Dec. 29, 1925. 1,567,268

G. M. HOLLEY

CARBURETOR

Filed July 19, 1922 2 Sheets-Sheet 1

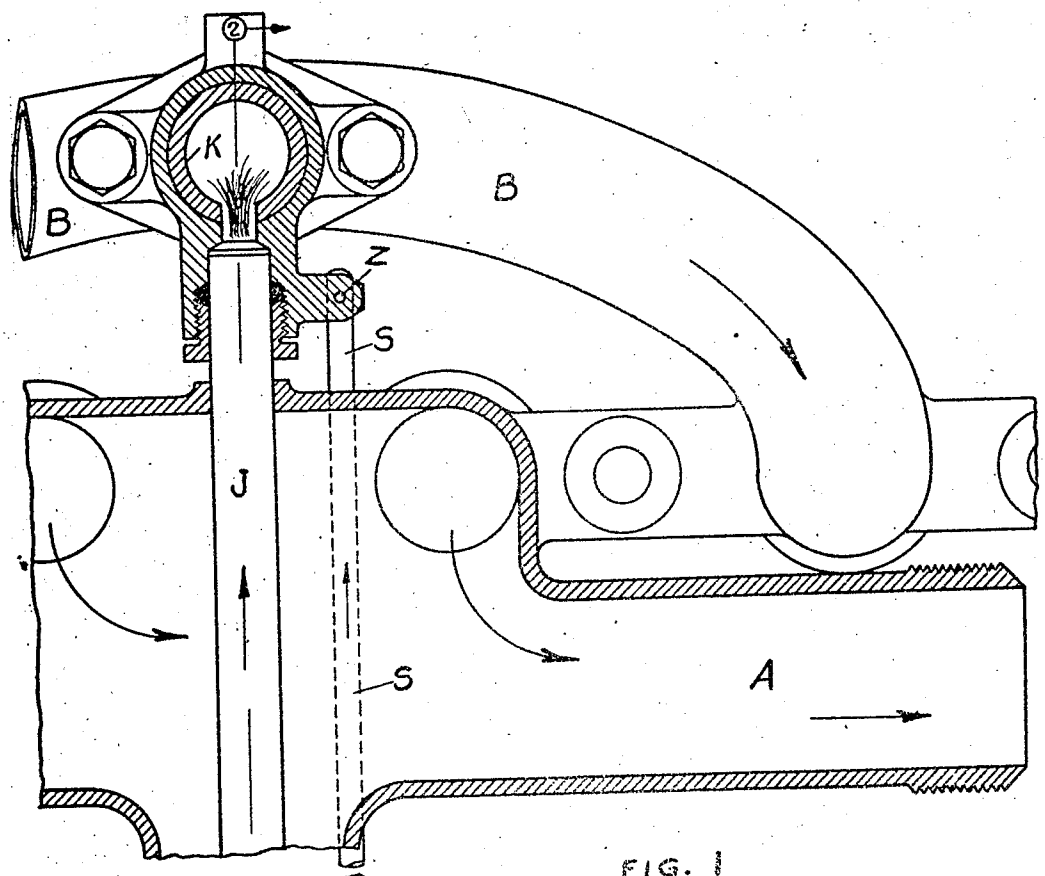
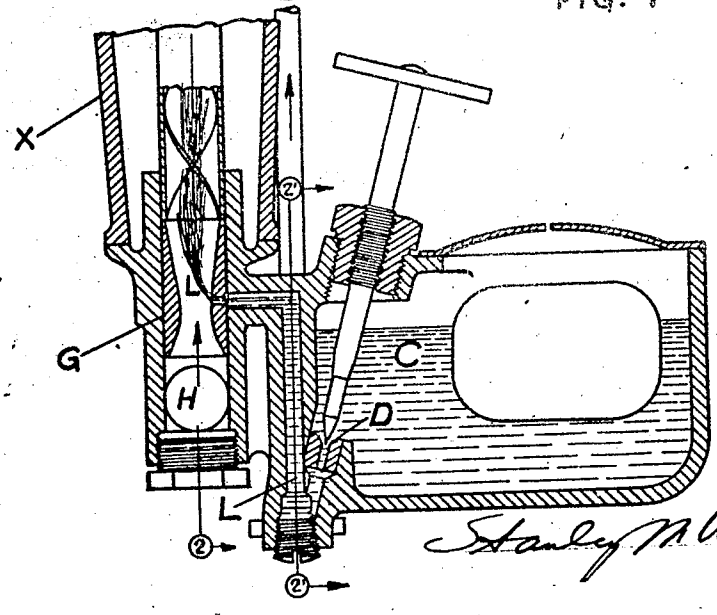


