecules and traverse hyper magnet gradients. The purpose of using a hyper magnetic field is to change conventional fuel into "nano" fuel. Having fuel particles with a smaller diameter, both better fuel efficiency and reduced emissions are achieved as the fuel burns more completely and more cleanly. With any fossil-fuel internal-combustion engine, an operator can expect to see a reduction in emissions to the environment, fuel savings, and better performance while using an apparatus that consumes no external energy.

WO 2009/137710 A2

APPARATUS FOR IMPROVING FUEL EFFICIENCY AND REDUCING EMISSIONS IN FOSSIL-FUEL BURNING ENGINES

BACKGROUND OF THE INVENTION

[1] Internal combustion engines powered by fossil fuels are highly prevalent in vehicles worldwide. As less-developed countries begin to industrialize, fossil-fuel powered vehicles will become all the more prevalent before newer technologies can impact the market. While by no means efficient, the internal combustion engine powered by fossil fuels remains the easiest and cheapest alternative for generating energy to power a vehicle.

[2] In a typical vehicle, the fuel and engine system typically includes a gas tank for storing fuel prior to burning the fuel. Without getting into further details of the fuel system here, various devices may be implemented along the fuel line to improve fuel efficiency and to reduce emissions when the fuel is consumed. Such devices include common fuel filters, catalytic converters, electronic fuel injection systems, and the like.

[3] A large emphasis has been placed on the manufacturing of more efficient and cleaner burning fossil-fuel engines worldwide over the past several years. New technologies have included multiple electro injection systems, closed-loop computer-controlled systems, turbo-pressure boost systems and other similar technologies. Each of these systems has taken the manufacture of the automobile engine to a new level, but none of these particular systems have helped in any significant reductions of emissions to the environment.

[4] Expanding globalization of the automobile industry worldwide underscores the need for greater progress in the areas of international harmonization of automotive technical standards and certification systems for higher fuel quality. Improvements may include reduced exhaust emissions as well as higher fuel efficiency. In today's automotive industry, relatively few vehicles meet the mileage rating of "excellent" (*i.e.,* over 40 miles per gallon (MPG)). For example, of all the 2006 cars rated by the U.S. Environmental Protection Agency (EPA), only 1% achieved an "excellent" rating while 40% received a "poor" rating (*i.e.,* under 20 MPG). MPG or find a simple measure of manufacturers' response to the need for more fuel-efficient cars which many transnational oversight committees will use to track the overall industry performance on an annual basis. Clearly, a need exists for more fuel-efficient vehicles and vehicles with reduced emissions.

[5] Furthermore, in less developed countries, fuel that is used in most vehicles is dirty and contains a high level of particulates which results in even lower fuel efficiency and higher levels of emissions. Improving fuel efficiency and reducing emissions has been sought after since the invention of the internal combustion engine. As a result, many solutions have been introduced over the years.

[6] One such solution has been to use a vortex generator. A vortex generator, which is usually installed on the upstream side of the mass airflow sensor, uses stationary veins or spinning blades to make inlet air between an air cleaner in an intake manifold become excited like a mini-tornado. This vortex mixes fuel more thoroughly with air, which means the fuel will burn more completely in a combustion chamber. A problem with this solution, however, is the long length of intake tract designed to maximize a smooth airflow. Turbulence, coupled with the restricted airflow caused by the vortex generator can only reduce the amount of air that may enter into the manifold. As a result of less air, the engine is less powerful which is an unacceptable trade-off in many situations.

[7] Another efficiency and emissions solution has been to use an electronic engine ionizer fuel saver, which are sometimes referred to as capacitor blocks. These rubber blocks clip onto the spark plug wires near the plugs and are intended to carry a charge from a cylinder plug wire to the electrodes of the other plugs. The charge then, theoretically, causes a partial breakdown of larger hydrocarbon molecules of the fuel in all of the non-firing cylinders which then results in increased combustion efficiency. However, empirical results show that very little efficiency is achieved.

[8] Yet another solution is to use vapor injectors. These devices take breakdown typical fuel into "fuel vapor" before the fuel reaches the engine and then meter the fuel vapor back to the engine through a pressurized control valve (PCV) vacuum line. In theory, the complete atomization of the fuel to its vapor phase should be achieved resulting in a more efficient burning. Fuel injected directly into the intake runners through a fuel injector is supposedly less available for combustion because at least some of the fuel droplets are still liquid and liquid doesn't burn as readily. The distribution of fuel through the vacuum tap may not necessarily meter the vaporized fuel equally to all cylinders. Those closer to the connection may receive more fuel than those farther away causing the closer cylinders to run rich. Even in a best case scenario of equal distribution, the fuel injection management computer monitors the amount of oxygen in the exhaust and chokes the engine back to a proper fuel and air mixture ratio. As a result any amount of vaporized fuel the device allows in would simply be subtracted from the amount the computer system normally dispenses anyway.

[9] Finally, another solution proposes using an external magnet clamp-on system that creates a magnetic field around a fuel line to which the device is clamped. However, these external devices have not shown any appreciable improvement in efficiency or emissions.

[10] As with any industry using internal combustion engines, there exists a need for higher fuel efficiency and reduced emissions when burning fossil fuels.

