G. E. PHILLIPS.

CARBURETER.

APPLICATION FILED DEC. 15, 1915.

1,321,471.

Patented Nov. 11, 1919.

2 SHEETS—SHEET 1.

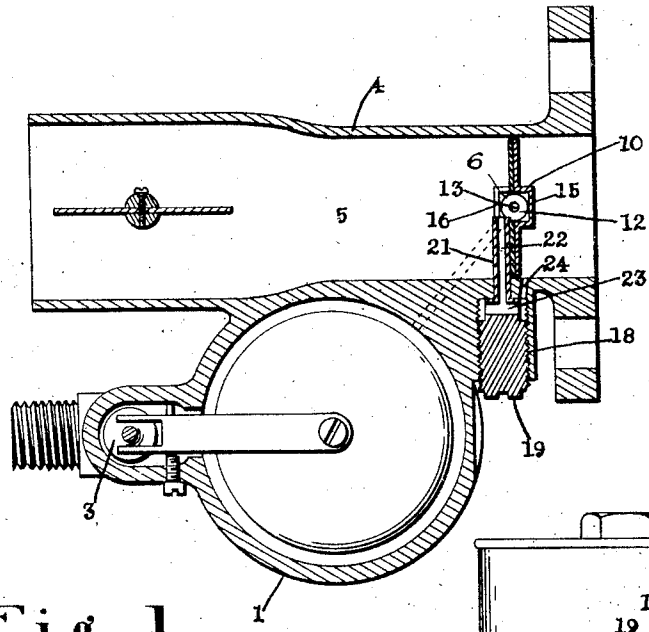


Fig. 1.

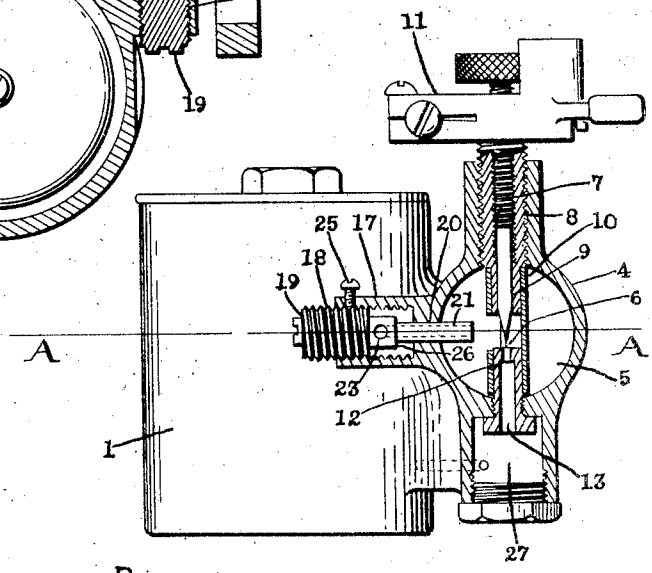


Fig. 3.

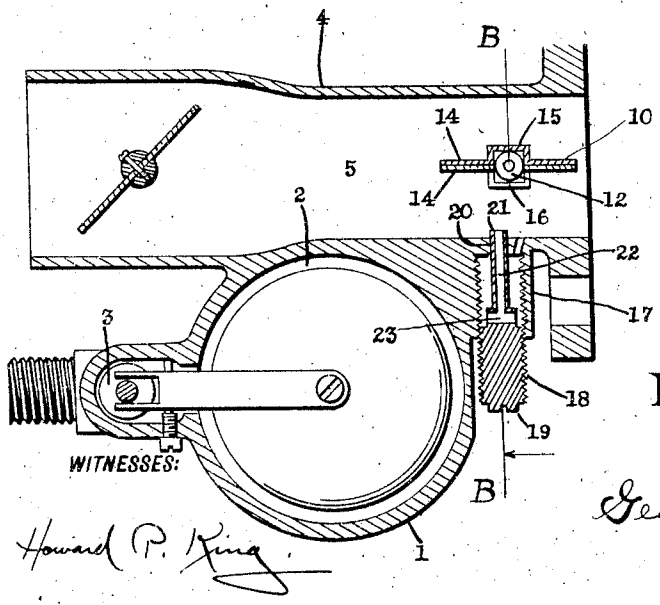


Fig. 2.

