April 26, 1938. O. KIESEL 2,115,634

HEAVY OIL CARBURETOR

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FIG. 1

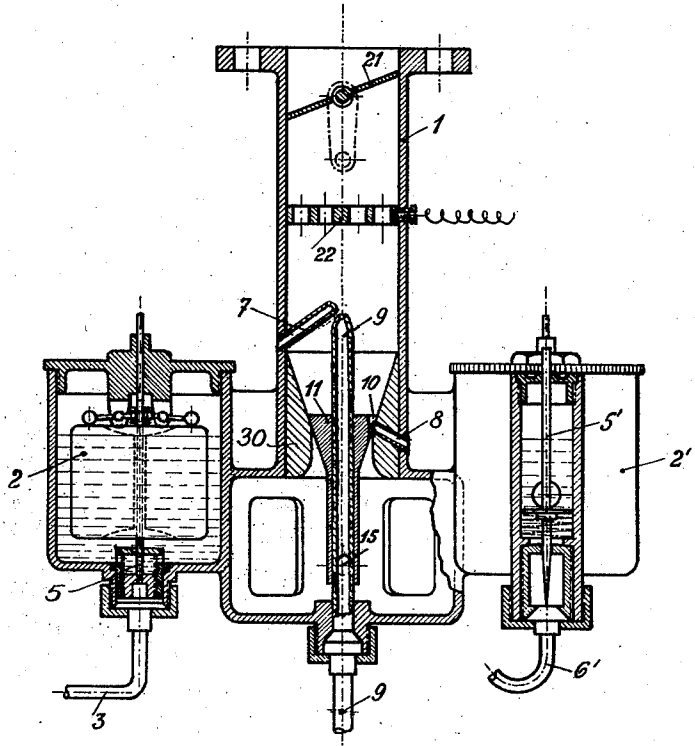

FIG. 2

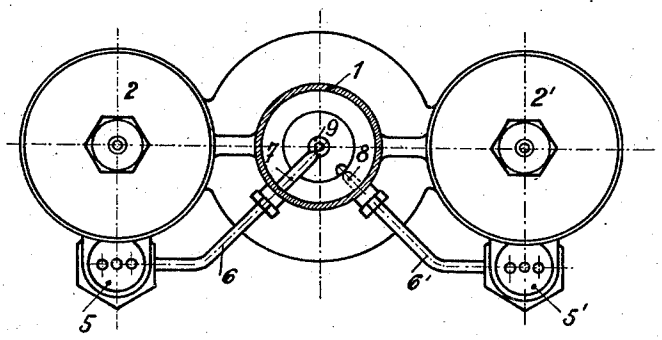

