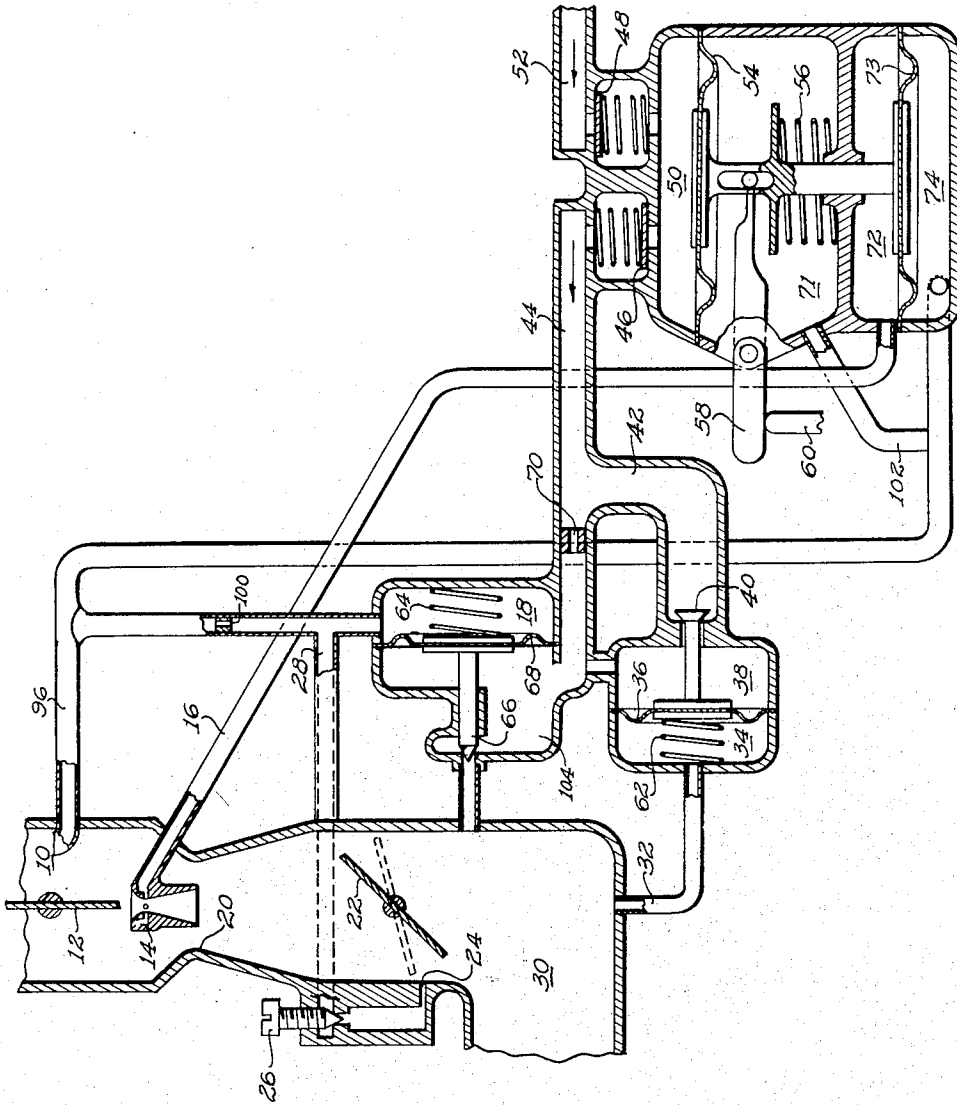


Nov. 7, 1950

A. W. ORR, JR  
PRESSURE CARBURETOR  
Filed Aug. 30, 1946

2,529,101



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# UNITED STATES PATENT OFFICE

2,529,101

## PRESSURE CARBURETOR

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Application August 30, 1946, Serial No. 693,907

5 Claims. (Cl. 261-27)

1

The object of this invention is to supply fuel under pressure to an internal combustion engine and to measure the quantity of fuel by the depression in a venturi located in the air entrance. Specifically, the pressure of fuel delivered by an ordinary variable stroke diaphragm pump in general use is caused to vary with the air flow as indicated by the depression in the venturi in the air entrance. Fuel from this variable pressure variable stroke fuel pump is discharged directly into the inlet manifold without any float chamber.

The figure shows diagrammatically a form of my invention.

In the figure, 10 is the air entrance, 14 is the venturi in said air entrance, 22 is the throttle, which, when closed, places the opening 24 below, that is, on the suction side of the throttle 22. This imposes a suction through pipe 28 in chamber 18. An adjustment 26 determines the relative effect of this suction which is most effective at closed throttle (idling condition).

Air entrance pressure is admitted through the tube 96, past the restriction 100, to the chamber 18.

The pump 44-46-50-48-52-58-60 is adapted to deliver fuel at a pressure determined by the air flow and by the pressure exerted by the spring 56. The pipe 16 connects to the chamber 72, above a diaphragm 73, and the chamber 74, below the diaphragm 73, is connected through the pipe 96 to the air entrance 10. At the point of entrance 96 faces upstream.

