F. L. SESSIONS.

FLOAT VALVE MECHANISM.

APPLICATION FILED MAY 4, 1917.

1,342,874. Patented June 8, 1920.

Fig. 1.

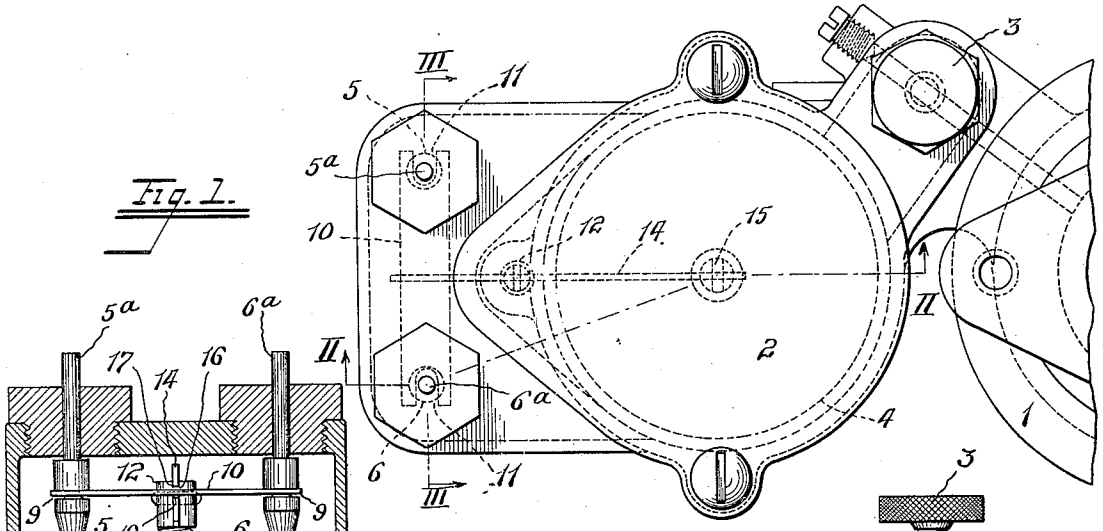


Fig. 3.

Fig. 2.

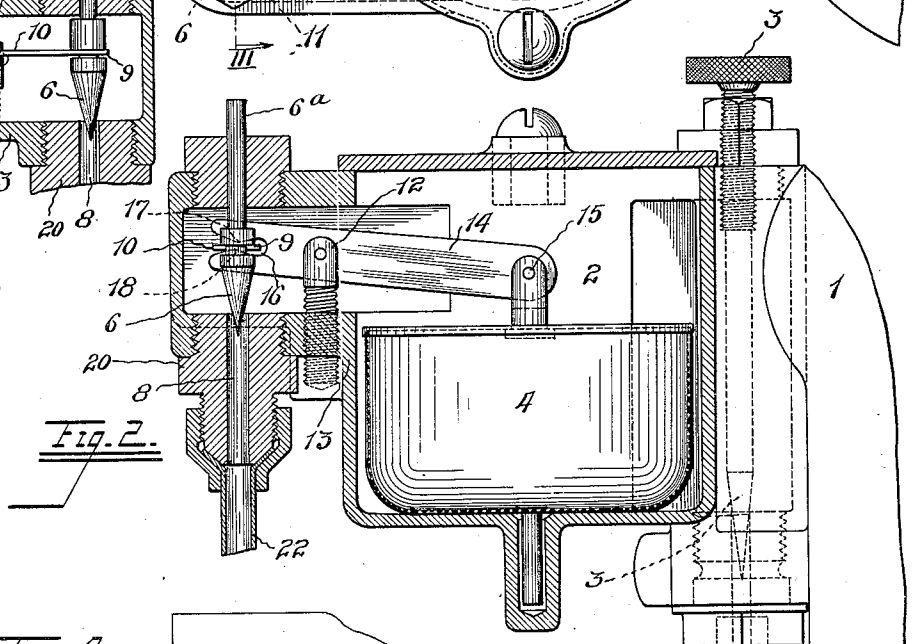
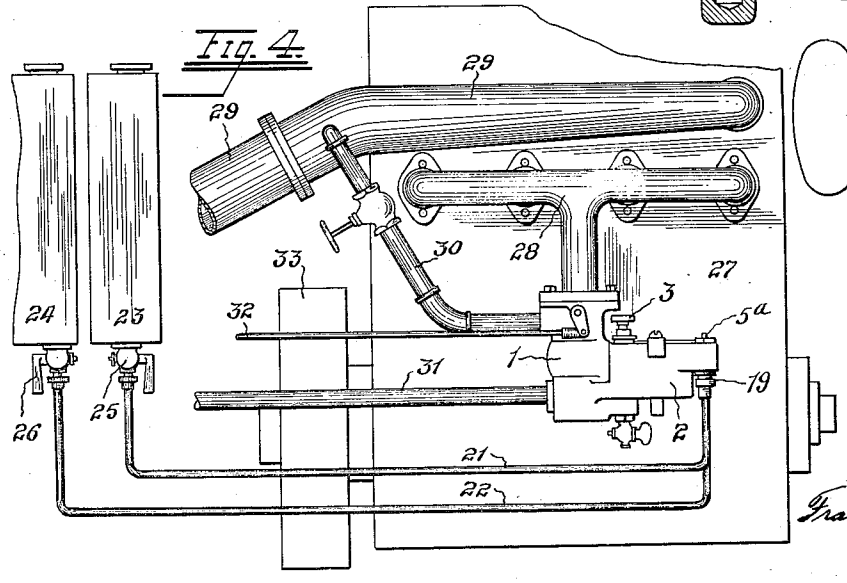