FIG. 1



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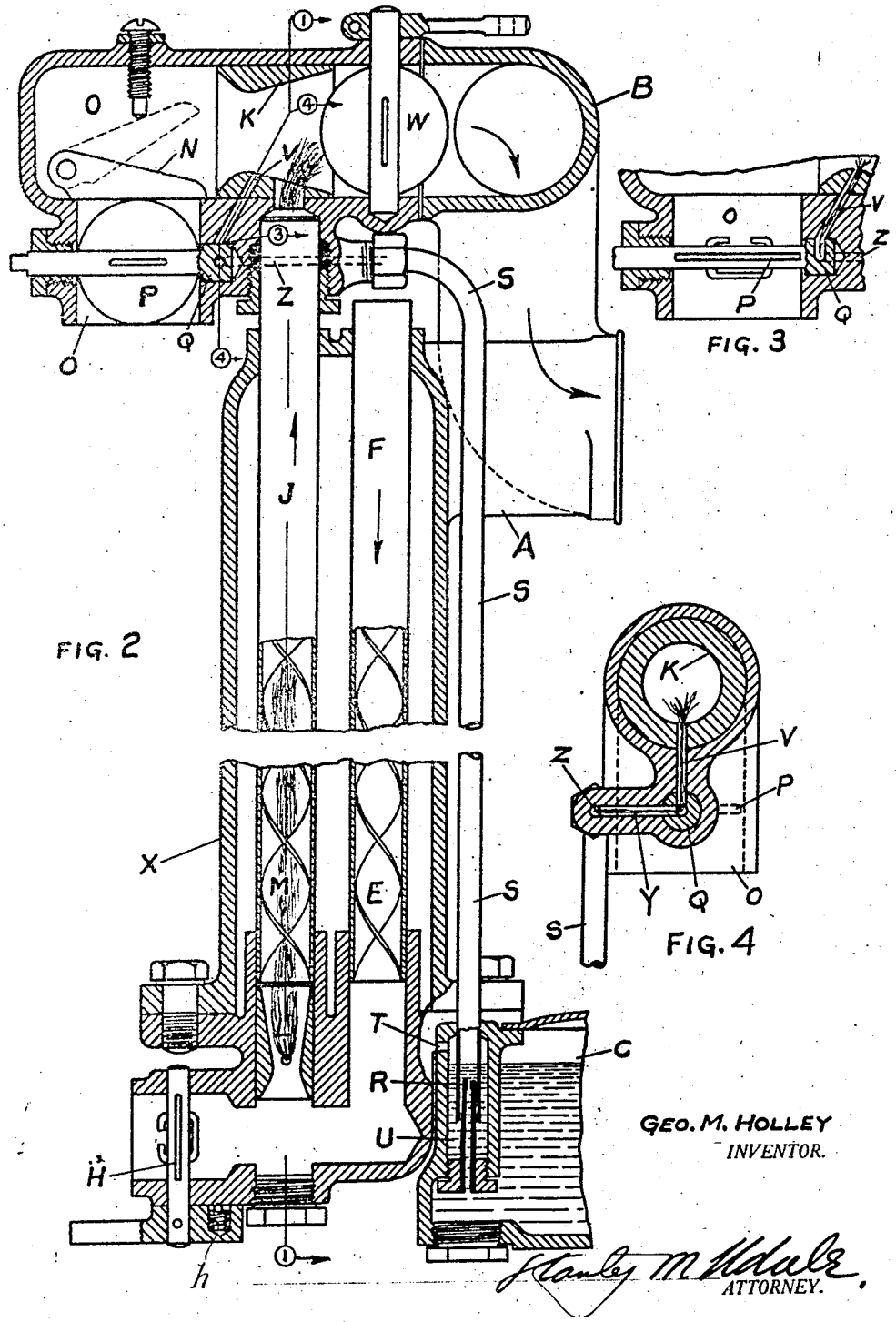

FIG. 2

FIG. 3

FIG. 4

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UNITED STATES PATENT OFFICE.

