No. 665,496. Patented Jan. 8, 1901.

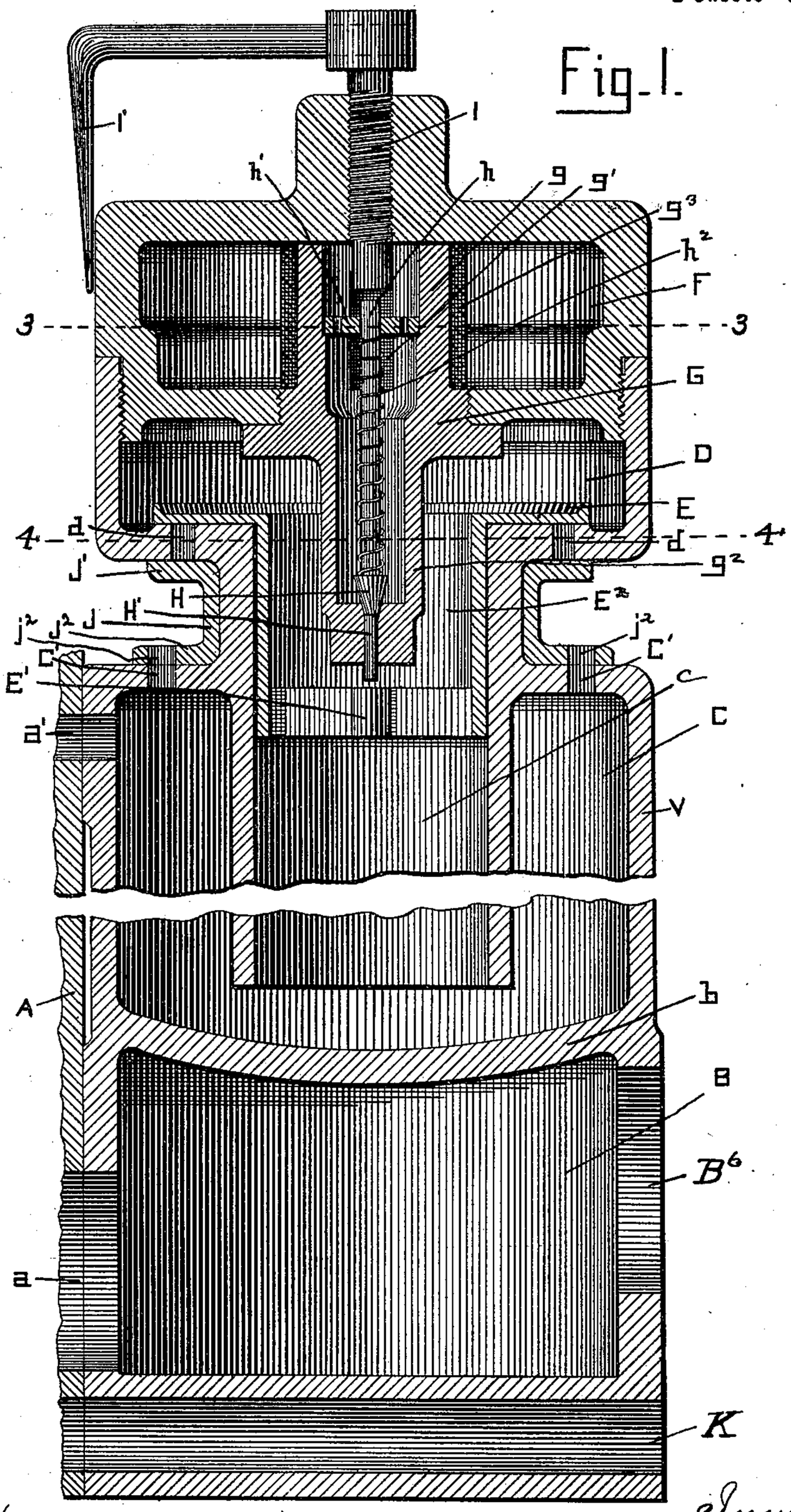
W. O. WORTH.

CARBURETER.

(Application filed June 9, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



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James L. Mansfield.

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By his attorneys.
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Fig. 2.