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2 SHEETS—SHEET 2.

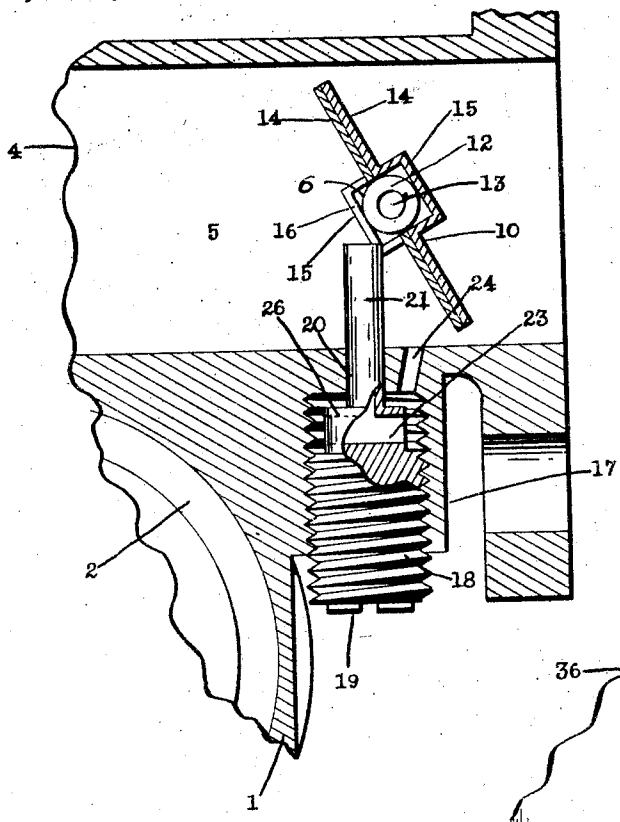


Fig. 4.

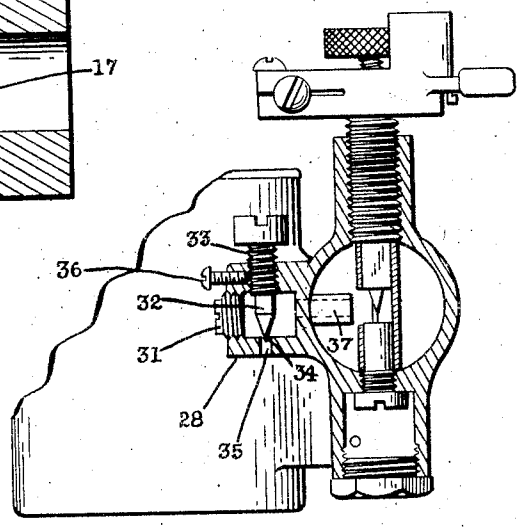


Fig. 6.

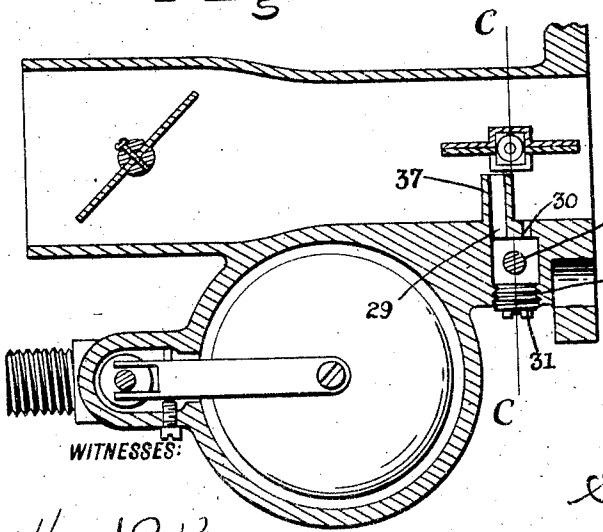


Fig. 7.

