Jan. 16, 1962 M. F. STERNER 3,017,166

ACCELERATING PUMP

Filed Oct. 8, 1958 2 Sheets-Sheet 1

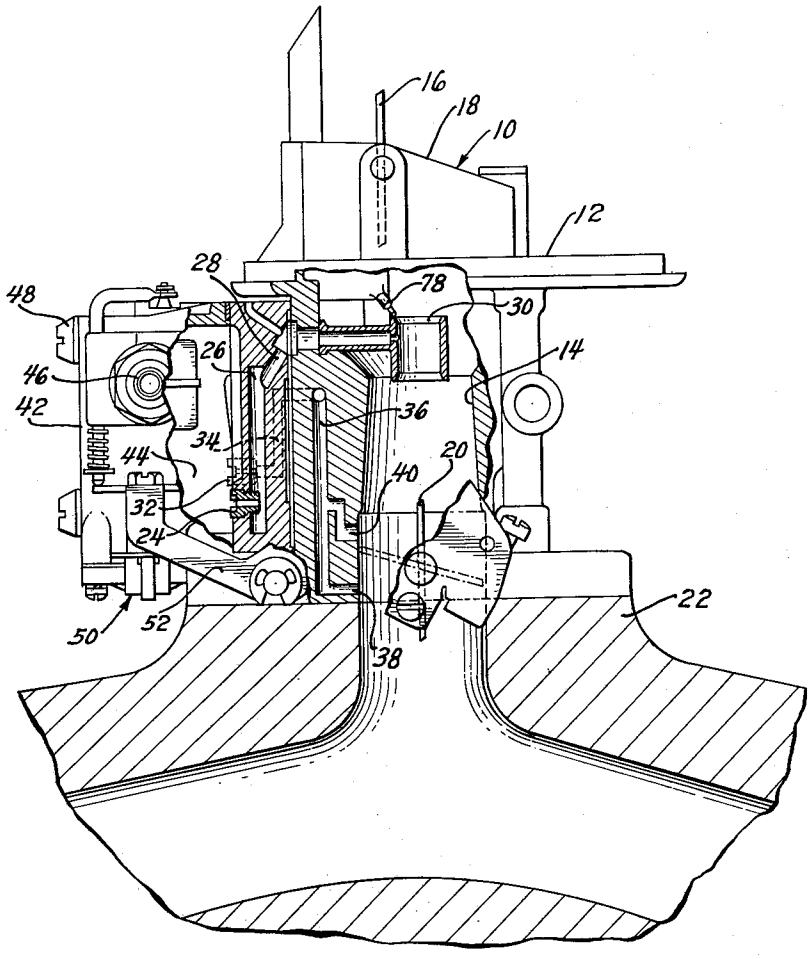


Fig. 1

INVENTOR.
MELVIN F. STERNER
BY
Walter Patronko, Jr.
ATTORNEY

Jan. 16, 1962 M. F. STERNER 3,017,166

ACCELERATING PUMP

Filed Oct. 8, 1958 2 Sheets-Sheet 2

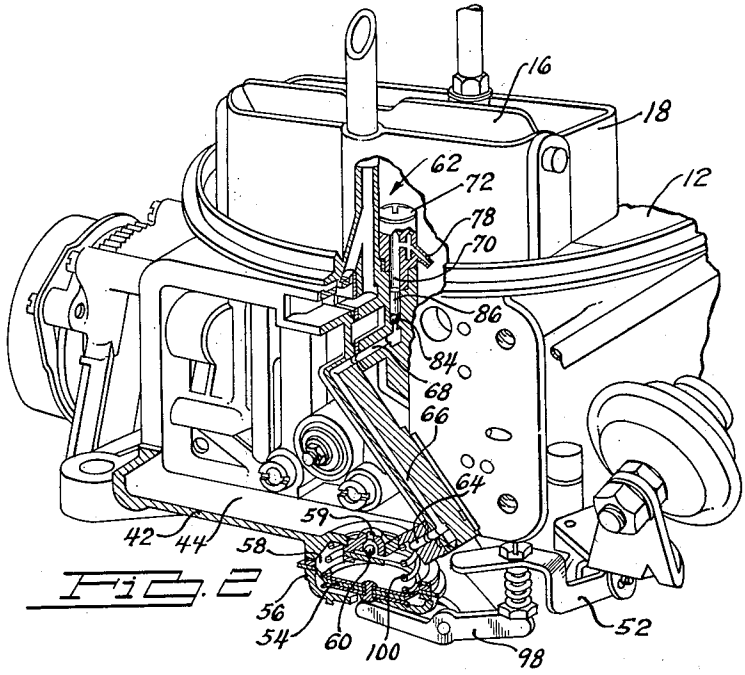


Fig. 2

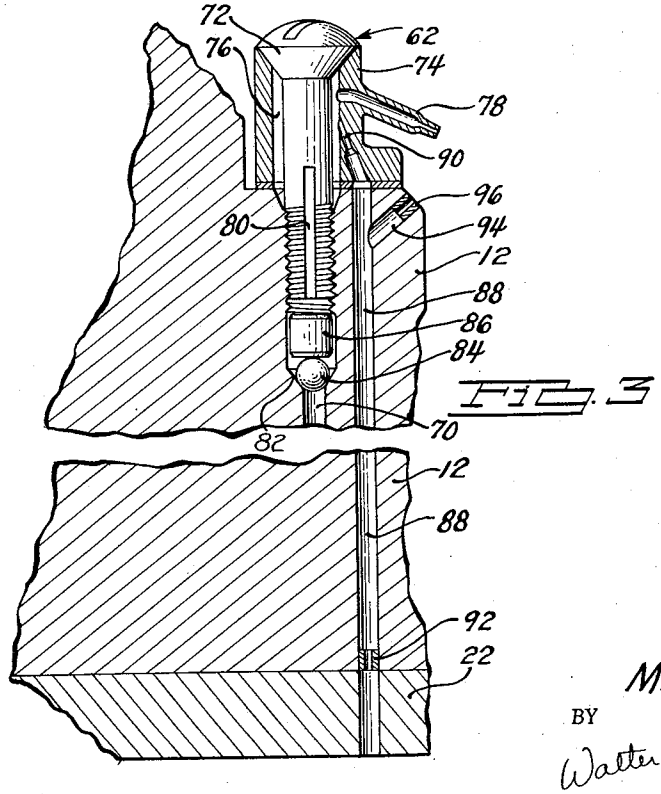


Fig. 3

INVENTOR.
MELVIN F. STERNER
BY
Walter Patronka, Jr.
ATTORNEY

United States Patent Office 3,017,166 Patented Jan. 16, 1962

3,017,166

ACCELERATING PUMP

Melvin F. Sterner, Bloomfield Hills, Mich., assignor to Holley Carburetor Company, Van Dyke, Mich., a corporation of Michigan

Filed Oct. 8, 1958, Ser. No. 765,975
4 Claims. (Cl. 261—34)

This invention relates generally to pumps, and more specifically to accelerating pumps used in carburetors for internal combustion engines.

When an engine is called upon to accelerate rapidly, the air flow through the carburetor responds almost immediately to the increased throttle opening; however, the fuel which is heavier than air, lags a substantial amount behind the increased air flow, thereby causing a leaning out of the fuel-air ratio. The accelerating pump is designed to correct this condition by supplying liquid fuel until the other fuel metering systems once again are providing the proper mixture.

The performance of accelerating pumps, in general, has been seriously impaired by fuel vapors trapped within the accelerating pump system. The presence of these vapors is attributed to those situations where an excessive amount of heat is created within the engine compartment, whether by a hot shut-down or prolonged idling of the engine. When vapor is trapped in the system, it displaces the volume therein which liquid fuel would normally occupy and therefore, when the accelerating pump is called upon for additional fuel, none will be supplied because of the absence of liquid fuel.

Accordingly, it is an object of this invention to provide means for removing any vapor within the accelerating pump system.

