A. MANUEL.

FUEL FEEDER.

APPLICATION FILED MAY 2, 1907.

924,483.

Patented June 8, 1909.

2 SHEETS—SHEET 1.

4

Fig. 1.

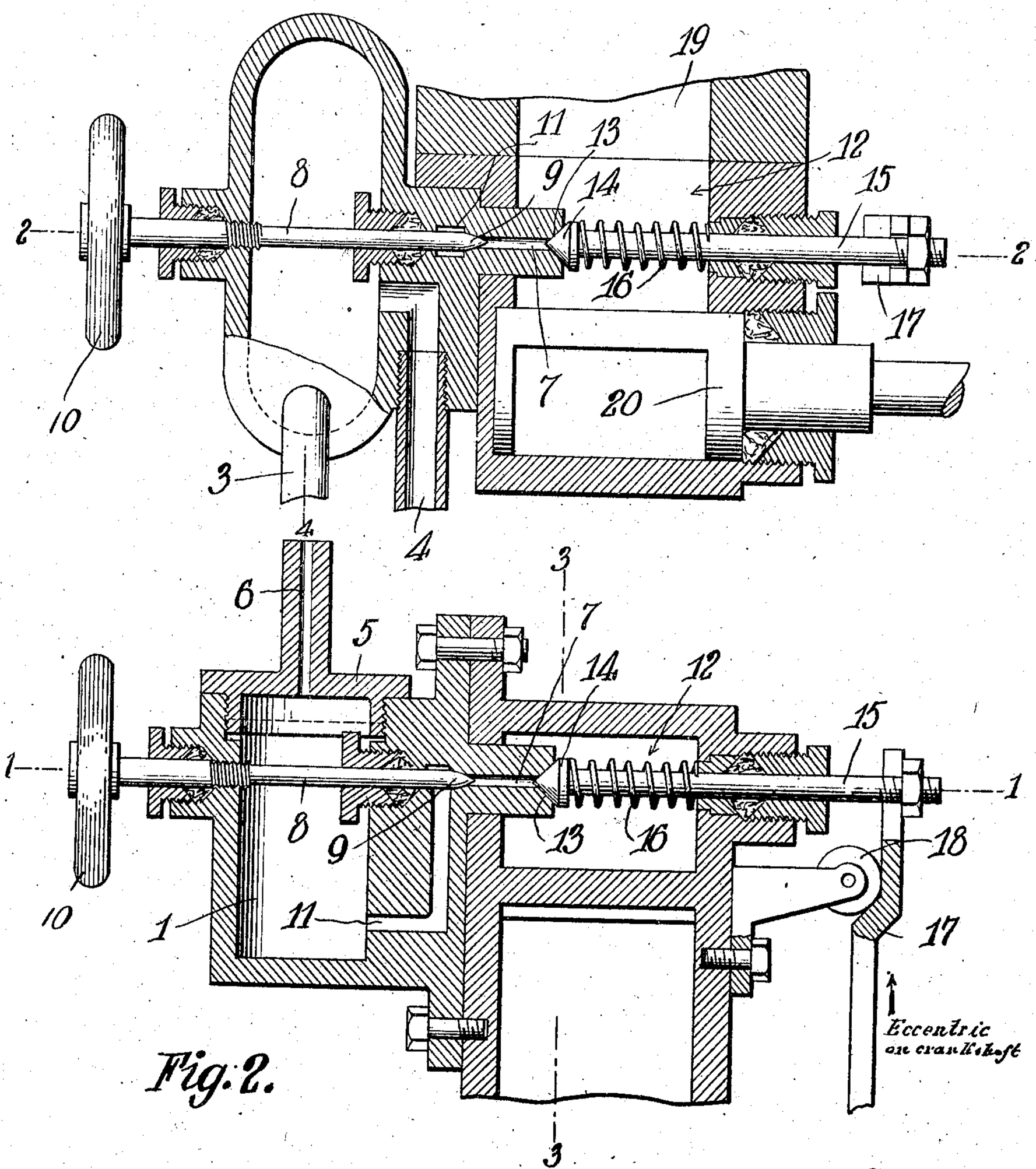

Fig. 2.

