W. F. ROTHE & E. E. CULP.

CARBURETER.

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1,022,703.

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Fig. 1.

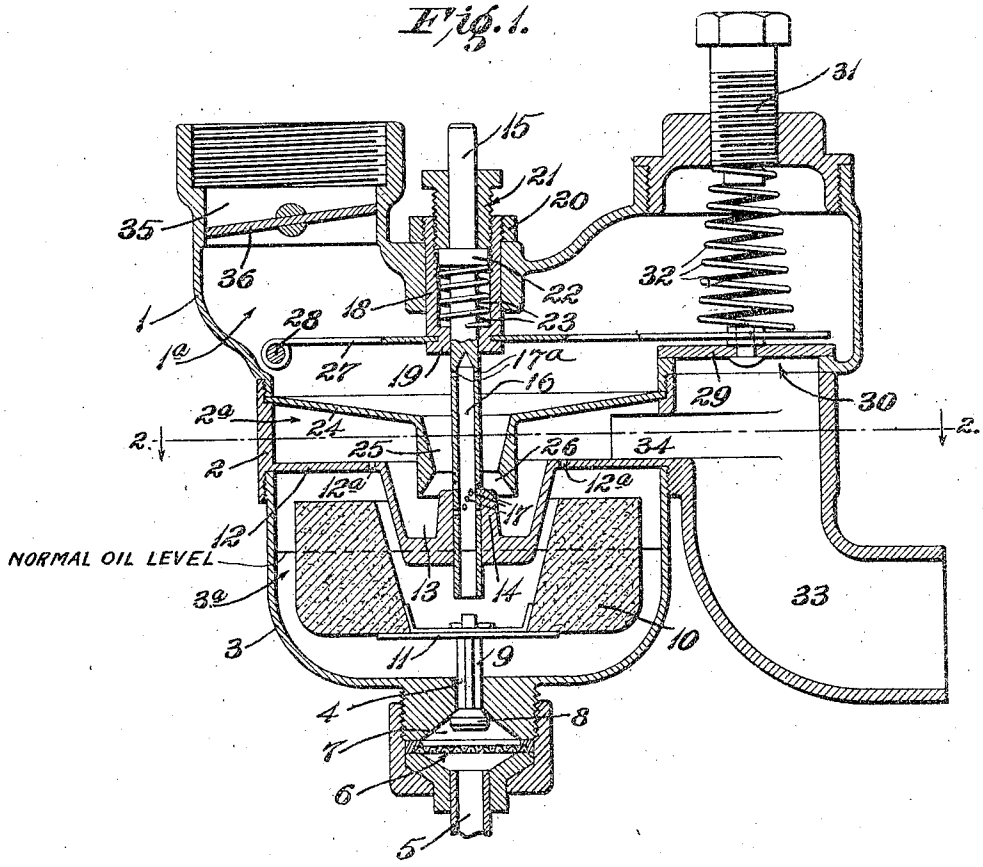
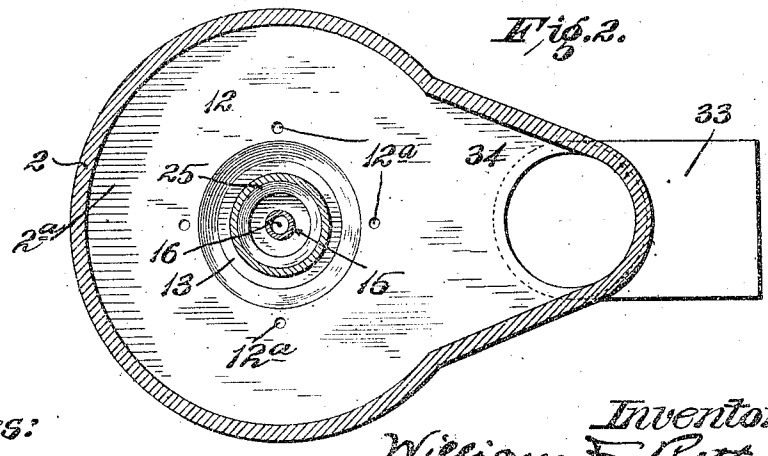


Fig. 2.



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CARBURETER.

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To all whom it may concern:

Be it known that we, WILLIAM F. ROTHE, a citizen of the United States, and a resident of the city of East St. Louis, in the county of St. Clair and State of Illinois, and EARLE E. CULP, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Carbureters, of which the following is a specification.

