J. M. KELLEY.

RECARBURETER FOR GAS ENGINES.

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1,355,149.

Patented Oct. 12, 1920.

Fig.1.

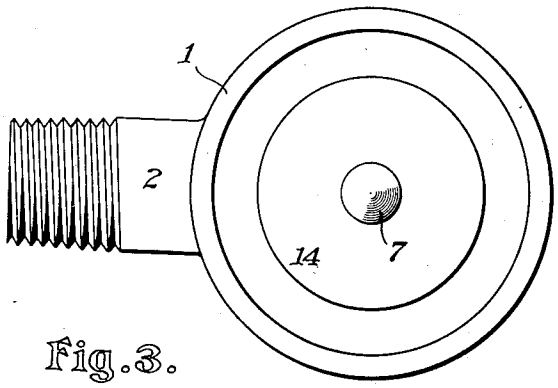


Fig.5.

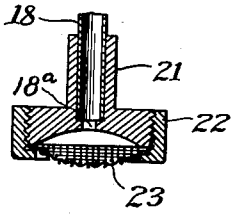
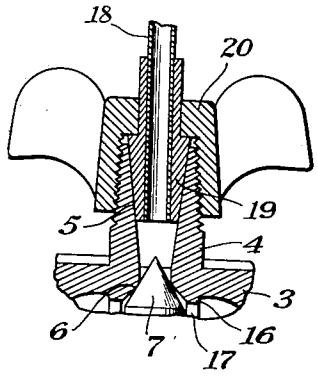


Fig.2.

Fig.3.



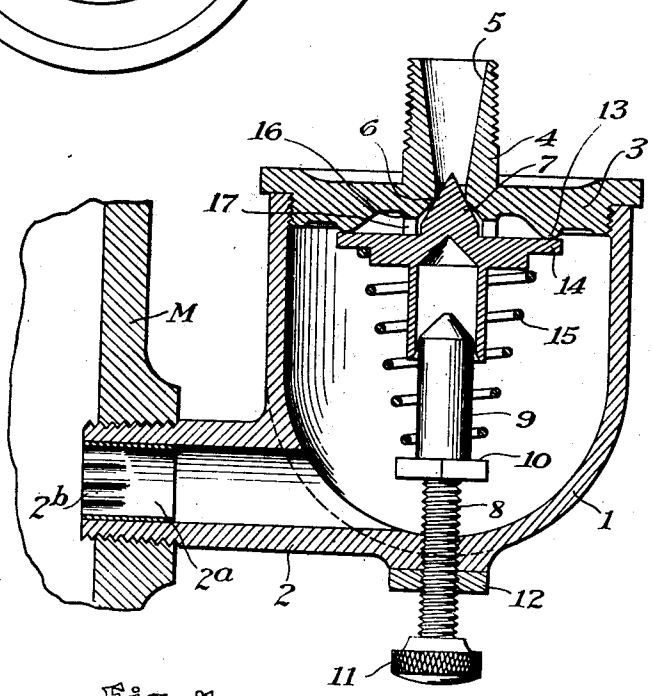


Fig.4.

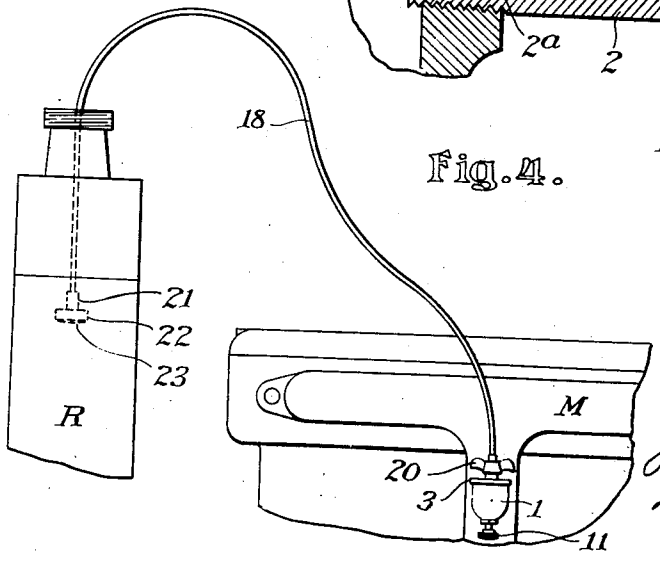
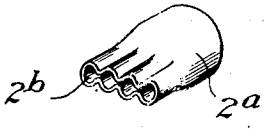


