March 15, 1949. M. MALLORY 2,464,328

CARBURETOR

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Fig. 2

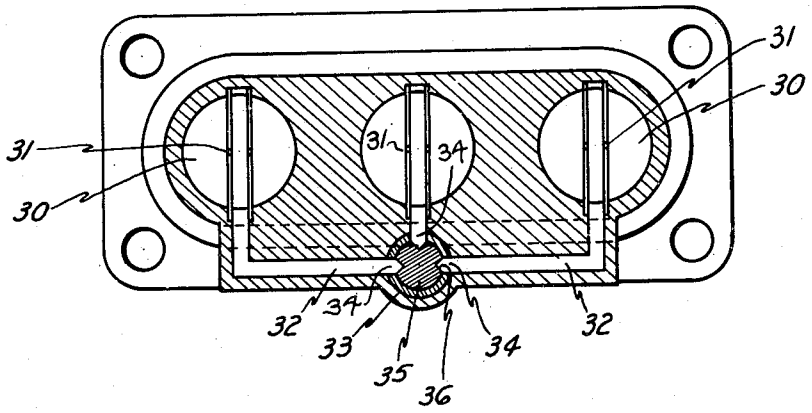
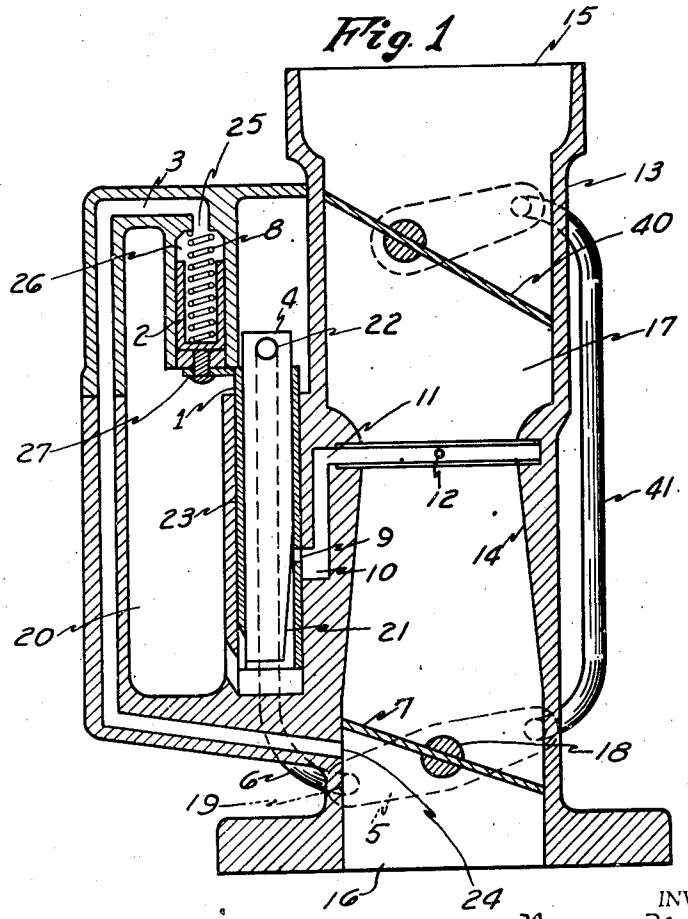


Fig. 1



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CARBURETOR

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2 Claims. (Cl. 261—49)

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This invention relates to a carburetor for an internal combustion engine and more particularly to a power jet arrangement for a carburetor.

It is the object of this invention to produce a carburetor having a power jet which will respond immediately and smoothly to enrich the fuel mixture when the throttle is opened to apply a heavy load on the engine. This object is achieved by means which utilizes the manifold vacuum to enrich the fuel mixture when the manifold vacuum drops and the load on the engine increases and to decrease the richness or lean out the fuel mixture when the manifold vacuum increases and the engine is operating under a light load.

For purposes of description, the specific embodiment of the invention comprises a valve which controls the flow of fuel from the float bowl to the carburetor nozzle in accordance with the vacuum conditions in the intake manifold so that upon a drop in the intake manifold vacuum the valve increases the flow of liquid or raw fuel from the float bowl to the carburetor nozzle and upon an increase in the manifold vacuum the valve decreases the flow of raw fuel from the float bowl to the nozzle.

