March 14, 1933. W. B. RAWERS 1,901,191

GAS AND AIR MIXER FOR HYDROCARBON ENGINES

Filed March 21, 1930

Fig. 1

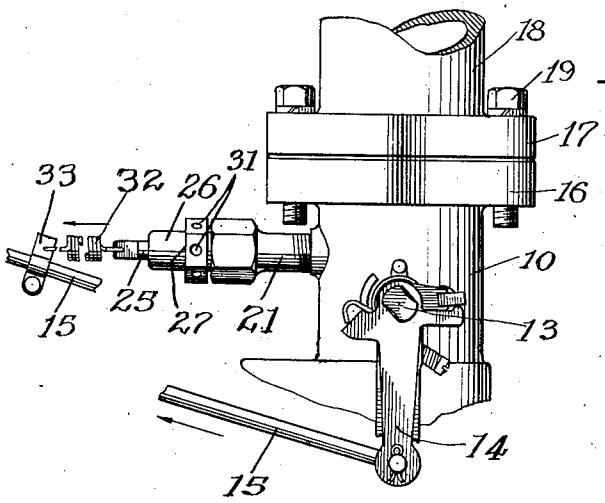


Fig. 3

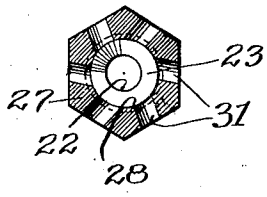
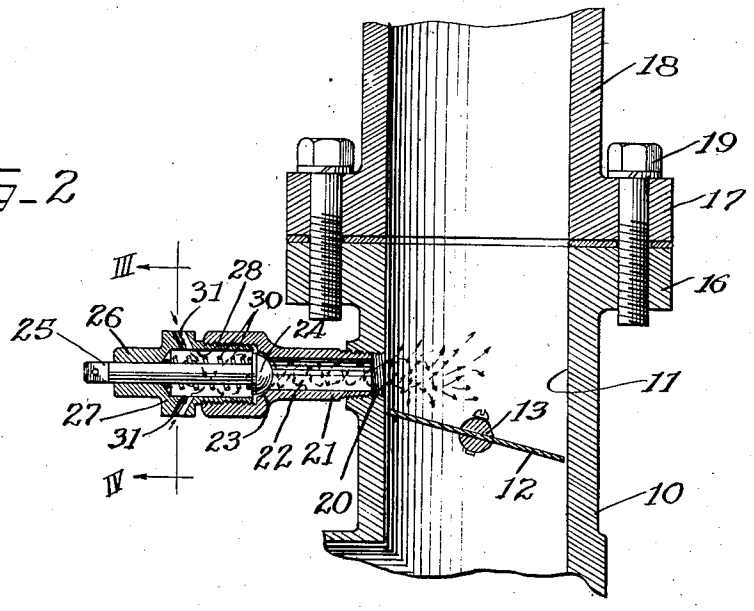


Fig. 2



Inventor

William B. Rawers.

by: Charles G. Hills Atty's.

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UNITED STATES PATENT OFFICE

WILLIAM B. RAWERS, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO GAS KRAKKER CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

GAS AND AIR MIXER FOR HYDROCARBON ENGINES

Application filed March 31, 1930. Serial No. 437,671.

This invention relates to carbureting systems for hydrocarbon engines and has special reference to the provision of a gas and air mixer or economizer for supplying additional air to the normal mixture delivered by the carbureter, under engine operating conditions other than idling.

In the operation of hydrocarbon or internal combustion engines of the variable speed and load type, slow speed idling to be smooth requires a richer mixture than the most economical mixture for operation under normal load. It is accordingly an object of this invention to provide an improved and simplified economizer or gas and air mixer for supplying and properly mixing additional air with the carbureted fuel and air mixture delivered by the carbureter, the functioning of the mixture being controlled to correspond in a predetermined relationship to the movement of the normal throttle control of the engine.

It is a further object of this invention to provide an improved and simplified economizer attachment for the carburetion systems of internal combustion engines wherein the operation of the economizer is yieldingly controlled by the throttle position and wherein the relative point of opening and extent of opening is readily adjusted relative to throttle movements.

It is also an object of this invention to provide an improved gas and air mixer or economizer of the class described wherein the entering air is given a swirling motion to facilitate even mixture with the already carburetted fuel and air mixture leaving the carbureter.

