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FUEL FEED MECHANISM FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED JAN. 20, 1913.

1,166,967.

Patented Jan. 4, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

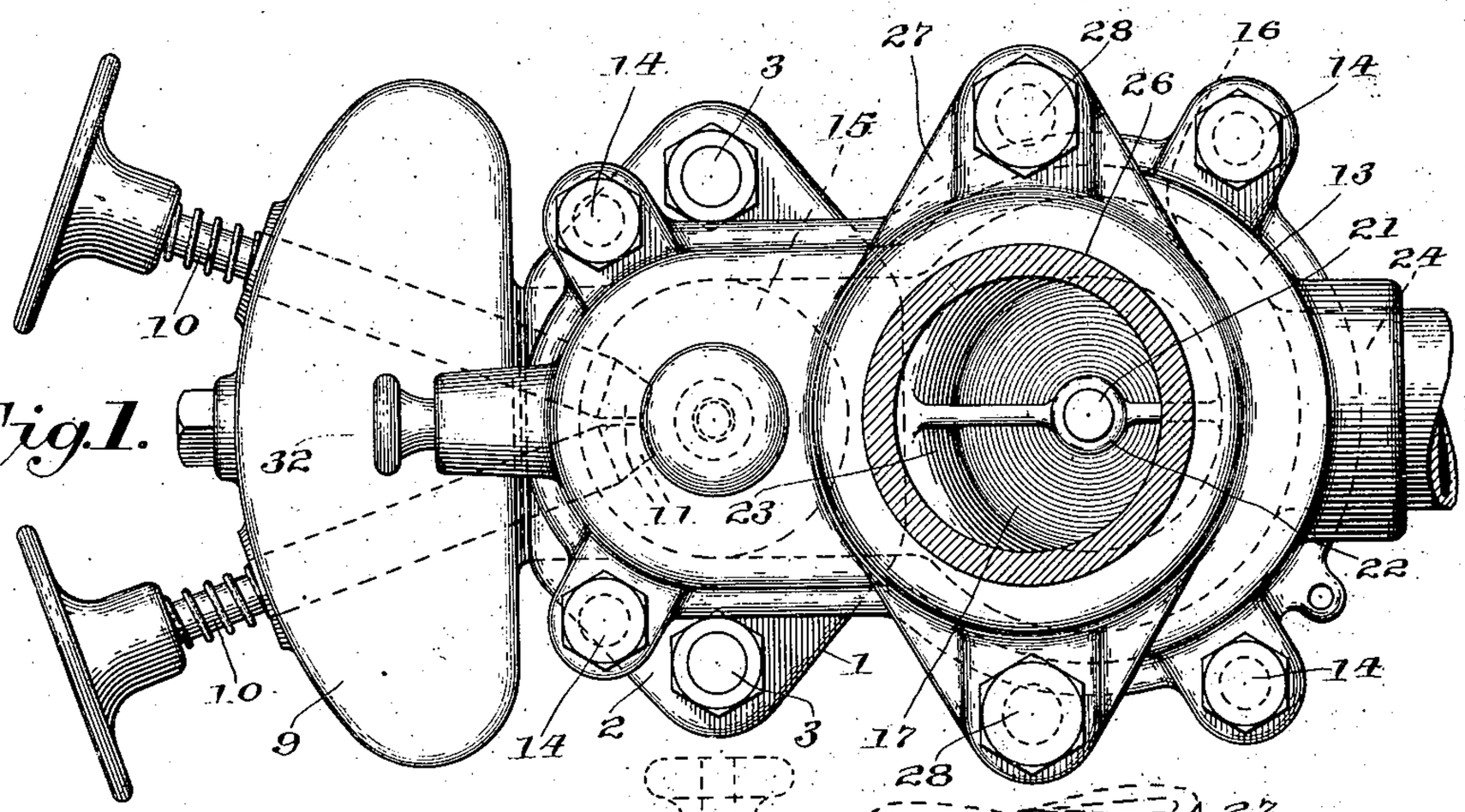

Fig. 2.

