

J. W. JONES.
 LIQUID FUEL FEEDING DEVICE FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED MAY 25, 1917.

1,408,208.

Patented Feb. 28, 1922.

Fig. 1.

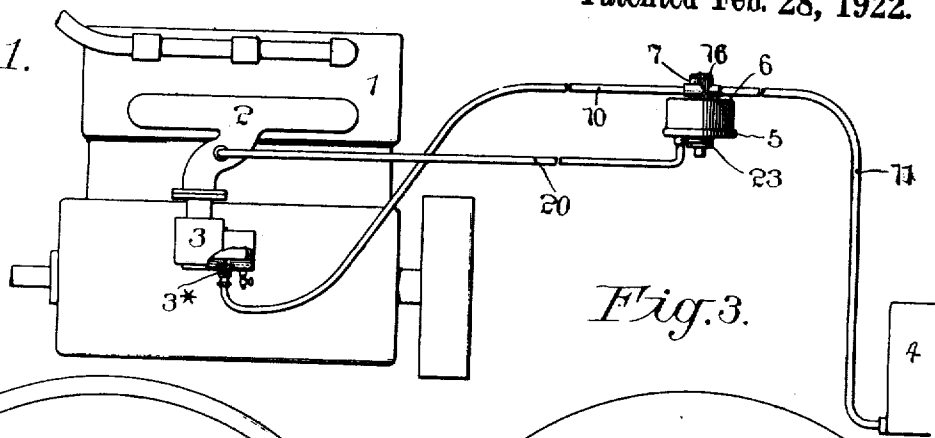


Fig. 2.

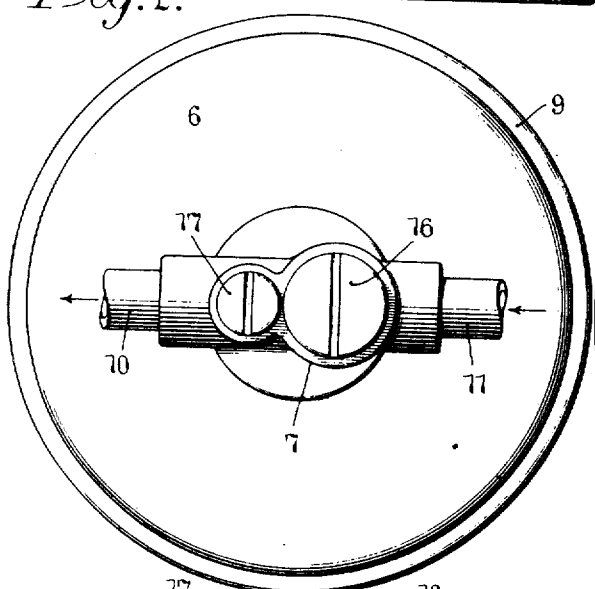


Fig. 3.

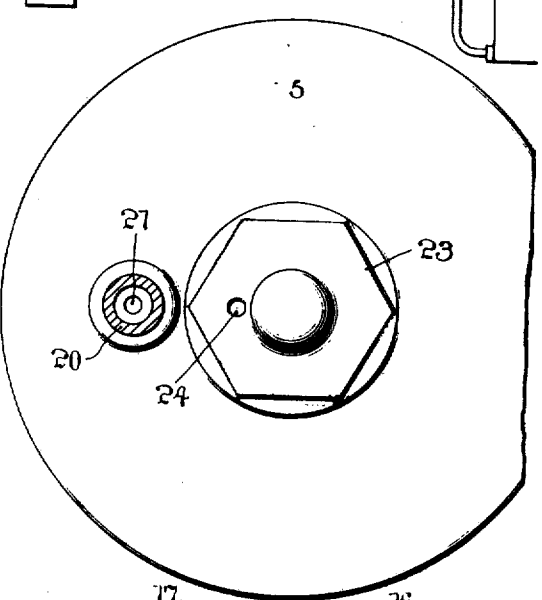


Fig. 4.

