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CARBURETER.

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1,022,702. Patented Apr. 9, 1912.

Fig. 1.

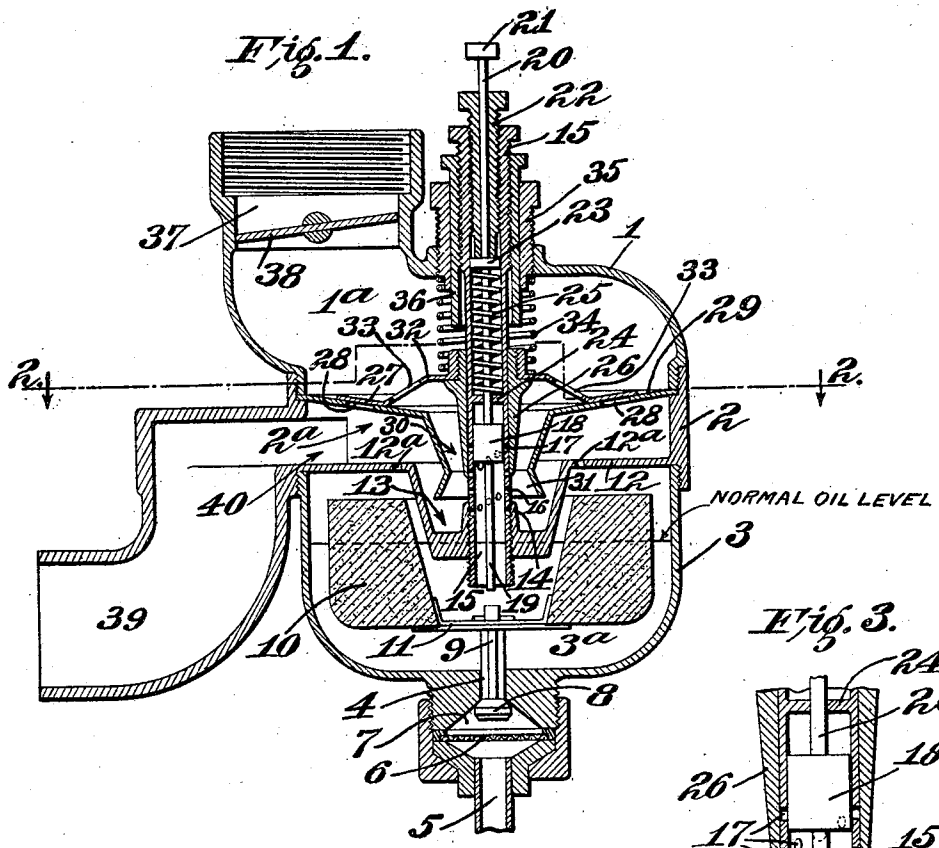


Fig. 3.

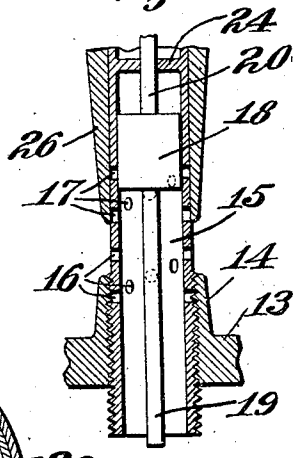
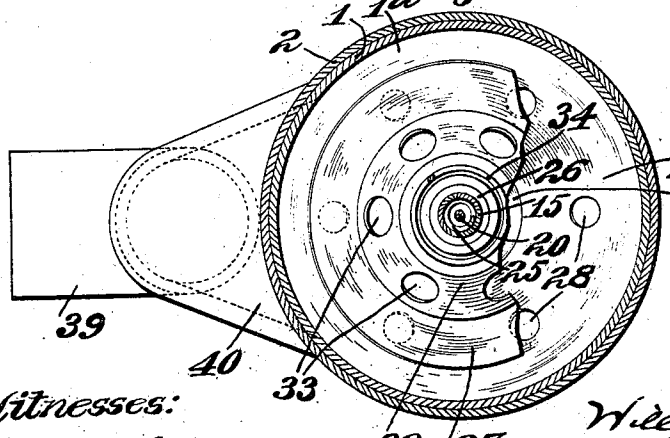


Fig. 2.



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UNITED STATES PATENT OFFICE.