It is further an object of this invention to provide automatic means for removing vapor from within the accelerating pump system; and more specifically, to provide automatic means for continually removing vapor from within the accelerating pump system during periods of engine operation.

Other objects and advantages will become apparent when reference is made to the following specification and illustrations, wherein:

FIGURE 1 is a side elevational view, with portions thereof cut away and in cross-section, of a carburetor embodying the invention;

FIGURE 2 is a perspective view of the carburetor, again with portions thereof cut away and in cross-section, and having the fuel bowl removed with the exception of the accelerating pump and associated linkage;

FIGURE 3 is an enlarged view of the accelerating pump nozzle in cross-section, taken on a plane substantially through the center of the carburetor body and pump nozzle.

Referring now in greater detail to the drawings, FIGURE 1 illustrates a carburetor 10 having a body 12 with an induction passage 14 extending therethrough. The carburetor is provided with the usual choke valve 16 controlling the entrance of the air intake 18 and throttle valve 20 controlling the flow of combustible mixture to the engine intake manifold 22.

A main fuel system is defined by metering restriction 24, conduits 26 and 28 and nozzle 30, which discharges as required within the induction passage 14. An idle system having a minimum idle and a transfer portion is schematically comprised of restriction 32, conduits 34 and 36, port 38 and slot 40 which discharge selectively below the throttle valve 20. A fuel bowl 42, defining a chamber 44 and having an inlet 46, is secured as by screws 48 to the body 12 in such a maner so as to supply all the fuel systems with a source of fuel. An accelerating pump 50 is attached to the bottom of the fuel bowl and

is adapted to be actuated in a well known manner by levers 52 and 98—when the throttle 20 is opened.

