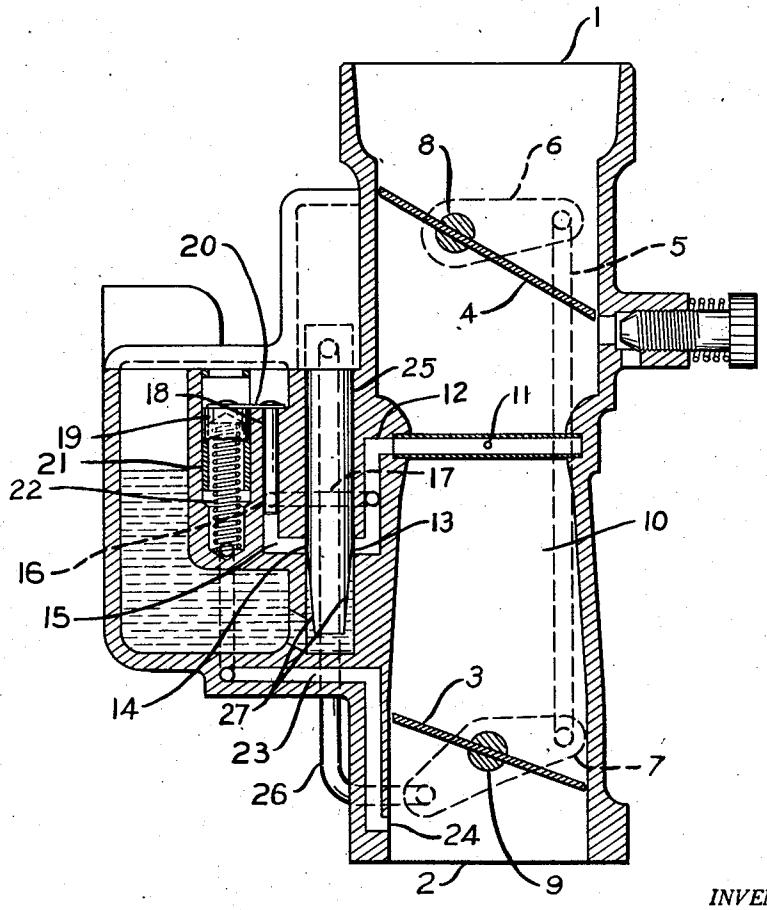
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CARBURETOR

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INVENTOR.
MARION MALLORY

BY Barnes, Kisselle, Laughlin & Reisch
ATTORNEYS.

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CARBURETOR

Marion Mallory, Detroit, Mich.

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3 Claims. (Cl. 261—41)

This invention relates to a carburetor.

It is old in carburetors to vary the ratio of fuel to air according to the requirements of the engine. Thus, when the engine is operating under a full load or at wide open throttle, a richer mixture is supplied the engine than when the engine is operating under part load or at part open throttle.

It is the object of this invention to produce a carburetor that will enrichen the fuel mixture whenever the engine is operating under a considerable or heavy load.

This invention also contemplates a carburetor wherein the fuel is metered throughout the entire range of fuel mixture ratio. This object is achieved by means of a power jet which cuts in whenever the vacuum in the manifold reaches or falls below a predetermined value and wherein the fuel supplied to the power jet is metered. The fuel to the power jet is metered to admit more fuel to the power jet as the throttle opens and less fuel as the throttle closes, that is, the fuel to the power jet is metered in accordance with the opening and closing of the throttle valve.

The drawing is a vertical cross section through the improved carburetor.

The carburetor comprises a housing provided with an air inlet 1 and a fuel mixture outlet 2 into the manifold of the engine. The throttle valve is designated 3 and the air valve 4. The throttle valve 3 and air valve 4 are connected together so that they open and close in synchronism. This is accomplished by means of a link 5 connected at one end to arm 6 and at the other end to arm 7. Arm 6 is fixed on shaft 8 which supports valve 4 and arm 7 is fixed on shaft 9 which supports throttle valve 3.

The mixing chamber is designated 10 and the fuel is delivered into the mixing chamber through jet 11. Jet 11 is connected with the fuel bowl by passageway 12 and orifice 13. Jet 11 is also connected with the fuel bowl by orifice 14, passageway 15, orifice 16 and passageway 17 which connects into passageway 12 between jet 11 and orifice 13. Orifice 16 is controlled by valve 18 which is connected to piston 19 by bridge 20. Piston 19 is mounted in cylinder 21. A compression spring 22 is mounted between the bottom of cylinder 21 and piston 19 so that spring 22 tends to raise piston 19. The lower end of cylinder 21 is connected by means of passageway 23 and orifice 24 into the carburetor passageway on the engine or fuel mixture outlet side of throttle valve 3.

The fuel flowing through orifices 13 and 14 is metered by metering pin 25 connected by link 26 with arm 7. Metering pin 25 is provided on its opposite sides with flat tapers 27 which meter the fuel flowing through orifices 13 and 14. Since metering pin 25 is connected by link 26 with arm 7, as throttle valve 3 opens, metering pin 25 is raised so that flat tapers 27 cooperate with orifices 13 and 14 to increase the amount of fuel that can flow through these orifices. During the operation of the carburetor, fuel flows continuously through orifice 13, passageway 12 and jet 11 but fuel flows through orifice 14, passageway 15, orifice 16 and passageway 17 into passageway 12 only when valve 18 has been moved to open position by spring 22, as described below.