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FIG. 3

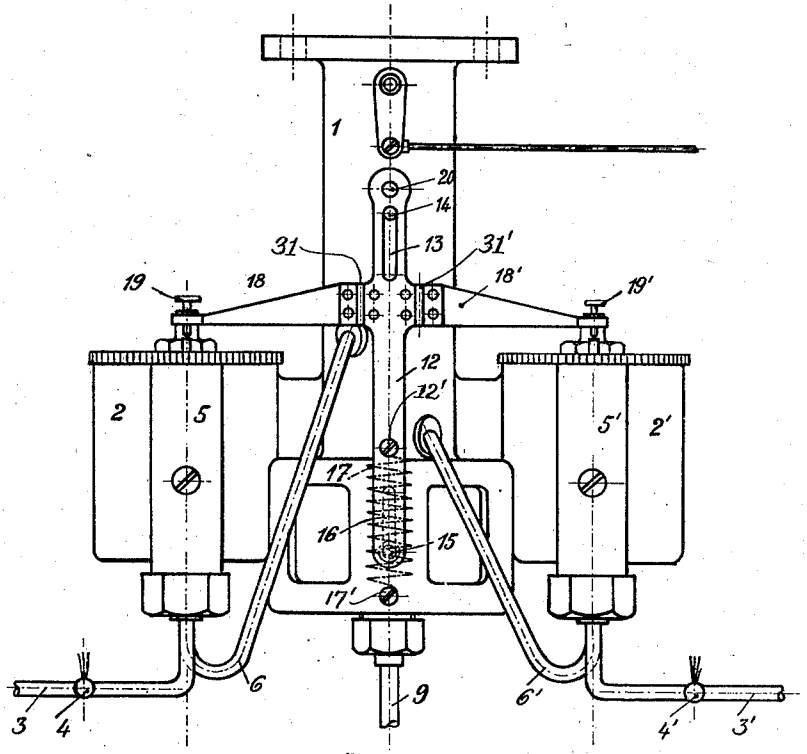

FIG. 4

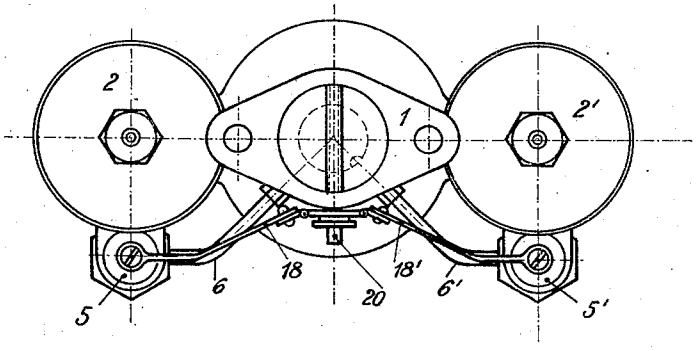

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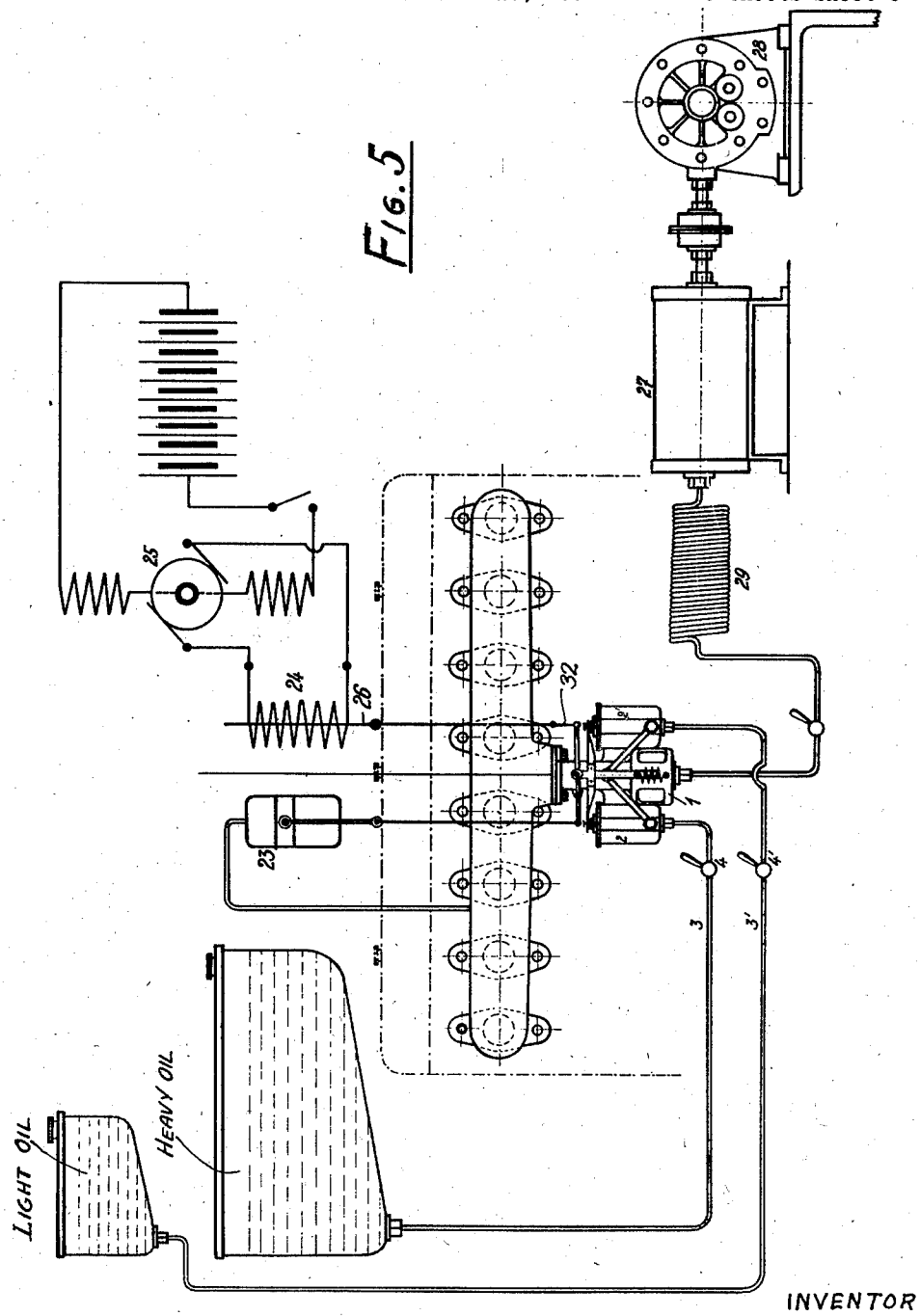
FIG. 5



