

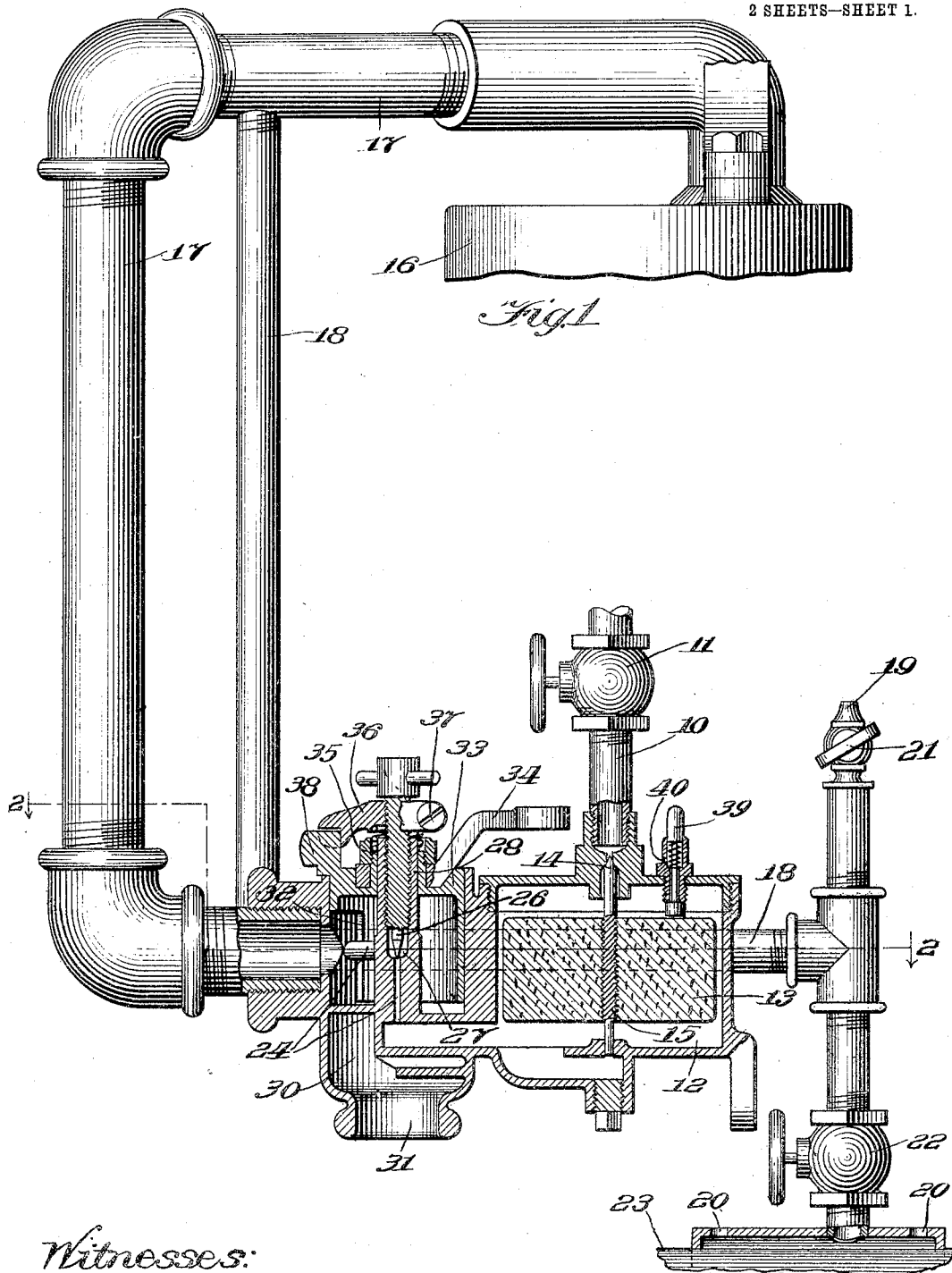
No. 817,903.

PATENTED APR. 17, 1906.

A. S. COMSTOCK.
CARBURETER.

APPLICATION FILED APR. 22, 1905.