Witnesses

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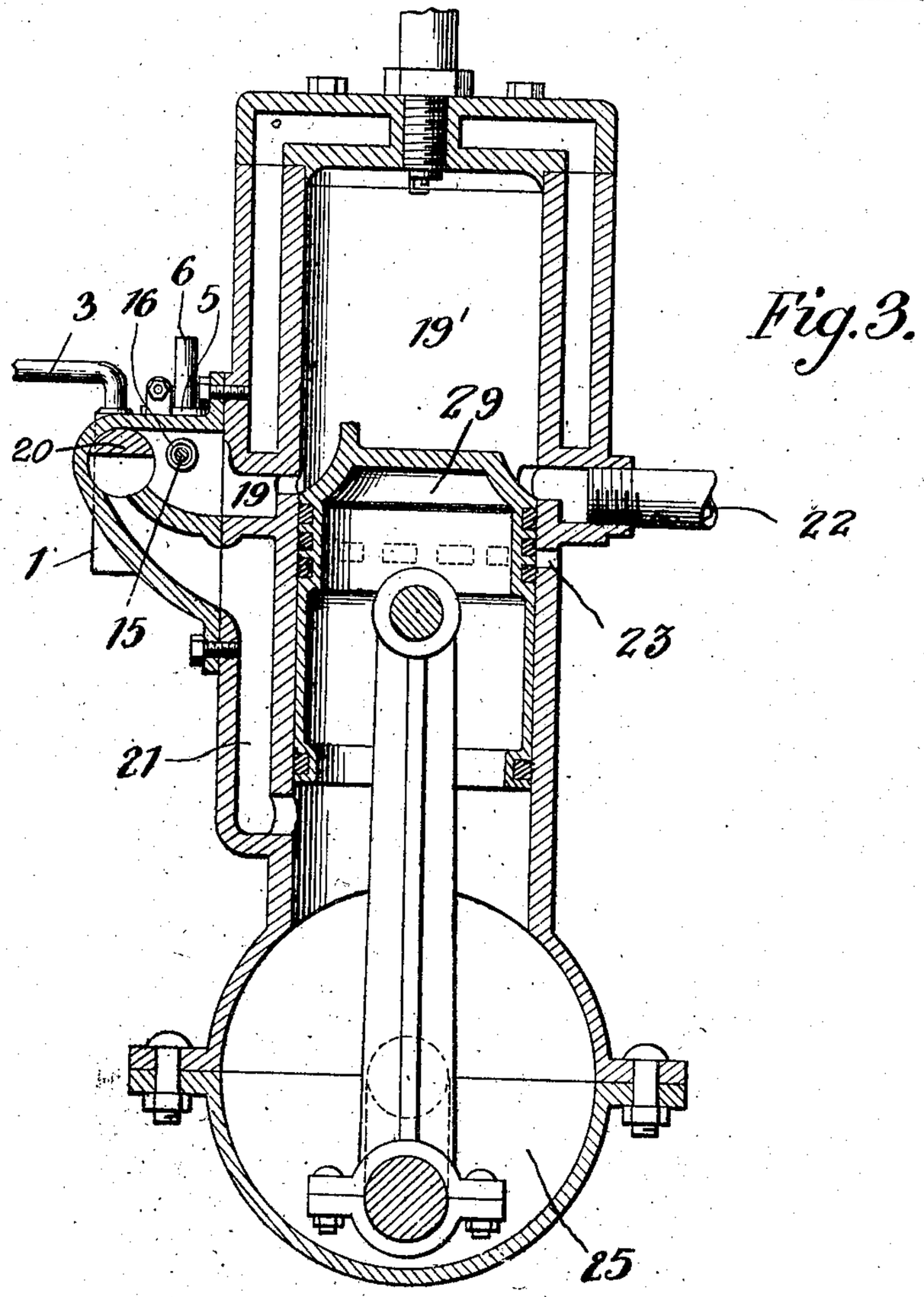

Fig. 3.