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2,115,634

UNITED STATES PATENT OFFICE

2,115,634

HEAVY OIL CARBURETOR

Oskar Kiesel, Munich, Germany, assignor to Otto Gutmann, Basel, Switzerland

Application June 25, 1937, Serial No. 150,378
In Germany May 20, 1933

4 Claims. (Cl. 123—127)

The known heavy-oil carburetors present considerable disadvantages which render the use of a heavy oil difficult as a general motive fluid for internal combustion engines. Thus in heavy oil carburetors generally used up to now the heavy motive fluid is excessively heated and in consequence thereof the readily evaporative components contained therein are extracted first, so that the remaining components have a considerable lowered rate of combustion. Owing to the loss of the readily evaporative parts there remains a residue of fuel which can only be utilized by the constant working pressure method (Diesel method). It cannot be used, however, for engines having spark ignition systems. The excessive heat and the resultant vaporization of the readily evaporative components also cause continuous clogging of the carburetor and the fuel pipes.

Apart from the objectionable high temperature of the heavy motive fluid a further disadvantage of the known carburetor is apparent in that the heavy motive fluid decomposes into its molecular components by the air suction which likewise causes a considerable amount of heating. In addition to this the air suction must be forced at a great velocity, as otherwise there would be insufficient power for atomizing the heavy motive fluid. Owing to the fact that a high throttling of the suction air becomes continuously necessary at the combustion nozzle there is a great decrease in the output of the motor. This reduction of output of the motor is reduced still further due to the fact that to use a heavy motive fluid the air sucked by the engine must be considerably preheated.

All these disadvantages are overcome by the heavy-oil carburetor according to the present invention in which two floats and two injection nozzles are provided in a joint common casing for the optional use of light or heavy motive fluids. To start the motor, a light motive fluid is used which is atomized in the usual manner by the suction of the motor. When the motor has been heated to a certain temperature the heavy oil may be used, and for atomizing the heavy oil air is utilized which is compressed and heated in a special compressor.

The heavy-oil carburetor according to the invention is illustrated in one form of execution on the accompanying drawings in which

Figure 1 is a longitudinal section of the carburetor;

Fig. 2 is a cross sectional view taken on line II—II of Fig. 1;

Fig. 3 is a side view;

Fig. 4 is a top view; and

Fig. 5 is a diagrammatic view of the entire system.

The carburetor consists of a tubular casing 1 having on opposite sides thereof two float chambers 2 and 2', one for heavy motive fluid 2 and the other for light motive fluid 2'. The motive fluids are fed through the pipes 3 and 3' in which valves 4 and 4' are provided. To control the supply of fuel needle valves 5 and 5' are placed in the chambers 2 and 2' and the chamber 2 is connected to the heavy oil nozzle 7 by pipe 6 and the chamber 2' to the light oil nozzle 8 by pipe 6'. The heavy oil nozzle 7 is inclined towards the orifice of the blast pipe 9 serving to supply compressed air, while the light oil nozzle 8 terminates in a channel 10 in an air-regulating cone 11 carried on the blast pipe 9. For simultaneous operation of the air-regulating cone 11 and the fuel needle valves 5 and 5' a multi-armed lever 12 is provided having a slot 13 in the upper arm by which the lever is guided on the carburetor casing by means of a pin 14. The lever 12 is connected at its lower end to a pin 15 which projects into the interior of the carburetor through a slot 16 and is connected to the air-regulating cone 11. A tension spring 17, connected at one end 17' to the carburetor casing and the other end 12' to the lever 12, tends to force the lever 12 downwardly and thus to force the air regulating cone on its seat 30. The lever 12 has two hinged side arms 18 and 18' which press on the fuel needles of the valves 5 and 5' at their free ends by means of the adjusting screws 19 and 19'. By turning the arms on their hinges 31 or 31' the fuel needles may be easily and rapidly taken out.

