W. M. CARLIN.

CARBURETER.

APPLICATION FILED FEB. 19, 1908.

904,508. **Patented Nov. 24, 1908.**

2 SHEETS—SHEET 1.

Fig 1

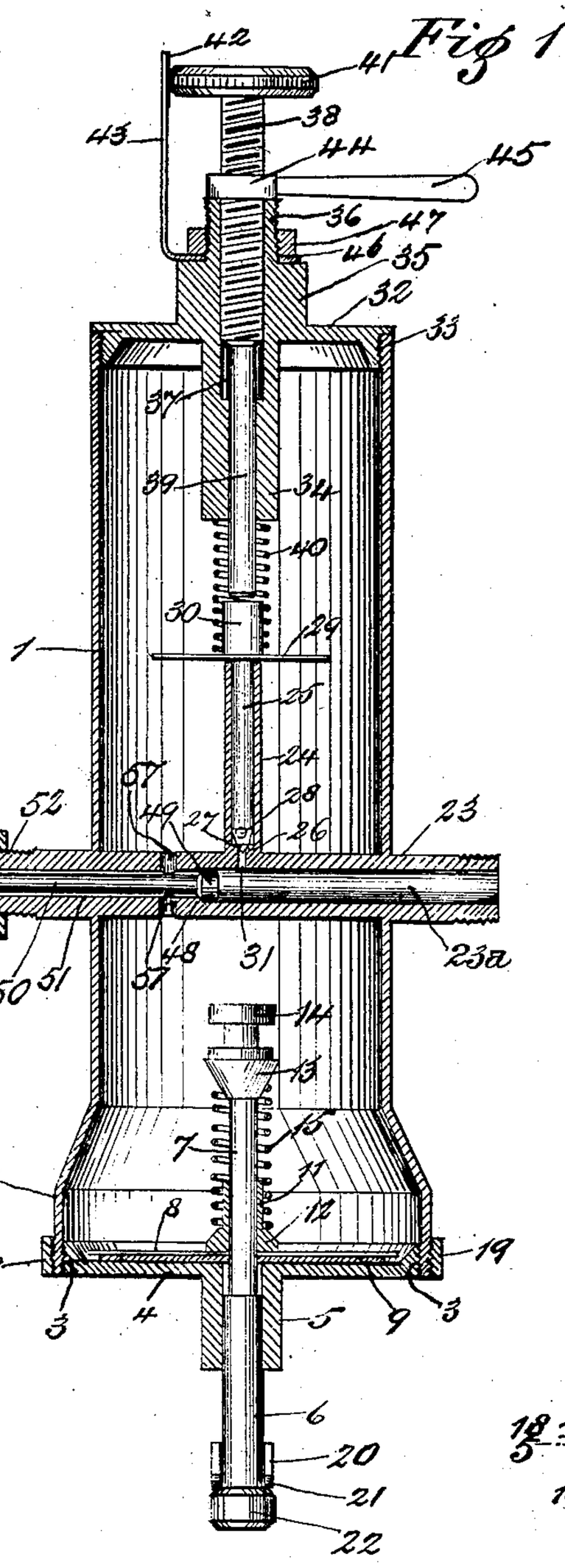


Fig. 2

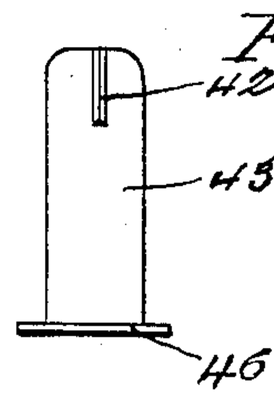


Fig. 3

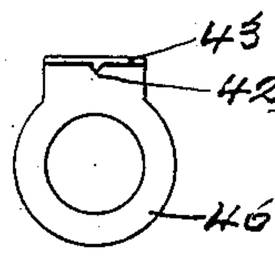
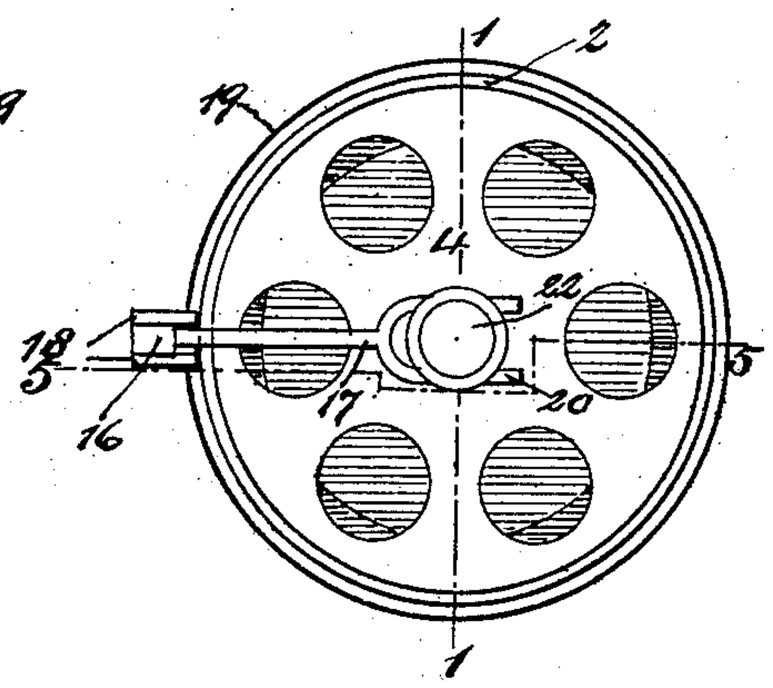


Fig. 4



WITNESSES:

Francis M. Springer

Jessie Weaver.

INVENTOR

William M. Carlin

BY

Thompson & Bell

ATTORNEY

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2 SHEETS—SHEET 2.