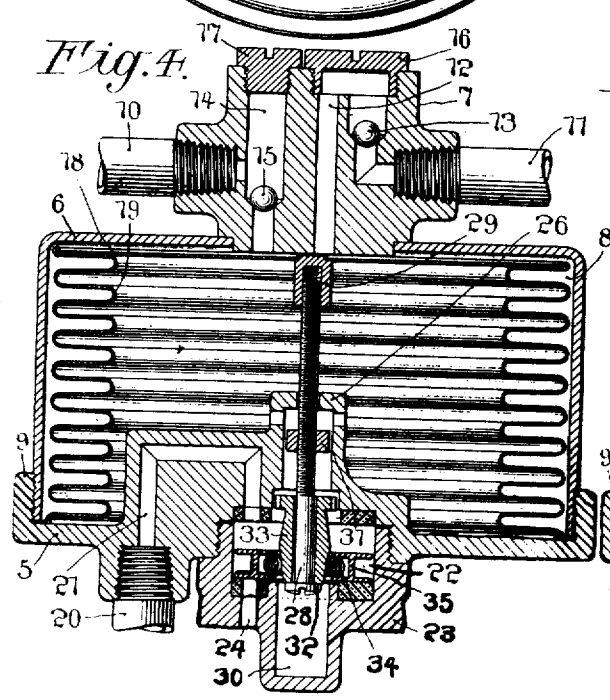
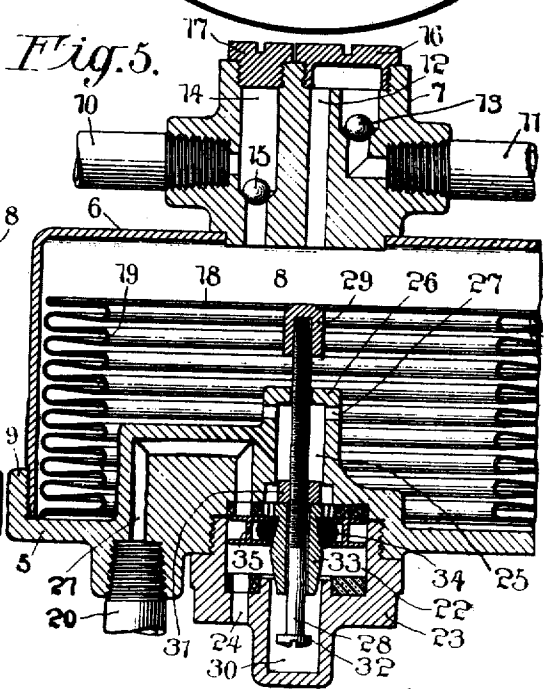


Fig. 5.



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UNITED STATES PATENT OFFICE.

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LIQUID-FUEL-FEEDING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

1,408,208.

Specification of Letters Patent.

Patented Feb. 28, 1922.

Application filed May 25, 1917. Serial No. 171,064.

To all whom it may concern:

Be it known that I, JOSEPH W. JONES, a citizen of the United States, and resident of the borough of Manhattan, in the city and State of New York, have invented a new and useful Improvement in Liquid-Fuel-Feeding Devices for Internal-Combustion Engines, of which the following is a specification.

My invention includes a novel pump by means of which liquid may be drawn from a source of supply and forced to any desired point elevated above the source of supply, by a variable displacement element located in the pump chamber. Means operated by said variable displacement element are employed for opening communication between the interior of said variable displacement element and sources of different fluid pressures. Means on the discharge side of the pump may be employed for controlling the discharge of the liquid from the pump.

My invention is more particularly intended for pumping liquid fuel from a supply tank to the carbureter of an internal combustion engine, the side walls of the variable displacement element of the pump having deep transverse corrugations, the variable displacement element, being normally extended when open to atmospheric pressure and contracted when open to a lesser pressure; the means for opening the interior of the variable displacement pumping element to either the intake side of the engine or to atmosphere being so arranged as to operate at different positions of the variable displacement element as, for instance, to open the interior of the variable displacement element to the intake side of the engine when the element has been extended to a predetermined point and to open the interior of the variable displacement element to atmosphere when the element has been contracted to a predetermined point.

A practical embodiment of my invention is represented in the accompanying drawings in which,

Fig. 1 is a diagram illustrating the application of my invention to an internal combustion engine in which the carbureter is located above the supply tank.

Fig. 2 is a top plan view of my improved pump.

Fig. 3 is a bottom plan view of the same.