Fig.6.



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UNITED STATES PATENT OFFICE.

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RECARBURETER FOR GAS-ENGINES.

1,355,149. Specification of Letters Patent. Patented Oct. 12, 1920.

Application filed September 6, 1916. Serial No. 118,602.

To all whom it may concern:

Be it known that I, JOHN M. KELLEY, a citizen of the United States, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Recarbureters for Gas-Engines, of which the following is a specification.

The present invention relates to recarbureters for internal combustion engines of the type in which the mixture, after it has been discharged from the carbureters, is again subjected to a carbureting action by the remixture of a further small amount of air, and an object of this invention is to provide a construction which will employ a needle valve controlled by the suction of the engine so that the valve opens to supply an adjusted amount of air proportional to the speed of the engine. Another object of the invention is to provide a casing construction by which a priming fuel may be introduced through the air inlet opening to start the engine. Still another object is to improve the adjusting means for an auxiliary air intake valve. A still further object of the invention is to provide means for utilizing at will the auxiliary air intake valve for introducing a small quantity of hot water into the engine for cleaning the cylinders and muffler of carbon.

To these and other ends, the invention consists of certain parts and combinations of parts all of which will be hereinafter described, the novel features being pointed out in the appended claims.

In the drawings:

Figure 1 is a plan view of the recarbureter;

Fig. 2 is a vertical section showing the latter attached to a manifold of a gas engine;

Fig. 3 is a vertical sectional view showing the manner of connecting the flexible tubing to the recarbureter;

Fig. 4 is a view showing the flexible tubing connecting the recarbureter with the radiator of an automobile; and

Fig. 5 is a detail sectional view of the strainer at the free end of the tubing which connects the recarbureter with the water supply.

Fig. 6 is a perspective view of the outlet nozzle.

Referring more particularly to the drawings, M indicates the manifold of a gas engine to which the recarbureter is attached. The casing 1 of the recarbureter preferably is cup-shaped, and has a lateral nipple 2 externally threaded and engaged with the walls of an opening, in the manifold M. A tube 2^a having a plurality of nozzles 2^b is fitted in one end of the nipple 2 to discharge the air in a plurality of streams into the manifold. A cover 3 is removably secured to the casing 1 preferably by external screw threads engaging within the casing.

From this cover, an externally threaded inlet nipple 4 may extend and be provided with a tapered bore 5 for a purpose to be hereinafter described. The inner end of this bore forms a valve seat 6 against which rests the tapered end of a needle valve 7. This needle valve is preferably guided on a stem or guide 9 which is carried by a screw 8, the screw extending through the bottom wall of the casing 1 and having a thumb piece 11 at its outer end. The upper end of the guide 9 serves as an abutment for the valve to limit the opening movement of the latter so that air above the adjusted amount can not enter the cup-shaped casing 1.

Also arranged on the screw 8 is an abutment 10 which forms the seat for the smaller end of a cone spiral spring 15 that also bears against a flange or disk 14 on the needle valve. This flange or disk 14 is adapted to bear against a seat 13 surrounding the valve seat 6, the engagement taking place when the needle valve 7 rests against the seat 6. Also surrounding the valve seat 6 is a guide tube 16 for the needle valve 7, said tube having openings 17 through which air may pass. The wall of the casing converges or tapers from the guide tube 16 to the valve seat 6 so as to guide the needle valve to its seat 6.

