

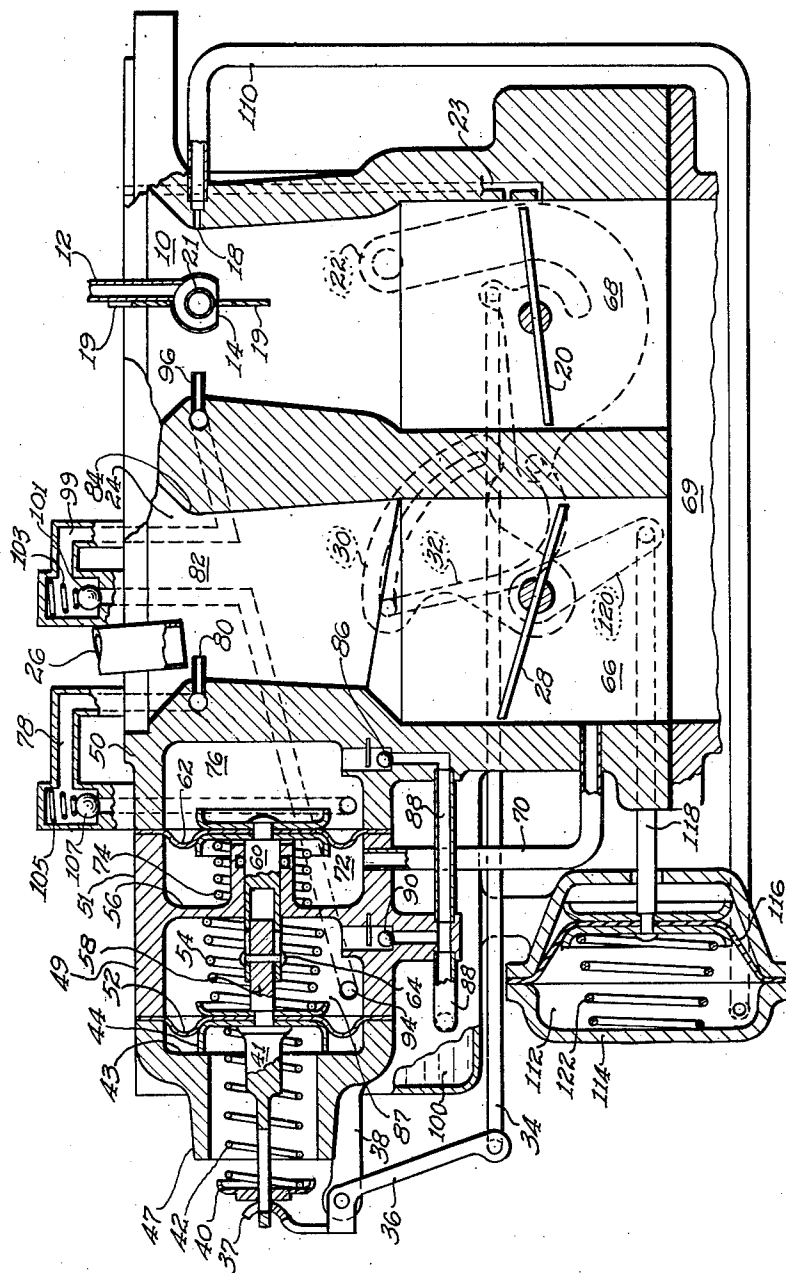
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ACCELERATING PUMP

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ACCELERATING PUMP

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5 Claims. (261—23)

The object of this invention is to increase the fuel flow when the two throttles of a two-stage (dual) carburetor are successively and rapidly opened.

Two fuel pumps are needed and I have discovered how to operate these two pumps so that they blend into the general fuel discharge and the car accelerates smoothly.

One of the pumps is mechanically controlled by the manually controlled throttle of the first stage carburetor. The second pump automatically responds to the opening of the second stage throttle which is automatically controlled by the air flow through the first stage carburetor. The diagram shows the preferred form of my invention.

In the figure:

10 is the air entrance to the primary carburetor;

12 is the fuel nozzle from a float chamber not shown, located above the air entrance 10;

14 is the annular fuel outlet surrounding the choke valve 19 located in the venturi 18 mounted on the choke shaft 21;

19 is the choke valve which rotates around the outlet 14 and is mounted on the shaft 21 located in the inside of the outlet 14;

20 is the throttle in the mixture outlet of the first carburetor;

22 is the lever for the throttle in the mixture outlet of the first carburetor;

23 is the low speed fuel outlet adjacent the upstream lip of a throttle 20 and also connected to the float chamber;

24 is the air entrance to the second carburetor;

26 is the fuel nozzle of the second carburetor connected to the same float chamber not shown, located above.

The second throttle 28 which is slightly unbalanced so as to be sucked shut is controlled by a slotted lever 30. A loose link 32 connects levers 22 and 30 together so that whenever the throttle 20 is closed the second throttle 28 is also closed positively.

After the throttle 20 is open the venturi suction in the throat of the venturi 18 is transmitted through a pipe 110 to a chamber 112 enclosed on the left by a cover 114 and to the right by a diaphragm 116. The rod 118 connects the diaphragm 116 with the throttle lever 120 which is integral with the lever 30. A compression spring 122 tends to keep the throttle 28 closed until such time as the suction of the throat of the venturi 18 is high enough to justify the opening of the second throttle 28. In other words, until such time as the depression in the chamber 112 is powerful enough to overcome the tendency of atmospheric pressure acting on throttle 28 to hold this second throttle 28 shut and also to overcome the similar tendency of the compression spring 122. The two outlet passages 68 from the first stage carburetor and 66 from the second stage carburetor both deliver into a mixture outlet 69. In other words, the chambers 66 and 68 are in free communication with each other.

