Oct. 24, 1944. C. H. VINCENT 2,361,250

INTERNAL-COMBUSTION ENGINE

Filed April 6, 1942

Fig. 1.

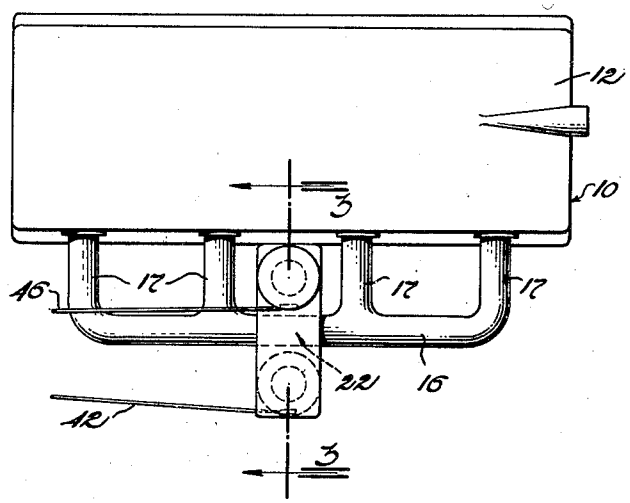


Fig. 2.

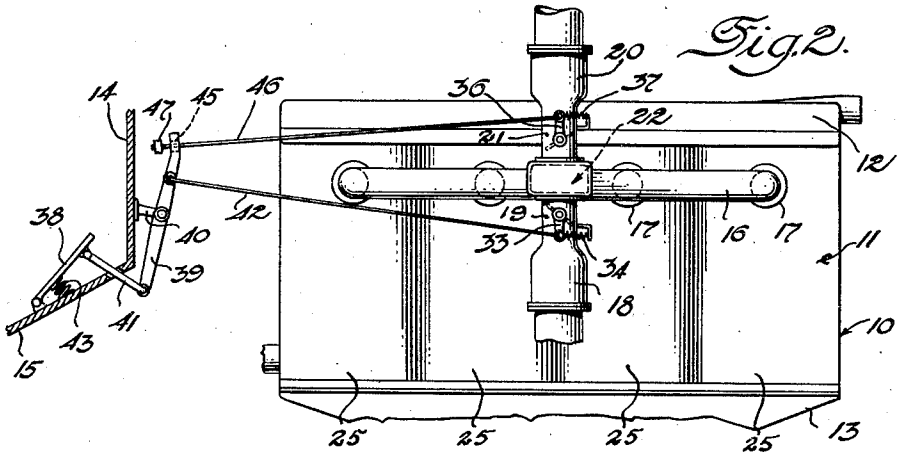
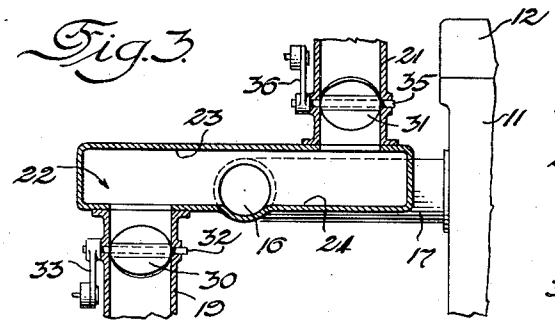


Fig. 3.



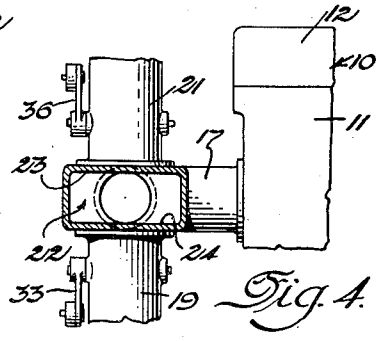


Fig. 4.

INVENTOR.
Charles H. Vincent

BY

Tibbetts & Hart
Attorneys.

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INTERNAL-COMBUSTION ENGINE

Charles H. Vincent, Avoca, Mich., assignor to Packard Motor Car Company, Detroit, Mich., a corporation of Michigan

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5 Claims. (Cl. 123—127)

This invention relates to engines and more particularly to systems for feeding fuel to engines.

An object of my invention is to increase the power and improve the performance of internal combustion engines by the provision of a fuel feeding system having two sources of fuel supply.

Another object of the invention is to provide a fuel feeding system for internal combustion engines in which fuel from an auxiliary source is added to fuel of a regular feeding system when the latter is in its high volume delivery range.

Another object of the invention is to provide a fuel feeding system for internal combustion engines in which superposed carburetors are arranged so that an updraft carburetor will be effective during all conditions of engine operation and a downdraft carburetor will be effective only in the higher power range of engine operation.

Other objects of the invention will appear from the following description taken in connection with the drawing, which forms a part of this specification, in which:

Fig. 1 is a plan view of an engine having the invention incorporated therewith;

Fig. 2 is an elevational view of the engine showing the fuel feeding system and throttle control mechanism;

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1 showing the manifold and carburetor attachment;

Fig. 4 is a sectional view similar to Fig. 3 showing a modified form of the invention.

Referring to the drawing by characters of reference, 10 indicates generally an internal combustion engine having a cylinder block 11, head 12 and oil pan 13. Except for the fuel feeding system, the engine can take any conventional form and is shown in advance of the dash 14 and toe board 15 of a motor vehicle.