Fig 5

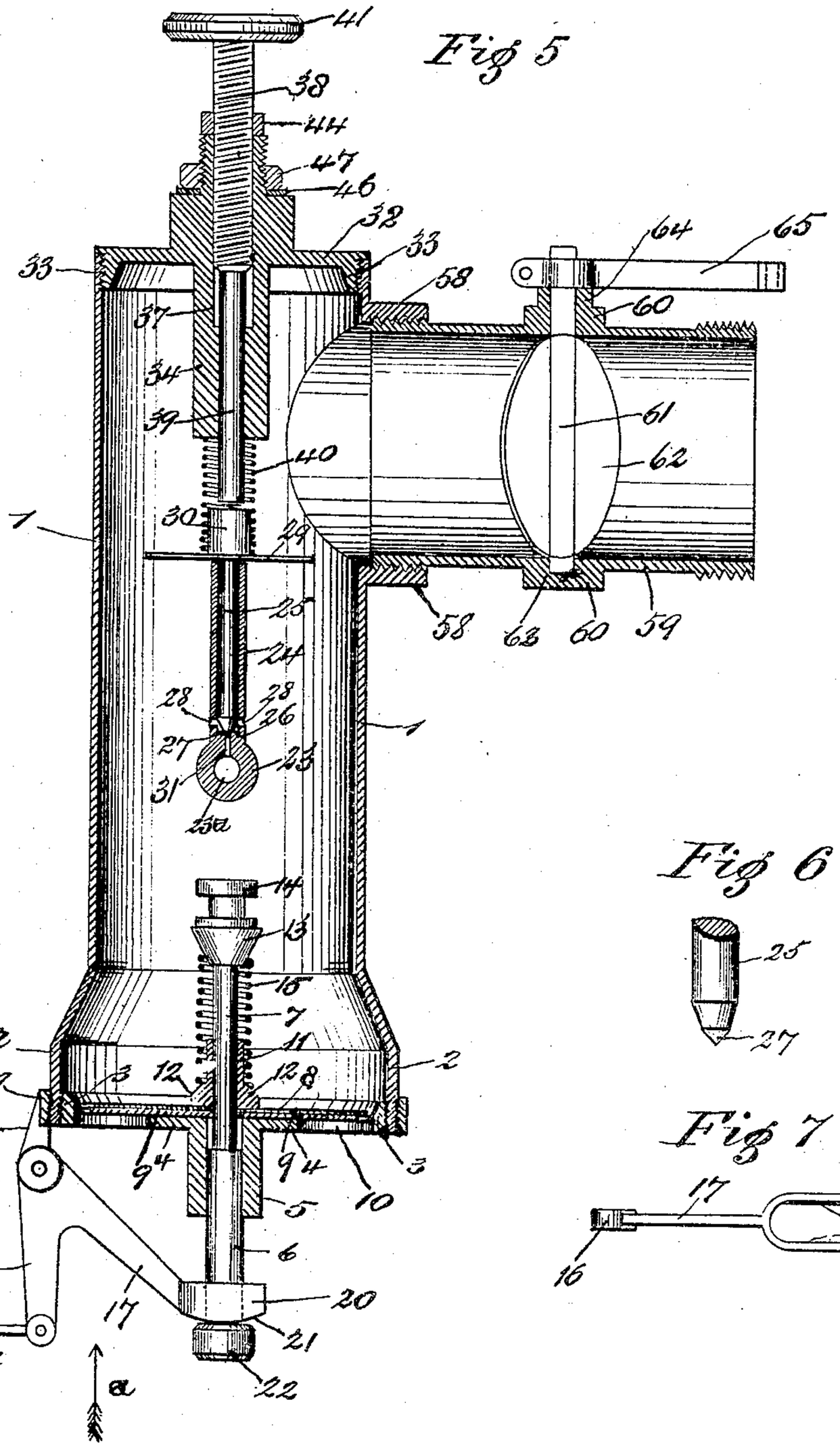

Fig 6

Fig 7

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CARBURETER.

No. 904,508. Specification of Letters Patent. Patented Nov. 24, 1908.

Application filed February 19, 1908. Serial No. 416,701.

To all whom it may concern:

Be it known that I, WILLIAM M. CARLIN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Carbureters, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in carbureters for use in connection with explosive engines and will be hereinafter described in the specification and particularly pointed out in the claims.

The object of this invention is to provide a carbureter into which the fluid fuel is directly admitted to be vaporized and mixed with the proper amount of air to form the explosive mixture preparatory to the admission of this gas into the cylinder or cylinders of the gas engine to which said carbureter is connected; also, to provide a micrometer adjusting device whereby the opening of the fluid fuel admission valve may be adjusted to a fine and accurate degree to regulate and adjust the flow of the fluid fuel into the carbureter; also, to provide means whereby the air admitted into the carbureter may be instantly controlled by the operator, at all times, from his seat without stopping the machine, to increase or diminish the amount of vacuum in the carbureter, as required. I attain these objects by means of the carbureter illustrated in the accompanying drawings in which like numerals of reference designate like parts throughout the several views.

Figure 1 is a vertical sectional view of the carbureter taken along the line 1—1 in Fig. 4; Fig. 2 is a detail view of the micrometer stop arm; Fig. 3 is a top view of the same; Fig. 4 is a bottom end view of the carbureter; Fig. 5 is a vertical sectional view of the carbureter taken along the line 5—5 in Fig. 4; Fig. 6 is a detail broken view of the valve spindle showing the form of the needle-point thereof; and, Fig. 7 is a detail view of the bell-crank lever looking in the direction of the arrow *a* in Fig 5.

I will now proceed to describe the construction and operation of my invention in detail in such clear, and exact terms that others skilled in the art to which it appertains may be able to construct and use the same.

This carbureter is composed of the hollow cylinder 1, having the enlarged air inlet bottom end 2, preferably of a bell-mouth form, which is threaded at its inner bottom end portion to receive the threaded rim 3 of the air inlet valve 4 to be removably secured therein.