Brief Description of the Drawings

[11] The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same become better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

[12] **FIG. 1** is a diagram of a fuel system for a fossil-fuel powered internal-combustion engine according to an embodiment of an invention disclosed herein;

[13] **FIG. 2** is a cutaway plan view of a first apparatus for improving fuel efficiency and reducing emissions in a fuel system according to an embodiment of an invention disclosed herein;

[14] **FIG. 3** is a cutaway plan view of a second apparatus for improving fuel efficiency and reducing emissions in a fuel system according to an embodiment of an invention disclosed herein; and

[15] **FIG. 4** is a cutaway plan view of a third apparatus for improving fuel efficiency and reducing emissions in a fuel system according to an embodiment of an invention disclosed herein.

DETAILED DESCRIPTION

[16] The following discussion is presented to enable a person skilled in the art to make and use the subject matter disclosed herein. The general principles described herein may be applied to embodiments and applications other than those detailed above without departing from the spirit and scope of the subject matter disclosed herein. This disclosure is not intended to be limited to the embodiments shown, but is to be accorded the widest scope consistent with the principles and features disclosed or suggested herein.

[17] By way of overview, an embodiment of the invention disclosed herein is described in the following paragraphs. As such, one embodiment comprises an apparatus, which is referred to as a nano-jet filter throughout this disclosure, for realizing improved fuel efficiency and reduced fuel emissions in an internal combustion engine when used in conjunction with a nano-jet. The apparatus includes a fuel inflow interface operable to couple with a fuel line for the intake of fuel. The apparatus further includes a fuel channeling chamber coupled to the fuel inflow interface, wherein the fuel channeling chamber is operable to direct the flow of fuel through the apparatus. Within this chamber, the apparatus includes a set of aligned magnetic members such that the flow of fuel passes through a magnetic field created by the set of aligned magnetic members. Finally, the apparatus includes a fuel outflow interface operable to couple to the fuel line to facilitate the flow of fuel from the channeling chamber back to the fuel line. This apparatus will be referred to as the nano-jet filter throughout the remainder of this disclosure.

[18] The purpose of using a hyper magnetic field is to help facilitate changing conventional fuel into “nano” fuel. That is, conventional fuel consists of fuel molecule clusters as typically as large as 300 nanometers in diameter. However, when conventional fuel is passed through a nano-jet system, the fuel molecule clusters are typically reduced to less than 3 nanometers in diameter. A system having a nano-jet saver is designed to reduce the fuel consumption by allowing for a more complete burning, which results from a more complete mixture between fuel molecules and oxygen in the engine. Fuel molecule are decomposed to smaller fuel particles (whose diameter is typically less than 3 nanometer) by applying a magnetic field to larger fuel molecule clusters and traversing a hyper magnet gradient when the fuel flows through a nano-jet saver fuel chamber. The system is further improved with a nano-jet filter installed prior to nano-jet saver which absorbs ferric granules that may be present in conventional fuel . Thus, the nano-jet filter purifies the fuel before entering the nano-jet saver, so as to improve the performance of the overall nano-jet system. Having fuel molecules with a smaller diameter, both better fuel efficiency and reduced emissions are achieved as the fuel burns more completely and more cleanly. With any fossil-fuel powered internal-combustion engine, an operator can expect to see a reduction in emissions to the environment, fuel savings, and better performance. Furthermore, the nano-jet system requires no external power source and, as such, consumes no additional energy during operation. The following figures better illustrate embodiments of a nano-jet filter and nano-jet saver.

[19] **FIG. 1** is a diagram of a typical fuel system ***100*** for a fossil-fuel powered internal combustion engine according to an embodiment of an invention disclosed herein. The system ***100*** is not intended to be an exhaustive diagram of all aspects of a fuel system in for an engine, but rather to provide a context in which the subject matter disclosed herein may be embodied within a fuel system ***100***. The basic components of the fuel system are typically electronically coupled to an engine control unit (ECU) ***160*** which is simply a computer or other control device for controlling the fuel system ***100***.

[20] The fuel system ***100*** includes a fuel tank ***110*** suitable for holding an appropriate amount of fuel. Typically, a fuel pump ***115*** is disposed near the fuel tank ***110*** such that the fuel comp may draw fuel from the fuel tank and dispense it through the fuel line ***150*** culminating at the engine ***135***. Various styles and kinds of fuel pumps 115 may be realized here, but further detail will not be discussed.

[21] The fuel system ***100*** may typically also include a fuel filter ***120***. The fuel filter ***120*** may be disposed along the fuel line ***150***, either in the engine compartment or underneath the vehicle by the fuel tank ***120***. The fuel filter ***120*** traps large foreign particles in the fuel and prevents these large particulates from getting into the engine. As is known, with the force of the fast up-and-down motion of the pistons, if any large particles manage to get in the fuel, this could cause some serious damage to the engine ***135***. A clean fuel filter ***120*** is important to the performance of a vehicle's engine, however, small particulates still manage to get through and, while these small particulates do not cause as much engine damage, efficiency and emissions are still comprised.

[22] The fuel system ***100*** may also typically include a fuel injection device ***130***. Until the early 1980's many vehicles used carburetors to achieve better fuel efficiency. With the advent of fuel injection systems, carburetors have virtually disappeared from the market. At first, carburetors were replaced with throttle body fuel injection systems (also known as single point or central fuel injection systems) that incorporated electrically controlled fuel-injector valves into the throttle body. These were almost a bolt-in replacement for the carburetor, so the manufacturers did not have to make any drastic changes to their engine designs.

[23] Gradually, as new engines were designed, throttle body fuel injection was replaced by multi-port fuel injection (also known as port, multi-point or sequential fuel injection). These systems have a fuel injector for each cylinder, usually located so that they spray right at the intake valve. These systems provide more accurate fuel metering and quicker response.

