July 2, 1929. E. DICKEY 1,719,103

FUEL SUPPLY APPARATUS

Filed Nov. 30, 1926

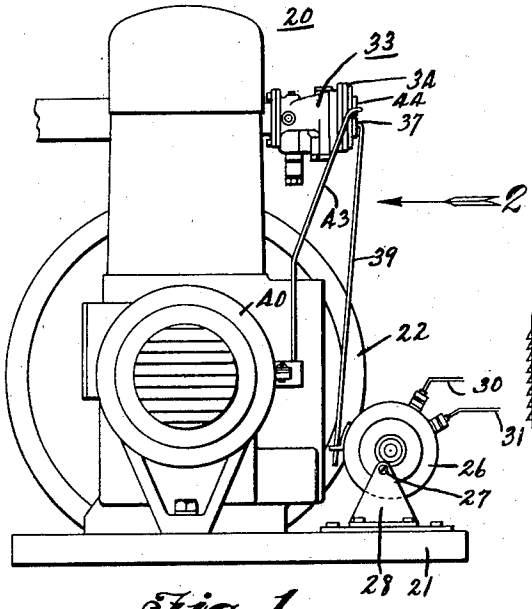


Fig. 1.

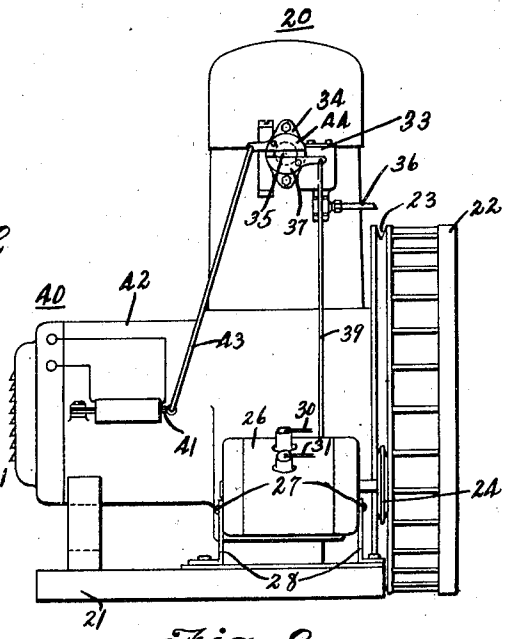


Fig. 2.

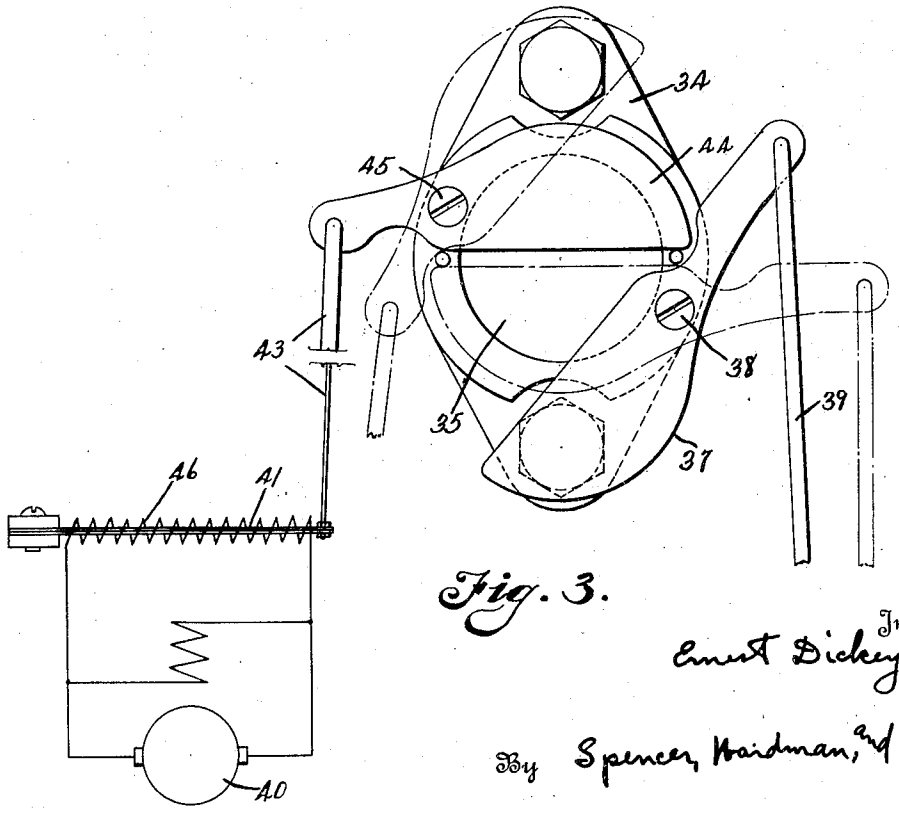


Fig. 3.

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UNITED STATES PATENT OFFICE.

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FUEL-SUPPLY APPARATUS.

Application filed November 30, 1926. Serial No. 151,814.

The present invention relates to apparatus for supplying fuel to an internal-combustion engine, and particularly to apparatus for controlling the proportions of fuel and air to secure easy starting of the engine and efficient engine operation.

The present invention is particularly adapted for a power plant including an internal-combustion engine and a generator driven thereby, and it is one of the objects of the present invention to vary the proportions of fuel and air delivered to the engine in accordance with the load on the generator, and also in response to the operation of the engine starting apparatus.