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CARBURETER.

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Application filed February 27, 1911. Serial No. 611,180.

To all whom it may concern:

Be it known that we, WILLIAM F. ROTHE, a citizen of the United States, and a resident 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; Fig. 2 is a horizontal section on the line 2—2 of Fig. 1; and Fig. 3 is a fragmentary view, on an enlarged scale, illustrating the construction and arrangement of the adjustable oil feeding device.

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 screw-threaded vertical bore in which is fitted the screw-thread lower end portion of a tube 15. The tube 15 is provided with a series of perforations 16 adjacent to the boss 14 or bottom of the oil cup 13 and a second set of perforations 17 above said first mentioned set. Preferably, the perforations of each series 16 and 17 are arranged in two spiral sets starting and ending at diametrically opposite points on opposite sides of the tube.

Slidably fitted in the tube 15 is a cylindrical valve-block 18 of sufficient length to cover all the openings in the series 17; and extending from the lower end of the valve-block 18 is a rod 19 which is adapted to bear against the upper end of the valve-stem 9. Extending from the upper end of the valve-block is a rod 20 having a knob 21 on its outer end. The rod 20 slides through a bore in a screw-plug 22 in the upper end of the tube 15. A collar 23 is secured to the rod 20 and adapted to bear against the inner end of the screw-plug 22; and interposed between the collar 23 on the rod 20 and a stop or shoulder 24 inside the tube 15 and above the valve 18, is a spring 25 which normally holds the collar 23 in contact with the end of the screw-plug 22. By this arrangement the rod 20 may be depressed to move the rod 19 into contact with the valve-stem 9 thereby depressing the valve 8, so as to open communication between the supply pipe 5 and reservoir 3^a, when it is desired to flood the oil cup in priming or starting the motor.

Slidably fitted over the tube 15 is a sleeve 26 whose lower end portion normally covers the series of perforations 17 in said tube 15

and on whose upper end portion is mounted a circular valve 27. The marginal portion of the valve covers an annular series of perforations 28 in the partition 29 which separates the air chamber 2^a from the mixing chamber 1^a.

Preferably, the upper partition 29 is dished or formed concavo-convex and is provided at its middle with an opening and depending annular portion or funnel 30 constituting a carbureting chamber. The lower end portion 21 of the funnel is flared oppositely to the flare of the upper portion and projects into the oil cup 13. The middle portion of the air valve 27 is dished upwardly, as at 32, and is provided with an annular series of perforations 33 which normally establish communication between the funnel or carbureting chamber 30 and the mixing chamber 1^a when the marginal portion of the valve is closed against the partition 29.

The valve 27 is resiliently held seated on the partition 29 by a spring 34 which bears at one end against the top of the valve and at its opposite end against a screw-plug 35 fitted into a screw-threaded opening in the casing 1. The plug 35 is provided with an axial bore in which is slidably fitted a bushing 36 whose inner end portion serves as a stop to limit the upward movement of the valve 27. The bushing 36 is provided with a screw-threaded bore adapted to receive the screw-threaded upper end portion of the tube 15. By this arrangement, the tube 15 may be adjusted in the screw-threaded boss 14 of the oil cup 13, so that one or all of the lower series of perforations 16 may be opened; and, as the tube 15 is raised or lowered to accomplish this adjustment, the bushing 36 of course has to be adjusted in or out on the tube, as the case may be, to properly locate its inner end portion with respect to the valve 27 for which it serves as a stop. Also, by adjusting the screw-plug 22 in and out, the valve-block 18 may be moved to close or open one or the entire upper series of perforations 17.

The mixing chamber 1^a is provided with an outlet opening 37 which is controlled by a throttle valve 38 and adapted for connection with the intake opening of an internal combustion motor.

An air intake pipe 39 communicates with the air chamber 2^a through the passageway 40. In some cases said pipe 39 may be extended, in any obvious manner, in proximity to the exhaust pipe or some portion of the motor so that the air which is taken into the carbureter will be heated.