Fig. 4 is a vertical central section through the pump with the parts in the positions 55 which they assume when the variable displacement element has reached a predetermined point in its extension and has opened its interior to the intake side of the engine, and

Fig. 5 is a similar view with the parts in the positions which they assume when the variable displacement element has been contracted to a predetermined point and has opened its interior to external atmosphere. 60

The internal combustion engine is denoted as a whole by 1, its intake manifold by 2 and the carbureter by 3. The float controlled inlet valve of the carbureter is denoted by 3*.

The liquid fuel supply tank is denoted by 4 and is shown as located below the carbureter 3. My improved pump comprises a base 5, a shell 6 and a valve chest 7. The shell 6 and base 5 together form a chamber 8. In the present instance the side walls 75 of the shell 6 are screw-threaded into an uprising peripheral flange 9 of the base 5. The branches 10 and 11 of the liquid supply line lead from the valve chest 7 to the float chamber of the carbureter 3 and to the supply tank 4 respectively. An inlet passage 12 leads from the interior of the chamber 8 to the branch 11, within which passage I locate a check valve 13. A discharge passage 14 leads from the pump chamber 8 to the branch 10, within which passage I locate a check valve 15. These check valves are shown in the present instance as ball valves and access thereto may be readily obtained 90 through screw caps 16 and 17 of the valve chest. These check valves are so arranged as to permit the flow of liquid fuel from the supply tank to the carbureter, but will prevent the reverse flow of the liquid fuel. 95

A normally extended variable displacement element forms a part of the pump and is located within the pump chamber 8, which element is herein shown as comprising a disc 18 and sides 19; the sides 19 being 100 deeply transversely corrugated. The circumferential bottom edge of the sides 19 is securely held against movement, in the present instance by clamping the edge between the base 5 and the bottom of the side walls 105 of the shell 6. This variable displacement

element is normally extended under atmospheric pressure, occupying the position shown in Fig. 4, and may be contracted to any predetermined point under the influence of a lesser pressure as for instance to the point shown in Fig. 5. The means for controlling the movement of the variable displacement element are herein shown as comprising a pipe 20 leading from the intake manifold 2 to a passage 21 in the base 5 of the pump. This passage 21 is shown as leading to a valve chamber 22 in a bottom cap 23. A passage 24 from external atmosphere also leads into this valve chamber 22. A common passage 25 leads upwardly from the valve chamber 22 in a central lug 26 uprising from the base 5 within the variable displacement element. One or more branch ports 27 lead from this passage 25 to the interior of the variable displacement element. An adjustable screw 28 extends upwardly through the valve chamber 22, the passage 25 and the upper end of the lug 26 into engagement with a depending lug 29 carried by the disc 18 of the variable displacement element. The lower end of this screw 28 is located in a recess 30 of the bottom cap 23, in alinement with the passage 25. This screw is provided with a nut 31 forming one abutment and a head 32 forming another abutment for a valve throwing sleeve 33 through which the screw 28 slides. This sleeve 33 has a double conically tapered exterior along which a yielding ring 34 is shown as a coiled wire ring and is carried by a double faced valve 35. The coaction of this ring with the double conically tapered exterior of the sleeve 33 is such that as the greatest diameter of the sleeve passes the transverse axis of the yielding ring, the yielding ring will snap the valve into its position to either close the vacuum passage 21 or the atmospheric pressure passage 24.