The valve seat 4 is provided with the central depending boss 5 which is bored to receive the enlarged portion 6 of the spring compressing spindle 7 so that the latter may be freely moved longitudinally therein. A metallic valve disk 8 is bored at its central portion to loosely fit on the spindle 7 to freely slide thereon and a cushion valve 9, constructed of a flexible or yielding material, as leather, or other suitable material, is situated between said disk valve 8 and the seat 4 and said cushion valve is constructed somewhat smaller in diameter than that of the valve disk 8, so as to partially cover the valve openings 10 formed in the valve seat 4, so that air will be drawn through the uncovered portions of the valve openings 10 at a greater velocity under and around the peripheral edge of said valve disk 8 into the interior of and through the cylinder 1.

A sleeve 11 is bored to loosely fit on the spindle to freely slide thereon and said sleeve is provided with the conical head 12 the purpose of which will be hereinafter described. The flat larger end or base of the conical head 12 is soldered or otherwise secured centrally on the top side of the valve disk 8, so that the latter will be maintained in horizontal position or at right angles to said spindle 7 when sliding thereupon.

On the top end of the spindle 7 is situated a cone 13 which is loosely fitted on the end of said spindle to be moved longitudinally thereon and an adjusting nut 14 is screwed on the threaded end of said spindle whereby said cone is adjusted and maintained in adjusted position on said spindle. A coil spring 15 surrounds the spindle 7 and is adapted to bear at its bottom end on the cone 12 and at its top end against the cone 13, so that said coil spring may be maintained concentric with said spindle and prevented from contacting therewith to avoid friction and provide a free action of said spring. A bell-crank lever having the arm 16 and the arm 17 formed in one integral piece is pivoted to the lug 18 formed on the ring 19 which latter is removably secured on the outer threaded portion of the enlarged portion 2 of the cylinder 1. The arm 17 of said bell-crank lever is provided with the fork 20 the bottom bearing edges

21 of the bifurcations of which are curved so as to bear centrally of the collar 22, secured on the end of the enlarged portion 6 of the spindle 7, in all positions, and the end of the arm 16 is connected by a suitable connecting rod, as the connecting rod 16[a], to the bell crank lever 16[b] on the steering shaft 16[c] of the automobile in which the engine may be situated so as to be readily and conveniently operated by the driver.

The fluid fuel duct 23 is formed integral with the cylinder 1 and extends diametrically therethrough to project at its ends beyond the outer periphery of said cylinder, and said duct is situated intermediate the top and bottom ends of the latter and above the top inner end of the spindle 7 and sufficiently far above the air inlet valve to provide the requisite space or fall through which the drippings from said duct may fall to evaporate. On the upper side of said duct and centrally situated in the interior of said cylinder 1 is the needle valve spindle guiding sleeve 24 which extends vertically therefrom and is formed integral therewith, and said guide sleeve is provided with a longitudinal bore into which the needle valve spindle 25 is fitted to slide freely in a longitudinal direction.

Near the bottom end of the valve spindle guiding sleeve 24 is formed the needle valve seat 26 to which the needle valve 27 of the needle valve spindle 25 is fitted to form a close joint and to coact therewith, and in said sleeve above said valve seat are formed the outlet openings 28 through which the fluid fuel, admitted by said needle valve, passes into the interior of the cylinder 1 to be vaporized and taken up by the current of air flowing through the interior of said cylinder. The baffle disk 29 is secured centrally on the top portion of the needle valve spindle 25 with its top side contacting with the shoulder of the stop-head 30 thereof, and said disk is provided to intercept the current of air passing through the cylinder 1 for the purpose of operating the valve spindle 25 to lift the needle valve 27 off its seat 26 which operation takes place only while air is being drawn into the interior of the cylinder 1 by the engine cylinders.