The chamber 71 is also connected to the air entrance pressure through the pipe 102 which is connected to the pipe 96.

The fuel delivered from the pump flows through the restriction 70, at which point there is a drop which increases as the square of the flow. The pressure on the diaphragm 36 varies with the flow and the position of the throttle 22, which varies the pressure in the air outlet 30, which varies the pressure in the chamber 34, to the left of the diaphragm 36.

The spring 62 tends to open the valve 40. The pressure in the air entrance is transmitted through the restriction 100 to the diaphragm chamber 18. The valve 66 is thus opened by the depression in the throat of the venturi 14, indirectly, because this depression causes the pump pressure in pump outlet 44 and in chamber 104, to the left of diaphragm 68, to increase as the pressure in chamber 72 falls and imposes an increased upward pressure on the diaphragm 54 of the fuel pump. The valve 66 thus opens in re-

2

sponse to an increase in the airflow through the venturis 14 and 20.

The valve 40 opens in response to the opening of the throttle 22 which increases the pressure in the passage 30 through the passage 32 in the chamber 34. Spring 62 also assists in opening the valve 40 against the pressure in the chamber 38.

In this construction the fuel measured by the opening of the valve 66 is delivered directly into the air passage 30 below the throttle 22.

### Operation

In the figure when operating with the throttle 22 closed down to the dotted line (idle) position the restriction 24 imposes a slight suction in the chamber 18 so that the valve 66 opens wide enough to admit enough fuel so that the engine will idle.

When the throttle 22 is opened to a normal running position, as shown in full lines, the valve 40 remains closed but the valve 66 progressively opens in response to an increase in suction in the venturi 14 which increases the pressure difference across the diaphragm 73 which, acting on the diaphragm 54 increases the pump pressure acting in the passage 44. This increase in pump fuel pressure in response to air flow causes an increase in fuel flow to balance the increased air flow. The pressure acting on the spring 64 increases as the pressure acting on the diaphragm 54 increases.

At wide open throttle the valve 40 is opened automatically by the rise in pressure in the passage 30, thereafter the fuel flowing past the annular passage around the stem of the valve 40 is added to the fuel flowing past the restriction 70.

What I claim is:

1. A fuel and air supply system for an internal combustion engine having an air entrance, a venturi therein, an air exit, a throttle valve therein, a variable pressure fuel pump which includes a moving wall acting as the pump piston, mechanical moving means having a one way connection with said wall on its suction stroke and a spring adapted to move said wall on its pumping stroke so as to determine the minimum pumping pressure means, means for increasing the pump pressure including means responsive to an increase in the depression in the throat of said venturi, said means being adapted to act on said moving wall so as to supplement the force exerted thereon by the said spring, a fuel outlet, a valve in said outlet, a moving wall connected to said valve, an air chamber located on one side of said wall and subjected to the pres-

3

sure of the air entrance, yieldable means tending to close said valve.

2. A device as set forth in claim 1 in which there is a restricted air passage leading from the air exit below the venturi and so located that it is on the engine side of the throttle only when the throttle is substantially closed, a passage connecting this restricted opening to said air chamber, a second restriction in the passage connecting said air chamber to the air entrance whereby the pressure in the air chamber is temporarily reduced when the throttle is substantially closed.

3. A fuel and air supply system for an internal combustion engine comprising, an engine operated diaphragm pump, yieldable means for moving the diaphragm in the pumping direction, positive means for moving the diaphragm in the suction direction, an air chamber, a second diaphragm connected to the first diaphragm and located so as to divide said chamber into two parts, an air entrance, a venturi therein, a passage subjecting one side of said second diaphragm to venturi suction, a second passage to the air entrance subjecting the other side of the air entrance pressure, the passages being connected to the air chamber associated with the second diaphragm so that the second diaphragm adds its influence to the yieldable means acting on the first diaphragm as the venturi suction increases, a fuel entrance to the fuel pump, a check valve therein, a fuel exit, a check valve therein, a fuel passage leading to an outlet into the main air passage, a valve in said outlet, a third diaphragm connected to said valve and responsive to the fuel pressure generated by said pump, yieldable means tending to close the valve, an

4

air chamber on one side of said third diaphragm, a passage connecting this air chamber to the air entrance.

4. A device as set forth in claim 3 in which there is a throttle downstream from said venturi and in which there is a restriction in the outlet passage from said fuel pump, a bypass around said restriction, a valve in said bypass, means responsive to a rise in air pressure downstream of said throttle to open said valve.

5. A device as set forth in claim 3 in which there is a throttle downstream from said venturi and in which there is a restriction in the passage connecting the air chamber associated with the third diaphragm to the air entrance, a restricted second passage connected to said chamber leading to the air entrance at a point which is on the engine side of the throttle only when the throttle is almost closed so as to supplement venturi suction during idling.

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