FIGURE 2 illustrates the pump 50 as being comprised of a reinforced diaphragm 54 secured to the bottom of the fuel bowl by a member 56 and thereby creating a chamber 58. The chamber 58 communicates with chamber 44 of the fuel bowl 42 by means of passage 59 having a gravity actuated ball check valve 60. Chamber 58 also communicates with the pump nozzle assembly 62 by means of conduits 64, 66, 68 and 70.

A screw 72 and housing 74 cooperatively defining a chamber 76 constitute the basic nozzle assembly. A nozzle 78, which may either be formed as part of housing 74 or secured thereto, communicates with chamber 76 and is directed towards the induction passage 14. The screw 72 is threadedly received by the body 12, and a passage 80 formed in screw 72 is provided as a means of communication between chamber 76 and conduit 70. A seat 82 is provided within conduit 70 and a ball 84 and weight 86 are placed between the seat and chamber 76.

A separate conduit 88, with restrictions 90 and 92 at the ends thereof, communicates between the chamber 76 and a source of manifold vacuum. A second conduit 94 communicates with conduit 88 and the atmosphere through a restriction 96.

Operation

The general operation of the accelerating pump is briefly as follows:

When the throttle 20 is opened, the pump linkages 52 and 98 force the pump diaphragm 54 upwards. As the diaphragm moves up, the pressure forces the pump inlet ball check valve 60 closed thereby preventing fuel from flowing back into the chamber 44. The fuel within chamber 58 flows from there through conduits 64, 66, 68 and to conduit 70 where it causes the ball 84 and weight 86 to raise, thereby discharging the fuel from chamber 76 through nozzle 78 into the induction passage 14.

As the throttle is moved toward the closed position, the linkages 52 and 98 return to their normal positions, and the diaphragm 54 is forced downwardly by spring 100. As the diaphragm returns to its original position, the pump inlet ball check valve 60 is opened and chamber 58 is filled with fuel from the fuel bowl.

The specific improvement contemplated by the invention is that when the engine on which the carburetor 10 is mounted is started and becomes self sustaining, manifold vacuum will be applied through conduit 88 to chamber 76 and consequently to conduits 70, 68, 66 and 64. This will cause the vapors which are present in the system to be carried into the induction passage and subsequently to the engine. Since a vacuum is constantly applied to the system during engine operation, no vapors will collect even during excessively long periods of idle operation.

While but one embodiment of the invention has been disclosed, others are of course possible without exceeding the scope of the appended claims.

What I claim as my invention is:

1. In an internal combustion engine carburetor having an idle fuel system, a main fuel system and an acceleration fuel system including a fuel chamber and a fuel discharge nozzle connected by a fuel passage having a valve openable on operation of said acceleration system, means operative only during engine operation for continuously removing vapors from said acceleration system, said means comprising a passage connected to said fuel passage between said valve and said nozzle and to a source of engine vacuum.

2. In an internal combustion engine carburetor including a body with an induction passage therethrough, a

throttle valve in said passage, and an acceleration fuel system including a nozzle portion formed to provide a chamber and being adapted to discharge fuel into said induction passage whenever said throttle valve is opened, means for venting said acceleration system, said means comprising a first conduit communicating between a source of engine vacuum and said chamber, and a second conduit communicating between a source of substantially atmospheric air and said first conduit in order to modify the action of the engine vacuum.

3. A carburetor for an internal combustion engine, comprising a body with an induction passage therethrough, a choke valve controlling the intake of said induction passage, a throttle valve for determining the amount of combustible mixture passing therefrom, an idle fuel system discharging into said induction passage posterior to said throttle valve, a main fuel system discharging at times into said induction passage anterior to said throttle valve, an acceleration fuel system operative only during opening movement of said throttle valve for supplying additional quantities of liquid fuel to said induction passage, and means operative during engine operation for removing fuel vapors from said acceleration system.

4. A carburetor for an internal combustion engine, comprising a body with an induction passage therethrough, a choke valve controlling the intake of said induction passage, a throttle valve for determining the amount of combustible mixture passing therefrom, an idle fuel system discharging into said induction passage posterior to said throttle valve, a main fuel system discharging at times into said induction passage anterior to said throttle valve, an acceleration fuel system operative only during opening movement of said throttle valve for supplying additional quantities of liquid fuel to said induction passage, and means operative only during engine operation for removing fuel vapors from said acceleration system, said means including a passage connecting a vapor collecting portion of said acceleration fuel system with a source of vacuum resulting from operation of said engine.

References Cited in the file of this patent

UNITED STATES PATENTS

2,615,695	Winkler	Oct. 28, 1952
2,757,914	Ball	Aug. 7, 1956