The bottom end portion of the spindle 25, situated above the needle valve 27, is slightly reduced so that the fluid fuel passing through the valve opening 31 may flow freely into the clearance space thus formed above the valve seat 26 to the outlet openings 28.

The fluid fuel duct 23 is provided with the larger bore 23[a] through which the fluid fuel is admitted to the valve opening 31.

The top end of the cylinder 1 is provided with the cover 32 which is threaded at the outer periphery of its flange 33 to be screwed into the threaded portion of the top end of the cylinder 1, and said cover is provided with the centrally depending boss 34 and the upper central boss 35 having the upper reduced portion 36. A bore 37 extends centrally of the reduced portion 36 of the boss 35, the boss 35, and partially into the depending boss 34 and the said bore is threaded to receive the threaded portion 38 of the stop spindle 39. The lower portion of the depending boss 34 is bored to receive the lower reduced stop spindle 39 the lower end of which projects below the lower end of said boss 34 to almost touch the top end of the stop head 30. A light coil spring 40 surrounds the stop head 30 and the bottom reduced spindle 39 and is adapted to bear at its top end against the bottom end surface of the depending boss 34, and at its bottom end on the top surface of the baffle disk 29, and said spring is provided for the purpose of retaining said needle valve 27 on its seat 26 in such cases as when the carbureter is placed in an inverted position, or to prevent said valve from rising off its seat by the vibration or jar of the machine in which the engine may be situated.

On the top end of the threaded portion 38 of said stop spindle is secured a disk 41 which is finely notched at its peripheral edge into which the retaining tongue 42 of the spring arm 43 is adapted to fit to prevent a free rotation of said disk 41 and the stop spindle to which it is secured, whereby said stop spindle is set to adjust and regulate the lift of the needle valve 27 above its seat 26, by which means the lift of said valve may be adjusted manually to one thousandth part of an inch by the sound or click of the tongue 42 entering one of the peripheral grooves of the disk 41.

The spring arm 43 is provided with the foot 46 which is bored to loosely fit over the threaded reduced portion 36 of the boss 35, and a nut 47 is screwed on said reduced threaded portion to tightly secure said foot 46 to maintain said spring arm 43 in position, so that said retaining tongue 42 shall at all times enter one of the notches of the disk 41.

The lock nut 44 is bored and threaded to be screwed on the threaded portion 38 of the stop spindle, and the said nut is provided with a lever handle 45 whereby said lock nut is turned to lock said stop spindle in its adjusted position to limit the lift of the needle valve 27.

Before starting the engine to which a carbureter is connected, it is necessary to admit a small quantity of the fluid fuel into the interior of the carbureter or into the interior of the cylinder 1, so that the fluid fuel may be vaporized to fill not only the interior of the carbureter itself but also to fill the pipes intervening the carbureter and the valves of the engine to which said carbureter is connected, for this purpose, I pro-

vide the valve seat 48 formed at the end of the larger bore of the duct 23 against which the valve 49 is seated. A valve spindle 50 projects from the valve 49 and extends through the smaller bore 51 of the duct 23 to project through and beyond the cap end 52 of said duct and through the bore of the packing cap 53, which latter is secured on the threaded projecting end 52 of said duct, and the said cap is provided to compress a suitable packing material around the projecting end of the spindle 53 to prevent a leak of the fluid fuel. A removable collar 54 is securely screwed or otherwise secured on the reduced portion 55 of the spindle 50 and a coil spring 56 surrounds the projecting end of said spindle 50 and is situated between the removable collar 54 and the packing cap 53.

Outlet openings 57 connect with the reduced bore 51 of the duct 23 and the same are provided for the purpose of permitting the fluid fuel to drip into the interior of the cylinder 1 when the valve 49 is moved from its seat 48, in such cases, as when it is required to introduce a quantity of the fluid fuel into the interior of the carbureter sufficient to provide enough vapor to start the engine.