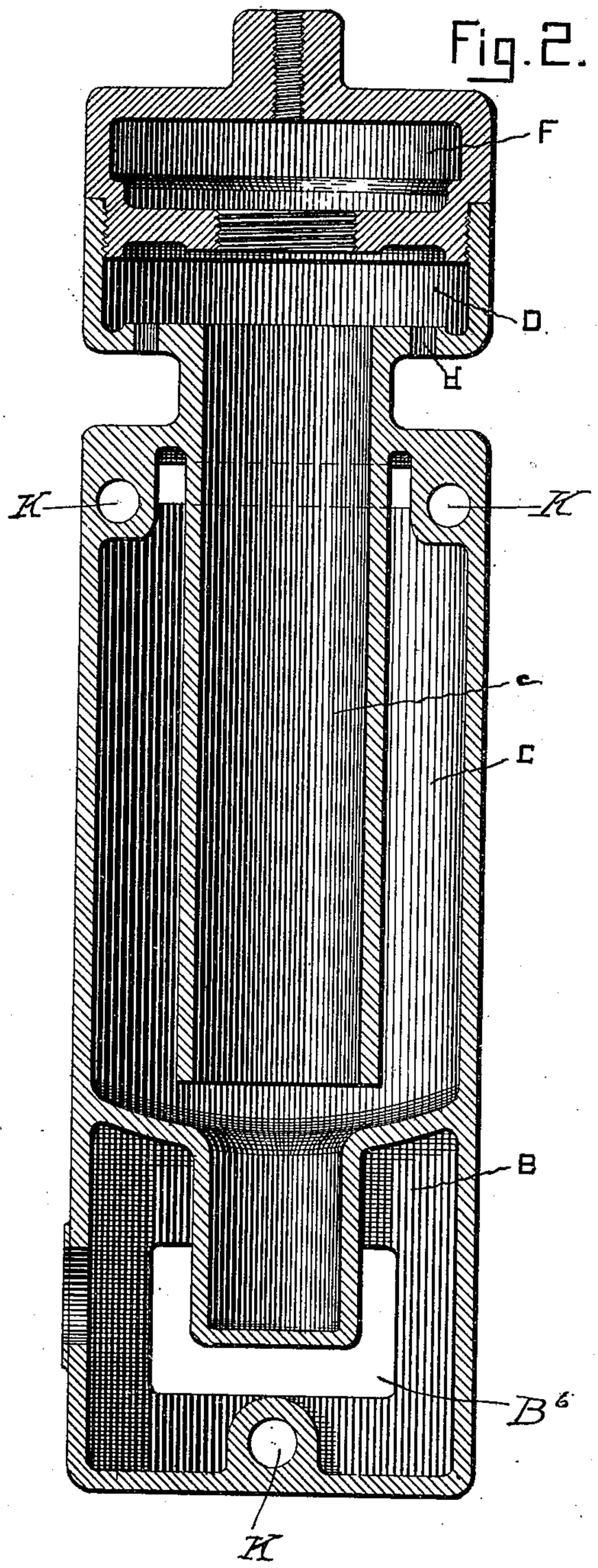


Fig. 3.

