Aug. 7, 1951 G. M. BICKNELL 2,563,096

CARBURETOR

Filed Jan. 28, 1946

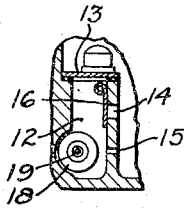


FIG. 3.

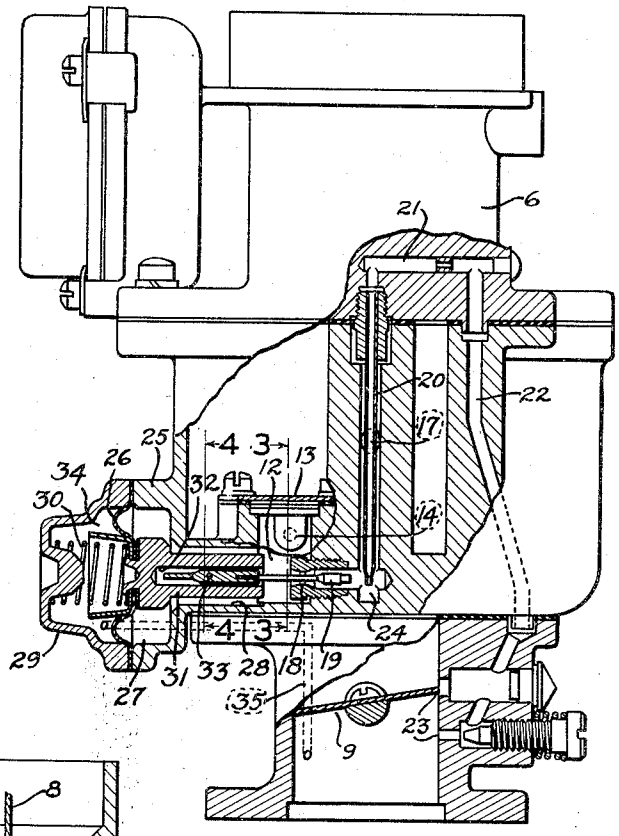


FIG. 1.

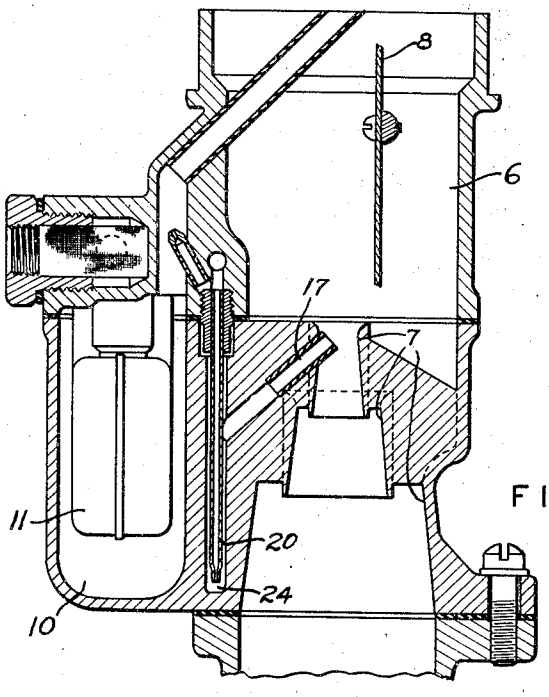


FIG. 2.

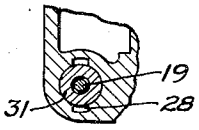


FIG. 4.

INVENTOR.
GEORGE M. BICKNELL
BY
George R. Ericson
ATTORNEY

Patented Aug. 7, 1951 2,563,096

UNITED STATES PATENT OFFICE

2,563,096

CARBURETOR

George M. Bicknell, St. Louis, Mo., assignor to Carter Carburetor Corporation, St. Louis, Mo., a corporation of Delaware

Application January 28, 1946, Serial No. 643,874

1 Claim. (Cl. 261—34)

1

This invention relates to carburetors for internal combustion engines and consists particularly in means for supplying an additional accelerating charge to the engine under conditions when the normal fuel supply is inadequate.

One difficulty with the usual type of accelerating pump is that the discharge anterior to the throttle is obstructed in its passage to the engine cylinders by the throttle valve. Heretofore, in the usual type of carburetor in which the main fuel nozzle is anterior to the throttle, it has not been feasible to discharge the pump posterior to the throttle because the high manifold suction would tend to draw fuel continuously from the pump. The inter-position of an adequate check valve in the pump outlet system, however, would delay and reduce the pump discharge in an undesirable manner.

It is an object of the present invention to provide a novel accelerating pump which discharges, at least in part, posterior to the throttle valve, but without the disadvantages above mentioned.

Another object is to provide an accelerating pump which discharges adequately and promptly through one or both of the main and idling fuel feeding passages.