[24] When the injector is energized, an electromagnet moves a plunger that opens the valve, allowing the pressurized fuel to squirt out through a tiny nozzle. The nozzle is designed to atomize the fuel. That is, the injector strives to make as fine a mist as possible so that it can burn cleaner and more efficiently. The amount of fuel supplied to the engine is determined by the amount of time the fuel injector stays open. This is called the pulse width, and it is controlled by the ECU ***160***. The injectors are mounted in an intake manifold so that they spray fuel directly at the intake valves. A pipe called the fuel rail supplies pressurized fuel to all of the injectors. In order to provide the correct amount of fuel for every operating condition, the ECU ***160*** has to monitor a huge number of input sensors. Without going into further detail, such sensors include a mass airflow sensor, one or more oxygen sensors, a throttle position sensor, a coolant temperature sensor, a voltage sensor, and an engine speed sensor.

[25] Disposed between the fuel filter ***120*** and the fuel injection device ***130*** are a nano-jet saver ***128*** and a nano-jet filter ***125***. Together a nano-jet filter ***125*** and a nano-jet saver ***128*** are sometimes called a nano-jet set or a nano-jet system.

These devices function together to improve fuel efficiency and reduce emissions in an internal combustion engine.

[26] A nano-jet saver ***128*** is a molecular breakdown device that may be used to facilitate the changing of the size of fuel molecule clusters. As described above, a nano-jet saver ***128*** is capable of changing the size of these molecular clusters from an average of 300 nanometers in diameter to 3 nanometers in diameter. The nano-jet filter ***125*** is intended to prevent ferric granule and other impurities from entering into the nano-jet saver ***128***. A set of aligned magnets inside the nano-jet filter ***125*** provides a means to protect the nano-jet saver ***128*** from medium-size to large-size particulates and thus prolong its working life to a large extent. The operation of the nano-jet saver ***128*** is discussed in more detail below with respect to **FIGs. 3** and **4** while the nano-jet filter is discussed in more detail with respect to **FIG. 2**.

[27] **FIG. 2** is a cutaway plan view of a nano-jet filter ***200*** (*i.e.,* the nano-jet filter ***125*** of **FIG. 1**) for improving the operation of the fuel system ***100*** according to an embodiment of an invention disclosed herein. In this embodiment, the apparatus ***200***, (*i.e.*, the nano-jet filter ***200*** which can be likened to the nano-jet filter ***125*** of **FIG. 1**) is shown with a single set of aligned magnetic members ***217***. The nano-jet filter ***200*** includes a fuel inflow interface ***210*** operable to couple with a fuel line (not shown in **FIG. 2**) for the intake of fuel. Fuel, (represented by small arrows in these figures) may be directed by the fuel inflow interface ***210*** toward a fuel channeling chamber ***235*** along the path ***211***. The fuel channeling chamber ***235*** is enclosed by a chamber body ***236***. The chamber body ***236*** typically comprises a composite metal or plastic suitable for handling high-pressure fuel lines. The fuel inflow interface ***210*** may be seated in the chamber body ***236*** using a gasket ***215***.

[28] Further, the chamber body ***236*** holds the aligned magnetic members ***217*** by providing a junction point with a gasket ***231*** for seating an assembly ***230*** with the aligned magnetic members ***217*** disposed thereon. In this embodiment, two magnetic members ***217*** are shown; one depicted on the bottom side of the nano-jet filter ***200*** and one depicted on the top side of the nano-jet filter ***200***. The alignment of these magnetic members ***217*** creates a channel by which fuel flowing through the nano-jet filter ***200*** passes through a hyper magnetic field created by the alignment of the north and south poles of the magnetic members ***217***. Having the magnetic members ***217*** disposed within the fuel channeling chamber ***235*** allows the fuel to come into direct contact with the magnetic members ***217***.

[29] Because the aligned magnetic members ***217*** are disposed on an assembly ***230***, the entire assembly ***230*** (which includes the magnetic members ***217***) may be removed from the fuel channeling chamber ***235*** via its access point. This allows for the cleaning of the magnetic members ***217*** as well as allowing for the changing of the magnetic members ***217*** to provide different configurations of alignments (*e.g.,* more fuel paths, stronger magnets, *etc.*) without having to replace the entire nano-jet filter ***200***. The access point may typically be a threaded junction point such that the assembly ***230*** may be rotatably secured to the chamber body ***236***.

[30] After the fuel passes through the hyper magnetic field, it continues along the path ***221*** to a fuel outflow interface ***220*** that is coupled back to the fuel line (again, not shown in **FIG. 2**). The fuel outflow interface ***220*** may be seated in the chamber body ***236*** using a gasket ***240***.

[31] In this embodiment, the fuel channeling chamber ***236*** allows for a single path for fuel to flow from the fuel inflow interface ***210*** to the fuel outflow interface ***220***. Other embodiments (described below) provide a plurality of paths for fuel to flow from the fuel inflow interface ***210*** to the fuel outflow interface ***220***. Furthermore, this embodiment shows the fuel inflow interface ***210*** and the fuel outflow interface ***220*** are arranged to direct fuel flow into the fuel channeling chamber ***235*** and fuel flow out of the fuel channeling chamber ***235*** in a parallel direction.