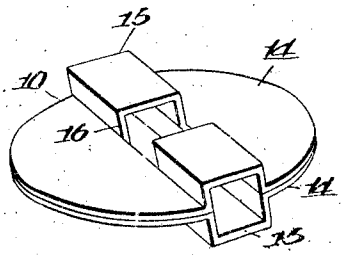


Fig. 5.

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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,321,471. Specification of Letters Patent. **Patented Nov. 11, 1919.**

Application filed December 15, 1915. Serial No. 66,888.

To all whom it may concern:

Be it known that I, GEORGE E. PHILLIPS, a subject of Great Britain, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

The objects of this invention are to provide a carbureter which will give a proper mixture of air and gasolene for low speed; to avoid waste of gasolene; to obtain a suction close to the fuel nozzle; to thus cause a less volume of air to draw in and vaporize a small quantity of gasolene when desired; to permit regulation of the mixture thus obtained; to allow the carbureter to supply the mixture to an engine as usual for high speeds; to secure simplicity of construction and operation, and to obtain other advantages and results as may be brought out in the following description.

Referring to the accompanying drawings, in which like numerals of reference indicate the same parts throughout the several views.

Figure 1 is a longitudinal section through a carbureter embodying my invention as upon line A—A of Fig. 3.

Fig. 2 is a similar sectional view showing certain movable parts in shifted position;

Fig. 3 is a transverse section as on line B—B of Fig. 2;

Fig. 4 is a sectional view similar to Figs. 1 and 2 upon an enlarged scale of a portion of the carbureter;

Fig. 5 is a detail perspective view of a certain throttle valve.

Fig. 6 is a sectional view similar to Figs. 1 and 2 showing a modified construction, and

Fig. 7 is a transverse section on line C—C thereof.

In the specific embodiment of the invention illustrated in said drawings, the reference numeral 1 indicates the usual cylindrical casing providing an interior float chamber or reservoir 2 into which gasolene may be admitted through a float valve 3 as is common in carbureters. At one side of the cylindrical casing 1 and tranverse thereto is a tubular member 4 providing a passage 5 for the air to enter and in the middle of this passage near the end thereof toward the engine is a valved nozzle 6 for controlling the admission of gasolene thereto from the float chamber or reservoir 2. In the drawings, the valve is shown as a needle valve with a threaded stem 7 within a sleeve 8 screw-threaded interiorly and exteriorly and providing at its inner end a squared or angular portion 9 non-rotatably receiving a throttle valve 10 upon itself. The sleeve 8 is threaded transversely into the tubular member, preferably parallel to the cylindrical casing 1, and is provided with means 11 at its outer end for turning the same whereby the throttle valve 10 may be turned to control the supply of mixed fuel and air to the engine. Opposite the inner or pointed end of the needle valve and in axial alinement therewith is a nozzle proper 12 projecting into the passage 5 and providing a central longitudinal hole 13 through which gasolene may be admitted into the passage 5, the pointed end of the stem 7 being adapted to partially close the hole 13 and control the quantity of gasolene admitted. Said nozzle proper 12 furthermore provides means to coact with the squared end of the sleeve 8 for supporting the throttle valve. In the drawings, the throttle valve is shown as comprising a pair of sheet metal disks 14, 14 held flatwise together and having diametrically of themselves at their facing sides alined channels 15, preferably stamped in the sheet metal and so proportioned as to rotatably receive at one end the squared portion of the sleeve 8 and rotatably receive at the other end the nozzle proper 12. The channel 15 of the disk at the side of the valve away from the engine (when the valve is closed) is cut away for its middle portion as at 16 so as to expose the fuel nozzle, as shown in the drawings, the other channel and disk being imperforate so that the valve will close the passage 5 between the fuel nozzle and the engine, when turned transverse to said passage.