One manner of controlling fuel mixture proportions in accordance with the load of the generator is by means of a thermostat which is heated by a coil in circuit with the generator. When the generator load is relatively great, the voltage impressed upon the heating coil will be less than when the generator load is light. The thermostat is associated with the engine carburetor so as to cause the fuel mixture to be richer when the generator load is heavy than when light. This feature of the invention is particularly advantageous when the engine is started under conditions of heavy current demand upon the generator.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a front view of an internal-combustion engine showing the improvement connected therewith.

Fig. 2 is a side view looking in the direction of arrow 2 in Fig. 1, and

Fig. 3 is a view showing a detail in larger scale.

Referring to the drawings, there is shown an internal-combustion engine 20 carried on a base 21 and provided with a flywheel 22. The flywheel 22 is provided with a peripheral groove 23 which is adapted to receive a disc 24. A starting motor 26 is pivotally carried by pins 27 on brackets 28 which brackets are suitably secured to the base 21. Current to the motor 26 is supplied by wires 30 and 31, and the motor drives the disc 24. When the engine is idle, or when the engine is self-operative, the motor 26 is in the position shown in Fig. 1, in which position the disc is not in engagement with the flywheel. However, when the motor is energized for cranking purposes, the armature and disc tend to move in a clockwise direction and the motor frame will move about pin 27 in a counterclockwise direction due to torque reaction. The movement of the motor frame will cause the disc 24 to engage the side walls of groove 23 to drive the flywheel. When the engine 20 becomes self-operative, the flywheel will tend to drive the disc and in so doing will throw the motor 26 to the position shown in Fig. 1.

A carburetor 33 of the conventional type and having a fuel mixing chamber is provided. A plate 34, provided with an air passage 35 which communicates with the air inlet to the mixing chamber, is secured to the carburetor. Fuel is delivered to the carburetor by a pipe 36. A valve 37 is pivotally carried by the carburetor by a screw 38. Valve 37 is connected by a rod 39 with the rocking motor 26 and is arranged to control the flow of air through the air inlet 35. When the starting motor is rocked to the engine-cranking position, valve 37 will move to the dot-and-dash line position shown in Fig. 3, and when the engine is self-operative and the motor has returned to its non-cranking position, the valve will assume the position shown by the full lines in the drawings. Thus, during the cranking operation, the valve 37 will impede the flow of air to the carburetor whereby a relatively large quantity of fuel will be drawn into the mixing chamber, whereby a rich mixture of fuel is obtained for starting purposes.

The engine 20 drives a generator 40, preferably of the shunt-wound type. The details of the power plant are not shown herein, but may be similar to the power plant shown in Patent No. 1,526,988 to Lester S. Keilholtz and Ernest Dickey, patented February 17, 1925. A thermostat, herein shown as a bimetallic blade 41, is connected at one end thereof to the field frame 42 and at the other end is connected by a rod 43 with a valve 44.

This valve 44 is pivoted by screw 45 to plate 34, and is arranged to control air inlet 35. A heating coil 46 is wound around blade 41 and is connected across the terminals of generator 40. When the engine and generator are inoperative, the valve 44 is in the position shown in the drawing, in which position the flow of air through inlet 35 is restricted. However, when the generator is operative, the blade 41 will be heated by the coil 46 and the blade 41 will bend downwardly, slowly to increase the air inlet. The construction of the blade 41 and coil 46 is computed relative to the engine and generator so that the proper proportions of fuel mixture will be delivered to the engine.

The fuel mixture proportions are also varied in accordance with the load imposed on the generator, whereby a relatively richer mixture is delivered to the engine when there is a heavy demand for current from the generator than when there is a small demand. When the demand for current is small, the voltage of the generator is relatively high and the coil 46 will be heated quickly. However, when there is a large demand, the voltage of the generator is relatively low and the blade will not be heated as quickly. Thus the proportion of the fuel mixture will be varied in accordance with the demand for current and in this manner the engine will operate efficiently under all load conditions. This construction is particularly advantageous when the engine is cold since, under that condition, a relatively richer mixture is desirable when there is a large load on the engine than when there is a smaller load.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In combination, an internal-combustion engine having a mixing chamber, said chamber having an air inlet and a fuel inlet, a generator driven by said engine, and means rendered operable after the engine is self-operative for gradually leaning the fuel mixture delivered to the engine, said means including temperature-responsive means for varying the proportions of fuel and air delivered to the mixing chamber, and a heating element for the means energized by the generator.

2. In combination, an internal-combustion engine having a mixing chamber, said chamber having an air inlet and a fuel inlet, a generator driven by said engine, and means rendered operable after the engine is self-operative for gradually leaning the fuel mixture delivered to the engine, said means including a thermostat heated by current of the generator for varying the proportion of fuel and air delivered to the mixing chamber.

3. In combination, an internal-combustion engine having a mixing chamber, a generator driven by the engine, and means rendered operable after the engine is self-operative for gradually leaning the fuel mixture delivered to the engine and for controlling the fuel mixture in accordance with the output of the generator, said means including temperature-responsive means for varying the fuel mixture proportions, and a heating element energized by the generator.

In testimony whereof I hereto affix my signature.

ERNEST DICKEY.