April 17, 1934. G. W. WALDO 1,955,661

FUEL ECONOMIZER FOR CARBURETOR ENGINES

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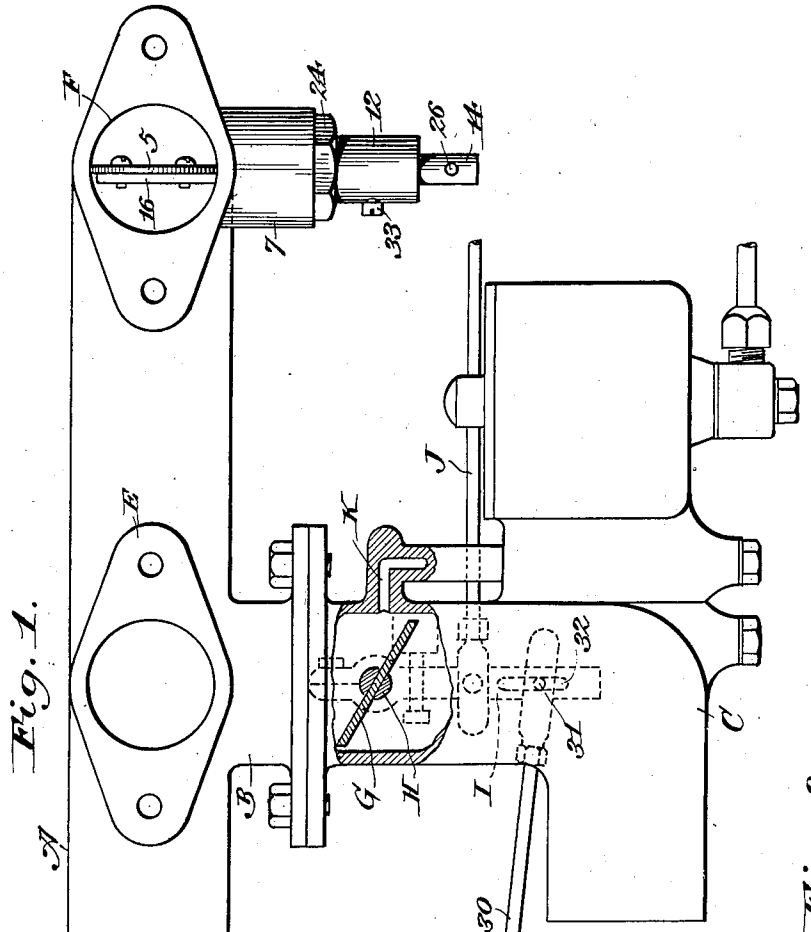


Fig. 1.

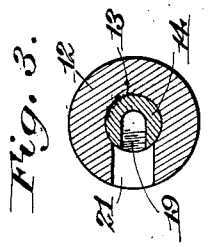


Fig. 3.

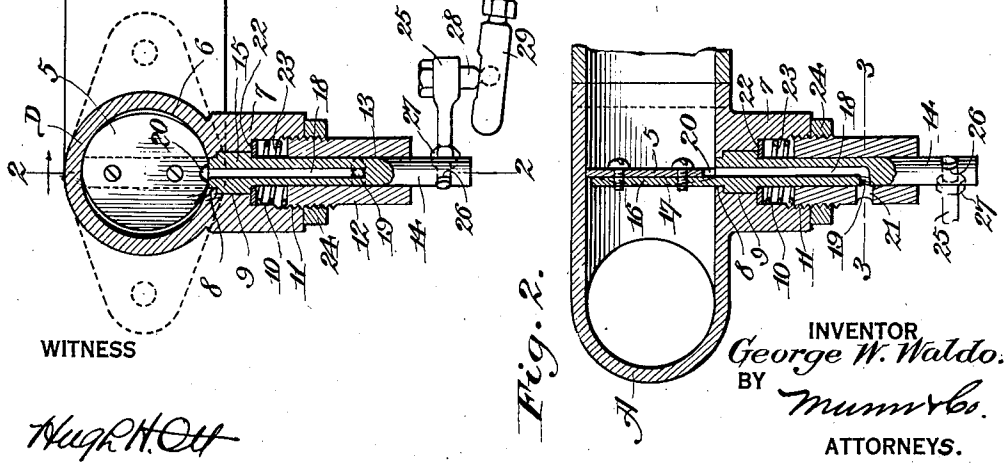


Fig. 2.