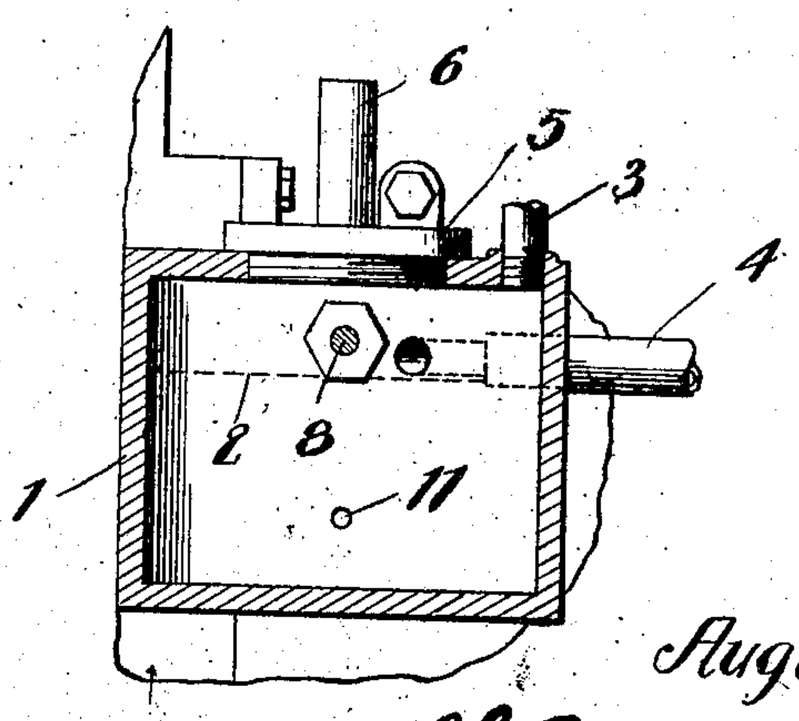

Fig. 4.

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UNITED STATES PATENT OFFICE.

AUGUSTUS MANUEL, OF FRESNO, CALIFORNIA.

FUEL-FEEDER.

No. 924,483. Specification of Letters Patent. Patented June 8, 1909.

Application filed May 2, 1907. Serial No. 371,525.

To all whom it may concern:

Be it known that I, AUGUSTUS MANUEL, a citizen of the United States, residing at Fresno, in the county of Fresno and State of California, have invented certain new and useful Improvements in Fuel-Feeders; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of engines in which atmospheric air is carbureted or enriched by admixture therewith of a vapor of a suitable hydro-carbon to produce an explosive mixture or gas and more particularly to that type of reciprocating engines of the class which are known as "three port two cycle engines" in which the explosion occurs with each revolution of the shaft.

The object of the invention is to provide a simple and positive mechanism for feeding fuel into the combustion or explosion chamber of the engine cylinder or into a preliminary mixing chamber as desired and before the explosion of fuel takes place thus preventing the explosive gases from accumulating in the crank chamber and causing fire therein.

Another object of the invention is to provide means whereby the suction of the crank chamber will draw the fuel into the upper part of the by pass or port which leads to the combustion cylinder and keep it out of the crank chamber, and thus prevent crank chamber fire.

With these and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a horizontal section of a portion of a gasolene engine embodying this invention, taken on the line 1—1 of Fig. 2; Fig. 2 is a vertical longitudinal section thereof taken on the line 2—2 of Fig. 1; and Fig. 3 is a vertical transverse section taken on the line 3—3 of Fig. 2; Fig. 4 is a vertical transverse section taken on line 4—4 of Fig. 1 and showing the reservoir for the gasolene.

The apparatus here shown is preferably made as an attachment for engines of the class mentioned and is designed to be bolted or otherwise secured thereto as the design of the engine shall require or render expedient; but it may be made as an integral part of the engine if preferred, in which case its shell or casing may be made integral with the casing or jacket of the engine.

In the embodiment illustrated is shown an oval fuel reservoir 1 which is filled with gasolene or other fluid fuel to a line 2 within one-fourth of an inch of the level of the valve hereinafter described. The object in making the reservoir oval is to keep it as narrow as possible and at the same time provide sufficient space to hold the necessary amount of fuel for the engine to draw from.

The fuel is pumped into the reservoir 1 by a small plunger pump (not shown) on the crank shaft through the pipe 3 which empties into the top of the reservoir. When the reservoir 1 is filled to the line 2 it overflows through a pipe 4 and is carried back into the supply tank whereby the fuel is retained at the same height in the reservoir 1 at all times, to provide for a uniform amount of fuel being drawn from the reservoir 1 into the combustion chamber 19 by the suction from the crank chamber 25. This reservoir 1 has a removable top 5 provided with a vent opening 6 for the passage of gas from the fuel to prevent pressure in the reservoir and an uneven supply of fuel to the cylinder.

Rotatably mounted in the walls of the reservoir 1 at a point slightly above the liquid level 2 is a valve stem 8 having a conical valve 9 at one end and an operating handle or wheel 10 at its other end. This valve stem 8 is surrounded by a suitable stuffing box to prevent air or fuel from passing backward into the fuel reservoir 1. Leading from the lower part of the reservoir 1 is an inverted Z-shaped channel or passage 11 the upper arm or passage 7 thereof leading into the valve chamber and is closed by a valve 9 which regulates the amount of fuel to be fed through said arm 11 into the channel 7.

A chamber or shell 12 is arranged adjacent the reservoir 1 into which the arm 7 of the channel 11 opens.