This invention relates to carbureters and more particularly to those used in connection with internal combustion motors.

It has for its principal objects to secure a proportional and correlated action of the oil and air valves, to provide for varying the proportional correlation between the air and oil valves, to secure a thorough mixture of the air and vapor, to provide for automatically increasing and decreasing the supply of oil to suit changes in the speed of the motor, and to attain certain other advantages hereinafter more fully appearing.

The invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawing which forms part of this specification and wherein like symbols refer to like parts wherever they occur,—Figure 1 is a vertical section through a carbureter embodying our invention; and Fig. 2 is a horizontal section on the line 2—2 of Fig. 1.

As shown in the drawing, the casing or shell of the carbureter comprises three separable sections; namely, an upper section 1, containing a mixing chamber 1^a; an intermediate section 2, containing an air chamber 2^a; and a bottom section 3, containing an oil reservoir or supply chamber 3^a. In the bottom of the oil reservoir or chamber 3^a is a passageway 4, which communicates with a supply pipe 5 through a strainer 6 in a small receiving chamber 7. The passageway 4 is controlled by a valve 8 whose stem 9 extends up into the reservoir 3^a and has a cork or other suitable float 10 secured thereon by cross-bars or plates 11. The float is adapted to lift the valve 8 and thereby close the passageway 4 when the oil or liquid hydrocarbon has reached a certain level in the reservoir. By this arrangement the general supply of oil or hydrocarbon may be kept in a large gravity tank (not shown) and conducted through the pipe 5; and the liquid in the reservoir 3^a is maintained at a substantially uniform level, as the float rises and falls and closes and opens the valve 8 upon the rise and fall of the level of the liquid in the reservoir.

The central portion of the lower horizontal partition 12 which separates the air chamber 2^a from the reservoir 3^a is depressed, as at 13, to provide an oil cup or receptacle. A boss 14 is formed on the bottom of the oil cup 13 and provided with a vertical bore in which the lower end portion of the rod 15 is slidably fitted. The lower portion of the rod 15 is provided with an axial bore 16 which extends substantially one-half the length of the rod. The lower end of the tubular portion of the rod is adapted to bear against the cross-bar or plate 11 which connects the float to the valve-stem 9 when the rod is depressed and whereby the valve 8 is depressed.

A series of perforations 17 are provided in the tubular portion 16 of the rod 15 adjacent to the boss 14. The perforations 17 are preferably arranged in two spiral sets starting and ending at diametrically opposite points on opposite sides of the tube. By moving the rod 15 up and down a portion only or the entire series of perforations 17 may be uncovered above the top edge of the boss 14, as desired.

Slidably fitted in an opening in the top of the upper casing section 1 is a hollow cylindrical member 18 whose lower end portion 19 is provided with a bore through which the rod 15 is slidably fitted. The upper end portion of the cylindrical member 18 is screw-threaded to receive a nut or collar 20 which rests on top of the casing section 1 and supports said member 18. The upper portion of the member 18 is internally screw-threaded to receive a screw-plug 21 having an axial bore in which the upper end portion of the rod 15 works. A fixed collar or shoulder 22 is provided on the rod 15 and interposed between said collar and the bottom portion 19 of the member 18 is a spring 23 which yieldingly holds said shoulder portion 22 in contact with the inner end of the screw-plug 21.

The upper partition 24 which separates the air chamber 2^a from the mixing chamber 1^a is provided with a central opening and

a depending annular portion or funnel 25 constituting a carbureting chamber whose lower end portion projects into the oil cup or receptacle 13 and is flared, as at 26, oppositely to the flare of the upper portion of the funnel. Preferably, the lower edge of the funnel 25 extends to a plane slightly below the top edge of the boss 14.

A lever 27, preferably a somewhat resilient flat metal strip or plate, is secured to the cylindrical member 18 and hinged at one end on a rod 28 extending across the upper casing section 1. On the opposite end of the lever is mounted a valve 29 adapted to close the air inlet opening 30 for the mixing chamber 1^a. In the top of the casing section 1 is a screw-plug 31 and interposed between the inner end of said screw-plug and valve 29 is a spring 32.

An air intake pipe 33 communicates with the air inlet opening 30 for the mixing chamber 1^a and also with the passageway 34 opening into the air chamber 2^a. In order to heat the air before it is taken into the carbureter, the pipe 33 may be extended, in any obvious manner, in proximity to the exhaust manifold or pipe or any portion of the motor which radiates heat sufficient to heat the pipe.

