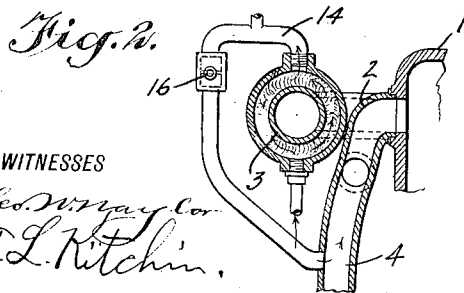
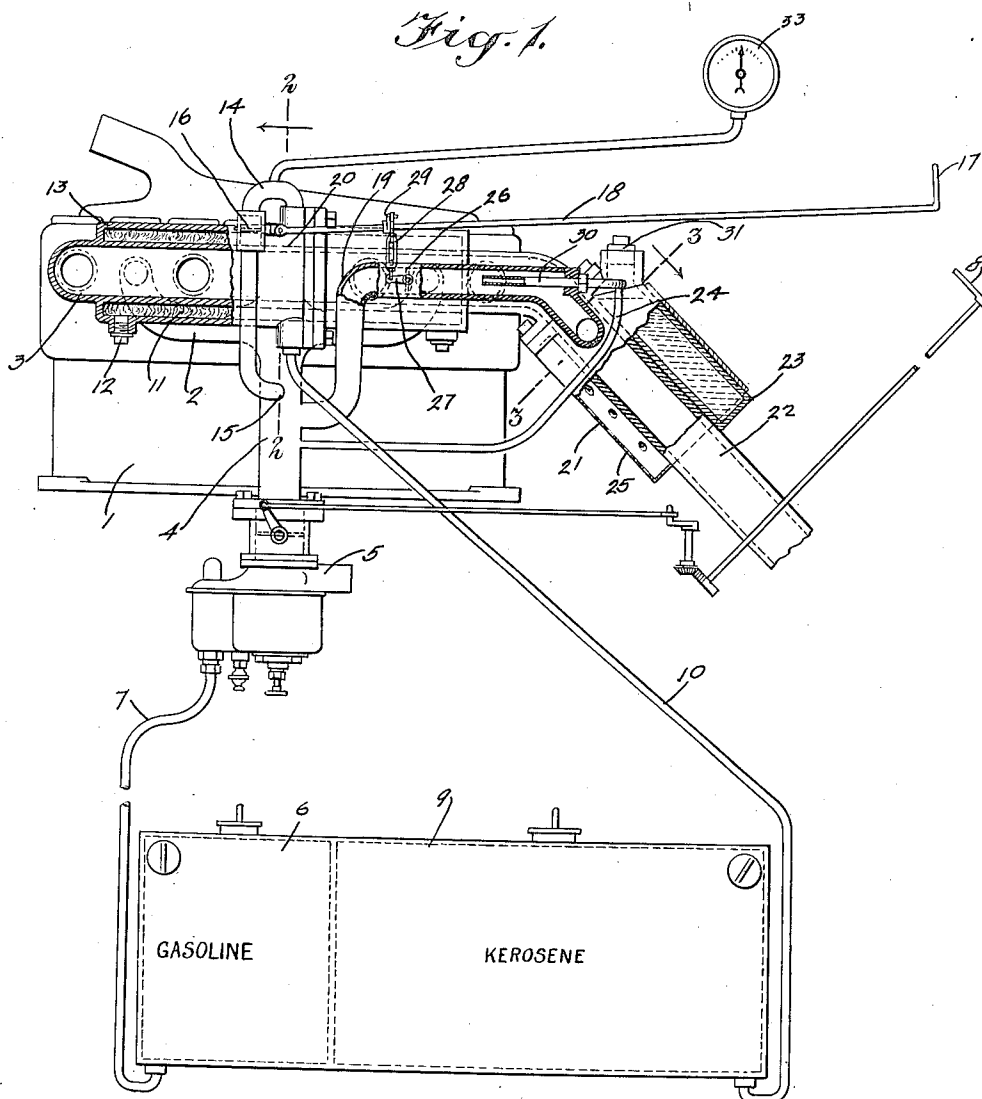


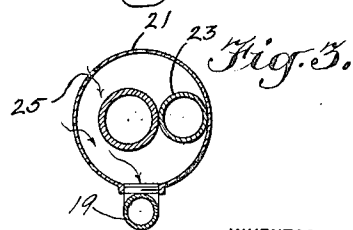
M. CAVANAGH.
INTERNAL COMBUSTION ENGINE.
APPLICATION FILED OCT. 31, 1917.