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Fig.3.

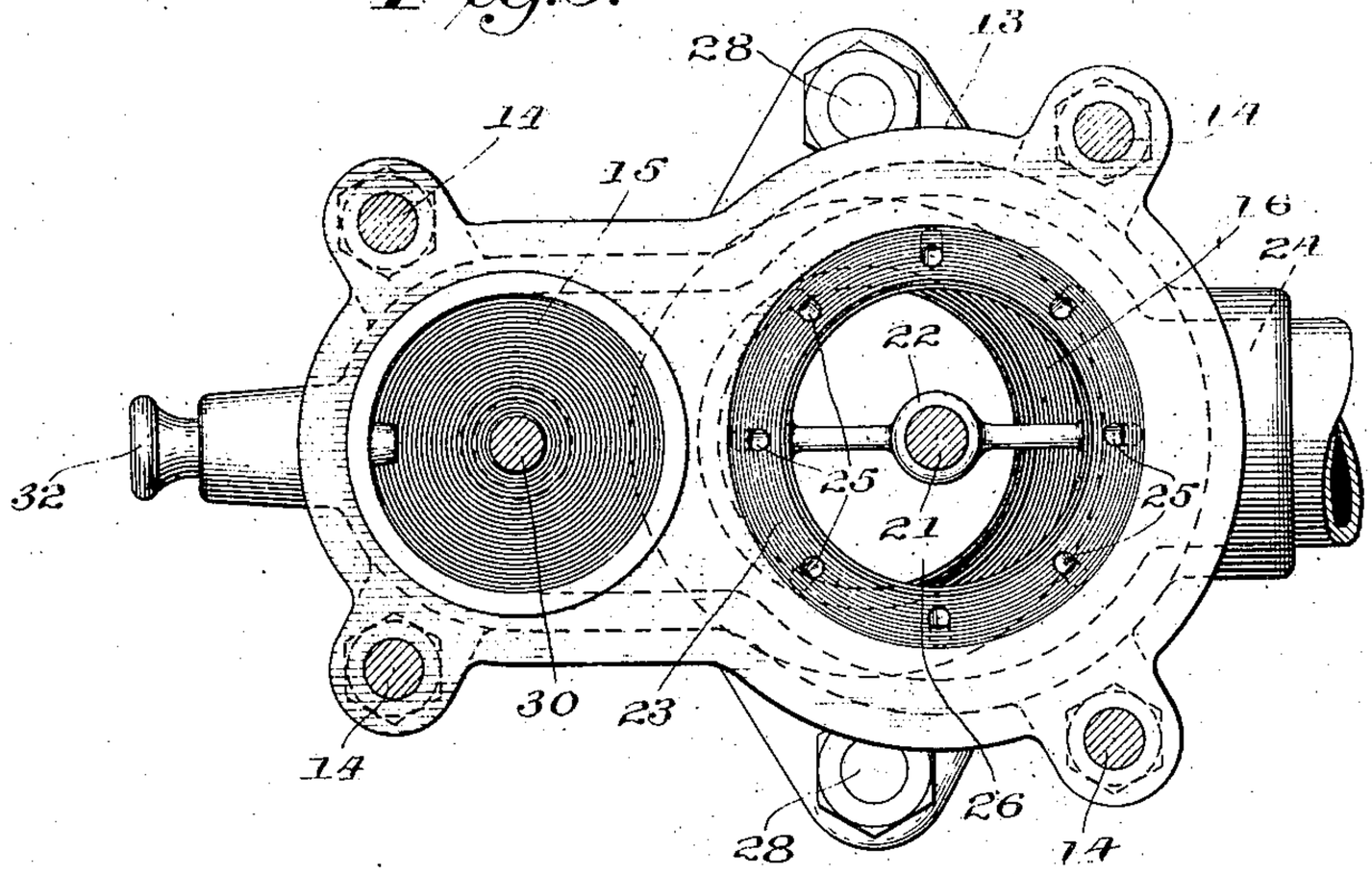
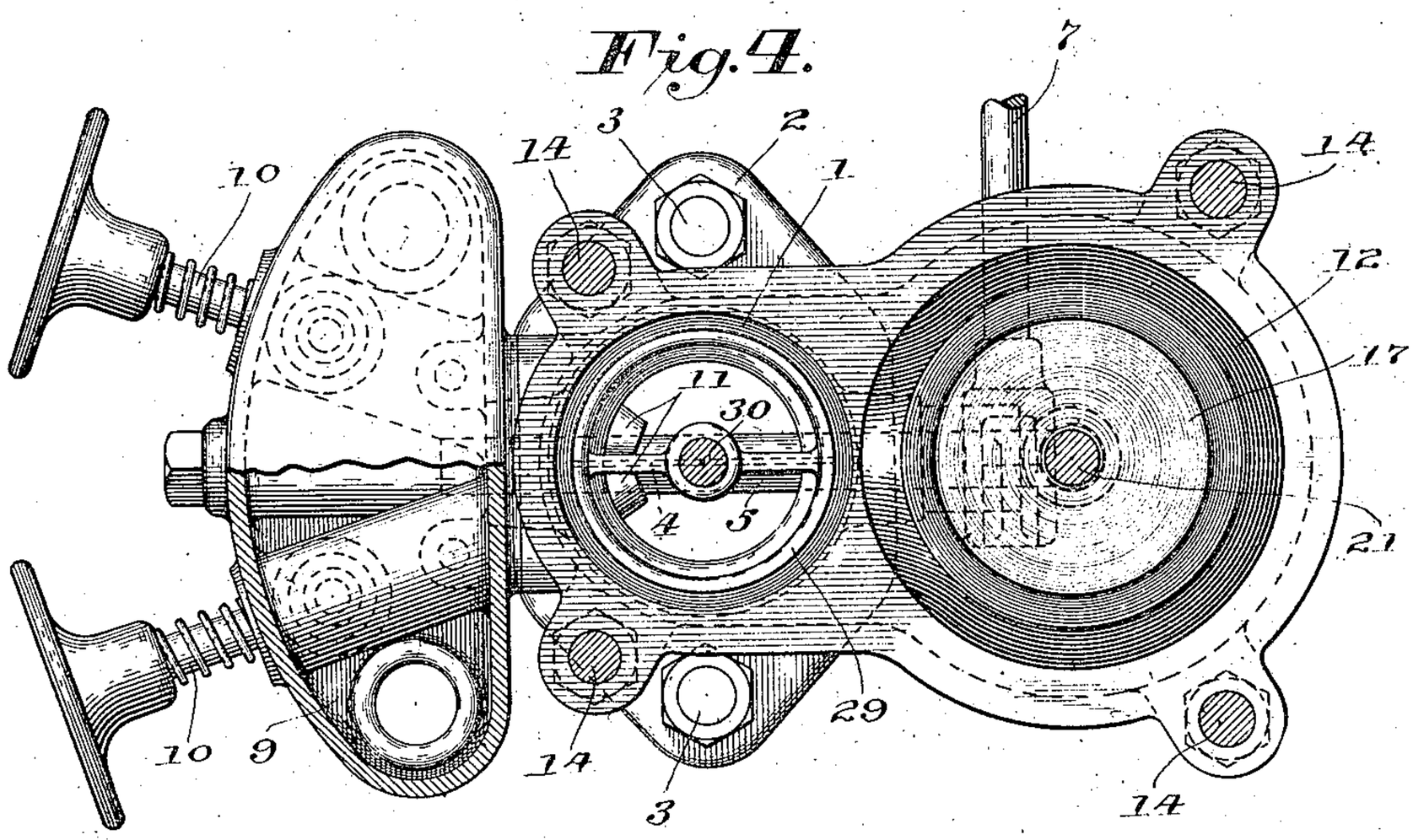


Fig.4.