2 SHEETS—SHEET 1.



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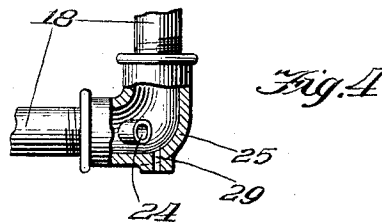
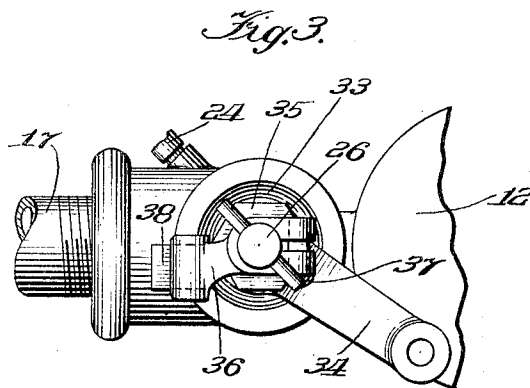
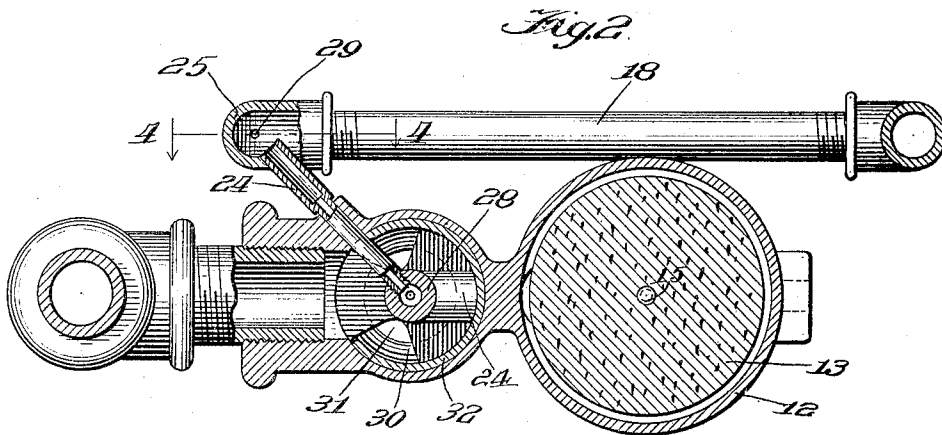
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2 SHEETS—SHEET 2.



Witnesses: .

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UNITED STATES PATENT OFFICE.

ALPHONSO S. COMSTOCK, OF EVANSTON, ILLINOIS.

CARBURETER.

No. 817,903.

Specification of Letters Patent.

Patented April 17, 1906.

Application filed April 22, 1905. Serial No. 256,906.

To all whom it may concern:

Be it known that I, ALPHONSO S. COMSTOCK, a citizen of the United States, and a resident of Evanston, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Carbureters, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to a device commonly known as a "carbureter," which is employed for impregnating air with the vapor of a volatile liquid fuel for the purpose of obtaining an explosive fluid adapted for the charge of internal-combustion engines.

In a variety of the circumstances under which explosive-engines are now employed it is found most expedient to control the amount of power generated by regulating the quantity of explosive material delivered to the cylinder for each cycle. The control of the engine by this method is preferably obtained by the regulation of the admission of air and of the fuel to the mixing-chamber and has been most successfully effected by devices known "as float-feed" carbureters. In some of these carbureters the air and fuel valves are connected so as to be operated together and are so proportioned that a uniform ratio is maintained between the amounts which they deliver irrespective of the total amount delivered by each. As heretofore employed, however, these carbureters have been so constructed that when the supply of air and fuel is greatly reduced the quantity of air passing through the parts is so small compared to their sectional area that it travels very slowly and becomes only imperfectly intermixed with the fuel, which is therefore not completely vaporized, and a part of each charge is allowed to accumulate in liquid form within the passages. If then after running the engine for some time on a reduced charge a rapid circulation is induced by the admission of a greater quantity of air when it is desired to increase the power, the accumulated fuel is quickly vaporized and a material too rich in fuel vapor to be explosive is delivered to the power-cylinder and the engine stops.

The object of the invention is to provide a carbureter in which the circulation of air is always active for a sufficient distance to in-

sure a complete intermixing and vaporization of the fuel vapor.

The invention contemplates a narrow passage of considerable length, into which the fuel is delivered and through which all of the air for the smallest power charges is required to travel, and a larger passage which the former joins before entering the power-cylinder and to which additional air varying in amount will be admitted for all other charges.

The invention consists in the construction and arrangements of parts to be hereinafter described and which are illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of my improved carbureter, showing a detail of an engine-cylinder, some of the parts appearing in vertical cross-section. Fig. 2 is a detail plan section on the line 2 2 of Fig. 1. Fig. 3 is a plan view of a detail of the device, and Fig. 4 is a sectional detail on the line 4 4 of Fig. 2.

A supply-pipe for liquid fuel appears in the drawings at 10. It may be joined to a suitable reservoir (not shown) in any desired manner, but preferably in such a way that the flow through the pipe will be by gravity. A valve is shown in the pipe at 11 and may be employed for entirely shutting off the supply when the device is not in use, but will ordinarily be left wide open. The supply-pipe leads to a float-chamber 12 of usual construction and provided with a float 13, adapted to operate a valve 14 for controlling the delivery to the chamber. The float has a threaded engagement with the stem of the valve, as indicated at 15, and its position upon the valve-stem may be so adjusted that the valve will be seated whenever the fluid has reached the level within the chamber found to operate most efficiently.

A detail of a power-cylinder is shown at 16 and a pipe 17 leading thereto, through which the explosive charge enters the engine. This pipe is joined, preferably at some distance from the cylinder, by a pipe 18 of smaller diameter and which is open to the atmosphere at its farther end. In the drawings two of such openings 19 20 are shown, each controlled by a valve 21 22. One, as 19, opens directly to the atmosphere and the other into a drum having foraminous walls and sur-

rounding some heated portion of the engine, as the exhaust-pipe, a detail of which appears at 23. Through this latter opening warm air may be drawn, and either of the
5 openings may be employed for the admission of air to the pipe 18, as the condition of the weather may require, by adjusting the valves 21 22.