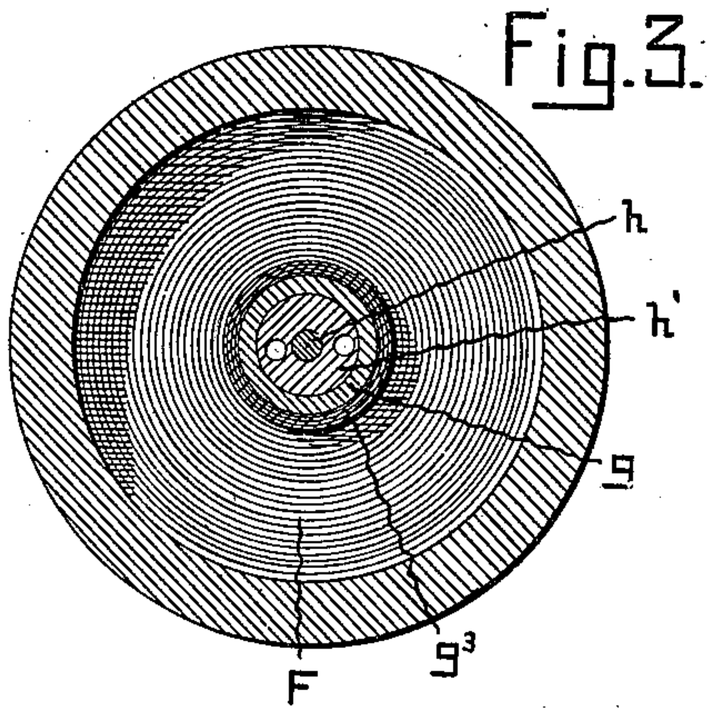
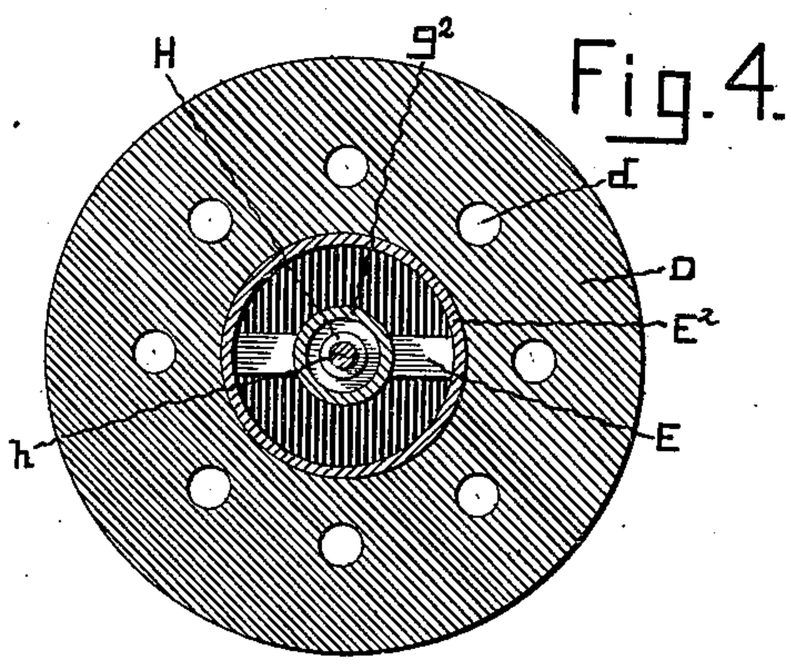


Fig. 4.



Witnesses
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James R. Mansfield

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UNITED STATES PATENT OFFICE.

WILLIAM OSCAR WORTH, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS TO WILLIAM R. DONALDSON, OF LOUISVILLE, KENTUCKY, AND HENRY W. KELLOGG, OF BATTLE CREEK, MICHIGAN.

CARBURETER.

SPECIFICATION forming part of Letters Patent No. 665,496, dated January 8, 1901.

Application filed June 9, 1899. Serial No. 719,939. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM OSCAR WORTH, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Carbureters; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in gas and air mixers or carbureting devices for liquid and gas fuel engines; and its object is to provide an efficient carbureter whereby air and liquid or gas fuels may be thoroughly commingled to form a proper explosive mixture for use in the exploding-chamber of a gas-engine.

The invention consists in the improved construction and combination of parts hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of the carbureter, indicating it as applied to the working cylinder of a gas-engine. Fig. 2 is a reduced detail vertical section thereof at right angles to Fig. 1 and showing a slight modification of the form of casing. Fig. 3 is a reduced section on line 3 3, Fig. 1; and Fig. 4 is a similar section on line 4 4, Fig. 1.

A designates the working cylinder of an explosive-gas engine, a being the exhaust-port and a' the inlet-port. To the ported side of the engine is secured the carbureter V. This carbureter has a lower heating-chamber B, which communicates with the exhaust-port a of the engine and also by outlet B^6 with any suitable means for conducting away the exhaust-gases, which gases are utilized to heat the walls of the chamber B.

Above the chamber B is a mixing-chamber C, in which is a central vertically-depending tube c, which extends almost to the bottom b of the chamber C. This tube also extends through and above the top of the chamber C and is the primary mixing-chamber for the gas and air or oil and air.

Above the chamber C and on top of tube c is a valve-chamber D of larger diameter than the tube and provided with a series of air-inlet apertures d in its bottom, which, however, may be all closed by the annular flanged valve E, whose hollow stem E^2 depends into tube c and is guided thereby.