Arranged at the outer end of the channel arm 7 which opens into the chamber 12 is a valve seat 13 on which is seated a conical valve 14 mounted on the stem 15 which projects through the wall of the chamber 12 and on which a spiral spring 16 is mounted between the valve 14 and the wall of the chamber 12. This spring 16 serves to hold the valve 14 normally on its seat and to return it to its closed position after being opened.

Loosely mounted on the outer end of the valve stem 15 is a cam member 17 adapted to slide vertically on said stem. This cam member 17 is operated by an eccentric on the crank shaft (not shown), said eccentric forcing the cam 17 upwardly on the outer stroke of the piston 24 into contact with the roller 18 mounted on the chamber 12 and the upward movement of the cam member 17 on said roller causes it and the stem 15 to move outwardly and open the valve 14 against the tension of the spring 16 for letting out the fuel from the passage 7, into the port 19 which leads to the combustion chamber 19′. This opening of the valve 14 by the cam member 17 occurs on the compression stroke of the piston when suction is on in the crank chamber 25 and the valve 20 being opened the desired distance by means of a hand lever (not shown), the fuel is drawn into the chamber 12 by the suction of the chamber and on the power stroke of the piston, the valve 14 is closed and the fuel supply cut off. When compression begins in the crank chamber 25 on the power stroke of the piston, the air admitted through the opening 23 when the piston 24 was at the limit of its compression stroke is forced out through the passage 21 and chamber 12 into the combustion chamber 19′ and carries with it the fuel admitted to the chamber 12 with which it is thoroughly mixed to form an explosive gas. When suction is on in the crank chamber, the valve 14 is opened only a sufficient time to permit the desired amount of fuel to be drawn into said chamber 12, communication being established between said chamber 12 and the crank chamber by means of the passage 21. When compression in the crank chamber commences on the backward or power stroke of the piston, the compressed air in said crank chamber is forced out through the passage 21 into the mixing chamber 12 where it comes into contact with the fuel drawn thereinto and passes with it into the combustion chamber 19′. There is no opening for air to enter the upper part of passage 21, and hence no fuel can get into the crank chamber to cause explosion. Should any of the fuel pass into the passage 21 no gas would be formed as the fuel would be too rich in carbon to form a gas until mixed with air, and there being no air passing through said passage 21 the fuel would remain there until forced out on the compression in the crank chamber produced by the power stroke of the piston. The valve 14 is closed when the pressure is on in the crank chamber to prevent the air rushing into the reservoir 1.

The oval shape of the reservoir 1 adapts the device for use on an automobile or other moving engine as the raising or lowering of the height of the fuel in the passage 7 is thereby prevented. By making the reservoir deep and as narrow as possible consistent with the necessary space to provide the necessary fuel for the engine to draw on, the less variation there will be in the level of the liquid relative to the overflow and it will thus be evident that the narrow reservoir with the overflow arranged at the center of one side thereof will result in less splashing and in keeping the fuel at an approximately even height thus furnishing an even supply of fuel to the cylinder. Thus, if the reservoir or tank were made one-half the width of that shown the variation in the overflow line would be at least one-half less. This oval shape permits the opposite side of the tank to be kept very close to the overflow, thus retaining the fuel at an even height which is very necessary to the successful running of the engine.

I claim as my invention:—

1. The combination of an oil reservoir, a combustion chamber adjacent thereto, a crank chamber having a crank shaft operable therein and provided with an air inlet, a piston operable in said combustion and crank chambers and connected with said crank shaft, a mixing chamber arranged between said combustion chamber and said reservoir, a duct leading from said reservoir to said mixing chamber, a passage connecting said crank and mixing chambers, a passage connecting said mixing and combustion chambers, a spring pressed valve arranged in said duct, a cam member mounted to slide vertically on the stem of said valve and adapted to be operated by the crank shaft to cause said cam member to move upward on the compression stroke of the piston, and means for engaging said cam member on its upward movement to force it outward to open said valve.

2. The combination of an oil reservoir, a combustion chamber arranged adjacent thereto, a crank chamber having a crank shaft operable therein, a piston operable in said combustion and crank chambers and connected with said crank shaft, a mixing chamber arranged between said combustion chamber and said reservoir, a duct leading from said reservoir to said mixing chamber, a passage connecting said crank and mixing chambers, a passage connecting said mixing and combustion chambers, a spring pressed valve arranged in said duct, a cam member

mounted to slide vertically on the stem of said valve and adapted to be operated by the crank shaft whereby said cam member is moved upward on the compression stroke of the piston, and a roller mounted to engage said cam member on its upward movement to force it outward to open said valve.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

AUGUSTUS MANUEL.

Witnesses:

GEO. H. CLARK,

H. W. CLARK.