In the operation of the carbureter, the screw-plug 21 is adjusted to position the rod 15 so that the proper number of the openings 17 in the tubular portion of said rod are open above the top edge of the boss 14 to admit sufficient oil for the combustible mixture for the low speed of the motor. On each suction stroke of the piston of the motor, the air is drawn into the chamber 2^a around outside of the funnel or carbureting chamber 25, thence down into the oil cup 13 where it takes up the oil therein, and thence up through the funnel or carbureting chamber into the mixing chamber 1^a and out through the outlet opening 35 which is controlled by a throttle-valve 36 and adapted for connection with the intake of the combustion chamber of the motor. In case there is no oil in the cup 13 a suction is created by the piston of the motor and the air which is drawn past the perforations 17 in the tubular portion 16 of the rod 15, and the oil in the reservoir 3^a is drawn into said tubular portion 16 and out through said perforations 17 where it is mixed with the air in the carbureting and mixing chambers. When the throttle-valve is opened more fully and the motor is running at a higher speed, the valve 29 is lifted to uncover the air inlet openings 30, and at the same time, the lever 27 is lifted and raises the member 18 and the rod 15 carried thereby. Hence, more of the perforations 17 are opened above the top edge of the boss 14, admitting a larger quantity of oil into the carbureting chamber 25 where it is taken up by the air which passes therethrough, and the mixture is finally completed in the mixing chamber 1^a.

To make it sure that the oil will rise in the tube 16 to a sufficient height to pass out through the perforations 17, a vent opening or openings, preferably a pair of them, are provided at the top of the tube 16 as indicated at 17^a in Fig. 1 of the drawings. By this arrangement a partial vacuum is created in the tube upon the suction stroke of the engine piston and the oil is drawn well up into the tube.

By the construction and arrangement of the cylindrical member 18 on the lever 27, and the correlation of the air valve 29 and its spring 32, together with the adjustable screw-plugs 21 and 31, the tensions of the springs 23 and 32 may be adjusted to a nicety; and, by adjusting the nut 20 on the member 18, the latter may be supported so that the lever 27 which, as above stated, is preferably somewhat resilient, supports the valve 29 lightly on its seat over the opening 30 and the valve has to be lifted only against the tension of its spring 32.

In priming the motor, on starting, the rod 15 is pressed downwardly against the tension of the spring 23 and its lower end is moved into contact with the cross-bar or plate 11 which connects the float 10 to the valve-stem 9 and the valve 8 is opened and the oil flows into the reservoir 3^a until it reaches a level with the openings 17 in the tubular portion 16 of the rod 15. The oil may reach a level with the bottom of the partition 12 and flow through the vent openings 12^a in said partition and into the chamber 2^a; or, in case the oil does not reach a level so high, the vapors will be forced through said vent openings 12^a into the chamber 2^a by the body of oil rising in said reservoir 3^a. Hence, when the engine is cranked, the air is drawn in through the chamber 2^a and through the oil cup 13 and funnel 25, and a mixture rich in hydrocarbon vapors is drawn into the combustion chamber of the engine.

Obviously, the device admits of considerable modification without departing from our invention. Therefore, we do not wish to be limited to the specific construction and arrangement shown.

What we claim is:

1. A carbureter comprising a casing divided by two substantially horizontal partitions to provide a mixing chamber, an air chamber below said mixing chamber, and an oil reservoir below said air chamber, said mixing chamber having a separate air inlet opening and a valve normally closing said inlet opening, the upper partition having a central opening and a depending annular portion surrounding said central opening and constituting a carbureting

chamber, and said lower partition having a central depression constituting an oil receptacle into which said carbureting chamber extends, a central projection on the upper face of the bottom of said oil receptacle, said projection having a vertical bore therethrough, a vertically movable rod whose lower portion is bored axially to constitute an oil supply tube and fitted through the bore in said projection and communicating with said oil reservoir, the tubular portion of said rod having a multiplicity of perforations adapted to communicate with said carbureting chamber, and the upper end portion of said rod projecting through the top of the casing, an adjustable and resilient device for supporting the rod with a desirable number of the perforations in its tubular portion uncovered above said projection of the oil receptacle, and a lever connection between said adjustable supporting device and the air valve for said mixing chamber whereby, when said air valve is opened, the supporting device is lifted and the rod thereby moved to uncover a greater number of the perforations in its tubular portion.