Above chamber D is a gas, gasolene, or oil holding chamber F, formed in a separate casting from the other portion of the apparatus and screwed into the casting forming the bottom and side walls of chamber D, as shown. Through the bottom of chamber F extends a tightly-fitting hollow plug G, the upper part g of which extends to the top of chamber F, as shown, and its lower part g^2 depends into the tube c, this lower portion being smaller than its upper portion. The walls of the upper portion g are slotted at g', and this portion g is wrapped exteriorly with one or more thicknesses of wicking or fabric g^3 or suitable screening material, which will allow the oil or gasolene to filter into the hollow plug G and drop into the lower portion g^2 thereof. In the bottom of the part g^2 is a small perforation which is closed by a puppet-valve H, having a stem H', which depends slightly below the plug g^2 and is in position to be struck by a bar E' in the stem of valve E when said valve is lifted. The upper rod h of valve H plays through a perforated guide h', fixed in the upper portion g of the plug, and a spring h^2, interposed between valve H and guide h', will forcibly and quickly seat the valve H after it is raised. The amount of possible opening of valve H is regulated by an adjustable screw I, tapped through the top of chamber F. This screw I may be provided with an indicating-finger I', and indicating-marks may be attached to the outer wall of the chamber F, so that the attendant can readily adjust the screw to properly regulate the admission of oil. On the projecting portion of the tube c, between the chambers C and D, is fitted an annulus J, which is provided with upper and lower flanges J' J^2, which respectively fit closely against the bottom of chamber D and the top of chamber C. Flange J' is provided with a series of perforations j', adapted to register with the perforations d in the bottom of chamber D, and flange J^2 is provided with a series of perforations j^2, adapted to register with perforations C' in the top of chamber C. The perforations j' and j^2 of the

respective flanges alternate, so that one set of perforations can be wholly or partially closed when the others are wholly or partially open.

The annulus J is adapted to be automatically controlled by a governor on the engine, and its purpose is to regulate the admission of air to the mixing-chambers, so that the quality of the explosive mixture can be automatically controlled and the engine governed by varying the mixture as is required to maintain a uniform speed under different loads.

It is obvious that instead of employing gasolene or oil in chamber F gas may be piped thereinto from any suitable source of supply, and its admission into the mixing-chambers C *c* can be controlled by the valve H, for which a larger one, however, should be substituted and properly adjusted by the regulating-screw I.

Operation: The hot exhaust-gases from the exploding-chamber admitted into chamber B of the carbureter heat the walls of the latter, particularly the top *b* thereof, which also forms the bottom of the mixing-chamber C. If desired, the bottom *b* may be made to depend farther into the chamber B, as in Fig. 2, so that it will be more highly heated by the waste gases. When the inlet-valve is opened, upon the descent of the piston a powerful suction is created through the port *a'* in chambers C, *c*, and D, and if the apertures *j'* and *d* are registering the suction will induce air to enter through the passages *j' d*, lifting the valve E, whereupon the bar E' in the stem E^2 of valve E strikes the stem H' of valve H and unseats the latter, permitting some of the oil to escape from the hollow plug G into the tube *c*, where it is partially vaporized by the inrushing air and further vaporized and commingled with the air as it passes through chamber C to the port *a'*. Should any heavy oil drop onto the bottom *b* of the chamber, it is vaporized by the heat and the resultant vapors commingled with the air in the chambers C *c*. The richness of the explosive mixture will depend upon the relative amounts of oil or gas and air admitted into the mixing-chambers C *c*, and the amount of oil or gas will further depend upon the adjustment of the regulating-screw I for the valve H. It will be observed that the inrush of air through apertures *d* raises valve E, and the latter operates valve H, and thus the admission of oil or gas is controlled by the air-valve.

The power or speed of the engine is of course dependent upon the richness of the explosive mixture. If it is running too fast, the amount of oil or gas admitted should be lessened. Also if the work is very light the richness of the explosive mixture should be decreased. This may be regulated by shifting valve J by a governor. The valve can be shifted so that it will increase the supply of air admitted through the apertures *d* or will admit air directly into the mixing-chamber C through the apertures C', and by sufficiently shifting valve J air can be admitted through apertures C' in such quantity as to prevent any suction in the valve-chamber D. Consequently valve E will not be lifted and no gas or oil will be admitted, and this will very quickly reduce the speed of the engine. Thus valve J renders the carbureter very sensitive to the action of a governor and enables the strength of the explosive mixture to be regulated with the greatest nicety.