[32] Using such a nano-jet filter ***200*** in conjunction with a nano-jet saver (***300*** and/or ***400*** described below) provides a means for ferric granules that may be present in dirty fuel to be removed before entering into a nano-jet saver. By removing larger particulates, the operating life of the nano-jet saver may be greatly improved. Thus, using a system that includes both a nano-jet filter ***200*** and a nano-jet saver ***300/400*** improves fuel efficiency and reduces emissions, particularly when the fuel being used is of a lower quality and/or grade.

[33] **FIG. 3** is a cutaway plan view of a second apparatus ***300*** for helping to improve fuel efficiency and to reduce emissions in a fuel system ***100*** according to an embodiment of an invention disclosed herein. In this embodiment, the apparatus ***300***, (*i.e.*, the nano-jet saver ***300*** which can be likened to nano-jet saver ***128*** of FIG. 1) is shown with a two separate sets of aligned magnetic members ***340*** and ***341***.

[34] The nano-jet saver ***300*** includes a fuel inflow interface ***310*** operable to couple with a fuel line (not shown in **FIG. 3**) for the intake of fuel. Typically the nano-jet saver ***300*** follows a nano-jet filter ***200*** in a fuel flow line. Fuel, (again represented by small arrows in these figures) may be directed by the fuel inflow interface ***310*** toward a fuel channeling chamber ***335*** along the path ***311***. The fuel channeling chamber ***335*** is enclosed by a chamber body ***336***. The fuel inflow interface ***310*** may be seated in the chamber body ***336*** using a gasket ***312***.

[35] Further, in this embodiment, the chamber body ***336*** holds two sets of aligned magnetic members ***340*** and ***341*** by providing two assembly junction points with gasket for seating assemblies ***330*** and ***331*** with the aligned magnetic members ***340*** and ***341*** disposed thereon. In this embodiment, to magnetic members ***340*** and ***341*** are shown as sets of three magnets; one depicted on the bottom side of the nano-jet saver ***300***, one depicted centered in the nano-jet saver ***300***, and one depicted on the top side of the nano-jet saver ***300***. As before, the alignment of these magnetic members ***340*** and ***341*** creates channels by which fuel flowing through the nano-jet saver ***300*** passes through a hyper magnetic field created by the alignment of the north and south poles of the magnetic members ***340*** and ***341***. Having the magnetic members ***340*** and ***341*** disposed within the fuel channeling chamber ***335*** allows the fuel to come into direct contact with the magnetic members ***340*** and ***341***. Furthermore, having multiple assemblies ***330*** and ***331*** with multiple magnetic members ***340*** and ***341*** disposed thereon, several channels for fuel flow are created, thereby increasing the total effectiveness of the breakdown of the fuel.

[36] As before, because the aligned magnetic members ***340*** or ***341*** are disposed on a single respective assembly ***330*** or ***331***, each individual assembly ***330*** or ***331*** (which includes the respective magnetic members ***340*** or ***341***) may be removed from the fuel channeling chamber ***335*** via its respective access point. Again, this allows for the cleaning of the magnetic members ***340*** and ***341*** as well as allowing for the changing of the magnetic members ***340*** and ***341*** to provide different configurations of alignments (*e.g.,* more fuel paths, stronger magnets, *etc.*) without having to replace the entire nano-jet saver ***300***. The access point may typically be a threaded junction point such that the assembly ***330*** or ***331*** may be rotatably secured to the chamber body ***336***.

[37] After the fuel passes through one or more magnetic fields it continues along the path ***321*** to a fuel outflow interface ***320*** that is coupled back to the fuel line (again, not shown in **FIG. 3**). The fuel outflow interface ***320*** may be seated in the chamber body ***336*** using a gasket ***322***.

[38] The nano-jet saver ***300*** may further include one or more flush plugs ***351*** and ***352*** secured in a flush plug seating such that when the flush plug is removed, the fuel channeling chamber ***335*** may be exposed for flushing.

[39] **FIG. 4** is a cutaway plan view of a third apparatus ***400*** for improving fuel assisting with efficiency and reducing emissions in a fuel system ***100*** according to an embodiment of an invention disclosed herein. In this embodiment, another version of a nano-jet saver ***400*** is shown with a single set of aligned magnetic members ***421*** but with the fuel inflow interface ***410*** and the fuel outflow interface ***460*** at a perpendicular angle to each other.

[40] The nano-jet saver ***400*** includes a fuel inflow interface ***410*** operable to couple with a fuel line for the intake of fuel. Fuel may be directed by the fuel inflow interface ***410*** toward a fuel channeling chamber ***432*** along the path ***420***.

The fuel channeling chamber ***432*** is enclosed by a chamber body ***450***. The fuel inflow interface ***410*** may be seated in the chamber body ***450*** using a gasket ***431***.

[41] Similar to the previous embodiment, the chamber body ***432*** holds a set of aligned magnetic members ***421*** at an assembly junction points with gasket for seating an assembly ***430*** with the aligned magnetic members ***421*** disposed thereon. In this embodiment, one set of aligned magnetic members ***421*** are shown as a set of three magnets; one depicted on the bottom side of the nano-jet saver ***400***, one depicted centered in the nano-jet saver ***400***, and one depicted on the top side of the nano-jet saver ***400***.

[42] As before, the alignment of these magnetic members ***421*** creates channels by which fuel flowing through the nano-jet saver ***400*** passes through a hyper magnetic field created by the alignment of the north and south poles of the magnetic members ***421***. Having the magnetic members ***421*** disposed within the fuel channeling chamber ***432*** allows the fuel to come into direct contact with the magnetic members ***421***. Furthermore, having three magnetic members aligned in this manner creates two distinct paths for fuel flow through the fuel channeling chamber ***435*** as depicted by the small arrows in **FIG. 4**. Again, this increases the total effectiveness of the magnetic fields.