In operation, presuming the parts to be in the position shown in Fig. 4, and it be required to feed liquid fuel to the float chamber of the carbureter 3, the raising of the disc 18 by the extension of the variable displacement element will have caused the head 32 of the screw 28 to engage the sleeve 33 and raise it a sufficient distance to cause the double faced valve 35 to snap down into position to close the port 24 leading to atmosphere and at the same time open communication from the interior of the variable displacement element to the intake manifold 2 of the engine through the pipe 20, the passage 21, the valve chamber 22, the passage 25 and ports 27. Under the influence of the partial vacuum, the variable displacement element will be gradually contracted, thus drawing in a supply of fuel from the supply tank 4, past the check valve 13 and into the pump chamber 8. When this variable displacement element has reached a predetermined point in its contraction, the nut 31 will engage the top of the sleeve 33 and depress the sleeve a sufficient distance to cause the valve 35 to be snapped into the position shown in Fig. 5, where communication to the intake side of the engine is cut off and communication between the interior of the variable displacement element and external atmosphere is established through the passage 24, the valve chamber 22, the passage 25 and the ports 27. This will permit the variable displacement element to extend, if the float controlled inlet valve 3* of the carbureter be open, thus forcing the liquid which has been drawn into the pump chamber 8, out through the discharge passage 14, past the check valve 15 and through the branch 10 into the float chamber of the carbureter until the chamber is filled and the valve 3* is closed. It is to be understood that when the float controlled inlet valve 3* of the carbureter is closed by the reception of a sufficient supply of fuel, the variable displacement element will be caused to remain in its partly extended position until more fuel is required and the float controlled valve thereby opened, it being the intention that the pump should be of considerable capacity so that every time the variable displacement element is contracted, a considerable supply of liquid will be drawn into the pump chamber where it may be forced in small quantities into the supply chamber of the carbureter, as needed.

By the utilization of a pump of the character herein shown, it will be seen that all friction of the pumping element is eliminated and the necessity of an auxiliary gravity feed tank is also eliminated, the liquid fuel being pumped directly from the supply tank to the carbureter in the amount needed by the carbureter irrespective of the relative positions of the parts.

It will also be seen that the pump is only operated as needed, the drawing in of a new supply of liquid by the contraction of the normally extended pumping element being controlled by the position of the element which can be readily adjusted as well as the time for permitting extension of the element to discharge the liquid.

While I have described my invention as a pump for feeding fuel to the carbureter of an internal combustion engine, it is to be understood that I do not wish to limit myself to such use, but intend to cover the device for any purpose for which it may be used.

It is evident that this is only one embodiment which would come within the scope of my invention, and hence I do not wish to limit myself strictly to the construction herein set forth, but

What I claim is:

1. A pump comprising a pump chamber 130

having inlet and discharge passages, an extensible and contractible pumping element in said pump chamber said element having deeply corrugated side walls and a closed free end and means on the discharge side of the pump for controlling the extension movement of said element.

2. A pump comprising a pump chamber having inlet and discharge passages, a fluid pressure controlled extensible and contractible pumping element in said pump chamber, said element having deeply corrugated side walls and a closed free end and means on the discharge side of the pump for controlling the extension movement of said element.

3. A pump for feeding liquid fuel to the carbureter of an internal combustion engine, comprising a pump chamber having inlet and discharge passages, an extensible and contractible pumping element in said pump chamber, which element will be maintained at substantially any point in its discharging movement by a closure of the carbureter inlet valve, said element having deeply corrugated side walls and a closed free end.

4. A pump for feeding liquid fuel to the carbureter of an internal combustion engine, comprising a pump chamber having inlet and discharge passages and a fluid pressure controlled extensible and contractible pumping element in said pump chamber which element will be maintained at substantially any point in its discharging movement by a closure of the carbureter inlet valve, said element having deeply corrugated side walls and a closed free end.

5. A pump comprising a pump chamber, having inlet and discharge passages, a normally extended pumping element in said pump chamber, said element having deeply corrugated side walls and a closed free end, means to contract said element and means on the discharge side of the pump for controlling the extension movement of said element.

6. A pump for feeding liquid fuel to the carbureter of an internal combustion engine, comprising a pump chamber, having inlet and discharge passages, a normally extended pumping element in said pump chamber whose extension movement is controlled by the carbureter inlet valve, and means to contract said element, said element having deeply corrugated side walls and a closed free end.

7. A pump comprising a pump chamber having inlet and discharge passages and a fluid pressure controlled extensible and contractible pumping element in said pump chamber, said element having deeply corrugated side walls and a closed free end.

8. A pump for feeding liquid fuel to the carbureter of an internal combustion engine,

comprising a pump chamber having inlet and discharge passages and a fluid pressure controlled extensible and contractible pumping element in said pump chamber, said element having deeply corrugated side walls and a closed free end.

9. A pump comprising a pump chamber having inlet and discharge passages, a fluid pressure controlled extensible and contractible pumping element in said pump chamber, said element having deeply corrugated side walls and a closed free end and automatic means to control the extension and contraction of said element.