The regulation of the feed of air and fuel is carried out by an automatic regulating device which engages the pin 20 of the lever 12, intermediate levers being interposed, if necessary. To regulate the mixture a throttle valve 21 is arranged in the upper part of the carburetor casing 1. Below said throttle valve an interchangeable screen plate 22 is arranged which may be electrically heated if desired during cold weather.

The regulation of the mixture may be effected by means of a vacuum regulator 23 (Fig. 5), but it may also be controlled electrically. For this purpose a magnetic coil 24 is provided which receives current from a small separately excited auxiliary generator 25. The generator is coupled to the motor so that its tension increases or decreases dependent on the speed of the motor.

With an increased tension the exciting-current also increases and consequently the drawing power of the magnetic coil so that the coil tends to pull the core **26** more or less in opposition to the tension of the spring. The adjusting power is transmitted to the lever **12** of the carburetor by means of a rodding system of rods **32**.

The carburetor operates in the following manner:

When starting the motor, one operates first with a light motive fluid after having adjusted the valves **4** and **4'** accordingly, the fuel being atomized by the air suction. After the motor has become sufficiently warm, one changes over to heavy oil, drawing the combustion air from a compressed air container **27** which is continuously kept under pressure by a compressor **28**. Before the entry into the carburetor, the compressed air is heated in a superheater coil **29** which may surround the exhaust pipe of the engine. The hot compressed air creates in the carburetor a fuel mist which produces, in combination with the easily heated additional air, a perfect gas-air mixture. Tests have proved that this mixture does not break down but retains its gaseous condition without any change whatever. The motor runs perfectly at any speed. As the suction air need not be throttled any longer, but only requires a uniform mixing with the heavy motive fluid which is already atomized separately, the highest output of the engine is attained in every case. The heavy motive fluid should be warmed somewhat in the carburetor so as to bring it to a more fluid state. As a rule the heat of the motor alone is sufficient for this purpose.

I claim as my invention:

1. A heavy-oil and light oil carburetor for a motor and of the type in which compressed air atomizes the fuel, comprising a casing, an adjusting device secured to the casing and being adapted to be regulated in dependence on the revolutionary speed of the motor, a pair of fuel needle valves in the casing one of which is for the heavy oil and the other for light oil, an air regulating valve in the casing, and means connecting the adjusting device to the air regulating valve and the fuel needle valves, the adjusting device including a "cross-shaped" element of which the vertical arm is connected to the air regulating valve and the other two horizontal arms are each connected to a fuel needle valve.

2. A heavy-oil and light oil carburetor for a motor and of the type in which compressed air atomizes the fuel, comprising a casing, an adjusting device secured to the casing and being adapted to be regulated in dependence on the revolutionary speed of the motor, a pair of fuel needle valves in the casing one of which is for the heavy oil and the other for light oil, an air regulating valve in the casing, and means connecting the adjusting device to the air regulating valve and the fuel needle valves, the adjusting device including a "cross-shaped" element of which the vertical arm is connected to the air regulating valve and the other two horizontal arms are each connected to a fuel needle valve and the horizontal arms being rotatably mounted on the vertical arm to disconnect a horizontal arm from its needle valve when desired.

3. A heavy-oil and light oil carburetor for a motor and of the type in which compressed air atomizes the fuel, comprising a casing, an adjusting device secured to the casing and being adapted to be regulated in dependence on the revolutionary speed of the motor, a pair of fuel needle valves in the casing one of which is for the heavy oil and the other for light oil, an air regulating valve in the casing, means connecting the adjusting device to the air regulating valve and the fuel needle valves, and electrical means for adjusting the device.

4. A heavy-oil and light oil carburetor for a motor and of the type in which compressed air atomizes the fuel, comprising a casing, an adjusting device secured to the casing and being adapted to be regulated in dependence on the revolutionary speed of the motor, a pair of fuel needle valves in the casing one of which is for the heavy oil and the other for light oil, an air regulating valve in the casing, means connecting the adjusting device to the air regulating valve and the fuel needle valves, and means connected to the suction of the motor to operate the adjusting device.

OSKAR KIESEL.