[43] As before, because the aligned magnetic members ***421*** are disposed on a single assembly ***433***, the entire assembly ***433*** (which includes the respective magnetic members ***421***) may be removed from the fuel channeling chamber ***432*** via its access point for configuration change or cleaning. The nano-jet saver ***400*** may further include a flush plug ***430*** secured in a flush plug seating such that when the flush plug is removed, the fuel channeling chamber ***432*** may be exposed for flushing.

[44] After the fuel passes through one or more hyper magnetic fields, it continues along the path ***435*** to a fuel outflow interface ***460*** that is coupled back to the fuel line. The fuel outflow interface ***460*** may be seated in the chamber body ***450*** using a gasket ***440***. Additional configurations of aligned magnetic members and fuel channeling paths are further contemplated, but not discussed herein for brevity.

[45] While the subject matter discussed herein is susceptible to various modifications and alternative constructions, certain illustrated embodiments thereof are shown in the drawings and have been described above in detail. Furthermore, those skilled in the art will understand that various aspects described in less than all of the embodiments may, nevertheless, be present in any embodiment. It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention.

What is claimed is:

1. An apparatus for assisting with reduced fuel emissions and increased fuel efficiency, the apparatus comprising

a fuel inflow interface operable to couple with a fuel line for the intake of fuel;

a fuel channeling chamber coupled to the fuel inflow interface, the fuel channeling chamber operable to direct the flow of fuel through the apparatus;

at set of aligned magnetic members disposed within the fuel channeling chamber such that the flow of fuel passes through a magnetic field created by the set of aligned magnetic members; and

a fuel outflow interface operable to couple to the fuel line to facilitate the flow of fuel from the channeling chamber back to the fuel line.

2. The apparatus of claim 1 wherein the fuel inflow interface further comprises a gasket for seating the apparatus to the fuel line.

3. The apparatus of claim 1 wherein the fuel outflow interface further comprises a gasket for seating the apparatus to the fuel line.

4. The apparatus of claim 1 wherein the fuel channeling chamber further comprises a single path for fuel to flow from the fuel inflow interface to the fuel outflow interface.

5. The apparatus of claim 1 wherein the aligned magnetic members are disposed such that the fuel flowing though the fuel channeling chamber comes into direct contact with the magnetic members.

6. A method for reducing emissions when burning fuel in an internal combustion engine, the method comprising:

directing fuel into a fuel channeling chamber prior to burning the fuel in the internal combustion engine;

passing the fuel through a magnetic field such that the fuel comes into direct contact with magnetic members that induced the magnetic field; and

directing fuel out of the fuel channeling chamber into the internal combustion engine.

7. The method of claim 6 further comprising reducing the number of particulates in the fuel when the fuel is passed through the magnetic field.

8. The method of claim 6 further comprising reducing the size of fuel molecules from approximately 300 nanometers to approximately 3 nanometers when the fuel is passed through the magnetic field.

9. The method of claim 6 further comprising configuring the magnetic members to produce a pre-defined hyper magnetic field.

10. The method of claim 6 further comprising improving fuel efficiency and reducing fuel emissions in the internal combustion engines by passing the fuel through the magnetic field.

11. A system, comprising:

a nano-jet filter having first set of aligned magnetic members disposed within a fuel channeling chamber such that flow of fuel passes through a hyper magnetic field created by the first set of aligned magnetic members, the hyper magnetic field operable to remove particulates from the fuel; and a nano-jet saver having second set of aligned magnetic members disposed within a fuel channeling chamber such that flow of fuel passes through a second magnetic field created by the second set of aligned magnetic members, the second magnetic field operable to reduce granularity of the fuel.

12. The system of claim 11, further comprising a third set of aligned magnetic members disposed within the fuel channeling chamber of the nano-jet saver such that the flow of fuel also passes through a third magnetic field created by the third set of aligned magnetic members.

13. The system of claim 11 wherein each set of aligned magnetic members are disposed on an assembly such that the assembly may be removed from the fuel channeling chamber via an access point.

14. The apparatus of claim 13 wherein the access point comprises a threaded junction point such that the assembly may be rotatably secured to a surrounding body of the fuel channeling chamber.

15. The system of claim 11 wherein the fuel channeling chamber in the nano-jet saver further comprises a plurality of paths for fuel to flow from a fuel inflow interface to a fuel outflow interface.

16. The system of claim 11 further comprising a flush plug disposed on the nano-jet saver and secured in a flush plug seating such that when the flush plug is removed, the fuel channeling chamber is exposed for flushing.

17. The system of claim 11 disposed within a fuel system of an internal combustion engine such that fuel flows through the system prior to reaching the internal combustion engine, wherein the fuel is filtered and granularized for more efficient burning and burning with reduced emissions.

18. A system for reducing emissions in a vehicle having an internal combustion engine, the system comprising:

a fuel tank suitable for holding fuel to be consumed in an internal combustion engine;

an emissions device for transforming the fuel to burn more efficiently and less emissions, the emissions device including a fuel channeling chamber having a set of aligned magnetic members such that the flow of fuel passes through a magnetic field created by the set of aligned magnetic members;

an internal combustion engine operable to use fossil fuel to convert energy from a chemical reaction into rotational energy; and

a fuel line suitable for providing a fuel flow path from the fuel tank through the emissions device and to the internal combustion engine.