These objects and other more detailed objects hereafter appearing are attained by the structure illustrated in the accompanying drawing in which:

Fig. 1 is a side view, partly sectioned, illustrating an internal combustion engine carburetor embodying the invention.

Fig. 2 is a vertical section of the carburetor taken on the center line of the mixture conduit.

Fig. 3 is a detail section taken on the line 3—3 of Fig. 1.

Fig. 4 is a similar section taken on the line 4—4 of Fig. 1.

The automotive carburetor shown comprises a downdraft mixture conduit or barrel 6 enclosing a series of Venturi tubes 7. The entry of air to the upper end of the conduit is controlled by a choke valve 8 and the discharge of mixture from the lower end is controlled by a throttle valve 9 operated in the usual manner from the driver's compartment. A fuel bowl 10 mounted adjacent the mixture conduit encloses a float 11 and the usual needle valve mechanism (not shown) for maintaining fuel therein at a substantially constant level.

Located in the lower portion of bowl 10 is a chamber 12 having a cover 13. This chamber is connected to the bowl through a pair of restricted

2

ports 14 and 15, the larger orifice 14 being controlled by a check valve 16 of the flapper type. The main nozzle 17 discharges into the smallest Venturi tube 7 anterior to throttle valve 9. This nozzle is connected to chamber 12 through a calibrated metering orifice element 18 controlled by a metering pin 19 and of less effective capacity than orifices 14 and 15. Fuel for idling is supplied through a tube 20, passages 21 and 22, and ports 23 located adjacent and posterior to the edge of throttle valve 9 when closed. Both idling tube 20 and main nozzle 17 communicate with a well 24 which is connected through orifice element 18 to chamber 12, this being understood as an "inter-connected" form of fuel system.

A circular ridge 25 formed on the outside of the fuel bowl wall adjacent chamber 12 is closed on its outer portion by a diaphragm 26 to form an accelerating pump pressure chamber 27 which communicates through passage 28 with chamber 12. The diaphragm is secured in position by a cap 29 and is constantly urged toward the right or discharging direction by a coiled spring 30 compressed between the diaphragm and cap. A plunger 31 extends rightwardly from the diaphragm through passage 28 and has a central longitudinal orifice 32 which receives metering pin 19, the latter being attached to the plunger by a pin 33 so that the metering pin moves with the diaphragm. The space 34 between the diaphragm and cap 29 is connected to the carburetor mixture conduit posterior to throttle 9 by a suction passage 35 so that fluctuation of the diaphragm and metering pin follow variations of suction in the engine intake conduit to which the carburetor is attached. In operation, when the carburetor is operating with the throttle closed or nearly closed and relatively high suction exists in the mixture conduit posterior to the throttle, diaphragm 26 is moved to the left so as to draw a charge of fuel into pressure chamber 27 through orifice 14 and past check valve 16. Chamber 12 is maintained full by the head of fuel in the bowl. When the suction drops, as occurs, for instance, upon opening movement of the throttle valve, diaphragm 26 is urged to the right by spring 30 so as to force fuel from chamber 27 into chamber 12 and thence through the metering orifice and main nozzle 17 and the idling passages into the mixture conduit. When the pressure in chamber 12 is thus increased, check valve 16 prevents its dissipation back into the bowl so that a prompt and adequate accelerating discharge is provided. During idling and part throttle operation, the idling passages, normally,

will be full of fuel so that a substantial part of the pump discharge, upon such opening of the throttle, flows through the idling ports and reaches the engine without obstruction by the throttle plate.

This arrangement has a further advantage that during opening of the throttle, when the discharge of fuel transfers from the idling passage to the main nozzle, the level of fuel in the main nozzle is raised so as to expedite the normal aspiration of fuel therefrom. Check valve 16 may be omitted, if desired, as the body of fuel in chamber 12 will insure an adequate pump discharge through the various fuel passages.

The invention may be modified in this and other respects that will occur to those skilled in the art without departing from the spirit of the invention and the exclusive use of all modifications that come within the scope of the appended claim is contemplated.

I claim:

In a carburetor, a mixture conduit, a liquid fuel reservoir, a main fuel supply passage connecting said reservoir and said conduit, a normally open main metering orifice in said passage, an accelerating pump comprising a movable wall mounted adjacent the reservoir end of said passage and a pressure chamber between said wall and said passage end, a guideway between said chamber and said passage end, and a plunger element projecting from said movable wall and slidable in said guideway, there being space between said plunger and said guideway and said passage end having restricted communication with said reservoir for supplying liquid fuel to both said fuel passage and said pressure chamber.

GEORGE M. BICKNELL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,923,473	Beard	Aug. 22, 1933
2,103,629	Moore	Dec. 28, 1937
2,182,580	Bracke	Dec. 5, 1939
2,207,456	Coffey	July 9, 1940
2,389,922	Mennesson	Nov. 27, 1945
2,407,535	Carlson et al.	Sept. 10, 1946

FOREIGN PATENTS

Number	Country	Date
521,230	Great Britain	May 15, 1940