10. A pump comprising a pump chamber having inlet and discharge passages, a fluid pressure controlled extensible and contractible pumping element in said pump chamber, said element having deeply corrugated side walls and a closed free end, automatic means to control the extension and contraction of said element, and additional means on the discharge side of the pump for controlling the extension movement of said element.

11. A pump comprising a pump chamber having inlet and discharge passages, a fluid pressure controlled extensible and contractible pumping element in said pump chamber, said element having deeply corrugated side walls and a closed free end and means operated by the movement of said element to control its extension and contraction.

12. A pump comprising a pump chamber having inlet and discharge passages, a fluid pressure controlled extensible and contractible pumping element in said pump chamber, said element having deeply corrugated side walls and a closed free end, means operated by the movement of said element, to control its extension and contraction, and additional means on the discharge side of the pump for controlling the extension movement of said element.

13. A pump comprising a pump chamber having inlet and discharge passages and a normally extended extensible and contractible pumping element in said pump chamber, contracted by a reduction of pressure within said element, said element having deeply corrugated side walls and a closed free end.

14. A pump comprising a pump chamber having inlet and discharge passages, a normally extended extensible and contractible pumping element in said pump chamber, contracted by a reduction of pressure within said element, said element having deeply corrugated side walls and a closed free end, and means on the discharge side of the pump for controlling the extension movement of said element.

15. A pump comprising a pump chamber having inlet and discharge passages, a normally extended extensible and contractible pumping element in said pump chamber,

contracted by a reduction of pressure within said element, said element having deeply corrugated side walls and a closed free end, and automatic means to control the internal pressure of said element.

16. A pump comprising a pump chamber having inlet and discharge passages, a normally extended pumping element in said pump chamber, contracted by a reduction of pressure within said element, said element having deeply corrugated side walls and a closed free end and means on the discharge side of said pump for controlling the extension movement of said element.

17. A pump comprising a pump chamber having inlet and discharge passages, a normally extended extensible and contractible pumping element in said pump chamber, contracted by a reduction of pressure within said element, said element having deeply corrugated side walls and a closed free end, and means operated by the movement of said element to control its internal pressure.

18. A pump comprising a pump chamber having inlet and discharge passages, a normally extended extensible and contractible pumping element in said pump chamber, contracted by a reduction of pressure within said element, said element having deeply corrugated side walls and a closed free end, means operated by the movement of said element to control its internal pressure, and means on the discharge side of the pump for controlling the extension movement of said element.

19. A pump comprising a pump chamber having inlet and discharge passages, a variable displacement extensible and contractible pumping element in said pump chamber, said element having deeply corrugated side walls and a closed free end, two sources of different pressure and automatic means to open the interior of the element to a lower pressure when extended to a certain degree and to a higher pressure when contracted to a certain degree.

20. A pump comprising a pump chamber having inlet and discharge passages, a variable displacement extensible and contractible pumping element in said pump chamber, said element having deeply corrugated side walls and a closed free end, two sources of different pressure, automatic means to open the interior of the element to a lower pressure when extended to a certain degree and to a higher pressure when contracted to a certain degree, and means on the discharge side of the pump for controlling the extension movement of said element.

21. A liquid fuel pump for internal combustion engines comprising a pump chamber having inlet and discharge passages, an extensible and contractible pumping element in said pump chamber having passages leading respectively to external atmosphere and to

the intake side of the engine and a common valve operating to open the interior of said element to the intake side of the engine when extended to a certain degree and to external atmosphere when contracted to a certain degree.

22. A liquid fuel pump for internal combustion engines comprising a pump chamber having inlet and discharge passages, an extensible and contractible pumping element in said pump chamber having passages leading respectively to external atmosphere and to the intake side of the engine, a common valve operating to open the interior of said element to the intake side of the engine when extended to a certain degree and to external atmosphere when contracted to a certain degree, and means on the discharge side of the pump for controlling the extension movement of said element.

23. A liquid fuel pump for internal combustion engines comprising a pump chamber having inlet and discharge passages, an extensible and contractible pumping element in said pump chamber having passages leading respectively to external atmosphere and to the intake side of the engine and a common valve operated by the movement of said element to open the interior of said element to the intake side of the engine when extended to a certain degree and to external atmosphere when contracted to a certain degree.