WITNESS

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FUEL ECONOMIZER FOR CARBURETOR ENGINES

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3 Claims. (Cl. 123—52)

This invention relates to internal combustion engines which are driven by carbureted fuel, and has particular reference to an improved means for effecting a substantial economy in the consumption of fuel.

It is common knowledge that these types of engines consume when running within the idling range an appreciably greater amount of fuel in proportion to the work output than is necessary, which is a considerable factor in the operating cost of trucks, buses, taxicabs and other commercial cars, as well as pleasure cars, where they are operated in large cities, due to the fact that the engine is of necessity running for the greater portion of the time within the idling range.

The present invention broadly aims to provide a fuel economizer of the indicated character, which embodies means automatically rendered effective when the engine is running within the idling range, which means functions to reduce the suction action of certain of the cylinders on the carburetor.

The invention further comprehends in conjunction with a fuel economizer of the character set forth, means for venting to the atmosphere the cylinders which are affected by the device so as to avoid a back pressure, and which venting means further functions to admit air independent of the carburetor air intake, which air serves to dilute the carburetor fuel mixture in the manifold to afford a better mixture for the idling range.

More specifically, the invention contemplates a fuel economizer embodying a valve located in the carbureted fuel line leading to certain of the cylinders from the carburetor outlet, together with a connection between said valve and the carburetor control, which connection may be adjustable for regulating or varying the range of functioning of the device.

The invention further resides in the provision of a fuel economizing device which is comparatively simple in its construction, which may be inexpensively installed on previously built engines or incorporated in new engines, and which device is highly efficient in its purpose.

With the above recited and other objects in view, reference is had to the following description and accompanying drawing, in which there is exhibited one example or embodiment of the invention, while the claims define the actual scope of the same.

In the drawing:

Figure 1 is a face view of the intake manifold and carburetor as viewed from the inner engine side, with parts shown in section to disclose the underlying structure.

Figure 2 is a vertical sectional view taken approximately on the line indicated at 2—2 in Figure 1.

Figure 3 is an enlarged horizontal sectional view taken approximately on the line indicated at 3—3 in Figure 2.

Referring to the drawing by characters of reference, A designates generally an intake manifold of the conventional type, the same being illustrated for a six-cylinder engine, although it is to be here understood that the invention is applicable to any multi-cylinder engine which employs a carburetor. The manifold A has a depending flanged leg B which is attached to the carburetor C and is provided with the flange outlets D, E and F for conveying the carbureted fuel to the various cylinders. G designates a throttle or butterfly valve which is mounted on a rotary shaft H journaled in the carburetor outlet and controlled by the throttle arm I, to which is attached an actuator rod J. The carburetor is provided with the usual idling jet K which introduces fuel to the carburetor outlet above the throttle valve when the same is in the substantially closed idling position illustrated in Figure 1. It may here be explained that the idling range as employed in connection with this application is not only intended to mean when the engine is disconnected from the propeller shaft but is also intended to cover the driving of the vehicle in first and second gears and up to the time it actually attains the usual running speed of approximately fifteen to eighteen miles an hour.

The fuel economizing device which constitutes the present invention and is in effect an attachment or adjunct to the engine, includes a valve 5 constructed similar to the throttle or butterfly valve G of the carburetor, and said valve is located in certain of the intake manifold outlets, in the present instance one valve being shown in operative position in the outlet D and one being shown in inoperative position in the outlet F of the manifold. Necessarily, on a previously built engine, the manifold outlet D must have its inner periphery 6 reamed or otherwise machined to provide a true surface with which the valve 5 cooperates, whereas in an engine initially equipped with the economizer device, the surface 6 will be constructed to provide the true surface desired. In new constructions, the manifold outlet will be formed with a depending boss 7, while in previously constructed manifolds, the boss may be