1,311,044.

Patented July 22, 1919.



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MICHAEL CAVANAGH, OF NEW YORK, N. Y.

INTERNAL-COMBUSTION ENGINE.

1,311,044.

Specification of Letters Patent.

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Application filed October 31, 1917. Serial No. 199,467.

To all whom it may concern:

Be it known that I, MICHAEL CAVANAGH, a citizen of the United States, and a resident of the city of New York, Flushing, borough of Queens, in the county of Queens and State of New York, have invented a new and Improved Internal-Combustion Engine, of which the following is a full, clear, and exact description.

10 This invention relates to internal combustion engines and particularly to an attachment concerning the supply of fuel thereto, and has for an object the provision of an improved construction which may use either
15 kerosene or gasolene for operating the engine.

Another object in view is to provide an attachment for an internal combustion engine wherein kerosene is gasified and supplied to the manifold between the engine and the carbureter together with a predetermined quantity of air.

Another object in view is to provide an attachment for internal combustion engines in addition to the usual carbureter and gasolene supply whereby kerosene may be utilized as a substitute for gasolene in such a manner to be supplied to the engine in a gas mixed with air and steam or water.

30 In the accompanying drawing:—

Figure 1 is a side view of an engine with an embodiment of the invention generally applied thereto, the same being shown partially in section.

35 Fig. 2 is a transverse sectional view through Fig. 1 on line 2—2.

Fig. 3 is a transverse sectional view through one of the attachments, same being taken on line 3—3 of Fig. 1.

40 Referring to the accompanying drawing by numerals, 1 indicates an internal combustion engine of any desired type which is provided with an intake manifold 2 of substantially the usual type, and an exhaust manifold 3 of the special type hereinafter fully described. The intake manifold is provided with the usual intake pipe 4 extending from the carbureter 5 for receiving an explosive mixture therefrom. The carbureter 5 is con-
50 nected to the gasolene supply tank 6 by suit-

able pipe 7 whereby gasolene is supplied as needed or when desired. Carbureter 5 may be operated by the controlling member 8 near the wheel or by the accelerator pedal if desired, said member 8 and accelerator pedal
55 being of usual construction and forming no part of the present invention.

In operating the device it is intended to start the engine in any well known manner and use gasolene from tank 6 during the starting operation and until the engine has become heated to such an extent that the exhaust manifold will be heated sufficiently for gasifying the kerosene from tank 9 whereupon the gasolene may be turned off and the
65 gas created as just mentioned is discharged into the pipe 4 and from thence is let into the engine in the usual manner. Tank 9 is substantially the ordinary force feed tank so that kerosene will flow therefrom through
70 pipe 10 into the lower part of the jacket 11 preferably cast integral with the manifold 3. Jacket 11 is provided with cleanout openings normally closed by a plug 12 and is supplied with twisted wire or mineral wool, or
75 in fact any similar material 13 so as to more quickly heat and thereby gasify the kerosene entering the jacket. As the exhaust manifold 3 begins to get hot the kerosene in the jacket 11 will begin to gasify and consequently will force the ungasified kerosene
80 downwardly through pipe 10 into the tank 9 so that only gas will remain in the jacket. As this gas is used additional kerosene is automatically fed into the jacket by reason
85 of the pressure in the tank 9 so that substantially an even pressure of gasified kerosene is maintained. A pipe 14 is connected to the upper part of the jacket 11 and extends to point 15 where it is connected with
90 the pipe 4 of the inlet manifold whereupon gas may pass from the jacket into the inlet manifold and from thence into the cylinders of the engine. A valve 16 of any desired construction is arranged in pipe 14, said
95 valve being controlled by a controlling arm 17 arranged adjacent the wheel of the operator or any other desired point. In case the device is used on an automobile an additional accelerator pedal could be connected
100

with the rod 18 for turning on and off the valve 16.