The elbow 58 is formed on the side of the cylinder 1 near the top end thereof, and the same is threaded to receive the threaded end of the throttle pipe 59. The throttle pipe 59 is provided with an enlarged center portion 60, which is situated intermediate its ends, and the throttle spindle 61, to which the throttle 62 is secured, has its bottom end portion journaled in the step bearing 63 formed in the enlarged portion 60 situated at the lower side of the throttle pipe 59, and said spindle projects upwardly through the top bore of said top enlarged portion and the boss 64 formed thereon, and on the prolonged outer portion of said spindle is secured a lever arm 65, to the free end of which latter may be connected a connecting rod, which connects said arm to a suitable lever situated on the steering shaft of an automobile, so that the operator thereof may manipulate said throttle as the working conditions of said engine may require.

The operation of the carbureter is as follows:—The valve 49 is first opened by pressing the collar 54 to admit a small quantity of the fluid fuel into the interior of the cylinder 1, which drips down upon the top surface of the valve 8 to be evaporated and taken up by the incoming air. The engine, to which the carbureter is connected, is next cranked around to create a vacuum in the interior of the cylinder 1, and the connecting pipe thereof, to cause a current of air to pass through the air inlet openings 10, which current takes up and absorbs the vapor evaporated from the fluid fuel admitted into said cylinder. The explosive mixture thus formed passes upwardly in the interior of the cylinder 1 to and through the throttle pipe 59, thence through the connecting pipe connecting said throttle pipe 59 and the cylinder of the engine, to charge said cylinder with the explosive fluid with which to start the engine in motion. The engine, having been thus started, maintains a vacuum in the carbureter to draw a constant supply of air through the valve openings 10 of the air inlet valve, to cause a flow of fresh air through said carbureter. The current of air, in its passage through the carbureter, contacts with the bottom surface of the baffle disk 20, secured on the valve stem 25, to lift it and the needle valve 27 to which it is connected, off its seat to admit fluid fuel into the interior of the cylinder 1 there to be vaporized and mixed with the current of air passing therethrough to form the proper explosive mixture which passes on through the throttle pipe 59, through the connecting pipe to the engine cylinder, there to be exploded in the usual way. The supply of the explosive mixture may be controlled by the throttle valve 62 when desired.

When it is desired to increase the vacuum in the carbureter, the operator moves the spindle 7 downwardly by means of the mechanism, connecting it to the steering shaft, to compress the coil spring 15, so as to apply a greater resistance to the valve disk 8 and its cushion valve 9 to reduce or restrict the raising of the latter valves to diminish the supply of air through the valve openings 10 into the interior of the cylinder 1, thereby increasing the flow of the fluid fuel through the valve opening 31 to be vaporized and mixed with the reduced volume of air to enrich the latter.

The needle valve spindle 25 has a very limited motion which is increased or diminished by means of the stop spindle 39 which latter may be adjusted to a fine degree to fix the clearance between the stop end of the spindle 39 and the top end of the stop head 30 of the valve spindle 25 by means of the micrometer screw 33 and the collar 41, whereby the exact lift of the needle valve 27 may be, at all times, predetermined and set to an exact distance.

I claim:—

1. In a carbureter, the combination with a hollow cylinder having its top end closed and its bottom enlarged end open, an air inlet valve situated over said enlarged open bottom end, a mechanism connecting said valve and the steering shaft of the vehicle whereby the valve closure is effected to control the vacuum in said cylinder, and an outlet situated near said top closed end, of said cylinder of a fluid fuel duct situated intermediate the ends of said cylinder, and having an

inlet end situated exteriorly of said cylinder, a needle valve sleeve guide extending vertically from said duct and situated centrally of the interior of said cylinder, said guide sleeve having a fluid fuel outlet, a valve seat situated at the bottom of the bore of said guide sleeve and a needle valve spindle fitted into said guide sleeve to slide along longitudinally therein, a needle valve on the end of said spindle coacting with said seat, and a disk situated at the top portion of said spindle and connected thereto, said disk of smaller diameter than the interior diameter of said cylinder.