19. The system of claim 18, further comprising:

a fuel pump disposed between the fuel tank and the emissions device along the fuel line, the fuel pump operable to pump fuel from the fuel tank through the fuel line; and

a fuel filter disposed between the fuel pump and the emissions device along the fuel line, the fuel filter operable to remove large particulates from the fuel in the fuel line.

20. The system of claim 18, further comprising a fuel injection system disposed between the emissions device and the internal combustion engine along the fuel line, the fuel injection system controlled by an engine control unit and operable to inject fuel from the fuel line into combustion chambers in the internal combustion engine.

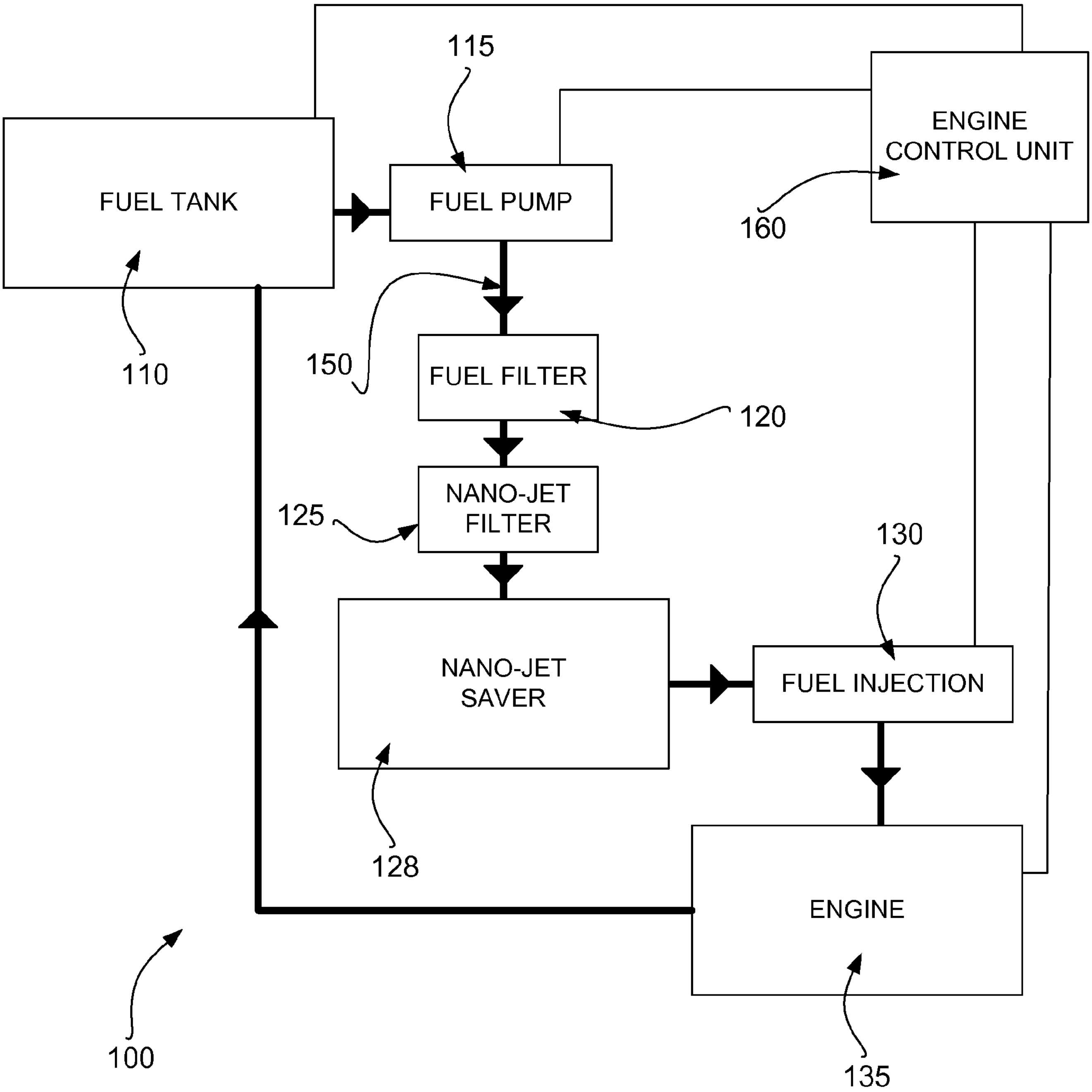
115
ENGINE CONTROL UNIT
FUEL TANK
FUEL PUMP
160
150
FUEL FILTER
110
120
125
NANO-JET FILTER
130
NANO-JET SAVER
FUEL INJECTION
128
ENGINE
100
135