24. A liquid fuel pump for internal combustion engines comprising a pump chamber having inlet and discharge passages, an extensible and contractible pumping element in said pump chamber having passages leading respectively to external atmosphere and to the intake side of the engine, a common valve operated by the movement of said element to open the interior of said element to the intake side of the engine when extended to a certain degree and to external atmosphere when contracted to a certain degree, and means on the discharge side of the pump for controlling the extension movement of said element.

25. A liquid fuel pump for internal combustion engines comprising a pump chamber having inlet and discharge passages, an extensible and contractible pumping element in said pump chamber having passages leading respectively to external atmosphere and to the intake side of the engine, and a common valve operating to open the interior of said element to the intake side of the engine and to close the interior of said element to external atmosphere when the element is extended to a certain degree and to close the interior of said element to the intake side of the engine and open the interior of said element to external atmosphere when the element has contracted to a certain degree.

26. A liquid fuel pump for internal com-

bustion engines comprising a pump chamber having inlet and discharge passages, an extensible and contractible pumping element in said pump chamber having passages leading respectively to external atmosphere and to the intake side of the engine, a common valve operating to open the interior of said element to the intake side of the engine and to close the interior of said element to external atmosphere when the element is extended to a certain degree and to close the interior of said element to the intake side of the engine and open the interior of said element to external atmosphere when the element has contracted to a certain degree, and means on the discharge side of the pump for controlling the extension movement of said element.

27. A liquid fuel pump for internal combustion engines comprising a pump chamber having inlet and discharge passages, an extensible and contractible pumping element in said pump chamber, passages leading from the interior of said element respectively to the intake side of the engine and to external atmosphere, a common valve to open and close said passages and a lost motion connection between said element and valve to operate the valve as the element extends and contracts to certain degrees.

28. A liquid fuel pump for internal combustion engines comprising a chamber, an extensible and contractible pumping element therein, having corrugated side walls and a closed free end, passages leading from the interior of said element respectively to the intake side of the engine and to external atmosphere, a common valve to open and close said passages, a lost motion connection between said element and valve to operate the valve as the element extends and contracts to certain degrees, and means to adjust the coactive relationship between said element and valve.

29. A liquid fuel pump for internal combustion engines comprising a chamber, a variable displacement pumping element therein, passages leading from the interior of said element respectively to the intake side of the engine and to external atmosphere, a valve to open and close said passages, a lost motion connection between said element and valve to operate the valve as the element extends and contracts to certain degrees, said connection including a screw carried by said element, said screw having spaced abutments, and a valve operating

sleeve loosely mounted on said screw between said abutments.

30. A liquid fuel pump for internal combustion engines comprising a chamber having valved inlet and discharge passages, a variable displacement pumping element therein, passages leading from the interior of said element respectively to the intake side of the engine and to external atmosphere, a valve to open and close said passages, a lost motion connection between said element and valve to operate the valve as the element extends and contracts to certain degrees, said connection including a screw carried by said element, said screw having spaced abutments, a valve operating sleeve loosely mounted on said screw between said abutments and means to adjust one of said abutments for controlling the coactive relationship between the element and valve.

31. A pump comprising a pump chamber having inlet and discharge passages, an expansible and contractible pumping element in said chamber, and means for simultaneously opening the interior of the element to reduced pressure and closing the interior of the element to atmosphere and vice versa.

32. A pump comprising a pump chamber having inlet and discharge passages, an expansible and contractible pumping element in said chamber, and means operated by the movement of said pumping element for simultaneously opening the interior of the element to reduced pressure and closing the interior of the element to atmosphere and vice versa.

33. A pump comprising a pump chamber having inlet and discharge passages, an expansible and contractible pumping element in said chamber having passages leading respectively to reduced pressure and atmosphere, and means for simultaneously opening one passage and closing the other passage.

34. A pump comprising a pump chamber having inlet and discharge passages, an expansible and contractible pumping element in said chamber having passages leading respectively to reduced pressure and to atmosphere, and means operated by the movement of the pumping element for simultaneously opening one passage and closing the other passage.

In testimony, that I claim the foregoing as my invention, I have signed my name this 15th day of May, 1917.

JOSEPH W. JONES.