It will be observed that the construction of the carbureter is very simple. It can be dressed on the ported side, so as to fit closely against the ported side of the engine, to which it can be secured by through-bolts, which may be passed through the openings K, as indicated in the drawings, presenting a very simple and compact appearance.

Having thus described my invention, what I therefore claim as new, and desire to secure by Letters Patent, is—

1. In a carbureter, the combination of the mixing-chamber, and the heating-chamber below the mixing-chamber and the valve-chamber above the mixing-chamber, provided with air-inlet apertures, a valve in said chamber having a hollow stem depending into the mixing-chamber and provided with a flange overlying and closing said apertures, said valve being adapted to be lifted by the inflow of air, substantially as described.

2. In a carbureter, the combination of the mixing-chamber, the valve-chamber above the same, provided with air-inlets and the air-valve in said chamber adapted to be lifted by the inflow of air; and a regulating-valve for said air-inlets, with an oil or gas supply, and a valve controlling said supply adapted to be operated by the lifting of the air-valve.

3. In a carbureter, the combination of the mixing-chamber, the valve-chamber above the same, provided with air-inlet apertures, the valve in said chamber having a hollow stem depending into the mixing-chamber and provided with a flange overlying and closing said apertures, and adapted to be lifted by the inflow of air; and an exterior regulating-valve for said air-inlets, with an oil or gas chamber above the valve-chamber, an inlet from said oil-chamber into the mixing-chamber, and a valve controlling said inlet adapted to be operated by the lifting of the air-valve.

4. In a carbureter, the combination of the mixing-chamber, the valve-chamber above the mixing-chamber having inlet-apertures and the air-valve therein adapted to be lifted by the inrush of air; with an oil or gas chamber above the valve-chamber, a hollow plug depending from the oil-chamber into the valve-chamber, an oil or gas valve in the lower end of said plug adapted to be operated by the air-valve, and the adjusting-screw for regulating the lifting of said oil-valve.

5. In a carbureter, the combination of the mixing-chamber, the valve-chamber above

the mixing-chamber having air-inlet apertures in its bottom, the air-valve having a hollow stem depending into the mixing-chamber, and adapted to be lifted by the inrush of air, and an exterior regulating-valve for said air-inlet apertures, and an oil or gas chamber above the air-chamber, a hollow plug depending into the hollow stem, with an oil or gas valve in said plug adapted to be operated by the air-valve, a spring for closing said oil-valve, and the adjusting-screw for regulating the lifting of said oil-valve.

6. The combination of the mixing-chamber, the air-chamber, the air-valve therein having a hollow stem depending into the mixing-chamber and adapted to be lifted by the inflowing air, an oil-chamber above the air-chamber, the hollow plug in the center of said oil-chamber having apertures in its upper end and depending from the oil-chamber into the hollow stem of the air-valve, an oil-inlet valve in the lower end of said plug having a stem depending therethrough adapted to be engaged by the air-valve, the spring for closing said valve, an adjusting-screw for regulating the opening of said valve, and the wicking surrounding the perforated upper end of said plug, substantially as described.

7. The combination of the mixing-chamber having air-inlets in its top, an air-chamber having air-inlets in its bottom, with the valve interposed between said chambers and having air-inlets adapted to register with the air-inlets of said chambers, substantially as described.

8. The combination of the mixing-chamber having perforations in its top, and an air-chamber having perforations in its bottom; with the valve interposed between said chambers and having flanges covering the perforations in said chambers, said flanges being perforated and adapted to register with the perforations in said chambers, substantially as described.

9. The combination with a mixing-chamber having air-inlets in its upper end, and the valve having inlets adapted to register with the inlets of the mixing-chamber; with the air-chamber above the mixing-chamber communicating therewith and having perforations in its bottom, the air-valve therein, the oil-chamber above the air-chamber and the oil-inlet valve adapted to be operated by the air-inlet valve, substantially as described.