FIG. 1

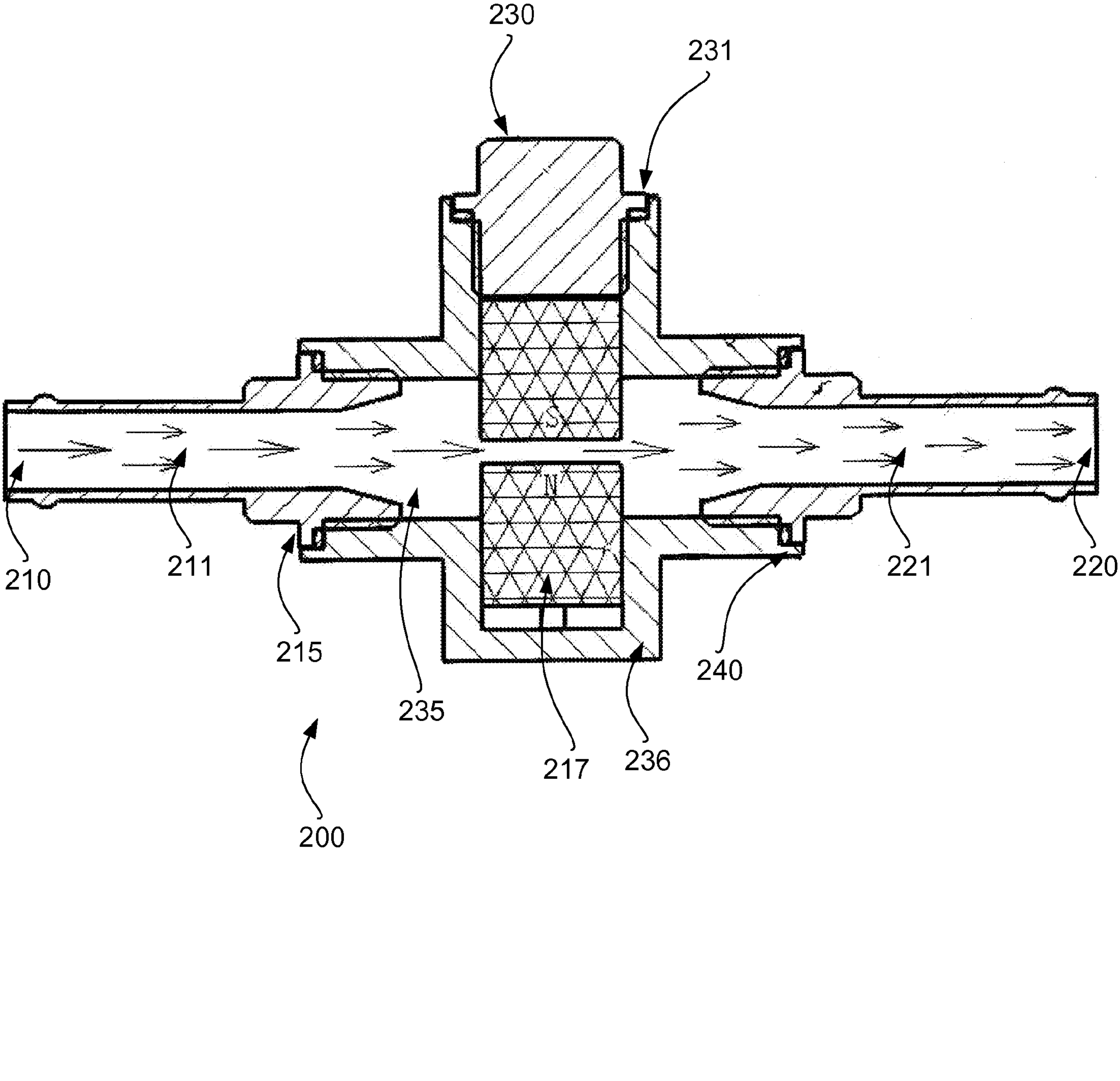

FIG. 2

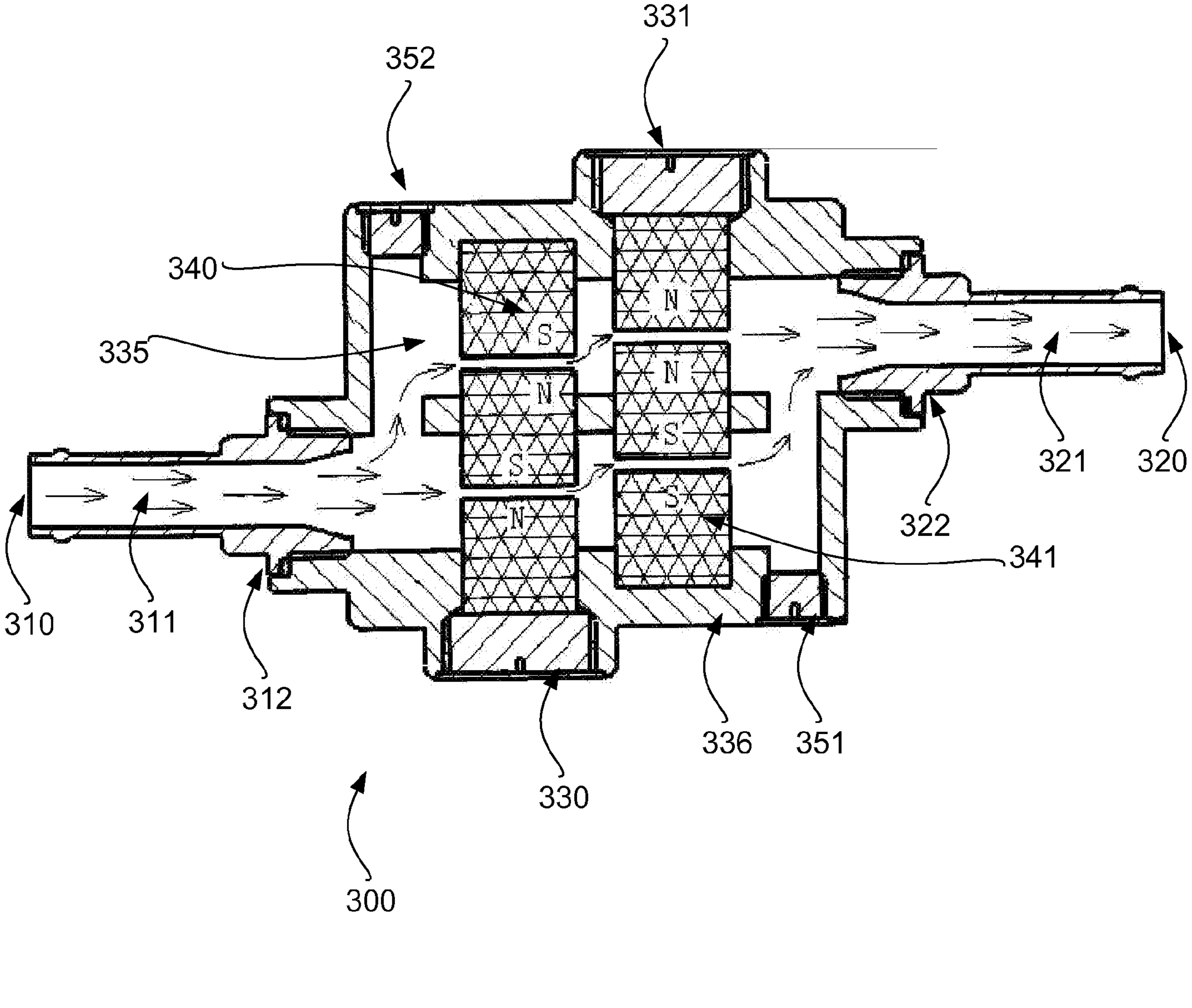
331
352
340
335
N
S
N
S
N
S
N
S
321
320
322
341
310
311
312
330
336
351
300