In the drawings:

Fig. 1 is a vertical section through a single carburetor and power jet arrangement.

Fig. 2 is a horizontal section through a multiple or compound carburetor showing the power jet arrangement applied thereto.

The carburetor comprises a housing 13 having a passageway 17 therethrough provided with a venturi 14. The air inlet of the carburetor is designated 15 and the fuel mixture outlet 16. The fuel mixture passes through outlet 16 into the intake manifold proper of the engine (not shown) but, practically as well as for the purpose of this specification, that portion of the passageway 17 on the outlet or engine side of throttle valve 7 constitutes a part of the engine intake manifold passageway. The throttle valve 7 is fixed on the usual shaft 18 which is journaled in the carburetor housing and rotated to open or close the throttle 7 by means of the lever 5 fixed on an end of shaft 18 externally of the housing 13.

The fuel reservoir or float bowl chamber is designated 20. Fuel passes from float chamber 20 through orifice 10, passageway 11 and nozzle 12 into the venturi 14. The flow of fuel from the float bowl through nozzle 12 is controlled by metering pin 4 and sleeve valve 1 provided with an orifice 9. The metering pin 4 is provided with

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a flat taper 21 adjacent its lower end and is slidable upwardly and downwardly in the sleeve 1 by means of link 6. The upper end of link 6 is pivotally connected to metering pin 4 as at 22 and the lower end is pivotally connected to the lever 5 as at 19. Thus, metering pin 4 is raised as the throttle valve opens and lowers as the throttle valve closes.

Sleeve valve 1 is arranged to slide upwardly and downwardly in bore 23 in the carburetor housing. The raising and lowering of valve 1 is controlled by the vacuum in the manifold passageway. To this end a passageway 3 communicates at one end as at 24 with the intake manifold passageway, that is, on the fuel mixture outlet side of throttle valve 7 and the other end of the passageway communicates as at 25 with cylinder 26. A piston 2 is reciprocably mounted in cylinder 26 and is normally urged downwardly by compression coil spring 8. The lower end of piston 2 is rigidly fixed to arm 27 which forms a part of sleeve 1. Sleeve valve 1 is provided with an orifice 9 which cooperates with the flat taper 21 of metering pin 4 and orifice 10 to regulate the flow of fuel from the float chamber into passageway 11.

As shown in the drawings, throttle valve 7 is closed for engine idling and the vacuum in the manifold passageway is high. The manifold vacuum is applied through passageway 3 on piston 2 which is shown in fully raised position. At this time sleeve valve 1 is in its extreme upward position so that orifice 9 is raised and adjacent the top side of orifice 10 and adjacent the upper end of tapered face 21.

Since, for purposes of description, metering pin 4 is shown in the form of a cylinder, the flat tapered surface 21 flares outwardly from the top to the bottom of the taper. Thus, as shown in Fig. 1, orifice 9 is adjacent or opposite the most restricted area of the flat taper 21 and the flow of fuel from the float bowl 20 through orifice 9 into passageway 11 is at its minimum. As throttle valve 7 opens, the vacuum in the intake manifold and in passageway 3 and cylinder 26 decreases thereby permitting spring 8 to lower piston 2 which simultaneously lowers the sleeve 1 and orifice 9. As orifice 9 is lowered it moves toward the less restricted end of flat taper 21 and thus increases the effective size of the fuel passageway between the flat taper 21 and the side wall of the sleeve 1 through which fuel can enter and flow through orifice 9 into passageway 11. In other words, the lowering of sleeve 1 relative to metering pin 4 has the same effect as raising the

metering pin 4. It should, of course, be understood that as the throttle valve 7 opens, metering pin 4 is simultaneously raised through link 6 and as the metering pin 4 is raised the flat taper 21 decreases the restriction to flow of fuel between the float bowl 20 and nozzle 12. When the throttle 7 is opened quickly, say, for example, from idle to wide open position, the manifold vacuum reaches its lowest value and under such condition the sleeve 1 will be in its lowermost position with orifice 9 adjacent the bottom of orifice 10 and the metering pin 4 will be raised to its highest position so that under such condition the minimum restriction to flow of fuel from float bowl 20 by taper 21 through orifice 9 into passageway 11 will be afforded and thus the fuel mixture will be greatly enriched due to this power jet action of metering pin 4 and sleeve valve 1.