It will be noted, that in this construction as so far described, when the throttle valve is nearly closed or stands substantially across the passage 5 the flow of air is adjacent the wall of the passage so the hole 13 from which the gasolene flows is not in the path thereof. Therefore uncertainty exists as to how much gasolene, if any, will be carried in with the air, and considerable in excess of that actually required for the proper mixture has to be admitted into the air passage to be sure of at least enough being taken up by the air to make the mixture, and it is this disadvantage and waste which the present invention aims to overcome.

Referring more particularly to Figs. 1 to 5 inclusive I have shown a preferred construction for obtaining a limited supply of the proper mixture of gasolene and air as the throttle valve is brought to closed position. To obtain such supply, I provide a by-pass the inlet end of which is close to the fuel nozzle outlet so a current of air entering the same will draw in a proper proportion of gasolene, and not require any excess flow.

In carrying out this feature of my invention a collar 17 is formed integrally with the casing 1 and tubular member 4, said collar being perpendicular to said member and at the side of and transverse to the casing. This collar is interiorly screw-threaded for receiving the threaded end 18 of an adjustable by-pass member 19. A restricted opening 20 is provided through the wall of the tubular member 4 in axial alinement with the collar, and through this opening extends a neck 21 into the air passage toward the center of the same. This neck is a part of the adjustable by-pass member and is in axial alinement with the threaded end thereof, whereby as the threaded end is screwed in or out the neck will turn within the restricted opening 20 and move in or out also. Furthermore, the parts are so related that the free end of the neck 21 may be brought close to the hole 13 through which the gasolene is admitted to the air passage, and upon the side of the throttle valve away from the engine, or side which has the portion 16 cut away. It will be noted that the neck projects inward from the wall of the passage toward which the fuel inlet faces as the throttle opens, and preferably the neck 21 is parallel and contiguous to the throttle when closed, as shown in Fig. 1, so that it serves as a stop for said throttle in closing.

The neck 21 is longitudinally hollow, as at 22, and at the end of the passage thus formed is a transverse hole 23 in open communication with the interior of the collar. Opening through the wall of the tubular member 4 into the interior of the collar 17 is a second or outlet hole 24 at the side of the neck toward the engine and spaced far enough therefrom so that as the throttle valve is brought into closed or perpendicular position to the tubular member the neck of the by-pass will be on one side thereof and the outlet hole 24 will open upon the other side thereof.

In operation, with the throttle valve closed and the engine creating a suction, atmospheric pressure will set up a flow of air through the neck 21 on the one side of the throttle valve and out by way of the hole 24 to the other side of the throttle valve into the engine, and due to the close proximity of the inlet end of the stem to the gasolene supplying hole, a quantity of gasolene will be drawn in also. With the throttle valve open somewhat, as in Fig. 4, so the outlet hole 24 is on the same side thereof with the neck, a suction through the by-pass is still effected, in that the rush of air by the hole 24 will draw air therefrom also and gasolene will therefore be drawn in. Obviously as the throttle valve is opened more and more, less air will be drawn through the by-pass, and with the throttle valve well open, the gasolene is carried directly in by the air in the passage at which time the by-pass need not operate.

In order to obtain the proper proportion of gasolene being carried through the by-pass, the neck has to be adjusted closer to or farther from the fuel nozzle outlet which may be readily done by screwing the by-pass member 19 in or out, and a set screw 25 is shown threaded transversely through the collar for clamping the member 19 in adjusted position. Furthermore, it may be noted that with the neck smaller in diameter than the threaded portion of the by-pass member, a chamber is provided which will allow the passage of the air and gasolene from the transverse hole 23 of the member to the outlet 24, and preferably a shoulder 26 is provided at the end of the stem next the threaded portion for preventing the threaded portion from being screwed entirely to the inner end of the collar, and thus a clear passage may always be had from the stem to the outlet. As free a supply of gasolene to the fuel nozzle is obtained as possible, and for this purpose, the longitudinal hole 13 provides the necessary restricted outlet toward the needle, but is enlarged therebelow and opens into an auxiliary reservoir 27 to which gasolene is supplied from the float chamber. By this means an adequate supply of gasolene is maintained very close to the needle valve so that the supply is positive and efficient upon all occasions.