brazed or welded. The boss 7, as shown, is provided with a vertical bore having an upper minor diameter 8, an intermediate larger diameter 9 and a lower major diameter 10 which is internally threaded as at 11 adjacent the lower end of the boss. The lower major internally threaded diameter of the bore has threadedly engaged therein a sleeve 12, the bore 13 of which corresponds approximately to the size of the minor upper diameter 8 of the bore of the boss. A valve stem 14 extends through the bore 13 of the sleeve 12 and through the bore of the boss and into the intake manifold outlet. The stem 14 is provided with an enlargement, preferably an integral collar 15 which snugly fits the intermediate diameter 9 of the boss bore. The upper portion 16 of the valve stem which is disposed within the manifold outlet is preferably flat and has secured thereto in flat contact with its inner face 17, the valve 5. The face 17 is disposed contiguous or at a tangent to a passage 18 which extends from the upper portion of the body of the stem at its juncture with the portion 16, downwardly and terminates in a radial internally threaded port 19 which opens through the periphery of the stem 14. The periphery of the valve 5 is formed with a notch 20, by virtue of which the passage 18 communicates with the interior of the manifold outlet at the engine side end when the valve is in its approximately closed position. The sleeve 12 is formed with a circumferentially extending slot 21, with which slot the port 19 is adapted to register when the valve stem 14 is turned to certain predetermined positions. A washer 22 surrounding the valve stem and located in the major diameter 10 of the bore is normally urged upwardly by a spring 23 which seats on the upper end of the sleeve 12. A lock nut 24 is threaded on the upper portion of the sleeve and binds against the lower end of the boss 7. The lower end of the valve stem 14 protrudes from the sleeve and carries a radial arm 25 which is adjustable in length, the adjustment being accomplished through the threaded engagement of the inner end of the arm in a threaded transverse opening 26 in the stem, the arm being locked in adjustment by a binding nut 27. The outer end of the arm is provided with a depending spherically headed shank 28 which is adjustable in the socketed terminal 29 of a link 30. The link 30 has its opposite end adjustably connected by a pin and slot connection 31 and 32 to the throttle arm I of the carbureter.

In operation, the link 30 connecting the stem 14 of the valve 5 with the throttle arm I is so adjusted that the valve 5 will assume a slightly opened position when the throttle valve G is in its substantially closed idling position, as illustrated in Figure 1. In this position of the stem, the port 19 fully registers with the slot 21. It follows that the valve 5 functions to materially reduce the suction action of the cylinders which are connected with the manifold outlet controlled by the valve. This reduction in the suction action on the carburetor reduces the amount of fuel drawn from the carburetor while the valve 5 is in its substantially closed position. At the same time, in order to avoid the building up of back pressure in the cylinders so affected, the passage 18 serves as a vent or breather by admitting air to the cylinders on the suction stroke. It will also be found in practice that a certain proportion of the air drawn in through the passage 18 will find its way past the valve 5 into the manifold where it will mix with and dilute the carburetor fuel in the manifold to make for a better mixture in the idling range. Due to the fact that the valve 5 is not completely closed, a portion of the fuel mixture will find its way past the valve into the cylinders which are affected thereby, and this fuel will be sufficiently combustible to supply the demands of the affected cylinders for the work output within the idling range. Obviously, as the carburetor throttle valve is opened, the valve 5 through the linkage described will be correspondingly opened until it reaches the full maximum opening in unison with the throttle valve. At the desired point where the engine leaves the idling range, the port 19 is moved out of registry with the slot 21, thereby cutting off communication of the passage 18 with the atmosphere.

In practice, one valve 5 only may be functioning or, if desired, more than one may be brought into play. Further, as illustrated in Figure 1, the valve 5 in the manifold outlet F is shown out of use and the same is locked in its opened condition by threadedly engaging a screw 33 in the threaded port 19 with the shank of the screw extending through the slot 21 in the sleeve 12. By providing more than one valve assemblage 5, they may also be alternately brought into play at the option of the operator by disconnecting the link 30 from one valve and connecting the same with the other.

What is claimed is:

1. The combination with a multi-cylinder carburetor engine, of a fuel economizer therefor including means rendered effective when the engine is idling, for reducing the suction action of certain of the cylinders upon the carburetor, said means comprising a valve located in the carbureted fuel intake line to said certain cylinders and a connection between said valve and throttle control.

2. A fuel economizer for multi-cylinder carburetor engines including in combination with a carburetor having a throttle valve and an intake manifold having a plurality of outlets, a valve located in one of the manifold outlets and a connection between said valve and the carburetor throttle valve for moving the valves in unison to reduce the suction created in the intake manifold within the idling range.

3. A fuel economizer for multi-cylinder carburetor engines including in combination with a carburetor having a throttle valve and an intake manifold having a plurality of outlets, a valve located in one of the manifold outlets and a connection between said valve and the carburetor throttle valve for moving the valves in unison to reduce the suction created in the intake manifold within the idling range and venting means operable with said valve for venting the cylinders of the engine controlled by said valve.

GEORGE W. WALDO.