A duct 24, leading from the float-chamber
10 12, enters the pipe 18 at any convenient point, but preferably at an elbow 25 therein. This duct is controlled by a needle-valve 26, which enters the duct through its wall, as at the right-angle turn 27, and has a threaded
15 engagement with a vertically-extended portion 28 of the wall. A drain for the escape of any accumulation of liquid fuel within the pipe 18 is afforded by a small opening 29 in the wall of the pipe adjacent the point where
20 it is pierced by the duct 24.

An opening for the admission of air is provided in the pipe 17 beyond the point where it is joined by the pipe 18, and the engine is controlled by means of a valve for closing
25 this opening and operating in conjunction with the needle-valve 26, which controls the supply of fuel. In order to simplify the construction of the mechanism for connecting these valves, the pipe 17 is joined to a chamber 30, surrounding the duct 24 and having
30 walls formed integral with those of the float-chamber 12. The opening for the admission of air to the pipe 17, as previously mentioned, is provided in the wall of this chamber at 31, and a valve for controlling this opening is
35 shown at 32. Preferably it has a cylindrical form and engages the wall of the chamber 30, Fig. 2. It is provided with a hub 33, rotatively engaging the vertically-extended portion 28 of the wall of the duct 24, and is operated
40 by means of a crank 34, firmly secured to the hub 33 by a nut 35. The rotation of the valve 32 is communicated to the needle-valve 26 by means of an arm 36, adjustably
45 secured to the stem of the needle-valve by a clamping-screw 37 and operatively engaging a lug 38, rising from the hub 32. A spring-controlled plunger 39 plays through the cover of the float-chamber 12 and may be operated
50 by the hand to depress the float 13, so as to unseat the valve 14 and permit an additional flow of fuel into the float-chamber if required in starting. In the casing of this plunger is a minute opening 40, intended to
55 provide access of air to the float-chamber.

The operation of the device is as follows: Air to satisfy the vacuum produced in the power-cylinder by the advance of its piston will enter the pipe 17 partly through the
60 chamber 30 and partly through the pipe 18. The amount of air entering through the chamber 30 will depend on the adjustment of the valve 32 and may be varied to accord with

the requirements of the charge desired by shifting the crank 34. The amount of air entering by way of the pipe 18 will be substantially uniform for all charges. It may be varied by operating either of the valves 21 22; but it is intended that a readjustment of these valves will be only occasionally required.
70 The air which flows through the pipe 18 will become charged with fuel in passing the point of the duct 24 and will become intimately mingled with its vapor in traveling through the extended narrow passage of the pipe between the elbow 25, where the fuel-duct enters and the point where the pipe 18 joins the pipe 17. The flow of fuel through the duct 24 may also be varied by shifting the crank 34, which operates both the needle-valve 26
80 and the air-valve 32. The relative adjustment of these valves is such that when the air-valve is entirely closed enough fuel is allowed to pass through the duct to properly carburet the air passing through the pipe 18.
85 When the crank 34 is shifted to open the air-valve 32, the needle-valve also turns and permits more fuel to pass through the duct 24. The air entering by way of the pipe 18 then becomes more heavily carbureted, but is afterward diluted to the required strength in the pipe 17 by air entering through the chamber 30 and passing the valve 32. It has been
90 found expedient to so adjust the float 13 that such a level will be maintained in the float-chamber 12 as will permit the fuel to be easily drawn through the duct 24 by the rush of air through the pipe 18 by the point of the duct, but not such that the fuel will flow through the duct from its own head. Any leakage
100 through the duct into the pipe 18 will, however, immediately escape through the drain-opening 29. In effect, the pipe 18 is a carbureting-passage, the vaporization of the fuel taking place wholly within it, while the
105 pipe 17, together with the valve 32, controlling the opening at its outer end, may be termed an "air-passage," as this pipe is traversed by air alone up to the point where it is joined by the pipe 18. The passage for fuel
110 is by way of the pipe 10, the float-chamber 12, and the duct 24. The pipe 17 is extended in front of the point where it is joined by the pipe 18 solely for the convenience in construction obtained by having the air and
115 fuel valves 32 and 26, respectively, in closely-related positions.

I claim as my invention—

1. In a carbureter, in combination, an air-passage, a fuel-passage, a carbureting-passage having an opening to the atmosphere and receiving from the fuel-passage and delivering to the air-passage, and means for simultaneously controlling the flow of air and fuel through the air and fuel passages, respectively, the flow of air through the carbu-
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125

retting-passage being independent of such controlling means.

2. In a carbureter, in combination, an air-passage, a fuel-passage, a throttling-valve in each of such passages, a lever operatively connected to both of such valves, a carbureting-passage receiving from the fuel-passage and delivering to the air-passage and having

an opening to the atmosphere, and a valve independent of the lever and of both the first-named valves for controlling the opening.

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