Referring to Figs. 6 and 7 a modified construction of by-pass is shown in which some of the advantages of the preferred construction as above described may be secured. A

collar 28 is provided at the side of the casing 1 and perpendicular to the tubular member 4 as in the preferred construction. From the bottom of the collar through the wall of the tubular member open two holes 29, 30 one of which, as 29, toward the air inlet end of the member is larger than the other. These holes are separated longitudinally of said member and the throttle valve 10 when closed is arranged to stand between the holes. Thus a suction created by the engine causes air to enter the larger hole 29 on the air inlet side of the throttle valve and escape into the passage on the side of the throttle valve toward the engine through the smaller hole 30. This flow of air will obviously carry with it gasolene from the fuel nozzle, it being noted that the outer end of the collar is closed by a threaded plug 31, and that a fixed tube 37 leads from the larger hole 29 to a point near the gasolene inlet of the throttle valve.

In order to regulate the proportion of air and gasolene in the mixture allowed to enter, I have provided a needle valve 32 in the collar and shown as transverse thereto. This needle valve provides a threaded stem 33 which is threaded into one side of the collar and terminates at its inner end in a point 34 adapted to close or partially close a hole 35 in the opposite side wall of the collar. A set screw 36 in the wall of the collar transverse to the stem provides a means of holding the stem in adjusted position. The hole 35 is for admitting air, and by regulating the quantity admitted therethrough, the quantity admitted through the hole 29 will be varied and consequently more or less gasolene may be drawn in as desired.

While I have referred to "gasolene" throughout the specification, my invention can be employed with any fuel commonly used in carbureters to which it may be found adapted, and obviously various detail modifications and changes may be made in the manufacture of my improved carbureter without departing from the spirit and scope of the invention, so that I do not wish to be understood as limiting myself except as required by the following claims when construed in the light of the prior art.

Having thus described the invention, what I claim is,

1. In a carbureter, the combination with a suction passage, and a throttle arranged to open and close said passage to the normal flow of fuel, of a fuel inlet substantially at the middle of the axis of said throttle on the rearward side thereof when closed, and an auxiliary passage leading laterally from said fuel inlet at a point within the suction passage transversely thereof and through its wall toward which the fuel inlet faces as the throttle opens to a point of the suction passage in front of the throttle when closed.

2. In a carbureter, the combination with a suction passage and a throttle for said passage having a fuel inlet at the middle of one side of itself, of a neck projecting into the suction passage parallel and contiguous to the said throttle when closed, said neck forming a stop for the throttle when closed and providing a passage leading to a point of the suction passage in front of the throttle when closed.

3. In a carbureter, the combination of a casing providing a suction passage and a chamber in the side wall thereof, a fuel nozzle in said passage, a throttle adapted to open and close said passage to the normal flow of fuel, and a threaded member adapted to screw in and out at one side of the passage and having a neck extending from said chamber into the suction passage adjacent the nozzle, whereby screwing said member in or out will position the neck closer to or farther away from said nozzle for obtaining greater or less flow of gasolene into said chamber, said chamber having an outlet into the suction passage upon the opposite side of the throttle when closed from said neck.

4. In a carbureter, the combination of a casing providing an air passage, a fuel nozzle disposed transversely across said air passage, a throttle valve rotatably mounted on said nozzle and adapted to open and close said passage to the normal flow of air and gasolene, a by-pass comprising a threaded member adapted to screw in and out at one side of the casing and having a reduced shoulder at the inner end of said threaded portion whereby a chamber is provided around said shoulder, and a neck extending axially from said threaded portion and shoulder into said air passage adjacent the nozzle whereby screwing said member in or out will position the neck closer to or farther away from said nozzle for obtaining greater or less flow of gasolene into said chamber, said chamber having an outlet into said air passage upon the opposite side of the throttle valve when closed from the neck.

GEORGE ERNEST PHILLIPS.