It is another object of this invention to provide an improved and simplified device of the class described than can be economically manufactured, installed and adjusted to existing engines.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawing.

On the drawing:

Figure 1 is a fragmentary elevation of adjacent parts of a carbureter and manifold showing the application thereto of a device embodying the features of this invention;

Figure 2 is a central section of the manifold and device; and

Figure 3 is an enlarged section on the line III—III of Figure 2 with the valve omitted.

As shown on the drawing:

In illustrating this invention the portion of a carbureter body 10 shown includes only the neck or mixture outlet passage 11 including the usual butterfly throttle valve 12 therein on a shaft 13 externally operated by means of a lever 14 and rod 15. The throttle is opened by a clockwise rotation set up by a pull to the left on the rod 15 as indicated by the arrow alongside the rod in Figure 1. The carbureter body 10 terminates in a mounting flange 16 engaging a similar flange 17 associated with the intake manifold riser 18, the two flanges being secured together by suitable capscrews 19.

A threaded aperture 20 is formed in the carburetor body above the opening edge of the throttle as this position is preferred due to the deflecting action of the inclined throttle which throws the carburetted fuel and air mixture towards the left side of the passage 11 at partial throttle openings.

The aperture 20 is provided for the reception of the device of this invention, which comprises a body 21 threaded at one end to engage in the aperture 20 and passaged at 22 for the inflow of air. A valve seat 23 is formed in the passage and the body to the left of the valve seat is formed with an enlarged threaded aperture forming a continuation of the passage 22. A valve 24 cooperates with the seat 23 and has a stem 25 of reduced diameter guided at 26 in a valve guide 27 threadingly engaged in the passage 22. The valve guide is formed with a chamber 28 between the actual guide portion 26 and the valve 24, this chamber being of sufficient size to permit the flow of air around the edges of the valve when the valve is retracted into the chamber. A spring 30 is positioned in the chamber behind the valve so that an in or out movement of the valve guide 27 in the threaded part of the passage 22

serves to increase or decrease the spring pressure serving to close the valve.

Entrance ports 31 are formed in the periphery of the valve guide about the chamber 28, these ports being so directed that they are substantially tangential with respect to the passage 22 so that the air entering the chamber 28 and passage 22 is given a pronounced swirling or spiral flow as indicated by the arrows in Figure 2, such a flow having been found to materially improve the even distributing of the economizer air in the carburetted mixture delivered by the carbureter.

In the operation of the device of this invention it is desirable to have the valve 24 closed while the throttle is positioned for idling or slight load conditions and to open the valve under normal conditions of load when the throttle has been at least partially opened. Thus it is desirable to co-relate the throttle control and the control of the valve of this invention. To this end a spring 32 is connected between the external end of the valve stem 25 and a clip 33 secured to the throttle operating rod. Since the spring 32 acts opposite in direction to the spring 30, and both springs are adjustable; spring 30 as hereinbefore described and spring 32 by relocating the clip 33 on the throttle rod; a very close adjustment is obtainable of the relative point of opening and the extent of opening of the valve 24. This adjustment is predetermined by suitable tests during the installation of the device in order to obtain the most economical fuel consumption under normal conditions.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as follows:

1. In combination with a carbureter and throttle, a port opening into the carburetor above the leading edge of the throttle when the latter is in idling position, a passaged body engaged in said port, a valve seat in said passage, a valve cooperating with said valve seat, a valve stem extending outwardly from said valve, a valve guide engaging said valve stem and having a chamber to receive said valve when opened, a spring in said chamber acting against the valve to close the same, said valve guide being threadingly engaged with said passaged body to vary the compression of said spring, and offset radial air ports in the valve guide and opening into said chamber substantially tangentially thereto whereby to create a swirling motion of the entering air prior to entry into the carbureter.

2. In combination with a carbureter and throttle, a port opening into the carbureter above the leading edge of the throttle when the latter is in idling position, a passaged body engaged in said port, a valve seat in said passage, a valve cooperating with said valve seat, a valve stem extending outwardly from said valve, a valve guide engaging said valve stem and having a chamber to receive said valve when opened, a spring in said chamber acting against the valve to close the same, said valve guide being threadingly engaged with said passaged body to vary the compression of said spring, offset radial air ports in the valve guide and opening into said chamber substantially tangentially thereto whereby to create a swirling motion of the air prior to entering the carbureter, and means for simultaneously operating the valve stem and the throttle.

In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

WILLIAM B. RAWERS.