2. A carbureter comprising a casing divided by two substantially horizontal partitions to provide a mixing chamber, an air chamber below said mixing chamber, and an oil reservoir below said air chamber, the upper partition having a central opening and a depending annular flange surrounding said central opening and constituting a carbureting chamber, the lower partition having a central depression constituting an oil receptacle into which the carbureting chamber projects, a vertically movable rod whose lower portion is tubular to constitute an oil supply tube, said rod being slidably fitted through the bottom of said oil receptacle and communicating with said oil reservoir, said tube having a multiplicity of perforations adapted to communicate with said carbureting chamber, an outwardly opening supply valve in the bottom of said oil receptacle beneath the end of said oil tube, and a resilient and adjustable support for said rod whereby the latter may be adjusted to uncover a desired number of the perforations in its tubular portion and also depressed to effect the opening of the inlet valve of said oil reservoir.

3. A carbureter comprising a mixing chamber, a carbureting chamber located below said mixing chamber and open at its top to continuous communication with the latter, an air chamber surrounding said carbureting chamber and open to continuous communication therewith at the bottom of the latter, a vertically movable oil pipe having a multiplicity of perforations adapted to communicate with said carbureting chamber, means for covering said perforations, vertically movable and adjustable supporting means for said oil pipe adapted to yieldingly hold it with a desired number of its perforations uncovered, said mixing chamber having an auxiliary air inlet, an inwardly open suction valve controlling said auxiliary air inlet, and a lever connection between said valve and said supporting means for the oil tube whereby the oil tube is raised to uncover its perforations proportionately to the distance said valve is raised.

4. A carbureter comprising a mixing chamber, a carbureting chamber located below said mixing chamber and open at its top to continuous communication with the latter, an air chamber surrounding said carbureting chamber and open to continuous communication therewith at the bottom of the latter, a vertically movable oil pipe having a multiplicity of perforations adapted to communicate with said carbureting chamber, adjustable and resilient supporting means for said oil pipe adapted to normally hold it with a desired number of its perforations uncovered, said means comprising a vertically adjustable support, a spring interposed between said support and a stop on said oil pipe, and a vertically adjustable member on said support adapted to engage said stop on the oil pipe to resist the action of said spring.

5. A carbureter comprising a mixing chamber, a carbureting chamber located below said mixing chamber and open at its top to continuous communication with the latter, an air chamber surrounding said carbureting chamber and open to continuous communication therewith at the bottom of the latter, said mixing chamber having an auxiliary air inlet, an inwardly opening suction valve controlling said auxiliary air inlet, a vertically movable oil pipe having a multiplicity of perforations adapted to communicate with said carbureting chamber, said oil pipe being slidably fitted in a bore so that any desired number of its perforations may be opened to communication with the carbureting chamber, vertically adjustable and resilient means for supporting said oil pipe, said means comprising a vertically adjustable support through which the pipe slides, a spring interposed between said support and a stop on said pipe, and a vertically adjustable member on said support adapted to contact with the stop and resist the action of said spring, and a lever connection between said vertically adjustable support and said valve which controls the auxiliary air inlet of said mixing chamber.

6. A carbureter comprising a mixing chamber, a carbureting chamber located below said mixing chamber and open at its top to continuous communication with the latter, an air chamber surrounding said car-

bureting chamber and open to continuous communication therewith at the bottom of the latter, said mixing chamber having an auxiliary air inlet, an inwardly opening suction valve controlling said auxiliary air inlet, a vertically movable oil pipe having a multiplicity of perforations adapted to communicate with said carbureting chamber, said oil pipe being slidably fitted in a bore so that any desired number of its perforations may be opened to communication with the carbureting chamber, vertically adjustable and resilient means for supporting said oil pipe, said means comprising a vertically adjustable support through which the pipe slides, a spring interposed between said support and a stop on said pipe, and a vertically adjustable member on said support adapted to engage said stop, a substantially horizontal resilient lever member pivoted at one end and secured at its opposite end to the valve which controls said auxiliary air inlet, the middle portion of said lever member being secured to said vertically adjustable supporting member for the oil pipe, a spring acting against said inwardly opening air valve, and means for varying the tension of said spring.

Signed at St. Louis, Missouri, this 18th day of February, 1911.

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Witnesses:
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