From the above it is evident that the power jet arrangement is characterized by utilizing an increase of vacuum in the intake manifold passageway to decrease the flow of fuel from the float bowl to the fuel nozzle and by utilizing a decrease of vacuum in the intake manifold to increase the flow of fuel from the float bowl to the nozzle and thereby enrichen the fuel mixture.

For purposes of description, the carburetor is shown as an air valve carburetor having the conventional air valve 40 connected by link 41 with throttle valve 7 so that valves 40 and 7 open and close simultaneously. However, it should be understood that the power jet arrangement will operate successfully with either a plain tube type of carburetor in the absence of air valve 40 as well as with the air valve type of carburetor shown in Fig. 1.

In Fig. 2 this power jet arrangement is shown applied to a compound carburetor. Fig. 2 is a horizontal section showing a compound carburetor having three throats or venturis 30 each provided with a fuel nozzle 31 which communicate with the float bowl through passageways 32 corresponding to passageway 11 in the principal form of the invention. In this form of the invention the sleeve valve 33 is similar to sleeve valve 1 and operated by identically the same suction arrangement such as passageway 3, piston 2 and spring 8, but since there are a plurality of fuel nozzles and passageways 32 leading thereto, sleeve valve 1 necessarily must be provided with three orifices 34 each of which corresponds to orifice 9. The metering pin is designated 35 and is operated with the throttle valve by exactly the same means as described above. For purposes of description metering pin 35 is shown with tapered grooves 36 which increase in depth as they approach the lower end of the metering pin. These grooves serve exactly the same function as the flat tapered surface 21 of metering pin 4.

The modified form of the invention operates identically the same as the principal form, the only difference being that a plurality, instead of a single carburetor is served by a single metering pin 35 and sleeve valve 33.

I claim:

1. In a carburetor for an internal combustion engine, a fuel mixture conduit, a throttle valve therein, a fuel passageway discharging into said conduit, a member having a metering orifice for said passageway, a tapered metering pin movable

independently of said member with said metering orifice for varying the effective size of said orifice, the taper of said metering pin being in juxtaposition to said metering orifice, means including a positive connection between said metering pin and said throttle valve for opening and closing said metering pin and said throttole valve in unison, and means actuated by changes of pressure in the fuel mixture conduit on the engine side of said throttle valve for moving said member with the metering orifice independently of and with respect to said metering pin to additionally vary the effective size of said metering orifice, said pressure actuated means responding to an increase in pressure in said mixture conduit to move said member with the metering orifice with respect to said metering pin and increase the effective size of said metering orifice and responding to a fall in pressure in said mixture conduit to move said member with the metering orifice with respect to said metering pin and decrease the effective size of said metering orifice.

2. In a carburetor for an internal combustion engine, a fuel mixture conduit, a throttle valve therein, a fuel passageway discharging into said conduit on the atmosphere side of said throttle valve, a member having a metering orifice for said passageway, a tapered metering pin movable independently of said member with said metering orifice for varying the effective size of said orifice, the taper of said metering pin being in juxtaposition to said metering orifice, means including a positive connection between said metering pin and said throttle valve for opening and closing said metering pin and said throttle valve in unison, and means actuated by changes of pressure in the fuel mixture conduit on the engine side of said throttle valve for moving said member with the metering orifice independently of and with respect to said metering pin to additionally vary the effective size of said metering orifice, said pressure actuated means being the sole means for controlling the position of said member with said metering orifice whereby said pressure actuated means can move said member with said metering orifice even when said metering pin remains stationary to vary the fuel mixture and whereby said pressure actuated means responds to an increase in pressure in said mixture conduit to move said member with the metering orifice with respect to said metering pin and increase the effective size of said metering orifice and responds to a fall in pressure in said mixture conduit to move said member with the metering orifice with respect to said metering pin and decrease the effective size of said metering orifice.

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