10. The combination with a mixing-chamber having perforations in its upper end, the annular valve having perforations adapted to register with the perforations in the mixing-chamber, and means for shifting said valve; with the air-chamber above the mixing-chamber communicating therewith and having perforations in its bottom, the air-valve having a tubular stem depending into said mixing-chamber, the oil-chamber above the air-chamber and the oil-inlet valve adapted to be operated by the air-inlet valve, substantially as described.

11. In a carbureter, the combination of the heating-chamber for the passage of exhaust-gases, the mixing-chamber above the heating-chamber, the air-chamber above the mixing-chamber having perforations in its bottom, the air-valve therein, the oil-chamber above the air-chamber having an oil-inlet into the mixing-chamber, and the valve for closing said oil-inlet, adapted to be operated by the air-valve.

12. In a carbureter, the combination of the heating-chamber for the passage of exhaust-gases, the mixing-chamber above the heating-chamber, the air-chamber above the mixing-chamber having perforations in its bottom, the air-valve therein, the oil-chamber above the air-chamber, the tubular plug in said oil-chamber having an oil-inlet in its lower end, the valve for closing said oil-inlet, having a stem adapted to be operated by the air-valve, the spring for closing said oil-valve, and the adjusting-screw for regulating the movement thereof.

13. In a carbureter, the combination of the heating-chamber, the mixing-chamber, the vertical tube depending into the mixing-chamber, the air-chamber at the upper end of said tube having perforations in its bottom, the annular valve closing said perforations, the oil-chamber above the air-chamber, the tubular plug in said oil-chamber depending through the air-chamber, the oil-inlet in the lower end of said plug, and the oil-valve therein adapted to be operated by the lifting of the air-valve, and the adjusting-screw for regulating the throw of said oil-valve.

14. In a carbureter, the combination of the heating-chamber, the mixing-chamber, the vertical tube depending into the mixing-chamber, the air-chamber at the upper end of said tube having perforations in its bottom, the annular valve closing said perforations, having a tubular stem depending into said tube, the oil-chamber above the air-chamber, the tubular plug in said oil-chamber and depending through the air-chamber into the tubular stem of the air-valve, the oil-inlet in the lower end of said plug the oil-valve therein adapted to be operated by the lifting of the air-valve, a spring for closing said oil-valve, and the adjusting-screw for regulating the throw of said oil-valve.

15. The combination of the mixing-chamber, the oil or gas chamber, the tubular plug in and depending from said chamber having perforations in its upper end within said oil-chamber said end being surrounded with wicking; with the oil-valve in the lower end of said plug within the gas-chamber, and the screw for regulating the movement of said oil-valve.

16. The combination of the mixing-chamber, the air-inlets thereto, the air-valve; the oil or gas chamber, the tubular plug in and extending through said chamber and depending therefrom into and through the mixing-chamber, said plug having perforations in its

upper end within said oil-chamber and an oil-outlet in its lower end below said oil-chamber, with the oil-valve in the lower end of said plug within the mixing-chamber, the spring for closing said valve and the screw for regulating the movement of said oil-valve.

17. In a carbureter, the combination of the heating-chamber, the mixing-chamber above the same, the tube depending into said mixing-chamber, the air-chamber at the upper end of said tube having air-inlets in its bottom, the air-valve in said chamber, the oil-chamber above the air-chamber, the tubular plug extending into and below said oil-chamber, said plug being perforated within the oil-chamber and surrounded by wicking therein, the oil-valve in the lower end of said plug adapted to be operated by the air-valve, a spring for closing the oil-valve, and the adjusting-screw for regulating the opening of said oil-valve.

18. In a carbureter, the combination of the heating-chamber, the mixing-chamber above the same, having air-inlets in its upper end, the tube depending into said mixing-chamber, the air-chamber at the upper end of said tube having air-inlets in its bottom, the annular air-valve in said chamber, the annular regulating-valve exterior to said tube for regulating the admission of air into both said mixing-chamber and said air-chamber; the oil-chamber above the air-chamber, the tubular plug extending into and below said oil-chamber, said plug being perforated within the oil-chamber, the oil-valve in the lower end of said plug adapted to be operated by the rise of the air-valve, a spring for closing said oil-valve, and the adjusting-screw for regulating the opening of said oil-valve.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WILLIAM OSCAR WORTH.

In presence of—

GEO. N. BRESSLER,

FANNIE LOGAN.