GEORGE M. HOLLEY, OF DETROIT, MICHIGAN.

CARBURETOR.

Application filed July 19, 1922. Serial No. 576,016.

To all whom it may concern:

Be it known that I, GEORGE M. HOLLEY, a citizen of the United States, residing at 2150 Burns Ave., Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Carburetors, of which the following is a specification.

This invention relates to an improvement in carburetors intended for use with automobile engines of the internal combustion type. This invention relates specifically to that type of carburetor commonly known as a vaporizer in which exhaust heat is applied to the primary air and fuel and in which the heated rich mixture thereby made is diluted with a much greater volume of comparatively cold air admitted through a passage regulated by an auxiliary air valve.

The specific objects sought in this invention are as follows:

1. Means for controlling the mixture temperature so as to prevent overheating of the fuel.

2. Improved atomization of the fuel.

Figure 1 shows the details of construction in cross sectional elevation, on plane 1—1 of Figure 2.

Figure 2 shows the carburetor in cross sectional elevation, taken on the plane 2—2 of Figure 1, and the primer incorporated with the carburetor, on the plane 2′—2′ of Figure 1.

Figure 3 shows a cross section through the primer, also taken on the plane 2—2 of Figure 1, showing the primer in its operating position.

Figure 4 shows a cross section, on the plane 4—4 of Figure 2, and shows another detail of the primer in elevation.

Carburetor.—In Figures 1 and 2, A is the exhaust manifold of an internal combustion engine of the automobile type having a plurality of cylinders. X is a dependant chamber leading out of the main exhaust passage and providing a dead space in which the circulation of the exhaust gases is modified and greatly reduced. B is an inlet manifold, preferably arranged above the exhaust manifold A. C is a float chamber, the flow of fuel from which is controlled by the orifice D and its cooperating valve. F (Figure 2) is the primary air heater located in the exhaust manifold and extending down through the dependant chamber X. G is a small Venturi tube forming the primary mixing chamber. L is the fuel passage leading to the throat of the said Venturi tube and connected to the restricted outlet D. J is the pipe or passage through which the mixture flows from the primary mixing chamber G to the secondary mixing chamber K, which is also formed in the shape of a venturi.

The valve H is a cold air entrance for admitting air from the atmosphere to mix with and moderate the temperature of the heated air drawn down through F and thereby supply to the primary mixing chamber G air of a regulated temperature, the temperature being determined by the position of the valve H, which is provided with spring detent *h* adapted to retain the valve in any given position.

E is a helical strip of metal inserted in the tube F for the purpose of increasing the effectiveness of the tube J. N is a similar twisted strip of metal located in the air and fuel heating tube J for a corresponding purpose. The strip N is removable for the purpose of cleaning the tube J.

O is the cold air entrance to the secondary mixing chamber K. This air entrance is controlled by a manually operated valve P, (which serves as the choke valve), and also by an automatic air valve M, which is preferably of the weighted type but may be an equivalent spring loaded valve. W is the throttle valve controlling the mixture outlet from the secondary mixing chamber K to the inlet manifold B.

Primer.—The priming means consist of the fuel nozzle R discharging into a tube G, which is connected to the secondary mixing chamber K through the boss of the choke valve P, as shown in Figures 2, 3, and 4. The fuel nozzle R is normally submerged and discharges into the well U which is vented to the atmosphere through the opening T. This well known arrangement provides an initial starting charge followed by a rich mixture formed from the air entering at T mixing with the fuel aspirated at R the mixture passing through S.