2. In a carbureter, the combination with a hollow cylinder vertically situated having its top end closed and its bottom enlarged end open, an outlet opening situated near its top end, and an inlet valve covering said bottom enlarged open end, a valve guide spindle extending interiorly of said cylinder, a valve controlling spring surrounding said spindle, and mechanism connecting said valve spring mechanism and the steering shaft of the vehicle whereby the tension of said valve spring is controlled to vary the vacuum in said cylinders, of a fluid fuel duct extending diametrically of said cylinder and situated intermediate the closed top and air inlet bottom ends thereof and having an inlet end exterior of said cylinder, a needle valve guide sleeve extending vertically from the upper side of said duct and centrally situated in the interior of said cylinder said guide sleeve having a fluid fuel outlet, a valve seat situated at the bottom of the bore of said guide sleeve, a needle valve spindle situated in said guide sleeve cylinder to slide longitudinally therein, a baffle disk situated at the top end of said spindle whereby the latter is raised by the current of air, said baffle disk of smaller diameter than the interior diameter of said cylinder, a needle valve on the lower end of said spindle coacting with said seat, a stop spindle situated vertically and centrally over the top end of said valve spindle, said stop spindle screwed into the closed end of said cylinder, a locking lever screwed on said spindle and situated exteriorly of said top closed end, a disk on the end of said spindle having peripheral notches, and a spring arm having a retaining tongue situated at its free end and adapted to engage the notches of said disk whereby the spindle is held in any desired set position.

3. In a carbureter, the combination with a hollow cylinder vertically situated having its top end closed and its enlarged bottom end open, a valve seat removably secured to said open bottom end, a valve coacting with said seat a guide boss having a central bore, said boss situated centrally of said seat and depending therefrom, a spindle fitting the bore of said boss to slide longitudinally therein, a spring surrounding said spindle and bearing on said valve to control the opening thereof, mechanism connecting said spindle and the steering shaft of the vehicle whereby the tension of said spring is varied to increase or diminish the vacuum in the cylinder, of a fluid fuel duct extending diametrically into the interior of said cylinder and situated intermediate the closed top end and the air inlet bottom end of said cylinder, said duct having a fluid fuel inlet end situated exteriorly of said cylinder, a needle valve spindle guide sleeve extending vertically from the upper side of said duct and situated centrally of the interior of said cylinder said guide sleeve having a fluid fuel outlet, a valve seat situated at the bottom of the bore of said guide sleeve, a needle valve spindle fitted into the bore of said guide sleeve to slide longitudinally therein, a needle valve coacting with said valve seat, a baffle disk situated at the top end of said spindle whereby the latter is raised longitudinally by the current of air, a stop spindle situated vertically and centrally over the top end of said valve spindle, a disk on the top end of said stop spindle, and a spring arm having peripheral stop notches extending upwardly and contacting at its free end with said disk, and a retaining tongue situated on said spring arm and adapted to engage the notches of said disk whereby the spindle is held in any desired set position.

4. In a carbureter, the combination with a hollow cylinder having its top end closed and its bottom enlarged end open, an air inlet valve situated over said enlarged open bottom end, an outlet situated near said top closed end of said cylinder, a fluid fuel duct situated intermediate the ends of said cylinder said duct having longitudinally extending bores of different diameters connecting at a point intermediate the ends of the duct and having priming openings situated to extend from the smaller bore to the interior of said cylinder, a needle valve guide-sleeve, a valve seat situated at the bottom of the bore of said guide-sleeve, a needle valve fitted to slide longitudinally in said sleeve and coacting with said seat, of a valve seat situated in the larger bore at the junction of the larger and smaller bores of said duct, a priming valve in said larger bore coacting with said seat, a valve spindle extending from said priming valve through said smaller bore to project beyond the open end of said duct, and a retaining spring for retaining said priming valve closed.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM M. CARLIN.

Witnesses:
THOMPSON R. BELL,
ORLANDO C. FORBES.