Fig. 4.



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UNITED STATES PATENT OFFICE.

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FLOAT-VALVE MECHANISM.

1,342,874. Specification of Letters Patent. Patented June 8, 1920.

Original application filed January 17, 1914, Serial No. 812,702. Divided and this application filed May 4, 1917. Serial No. 166,356.

To all whom it may concern:

Be it known that I, FRANK L. SESSIONS, a citizen of the United States, residing at Lakewood, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Float-Valve Mechanisms, of which the following is a specification.

My invention relates to float-valves which are used to automatically control the admission of liquids into tanks or other receptacles. It is particularly adapted to control the admission of liquid fuel or oil into what are known as constant level fuel chambers of carbureters such as are used in connection with internal combustion engines.

This application is a division of my copending application Serial No. 812,702, filed January 17, 1914, now matured into Patent 1,235,164, of July 31st, 1917.

Among the objects of my invention is the provision of a plurality of admission valves or float-valves controlled by a single float. It is well known that gasolene and other liquid fuel supply pipes and connections which conduct the fuel from a main supply tank to a carbureter sometimes become clogged with particles of dirt, or other foreign matter which interferes with the operation of the engine to which the carbureter is connected, or, so completely cuts off the supply of fuel that the engine cannot be operated at all. Another cause of clogging of the supply lines between the main supply tank and the carbureter is the freezing of water entrained in the pipes. Water being heavier than gasolene, sinks to the lowest point in the tank or pipes connected with the system, and it has frequently occurred that water has frozen in the small pipe lines leading from the main supply tank to the carbureter. By providing a plurality of supply pipes and a plurality of float-valves controlling the admission of fuel from these pipes to the carbureter, I greatly reduce the chances of the flow of fuel to the carbureter being interrupted.

In addition to providing a plurality of fuel admission pipes and float-valves for the purpose of avoiding interruptions of service by clogged pipes and connections as above described, my invention is applicable to the control of the admission of fuel to float chambers from two separate sources of supply. It is sometimes desired to use two grades of fuel in an internal combustion engine. For instance, when starting some engines, gasolene, being more volatile than kerosene, is used until the engine becomes hot and thereafter heavier and less volatile fuel such as naphtha or kerosene is used, as these fuels volatilize sufficiently for satisfactory operation at the higher temperature of the engine.

Sometimes, kerosene mixed with sulfuric ether is used as fuel for internal combustion engines. In such a case, my multiple float-valves are well adapted to control the admission of both of these liquids into the carbureter float chamber, as, by properly proportioning the sizes of the float-valve ports, or the hydrostatic heads of the main supply tanks, any desired quantities of the two fuels may be admitted to the float chamber.