Fuel is moved to the cylinders 25 within the block through a manifold consisting of a main conduit 16 having a plurality of outlet branch conduits 17. The branch conduits are suitably fixed to the cylinder blocks and connect with passages leading to the interior of the cylinders.

Two fuel supply systems are connected with the manifold. One supply system includes an updraft carburetor 18 having an outlet conduit 19 connected with manifold conduit 16 and the other system includes a downdraft carburetor 20 having an outlet conduit 21 connected with manifold conduit 16. The manifold conduit 16 has an enlarged portion 22, preferably between the inside branch conduits 17, formed with a flat top wall 23 to which conduit 21 is fixed and a flat bottom wall 24 to which conduit 19 is fixed. As shown in Figs. 1 to 3 inclusive, the carburetor outlet conduits are oppositely offset from the main portion of conduit 16 while in Fig. 4 they are perpendicular to the axis of conduit 16 and in vertical alignment.

Fuel volume delivery through the carburetor outlet conduits to the manifold is controlled by throttle valves 30 and 31. Valve 30 is fixed on shaft 32 traversing conduit 19 and an actuator arm 33 is fixed to the shaft. Coil spring 34 is connected with arm 33 to normally move the valve to idling position. Valve 31 is fixed on shaft 35 which extends through conduit 21 and is rotated by arm 36 fixed thereto. Coil spring 37 is anchored at one end and connected at the other end to arm 36 in a relation to normally close the downdraft throttle valve.

One of the throttle valves, preferably the updraft valve, is arranged to respond to any movement of an accelerator pedal 38 pivotally mounted on toe board 15. An actuator lever 39 is pivoted on bracket 40 fixed to the dash and link rod 41 connects the pedal with the lever. A link rod 42 connects lever 39 with throttle valve arm 33. The updraft throttle valve will respond to any movement of the accelerator pedal through the connecting linkage mechanism and spring 43 acts against the pedal urging it to throttle valve idling position as foot pressure is relieved.

It is proposed to utilize the auxiliary downdraft carburetor for feeding fuel to the manifold only after fuel above a predetermined volume is being delivered by the updraft carburetor. The auxiliary carburetor can be made smaller than the regular carburetor as it is used only in the higher power range of the engine. Various methods can be employed to actuate the auxiliary throttle valve so that it will open suddenly or gradually.

One way of operating the auxiliary throttle valve is to provide a linkage that will be actuated by the control mechanism for the regular throttle valve. Lever 39 is formed with an eye 45 at its upper end through which a rod 46 extends, and this rod is connected with throttle valve arm 36 and threaded to receive nut 47. The nut acts as an abutment with which lever 39 engages to actuate the rod 46 and the adjust-

ment of the nut on the rod will determine the timing of the opening movement of the auxiliary throttle valve relative to the opened position of the regular throttle valve.

The dual carburetor arrangement herein described promotes economy and increases the power output of the engine as compared with a single carburetor fuel feeding system. Maximum fuel delivery will be present when maximum power is required and in the lower power range the single carburetor gives economical performance with adequate power. It is recognized that updraft carburetors have a definite advantage over downdraft carburetors, from a standpoint of easy starting and economy, and an advantage is thus obtained by using an updraft carburetor for regular operation and using the downdraft carburetor as the auxiliary fuel supply means when maximum power is desired. By the superposed arrangement of the carburetors and their connection with the main manifold conduit between two branch conduits, fuel passing to the several branch outlets of the manifold will have similar fuel and air content.

Although the invention has been described in connection with a specific embodiment, the principles involved are susceptible of numerous other applications which will readily occur to persons skilled in the art. The invention is therefore to be limited only as indicated by the scope of the appended claims.

What is claimed is:

1. In a fuel feeding system for a multi-cylinder engine, an intake manifold connected with the engine cylinders, an updraft carburetor connected with a manifold, a downdraft carburetor connected with the manifold, throttle valves for the carburetors, an accelerator pedal, a lever connected to be rocked by operation of the pedal, and mechanisms operated directly by the lever for controlling the throttle valves, one of said mechanisms acting directly in response to rocking of the lever to open the throttle valve of the updraft carburetor and the other of said mechanism being actuated to open the throttle valve of the downdraft carburetor only after the throttle valve of the updraft carburetor is partly open.

2. In a fuel feeding system for engines, an intake manifold having a main conduit with branch outlet conduits extending therefrom, said main conduit having an enlarged portion between two of the branch conduits, an updraft carburetor secured to the bottom of the enlarged portion of the main conduit, and a downdraft carburetor secured to the top of the enlarged portion of the main conduit, said carburetors being offset oppositely from the axis of the main conduit.

3. In a fuel feeding system for engines, an intake manifold having a main conduit with branch outlet conduits extending therefrom, said main conduit having an enlarged portion between two intermediate branch conduits, an updraft carburetor secured to the bottom wall of the enlarged conduit portion, and a downdraft carburetor secured to the top wall of the enlarged conduit portion, the outlet portions of said carburetors being out of alignment.

4. In a fuel feeding system for engines, a fuel intake manifold having a main conduit with outlets leading therefrom, said main conduit having an enlarged portion between two outlets, and a pair of carburetors secured to the enlarged portion of the conduit in oppositely disposed relation offset from the axis of the conduit.

5. In a fuel feeding system for engines, a fuel intake manifold having a main distributing conduit with spaced outlet branches leading therefrom, and a pair of carburetors having outlet portions opening into the conduit between two of the outlet branches in oppositely disposed relation offset from the axis of the conduit.

CHARLES H. VINCENT.