In the operation of the carbureter, the tube 15 is adjusted so that the proper number of the openings 16 are clear of the top edge of the boss 14 to admit sufficient oil for the combustible mixture for the low speed of the motor. On the suction stroke of the piston, the air is drawn into the chamber 2^a around the outside of the funnel or carbureting chamber 30, thence down into the oil cup 13 where it takes up the oil therein, and thence up through the funnel and perforations 33 into the mixing chamber 1^a. In case there is no oil in the cup 13, the suction created by the piston of the motor and the air which is drawn past the perforations 16 in the oil tube 15, draws the oil from the reservoir 3^a up into the tube and out through said perforations. When the throttle is opened more fully and the motor is running at a higher speed, the valve 27 will be lifted against the tension of the spring 34 and the openings 28 in the partition 29 are uncovered so that a portion of the air passes into the mixing chamber through said perforations 28 without entering the oil cup 13 and funnel 30. As the air valve 27 is lifted, the sleeve 26 is also lifted to uncover the perforations 17 or so many of them that are not closed by the valve-block 18. Hence, more oil is admitted into the funnel and taken up by the air that passes therethrough, and the mixture is finally effected in the chamber 1^a.

In priming the motor, on starting, the rod 20 is pressed downwardly and the rod 19 which is connected thereto through the valve-block 18, is moved against the valve stem 9 and the valve 8 is depressed so that the oil in the chamber 3^a reaches a level with the openings 16 which are exposed above the boss 14. The oil then flows into the cup 13. By keeping the valve 8 open, in some cases, 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 air chamber 2^a; or, in case the oil does not reach a level so high, the vapors which may have accumulated on top of the oil in said chamber 3^a will be forced through said vent openings 12^a into the chamber 2^a by the body of oil rising in said chamber 3^a. Hence, when the engine is cranked, the air is drawn through the pipe 39 into the chamber 2^a and through the oil cup 13 and funnel 30 and a mixture rich in hydrocarbon vapors is drawn into the combustion chamber of the engine.

As above set forth, a more or less number of the perforations 16 may be opened to supply a greater or smaller quantity of oil, as required; and the valve-block 18 may also be moved to uncover as many of the openings 17 as desirable or necessary in the operation of the motor. So, too, by regulating the tension of the spring 34 and also by varying the position of the stop bushing 36, the opening of the valve 27 carrying the sleeve 26 is controlled.

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 an air chamber and a carbureting chamber communicating therewith, an oil receptacle communicating with said air chamber and with said carbureting chamber, an oil supply tube extending into said oil receptacle and into said carbureting chamber, said oil supply tube having a series of perforations adapted to communicate with said oil receptacle, means for uncovering all or a portion of said perforations, said oil supply tube having a second set of perforations adapted to communicate with said carbureting chamber, means for uncovering all or a portion of said second series of perforations in said oil supply tube, an additional device adapted to normally cover all of said second series of perforations, and an air valve connected to said additional device and adapted upon opening to actuate the same to uncover said second mentioned series of perforations.

2. A carbureter comprising communicating carbureting and mixing chambers, an air chamber having a normally open communication with said carbureting chamber, said air chamber also having means of communication with said mixing chamber, a valve arranged to normally close said means of communication between said air chamber and mixing chamber, an oil receptacle having a normally open communication with said air chamber and said carbureting chamber, an oil supply tube having an opening or openings communicating with said oil receptacle and an additional opening or openings adapted to communicate with said carbureting chamber, and a device for normally closing said additional oil supply tube opening or openings and connected to the aforesaid valve controlling the communication between said air chamber and said mixing chamber so as to uncover said additional oil supply tube opening or openings when said valve is opened.

3. A carbureter comprising communicating carbureting and mixing chambers, an air chamber having a normally open communication with said carbureting chamber, said air chamber also having means of communication with said mixing chamber, a valve arranged to normally close said means of communication between said air chamber and mixing chamber, an oil receptacle having a normally open communication with said air chamber and said carbureting chamber, an oil supply tube having an opening or openings communicating with said oil receptacle and an additional opening or openings adapted to communicate with said carbureting chamber, a device for normally closing said additional opening or openings in the oil supply tube and connected to the aforesaid valve controlling the communication between said air chamber and said mixing chamber so as to uncover said additional opening or openings upon the opening of the valve, and means for closing said additional opening or openings in the oil supply tube independent of the device which is connected to said valve.