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UNITED STATES PATENT OFFICE.

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FUEL-FEED MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

1,166,967. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed January 20, 1913. Serial No. 743,150.

To all whom it may concern:

Be it known that I, LEOPOLD F. BURGER, a citizen of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Fuel-Feed Mechanism for Internal-Combustion Engines, of which the following is a full, clear, and exact specification.

My invention relates to fuel feed mechanism for internal combustion engines, and in particular to such devices as are used in a dual capacity for either controlling the mixture of liquid hydrocarbon and air or of air and gas, depending upon the adjustment of the various parts of the mechanism; the object of my invention being to provide a mechanism simple in construction, comprising few parts, capable of easy and quick manipulation, and efficient in operation.

These objects are attained by means of the mechanism illustrated by the accompanying drawings, in which—

Figure 1 represents a top plan view of a fuel feed mechanism having my invention embodied in the construction thereof; Fig. 2 is a vertical half section of Fig. 1; Fig. 3 is a view of the upper part of Fig. 2 looking in the direction of the arrow A—B; and Fig. 4 is a view of the lower part of Fig. 2 looking in the direction of the arrow C—D.

The same reference numerals designate like parts throughout the several views.

The mechanism includes a vertically arranged mixing chamber 1 having a flange member 2 at the lower end thereof whereby it may be secured to an engine by means of bolts 3, and 4 represents a butterfly valve carried by a stem 5 journaled in opposite walls of the base of the mixing chamber and having an arm 6 secured to one end thereof whereby the valve 4 may be controlled by the governor mechanism of an engine by means of a connecting rod 7, the governor mechanism being operative to turn the valve in one direction and a spring 8 in an opposite direction. Secured to one side of the mixing chamber 1 above the valve 4 is a constant level fuel feed cup 9 that is divided into two receptacles for fuel, such as heavy or light hydrocarbon, the flow of fuel to the mixing chamber from either receptacle being controlled by means of needle valves 10 arranged radially relative to the center line of the mixing chamber, with the feed nozzles 11 within the chamber and operative to project the fuel toward the center thereof.

12 represents a cylindrical supplemental mixing chamber arranged upon the opposite side of the mixing chamber 1 and communicating therewith.

13 represents a separable member of the device secured to the upper sides of the walls of the mixing chamber by means of bolts 14, and includes an axial extension 15 of chamber 1 and an air receiving chamber 16 communicating therewith and in axial alinement with the chamber 12 and communicating therewith by means of a valve 17 seated at the bottom of the chamber and having a depending stem 18 that is slidably received by a tubular bearing 19 integral with the bottom wall of the chamber, and 20 represents a variable pressure spring mechanism surrounding the stem and bearing and operative to yieldingly hold the valve seated.

21 represents a stem extending upward from the valve and slidably mounted in a sleeve member 22 carried by the chamber walls.

23 represents an annular chamber at the base of chamber 16 that communicates with a source of gas supply by means of an opening 24, and with chamber 12 by means of small ports 25 through the seat for the valve 17.

26 represents an opening in the upper wall of chamber 16, and 27 a thimble member secured to the upper wall by means of bolts 28 and adapted to receive an air conducting pipe.

29 represents a cylindrical shell valve slidably mounted in mixing chamber 1 and provided with a stem 30 that extends through the upper wall of chamber 15, whereby the shell may be raised or lowered. The inner

surface of the wall of the valve is curved inward in a manner to reduce the interior diameter thereof at the middle of the shell, and 31 represents a slot upon one side thereof that receives the feed nozzles 11.