It will be apparent to those skilled in the art that other applications may be made of my invention described in these specifications and shown in the accompanying drawings in which Figure 1 is a plan view of a carbureter float chamber having two admission valves controlled by a single float; Fig. 2 is a vertical section on line II—II of Fig. 1; Fig. 3 is a vertical section on line III—III of Fig. 1; and Fig. 4 is a side elevation of an engine to which is connected a carbureter supplied with fuel from two supply tanks each connected by a separate pipe line to a separate float-valve both of which valves are controlled by a single float as shown in Figs. 1, 2 and 3.

Referring to the drawings, 1 represents a carbureter receiving fuel from a constant level, float chamber, 2, the flow of fuel from the float chamber to the carbureter being controlled by the customary adjustable needle valve, 3. 4 is a float of suitable weight and design for the purpose for which it is intended.

5 and 6 are similar float-valves of the usual cone or needle point type, but it will be understood that any other suitable form of valve may be used. 7 and 8 are fuel admission ports to the float chamber controlled respectively by valves, 5 and 6. The stems of valves, 5 and 6, are provided with groove, 9, 9, in which stand the slotted ends, 11, of an equalizing lever, 10. Grooves, 9, 9, are somewhat wider than the thickness of lever, 10, in order that the latter may have free play therein. Pivoted to a fulcrum

post, 12, which is adjustably secured to the metal casing, 13, of the float chamber, 2, is the operating lever, 14, connected at one end to the float, 4, by means of the pivot pin, 15. The other end of lever, 14, is slotted at 16, to receive the equalizing lever, 10. Slot, 16 is provided with bearing points, 17, 18, projecting inwardly from the sides of the slot so as to contact with equalizing lever, 10, without cramping it, regardless of the position of the float, 4, and lever, 14. 19 and 20 are threaded connections for receiving and securing pipes, 21 and 22, which conduct fuel from the supply tank or tanks such as 23 and 24 to the carbureter. 25 and 26 are cut off valves for the pipes, 21 and 22, respectively. 27 is a gas engine, conventionally shown, having its intake manifold, 28, connected to the carbureter, 1. 29 is the exhaust manifold of the engine. 30 and 31 are exhaust gas heating jacket connections to the carbureter. 32 is the throttle valve operating rod, and 33 is the fly wheel of the gas engine.

The operation of my invention as herein shown and described is as follows. Assuming that the apparatus is mounted and connected as shown in Fig. 4, and that the float, 4, is at its lowermost position in the float chamber which is empty, as shown in Fig. 2; the valves 25 and 26 will first be opened to allow fuel from both tanks, 23 and 24, to flow to the float chamber; float, 4, will be lifted by the fuel which enters the float chamber and the lever, 14, will press down upon equalizing lever, 10, which in turn will press down upon the valves, 5 and 6, and close the admission ports, 7 and 8. Should one of the valves, 5 or 6, close before the other, liquid will continue to enter the float chamber through the valve which has not closed, and as the float, 4, will continue to rise, the lever, 10, will fulcrum on the stem of the closed valve, and close the other valve.

By making the openings of the ports, 7 and 8, of different size, or, by giving the liquid in the tanks, 23 and 24, different hydrostatic heads, or, by making the lengths of the arms of lever, 10, unequal, the relative proportions of liquids from the supply tanks can be made anything desired.

If the arms of the lever, 10, be made of unequal lengths by moving the point of engagement of lever, 14, with lever, 10, to one side of the center of lever, 10, the actuating effort of the float upon valves, 5 and 6, will be unequal. If the liquid pressure tending to open valves, 5 and 6, be equal, the valve at the end of the longer arm of lever, 10, will open first and close last. It will be observed that the actuating effort of the float upon the valves will be exerted in the ratio predetermined by the relative lengths of the arms of lever, 10. In the drawings the arms of lever, 10, are shown of equal lengths so that the actuating effort of the float will be exerted equally upon the valves.

While the drawings accompanying this specification show my invention applied in a particular way to control the admission of liquid fuel to the constant-level, fuel-supply chamber of a carbureter, it will be evident to those skilled in the art that this is but one of numerous applications of my invention which may be made. It will be further apparent that my invention may assume various forms without departing from its spirit or scope.