In order not to depend on the carbureter 5 for an air supply when gas through pipe 14 is used, air is supplied through the pipe 19 which pipe is connected to pipe 4, preferably at a point farther from the cylinder than point 15 and to the heat jacket 21 surrounding the exhaust pipe 22, so as to be heated thereby, said jacket having a container 23 arranged therein for holding water, which water is heated somewhat from the pipe 22 so as to produce a continuous vapor. The container 23 is provided with a filling opening normally closed by a plug 31, and has pipes 24 and 30 connected thereto at the upper part so that vapor may be discharged through pipe 24 into the pipe 4 and through pipe 30 into the air pipe 19. A valve 26 is arranged in air pipe 19 which valve has an arm 27 connected therewith. A turn-buckle 28 is connected with arm 27 and with arm 29 rigidly secured to shaft 18, whereby whenever said shaft is rotated valve 26 will be opened or closed in proportion, in order that the air supply will be in proportion to the amount of gasified kerosene passing through pipe 14 into pipe 4. It will be noted that the pipes 24 and 30 will eliminate any possible objection in the way of carbon from the kerosene, as this arrangement supplies vapor continuously in proportion to the amount of kerosene gas used in addition to keeping the cylinders clean when gasolene is being used. Pipe 24 operates when gasolene is used as well as when kerosene is used, whereas pipe 30 is shut off when valve 26 is closed. A gage 33 is connected with the pipe 14 between valve 16 and the jacket so as to indicate the pressure in the jacket and thereby notify the operator when the conditions are proper for shutting off the gasolene and using the kerosene.

In operation the engine is started in the usual manner with valve 16 closed and also valve 26 closed. In starting the engine with the valves just mentioned closed, the explosive mixture will be drawing through the carbureter 5, which explosive mixture will be used until the exhaust manifold 30 becomes sufficiently hot to gasify the kerosene in the jacket 11. When the indicator 33 indicates that the proper pressure has been secured valve 16 and valve 26 are gradually turned on while the carbureter is gradually turned off. When the carbureter has been completely turned off and when kerosene is being used the kerosene vapor or gaseous matter is drawn from the jacket 11 into the pipe 4 while air is drawn through air pipe 19 from the heat jacket 21 surrounding pipe 22. This heat jacket is provided with a number of apertures 25 allowing fresh air

to enter as the heated air is drawn through pipe 19. In addition to the air being drawn into pipe 4 vapor will be drawn therein through the pipes 24 and 30 so that an ample supply of gas or vaporized kerosene is provided together with an ample supply of air and vapor from the tank 23 so that a thoroughly efficient explosive mixture is supplied. The engine may be supplied with more or less explosive mixture by merely operating the shaft or rod 18 and when the engine is stopped this rod is turned until the valves 16 and 26 have been shut off. If the engine is stopped for any considerable length of time the exhaust manifold will become cold and consequently filled with kerosene so that on again starting it will be necessary to start the engine by using gasolene from tank 6.

What I claim is:

1. In a device of the character described, the combination with an internal combustion engine having an inlet manifold and an exhaust manifold, of a carbureter connected with said inlet manifold, means for supplying gasolene to said carbureter, a container heated by the exhaust gases in said exhaust manifold, means for supplying kerosene to the interior of said container, a pipe connected with the upper part of the container and with said inlet manifold between the carbureter and the engine, a valve for controlling the amount of gasified kerosene passing through said pipe, an air supply pipe connected to said manifold, a valve arranged in the air supply pipe, and means for connecting said last mentioned valve and the valve in said pipe so the proportion of air and gasified kerosene may be maintained as said valves are opened and closed.

2. In a device of the character described, the combination of an internal combustion engine having an inlet manifold, an exhaust manifold, of a jacket surrounding said exhaust manifold, a filling of loose metallic material arranged in the jacket for breaking up oil, means for supplying a less volatile oil than gasolene to the lower part of said jacket, a pipe connected with the upper part of said jacket and to said intake manifold between the engine and the carbureter, a valve arranged in said pipe, an air pipe connected to said intake manifold, means for heating air passing through said air pipe, a valve in said air pipe, and means for simultaneously opening and closing both of said valves.

3. In a device of the character described, the combination with an internal combustion engine having an exhaust manifold and an inlet manifold, of a jacket surrounding the exhaust manifold, a loose filler arranged in said jacket, means for supplying kerosene

to the interior of said jacket whereby the same is heated and gasified, a pipe extending from the upper part of said jacket to said inlet manifold for leading gasified kerosene to the inlet manifold, and means for 1,
5 to the inlet manifold, an air heating jacket surrounding the exhaust manifold, an air pipe extending from said jacket to said inlet manifold, a valve in said air pipe, a valve in the pipe leading the gasified kerosene to the inlet manifold, and means for simultaneously opening and closing said valves.

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