4. A carbureter comprising a vertically disposed casing which is circular in transverse section, said casing being divided by two horizontal partitions to constitute a mixing chamber in the upper portion thereof, an air chamber below said mixing chamber and an oil reservoir below said air chamber, a centrally disposed carbureting chamber normally in continuous communication with said air chamber and with said mixing chamber, said upper partition having an annular series of perforations disposed around said carbureting chamber so as to establish communication between said mixing chamber and said air chamber, a lift valve on said partition adapted to normally close said annular series of perforations, an oil supply tube extending centrally through the carbureting chamber and into the oil reservoir, said oil supply tube having a series of openings adapted to communicate with said carbureting chamber, and means for normally closing a part of said openings in the oil tube and connected to said lift valve which controls said annular series of perforations in the upper partition so that the normally uncovered openings in the oil tube are successively uncovered proportionately to the opening of said valve.

5. A carbureter comprising a casing divided by two horizontal partitions to constitute, respectively, 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 portion surrounding the opening and constituting a carbureting chamber, said upper partition also having an annular series of perforations therein, and the lower partition having a central depression constituting an oil receptacle, an oil supply tube extending vertically through the bottom of the oil receptacle and upwardly through the carbureting chamber, said oil tube having a perforation therein adjacent to the bottom of the carbureting chamber, means for covering and uncovering said perforation in the oil supply tube, a series of perforations above said first mentioned perforation in said oil supply tube, said second mentioned series of perforations opening into the carbureting chamber, a sleeve slidably fitted on said oil tube and normally covering said second mentioned series of perforations

therein, and an air valve mounted on said sleeve and resting normally on top of said upper partition and covering the annular series of perforations therein.

6. A carbureter comprising a casing divided by two substantially horizontal partitions to constitute, respectively, a mixing chamber, an air chamber beneath said mixing chamber, and an oil reservoir below said air chamber, the lower partition being depressed at its center to constitute an oil receptacle, and the upper partition having a central opening and a depending annular portion surrounding said opening and extending into said oil receptacle and constituting a carbureting chamber, said upper partition also having an annular series of perforations surrounding its central opening, an oil supply tube extending vertically through the bottom of said oil receptacle and communicating with the oil reservoir and extending upwardly through the carbureting chamber, said oil supply tube having a perforation or perforations open continuously to communication with said oil receptacle adjacent to the lower end of said carbureting chamber, said oil supply tube also having a multiplicity of perforations above said first mentioned perforations therein, a sleeve slidably fitted over said oil supply tube and normally closing said second mentioned series of openings therein, and a valve mounted on said sleeve and resting normally on said upper partition and covering the annular series of perforations therein, said valve having a series of perforations for establishing communication between said carbureting and mixing chambers.

7. A carbureter comprising a carbureting chamber, an oil supply tube having a multiplicity of perforations adapted to communicate with said carbureting chamber, means for adjusting said tube so that a part of said perforations are normally uncovered to such communication, a device for normally covering the other perforations against such communication, and means for automatically actuating said covering device to uncover the perforations proportionately as air is taken increasingly into said carbureting chamber.

8. A carbureter comprising a carbureting chamber having an open air inlet and an auxiliary air inlet, and a valve normally closing said auxiliary air inlet, an oil supply tube having a multiplicity of perforations adapted to communicate with said carbureting chamber, means for adjusting said tube so that a certain number of said perforations are normally open to such communication, means for covering the other perforations normally against such communication, and means for automatically uncovering said covered perforations proportionately to the opening of the auxiliary air valve.

9. A carbureter comprising a vertically disposed casing which is circular in transverse section, said casing being divided by two horizontal partitions to constitute a mixing chamber in the upper portion thereof, an air chamber between said partitions and an oil reservoir in the lower portion thereof, said air chamber having an air inlet, the lower partition being depressed centrally and the upper partition having a central opening and depending annular portion extending into the depression in said lower partition, said depending annular portion of the upper partition constituting a carbureting chamber, said upper partition having an annular series of perforations extending around said depending annular portion, a lift valve on said upper partition adapted to normally close said annular series of perforations, an oil supply tube extending centrally through said carbureting chamber and communicating at its lower end with said oil reservoir, said oil tube having openings adapted to communicate with said carbureting chamber, and means for increasingly supplying oil to said carbureting chamber automatically as air is increasingly taken into the carbureter sufficiently to raise said valve on the upper partition.

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

WILLIAM F. ROTHE.
EARLE E. CULP.

Witnesses:
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