There are all the background parts necessary to understand this invention.

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The elements of my invention will now be described:

A link 34 connects the lever 22 with lever 36 pivotally supported by a bracket 38. The other end 37 of lever 36 is forked and engages a cup-shaped washer 40. As shown, a compression spring 42 pushes this disc against a washer 44 mounted on a rod 41. The forked shaped upper end 37 of lever 36 when throttle 20 opens compresses the spring 42 when cup-shaped washer 44 is moved away from the abutment 43.

Four casings 47, 49, 51 and 50 enclose these elements of my invention. 47 and 49 are made in one casting separated by the wall 56. Casing 50 is integral with the carburetor castings. Casings 49 and 51 are in between casings 47 and 50. A diaphragm 52 is located between casings 47 and 49 and is connected to rod 41. A compression spring 54 seated on partition 56 in casings 49 and 51 pushes diaphragm 52 to the left.

A rod 58 slides inside a hollow rod 60 which rod 60 projects to the left from a second diaphragm 62 located between casings 51 and 50.

A pin 64 projects from rod 58 into two slots in the hollow portion of rod 60 so that after rod 41 has moved to the right a certain distance rod 41 engages rod 60 and moves diaphragm 62 a short distance to the right. However, the main portion of the travel of second diaphragm 62 is under the influence of the suction in the second mixture outlet 66 (which is equal to and in communication with the first mixture outlet 68). A passage 70 leads from the mixture outlet 66 to a chamber 72 to the right of wall 56 and to the left of diaphragm 62.

A spring 74 pushes the diaphragm 62 to the right, provided the pin 64 in rod 58 is in such a position in the slots so that the hollow rod 60 may move to the right. This would not be possible, of course, when the throttle plate 20 is closed so that the rod 58 is in its extreme left-hand position. Suction in chamber 72 pulls the diaphragm 62 to the left when the pin 64 and rod 58 are in their left-hand position.

When the depression in 66 and 68 suddenly drops (as it does during rapid acceleration) diaphragm 62 moves to the right, ejecting gasoline from chamber 76 through passage 78 to nozzle 80 in throat 82 of the throat of the second venturi 84. Fuel enters chamber 76 past a check valve 86 from a fuel passage 88.

Fuel enters chamber 87 located between the diaphragm 62 and the wall 56 past a check valve 90 from the fuel passage 88.

Fuel is discharged from chamber 87 along the passage 94 which discharges through nozzle 96 located in the throttle 18 of the first venturi, through a passage 99 and past a check valve 101 which is seated by a spring 103. A similar spring 105 acts on a similar ball 107 in the passage 78.

A constant level fuel supply chamber 100 is indicated in the back ground and supplies fuel to the passage 88 through the check valves 90 and 86 to the fuel chambers 87 and 76.

Operation

Assume the throttle 20 is opened at such a rate that the engine accelerates and maintains the suction in the common mixture outlet 69. The diaphragm 62 remains as shown in the drawing because of the pin 64 being free to move in the slot. However, if after the throttle 20 is half open and the fuel is supplied chiefly from passage 23 and the throttle 20 thereupon ceases to be moved but the air flow through the first air entrance 10 continues to increase then the second throttle 28 will open and unless the second stage accelerating pump 72, 62, 76, 80, 82 was provided, a "lean spot" would develop. The opening of the two throttle valves 20 and 28 will cause the fuel in the chamber 76 to discharge even if the first throttle 20 quits

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moving after it has been moved to its half open position. The point is that the second throttle 28 is moved automatically and this fact requires an automatically pressure responsive pump to provide fuel for the automatic opening of the second stage throttle.

There is always a delay before the nozzle 26 comes into operation so that if the fuel in chamber 76 should be discharged on to the throttle 28 when 28 is still closed, when 28 does open there is this fuel available to run the engine in the time interval before nozzle 26 comes into action.

What I claim is:

1. A dual accelerating fuel pump to supply accelerating fuel for a dual carburetor having a first and a second mixture chamber with one common mixture outlet connected to an inlet manifold, a primary throttle and a secondary throttle, one in each mixture chamber, manual means for opening the primary throttle, automatic means for opening the secondary throttle after the primary throttle has been opened to a substantial degree, a mechanically operated accelerating fuel pump connected so as to open simultaneously with the opening movement of said primary throttle and to discharge into said first mixture chamber, an automatically operated pump responsive to inlet manifold pressure discharging into said second mixture chamber, a one-way connection between said mechanically operated accelerating fuel pump and said automatically operated pump so that said latter pump is positively prevented from discharging into said second mixture chamber when the manifold pressure approaches atmospheric and when the manually operated throttle is closed.

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2. A device as set forth in claim 1 in which the secondary throttle is automatically opened by means of a moving wall responsive to the suction in the air entrance to the first mixture chamber.

3. A device as set forth in claim 1 in which the mechanically operated fuel pump incorporates yielding means so that the pump operates after the first throttle has ceased to move.

4. A device as set forth in claim 1 in which the mechanically operated fuel pump incorporates yielding means so that the pump continues to operate after the first throttle ceases to move and in which there are automatic means responsive to the suction in the air entrance to the first mixture chamber connected to said secondary throttle whereby it opens as the air flow in the said air entrance increases.

5. A device as set forth in claim 3 and in which the secondary throttle is automatically opened by means of a moving wall responsive to the suction in the air entrance to the first mixture chamber.

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