The operation of the carburetor is as follows: When the engine is idling, throttle valve 3 and air valve 4 are almost closed so that just sufficient air flows through the carburetor to maintain the engine idling. At this time metering pin 25 almost closes orifice 13 so that only sufficient fuel is drawn through orifice 13, passageway 12 and jet 11 to keep the engine idling. At idle position of throttle valve 3 the vacuum existing on the engine side of throttle valve 3 and in passageway 23 and cylinder 21 draws piston 19 down, compressing spring 22, and this also moves valve 18 down so that it shuts off orifice 16. When valve 18 closes orifice 16 no fuel can flow from orifice 14 through passageway 15 into passageway 17. As the throttle valve is opened, air valve 4 will also open and the metering pin 25 likewise will rise so that flat tapers 27 increase the amount of opening at orifices 13 and 14. If, however, the throttle valve 3 is not open far enough to apply a considerable load on the engine, the vacuum on the outlet side of throttle valve 3 at orifice 24 will remain high enough to compress spring 22 and hold piston 19 and valve 18 downwardly to shut off orifice 16. As soon as the throttle is opened wide enough to apply considerable, but not necessarily full load on the engine, the vacuum below the throttle valve 3 at orifice 24 will collapse thereby permitting spring 22 to raise piston 19 and valve 18 which opens orifice 16. As soon as orifice 16 is open, fuel flows through orifice 14, passageway 15, orifice 16, passageway 17, into passageway 12 where it joins the fuel passing through orifice 13 into passageway 12, and then flows through jet 11 into the mixing chamber 10. This additional fuel flowing through orifice 14, passageway 15, orifice 16 and passageway 17 into passageway 12 increases the richness of the fuel mixture flowing

into the engine whenever the engine is operating under a considerable load.

The greater the vacuum in the intake manifold the better the fuel is atomized or mixed with the air and the more thorough becomes the combustion in the cylinder. Therefore, at high manifold vacuum a leaner or more economical fuel mixture can be used. If good acceleration of the engine is desired under low manifold vacuum conditions, then a higher fuel mixture ratio must be used because a poorer atomization of the fuel will be obtained and more fuel must be supplied to get the power desired. Thus, the tension of spring 22 will be such that it will open valve 18 whenever the vacuum in the intake manifold or on the engine side of valve 3 falls below a predetermined vacuum which will largely be determined by the performance desired from the engine associated with the carburetor. Preferably, the power jet cuts in only when the engine is subjected to a considerable load, such as occurs when the throttle is moved to wide or nearly wide open position, and such as occurs at low engine speeds when the throttle is moved only part way open from idle or close to idle.

As herein shown, jet 11 serves a dual purpose, namely, it supplies the engine with the fuel metered through orifice 13 and it also serves as a power jet to supply the engine with the fuel metered through orifice 14 when valve 18 is open. Obviously, by using jet 11 for this dual purpose, a more simple construction of carburetor is obtained. However, if desired a separate jet can be provided for supplying the engine with the fuel metered through orifice 14.

I claim:

1. A carburetor for an internal combustion engine comprising a housing with a passageway therethrough having an inlet and an outlet, a throttle valve in said passageway, a fuel nozzle, a fuel bowl, a passageway including two branches between the nozzle and the fuel bowl, a metering pin controlling the flow of fuel from the fuel bowl into the two branches, said metering pin having tapered faces adjacent the fuel inlet ends of said branches and operating in unison with the throttle to increase the flow of fuel through the two branches when the throttle is moved toward open position and to decrease the flow of fuel through the two branches when the throttle is moved toward closed position, a positive connection between said metering pin and the valve, and a vacuum controlled valve for shutting off one of said branches when the vacuum in said passageway between the throttle and the outlet increases above a predetermined point whereby the fuel mixture is made leaner.

2. A carburetor for an internal combustion engine, said carburetor having a passageway therethrough, a throttle valve and an air valve in said passageway arranged to open and close in unison, a fuel bowl, a fuel jet in said passageway between the throttle and air valves, a first conduit connecting said fuel bowl to said jet, a second conduit connecting said fuel bowl to said first conduit between said jet and the fuel inlet end of said first conduit, a metering pin positively connected to said throttle valve to open in synchronism therewith and simultaneously increase the flow of fuel out of the jet and the flow of air through the main passageway as the throttle opens, said metering pin having tapered faces adjacent the fuel inlet ends of said first and second conduits for controlling and metering the flow of fuel into said conduits, the clearance between the tapered sides of said metering pin and inlet ends of said first and second conduits increasing as the throttle opens, a valve controlling said second conduit, and vacuum controlled means connected into the said passageway on the outlet side of said throttle valve and connected to the valve in the second conduit for shutting off the second conduit whenever the vacuum on the outlet side of the throttle valve is high and for opening said second conduit whenever the throttle valve is opened sufficiently to lower the vacuum below a predetermined value whereby the fuel mixture is enriched.

3. A carburetor for an internal combustion engine, said carburetor having a main passageway therethrough with an inlet and an outlet, a throttle valve in said passageway, a fuel bowl, a jet in said passageway on the atmosphere side of said throttle valve, a first passageway connecting said fuel jet to the fuel bowl, a second passageway connecting said first passageway with said fuel bowl, a metering pin positively connected to the throttle valve for opening and closing in synchronism therewith, said metering pin having a shape adjacent the fuel inlet ends of said first and second passageways whereby an increasing clearance between the metering pin and inlet ends of said first and second passageways is produced as the throttle valve opens whereby said metering pin meters the fuel flowing from the fuel bowl into both of the said fuel passageways, a valve for closing said second fuel passageway, a suction controlled device connected to said fuel valve, and a passageway connecting the suction device with the main passageway of the carburetor on the outlet side of the throttle valve whereby the suction device responds to a decrease in the vacuum in said passageway on the outlet side of the throttle valve whenever the throttle valve is opened to lower the manifold vacuum below a predetermined value and thereby opens the said fuel valve to permit fuel to flow through the second fuel passageway and increase the amount of fuel flowing out of said jet and thereby enrich the fuel mixture.

MARION MALLORY.