FIG. 3

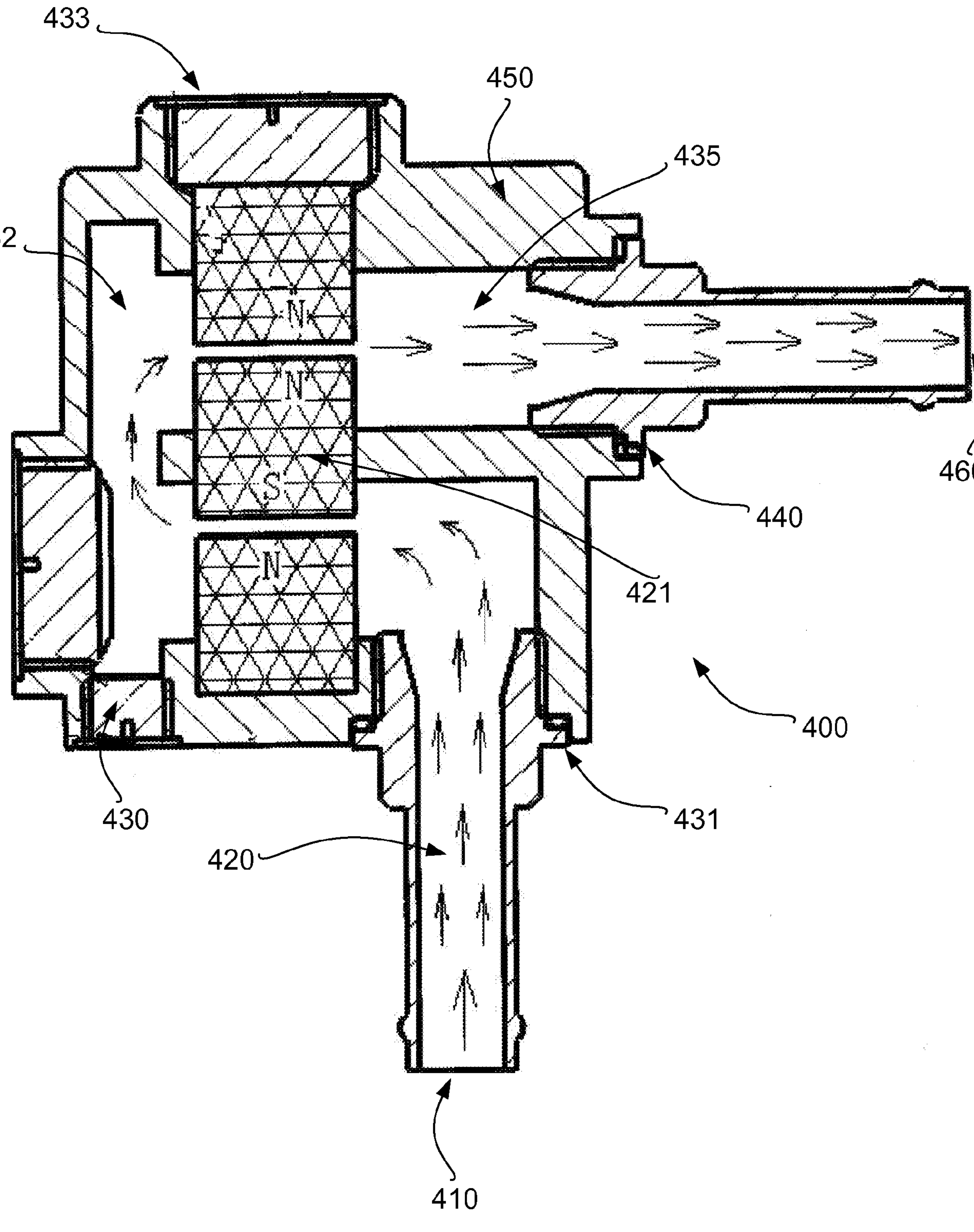

FIG. 4