The screw 8 is turned by the thumb piece 11 until the desired compression is secured in the spring 15, this compression being such that the valve 7 remains closed until the engine attains a certain speed so as not to conflict with starting after which the valve opens on every suction stroke of the engine due to the suction on the disk or valve 14. The amount of this opening is proportional to the speed of the engine owing to the fact that the valve 14 opens a greater distance for high speed than for low speeds when combined with a throttle

in the manifold to create a resistance to the flow of fuel through the manifold. The construction of the casing 1 permits the latter to be employed as a priming cup, it being only necessary to depress the valve 7 to enter priming material into the casing 1.

There may also be employed with this recarbureter, a flexible tubing 18 which is attached to the inlet nipple 4 preferably by a thumb nut 20 mounted to turn on the tubing 18 in order to force a tapered end 19 on the tubing in firm contact with the tapered wall 5 of the nipple. The other end of this tubing 18 has a head 21 externally threaded and engaged by a cap 22 which carries a screen 23. The tubing 18 is adapted to connect a radiator R of a motor vehicle or a vessel of hot water with the recarbureter in order that hot water may be conducted in small quantities to a gas engine for the purpose of removing the carbon coating from the inner walls of the engine, and for cleaning exhaust line and muffler, the inlet of the tubing 18 may be restricted at 18^a so that a minimum amount of water will enter the tubing.

If desired, the air and water taken in by the recarbureter may be preheated in any suitable manner as by winding a flexible tubing about the exhaust manifold and connecting the tubing with the recarbureter.

What I claim as my invention and desire to secure by Letters Patent is:

1. A recarbureter comprising a casing having attaching means and an air inlet port, a needle valve controlling the passage of air through said port, an annular seat surrounding said port, and a suction operated member movable toward and from said seat to coöperate therewith and connected to the needle valve to control the position of the latter.

2. A recarbureter comprising a casing having attaching means and an air inlet port, a needle valve coöperating with the walls of the port and controlling the amount of air passing through the port, an annular seat surrounding said port in spaced relation to the wall of the port engaged by the needle valve, and a suction-operated member movable toward and from said seat to coöperate therewith and connected to the needle valve to control the position of the latter.

3. A recarbureter comprising a casing having an inlet and an outlet, a guide in the casing, a needle valve movable on said guide and operating in the inlet, a seat about the inlet, and a suction operated device secured to the needle valve and movable toward and from said seat to coöperate therewith.

4. A recarbureter comprising a cup-shaped casing having a lateral outlet nipple, a removable cover for the casing having an inlet opening, a guide in the cup-shaped portion adjustable longitudinally from the exterior of the casing, an abutment on the guide, a cone spiral spring surrounding the guide and having its one end resting against the abutment, a needle valve operating in the inlet opening guided on the guide and held in closed position by the spring a seat on the casing cover about the inlet, and a disk on the needle valve engaging said seat when the needle valve closes the inlet.

5. A recarbureter comprising a casing having attaching means and an air inlet port, a needle valve controlling the passage of air through the port, a guide on which the needle valve operates, a seat surrounding the port, a suction-operated member movable toward and from said seat to coöperate therewith and rigidly connected to the needle valve to control the position of the latter, and a cone spiral spring surrounding the guide and holding the needle valve and the suction-operated member to their seats.

6. A recarbureter comprising a casing having attaching means and an air inlet, a needle valve coöperating with the walls of the port and controlling the amount of air passed through the port, an annular seat surrounding said port in spaced relation to the wall of the port engaged by the needle valve, a suction operated member coöperating with said seat and connected to the needle valve to control the position of the latter, and a guide tube surrounding the needle valve seat and provided with a plurality of openings in proximity to the suction-operated member so that the entering air strikes the suction-operated member in fine streams.

JOHN M. KELLEY.