This rich mixture enters the casting containing the secondary mixing chamber through the passage comprising several parts, the part 2 communicating with the tube S. This passage Z leads through another passage Y to the valve Q (Figure 4), which is integral with the valve P. From Q there is a passage V leading to the secondary mixing chamber K. The valve Q being integral with the valve P it follows that when the valve P

is moved the valve Q is also moved and the valve Q is arranged so that fuel may flow from Y to Z when, and only when, the valve P is closed, which is, of course, the starting position of the choke valve P. The primer R, S, T, U is therefore only operative when the choke valve P is closed.

Operation.—In starting the engine the mixture throttle valve W is partially opened ¼ and the choke valve, or strangling shutter as it is frequently called, P in the main or secondary air entrance O is completely closed, the valve Q being thereby opened so that the pipe S is in free communication, through Z and Y, with the passage V and so with the Venturi throat K of the secondary mixing chamber. Fuel in the well U is therefore swept out by the air entering at T and a rich mixture is subsequently discharged through the tube S by reason of the fuel aspirated from the nozzle R. This rich mixture, together with the priming fuel contained in the well U, facilitates starting.

Meanwhile, air is entering down F, through the primary mixing chamber G, where fuel is aspirated out of L, and mixed with the air flowing up J, and a rich mixture is thus drawn up J and flows into the engine along with the priming charge issuing through V into the secondary mixing chamber K.

When the engine begins to fire the exhaust gases quickly heat up the tubes F and J as they are made of thin-walled metal tubes, and in a comparatively short period of time (15 seconds), it is possible to open the valve P, cutting off the primer R, S, T, U, and to admit cold air past the valve N into the secondary mixture chamber K. Thereafter fuel is supplied solely from the passage L delivering to the throat of the primary mixing chamber G.

In normal operation the primary air is heated in the tube F, fuel issues from L into the primary mixing chamber G, the rich mixture flows through J where it is further heated, and a heated rich mixture issues into the secondary mixing chamber K. The location of the tube J in the dependant chamber X ensures that the fuel is subjected to a gradually increasing heating effect.

In the event that the mixture temperature becomes excessive, the mixture temperature in the primary mixing chamber G is readily reduced by opening the valve H, thereby admitting cold air which is taken in through G, up J, and so into the secondary mixing chamber K. This control is intended chiefly for use in hot weather.

The advantages of this construction is that one of the greatest difficulties experienced with carburetors having separate primary and secondary mixing chambers is overcome. This difficulty is in starting, due to the considerable distance separating the primary mixing chamber from the secondary mixing chamber, and also because the primary mixing chamber is necessarily large enough to carry the total requirements of the engine, hence it is larger than is desirable when starting. By the provision of a small independent priming device R, S, T, U this difficulty is largely overcome. In order to clean the tube J it is necessary to remove the helix contained therein. To do this it is necessary to disassemble the carburetor, separating the casting containing the float chamber C from the exhaust manifold A. At the same time it would render the twisted strip E accessible.

What I claim is—

1. In combination with an internal combustion engine, an exhaust pipe, a carburetor comprising primary and secondary mixing chambers, a fuel nozzle discharging into said primary mixing chamber, an air passage leading to said primary mixing chamber in heat conducting relationship with said exhaust pipe, a cold air entrance located between said air passage and said primary mixing chamber, means for controlling said air entrance for regulating the temperature in said primary mixing chamber, a passage connecting said primary mixing chamber to said secondary mixing chamber, said passage being in heat conducting relationship with said exhaust pipe, a secondary air entrance leading to said secondary mixing chamber to form therein an explosive mixture for said internal combustion engine.

2. In combination with an internal combustion engine, an exhaust pipe, a carburetor comprising primary and secondary mixing chambers, a fuel nozzle discharging into said primary mixing chamber, an air passage leading to said primary mixing chamber in heat conducting relationship with said exhaust pipe, a cold air entrance located between said air passage and said primary mixing chamber, means for controlling said air entrance for regulating the temperature in said primary mixing chamber, a passage connecting said primary mixing chamber to said secondary mixing chamber, a secondary air entrance leading to said secondary mixing chamber to form therein an explosive mixture for said internal combustion engine.

In testimony whereof I affix my signature.

GEO. M. HOLLEY.