When liquid fuel is being used the valve is in the position shown by full lines in Fig. 2, closing the opening between chamber 12 and chamber 1 and permitting air to be drawn directly from chambers 16 and 15 past the fuel nozzles 11 for vaporizing the fuel drawn therefrom. When it is desired that a mixture of gas and air be used, the valve 29 is drawn upward, as shown by dotted lines in Fig. 2, a spring-pressed plunger 32 mounted in the wall of chamber 15 being first withdrawn and then permitted to enter the slot 31 in a manner to retain the valve in its position of adjustment, wherein it closes the opening for the admission of air from chambers 16 to 15 and uncovers the opening between chambers 12 and 1, permitting air to be drawn through the valve controlled opening between chambers 12 and 16 and gas through the ports 25 during the suction stroke of the engine, the butterfly valve 4, controlled by the engine governor mechanism, throttling the supply of fuel in a well-known way.

What I claim as my invention, and desire to secure by Letters Patent, is:

1. A fuel feed mechanism for internal combustion engines having, in combination, a primary mixing chamber, a constant level fuel feed cup having valve controlled ports communicating with said chamber, a supplemental mixing chamber at one side of said primary chamber and having communication therewith, an air chamber, an opening between said air chamber and said primary mixing chamber, a port for the admission of air from said air chamber to said supplemental mixing chamber, a gas supply chamber having a series of ports communicating with said supplemental mixing chamber, a valve controlling both the admission of gas and air to said supplemental mixing chamber, and a tubular shell valve slidably mounted in said mixing chamber and adapted to close either the opening for air or the opening for air and gas thereto.

2. A fuel feed mechanism for internal combustion engines having, in combination, a vertically arranged tubular mixing chamber, a constant level fuel feed cup secured to one side of said chamber and having valve controlled ports and nozzles communicating therewith, a supplemental mixing chamber arranged upon the opposite side of said tubular chamber and having communication therewith, an air chamber arranged above said suplemental chamber, an annular gas receiving chamber at the base of said air chamber and provided with ports for the admission of gas to said supplemental chamber, a spring-pressed valve seated upon the lower wall of said annular chamber and controlling the admission of air and gas to said supplemental chamber, a passageway for air from said air chamber to said tubular mixing chamber, a tubular shell valve slidably mounted within said tubular chamber and provided with an open-ended slot adapted to receive the fuel feed nozzles, and means whereby said shell valve may be adjusted in a manner to close said air passageway or the opening between said tubular mixing chamber and said supplemental chamber.

3. In a fuel feed mechanism for internal combustion engines, the combination of a primary mixing chamber, a supplemental mixing chamber adapted to communicate therewith, and means for controlling communication between said chambers, said means having two operative positions, one in which it is suspended and the other in which it is positively locked.

4. In a fuel feed mechanism for internal combustion engines, the combination of a source of air supply, two mixing chambers, and a valve for controlling the flow of air from said source to one of said chambers in one position, and a fuel mixture from the second chamber to the first in another position.

5. In a fuel feed mechanism for internal combustion engines, the combination of a source of air supply, a plurality of mixing chambers, and means for controlling the flow of air from said source to one of said chambers either directly or indirectly through another of said chambers.

6. In a fuel feed mechanism for internal combustion engines, the combination of a source of air supply, a plurality of mixing chambers, a fuel feed nozzle projecting into one of said chambers, and a valve for controlling the flow of air from said source to one of said chambers in one position, and a fuel mixture from the second chamber to the first in another position, said valve having a notched portion through which said nozzle passes.

7. In a fuel feed mechanism for internal combustion engines, the combination of a plurality of mixing chambers adapted to communicate with each other, a feed nozzle associated with one of said chambers, and a valve for positively controlling communication between said chambers, said nozzle being adapted to limit the movement of said valve.

8. In a fuel feed mechanism for internal combustion engines, the combination of a source of air supply, two mixing chambers, a fuel nozzle in one of said chambers, and

a single valve which in one position permits a flow of air from said air source past said nozzle into one of said chambers and in another position cutting off direct communication between said air source and chamber and permitting a flow of fuel mixture from the second chamber to the first.

In testimony whereof I affix my signature, in the presence of two witnesses.

LEOPOLD F. BURGER.

Witnesses:
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S. E. HOUSTON.