My invention is of particular usefulness when applied to control the admission of fuel to carbureters used in connection with aeroplane or airship motors where the failure of fuel supply is a particularly serious matter. The usefulness of my invention is proportionately important in connection with the operation of all forms of internal combustion engines used upon road vehicles, or elsewhere. It may be applied also to the control of the admission of water or other liquid into supply tanks of various sorts. As will be apparent to those skilled in the art, either of the valves may be held closed by any convenient external means, as for instance, by vertical pressure applied to the end of one of the valve stems, 5^a or 6^a, without interfering with the operation of the other valve. During such closure of either of the valves, the pipes leading to it may be disconnected and cleaned, or repaired without interfering with the operation of the other valve.

I do not limit my invention to the particular form in which it is shown and described in these drawings and specification, as it will be apparent that various forms of valves, floats, tanks and equalizing means between the valves may be employed in full conformance to the disclosures herein made.

I claim:

1. In a carbureter, a float chamber and a float therein, two fuel supply connections to said float chamber, a valve for each of said fuel supply connections controlling the admission of fuel to the float chamber, an equalizing lever between said valves, and operating connections between said float and said equalizing lever whereby the valves are operated by movements of the float transmitted through said operating connections and said equalizing lever.

2. In a carbureter, a float chamber and a float therein, two fuel supply connections to said float chamber, a valve for each of said fuel supply connections controlling the admission of fuel to the float chamber, and means connecting the float with the valves for operating the latter, said means includ-

ing equalizing mechanism for equalizing the actuating effort of said float between said valves.

3. In a system of control for the supply of liquid fuel to internal combustion engines, a fuel receptacle having a float therein, a plurality of fuel supply pipes connected to conduct liquid fuel to said receptacle, a separate valve for controlling the flow of fuel through each of said supply pipes, and means connecting said float and said valves whereby the valves are operated by movements of the float, said means comprising equalizing mechanism for equalizing the actuating effort of said float between said valves.

4. In a system of control for the supply of liquid fuel to internal combustion engines, a plurality of fuel supply tanks, a receptacle having a float therein, separate supply pipes for conducting fuel from said tanks to said receptacle, a separate valve for controlling the flow of fuel through each of said supply pipes, means connecting said float and said valves whereby said valves are operated by movements of said float, said means including equalizing mechanism for equalizing the actuating effort of said float between said valves.

5. The combination of a receptacle adapted to contain liquid fuel and provided with two admission ports; two valves each controlling the flow of liquid fuel through one of said ports; an equalizing lever between said valves; a float in said receptacle and means connecting said float and said equalizing lever whereby movements of said float are transmitted to operate said valves.

6. The combination of a receptacle adapted to contain liquid fuel and provided with two admission ports; a float in said receptacle; two valves within said receptacle each controlling the admission of fuel through one of said ports; and means connecting said float and said valves whereby said valves are operated by movements of said float, said means including equalizing mechanism for equalizing the actuating effort of said float between said valves.

7. In a carbureter, a float chamber, a float therein, two fuel supply connections to said float chamber, two valves within said float chamber each valve being adapted to control the admission of fuel through one of said fuel supply connections respectively and means within said float chamber connecting the float and the valves whereby the valves are operated by movements of the float and the effort of the float is exerted in a predetermined ratio upon the valves.

8. In a system of control for the supply of liquid fuel to internal combustion engines, a fuel receptacle having a float therein, a plurality of fuel supply pipes connected to conduct liquid fuel to said receptacle, a separate valve for controlling the flow of fuel through each of said supply pipes, and means within said receptacle connecting said float and said valves whereby the valves are operated by movements of the float and the effort of the float is exerted in a predetermined ratio upon the valves.

9. In a system of control for the supply of liquid fuel to internal combustion engines, a plurality of fuel supply tanks, a receptacle having a float therein, separate supply pipes for conducting fuel from said tanks to said receptacle, a separate valve for controlling the flow of fuel through each of said supply pipes, and means within said receptacle connecting said float and said valves whereby the valves are operated by movements of the float and the effort of the float is exerted in a predetermined ratio upon the valves.

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

FRANK L. SESSIONS.

Witnesses:
FRANCES K. MANN,
LOUIS A. COSLETT.