No. 871,730. PATENTED NOV. 19, 1907.

J. A. McHARDY.

CARBURETER.

APPLICATION FILED JULY 24, 1906.

2 SHEETS—SHEET 1.

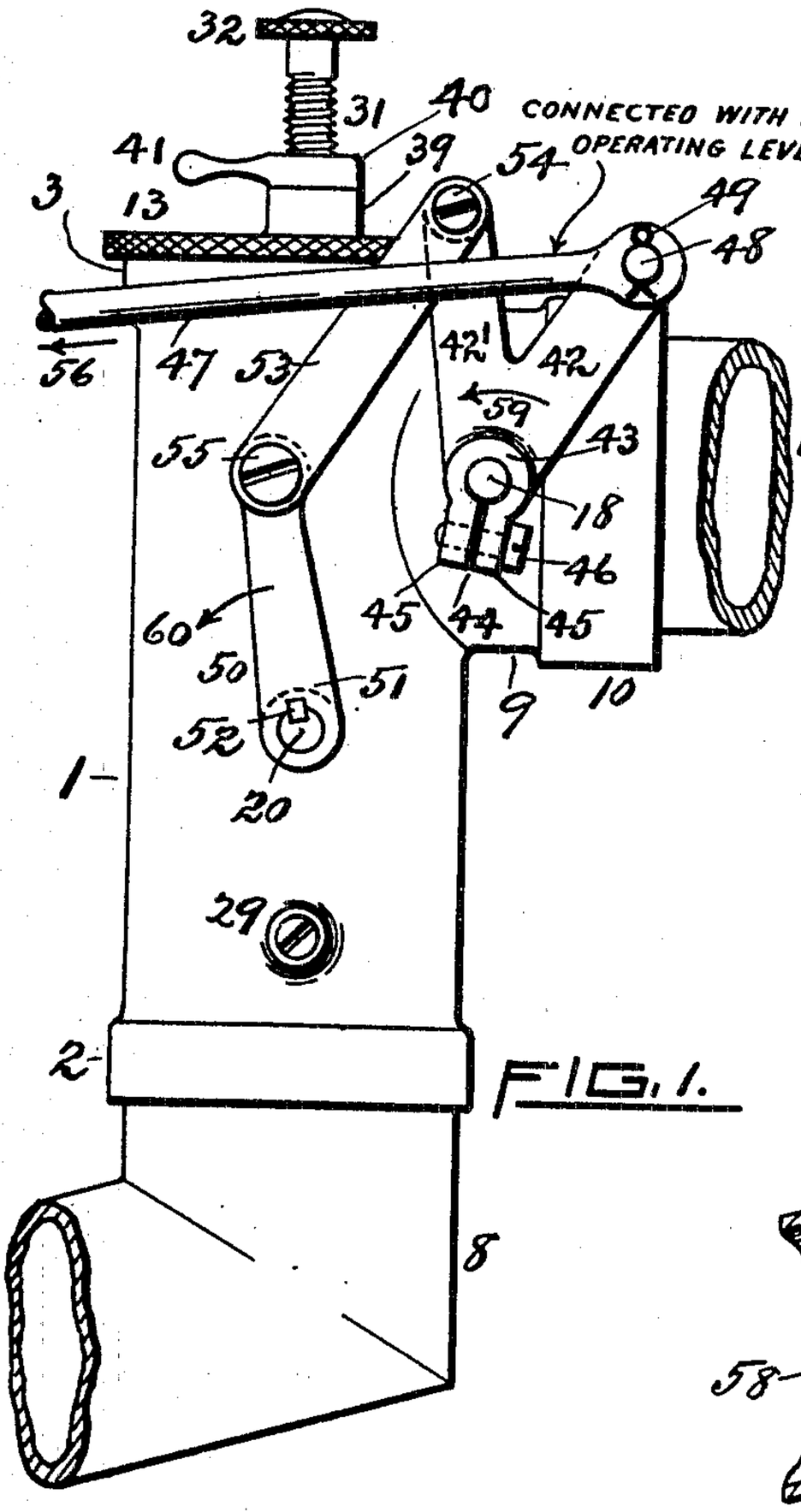

FIG. 1.

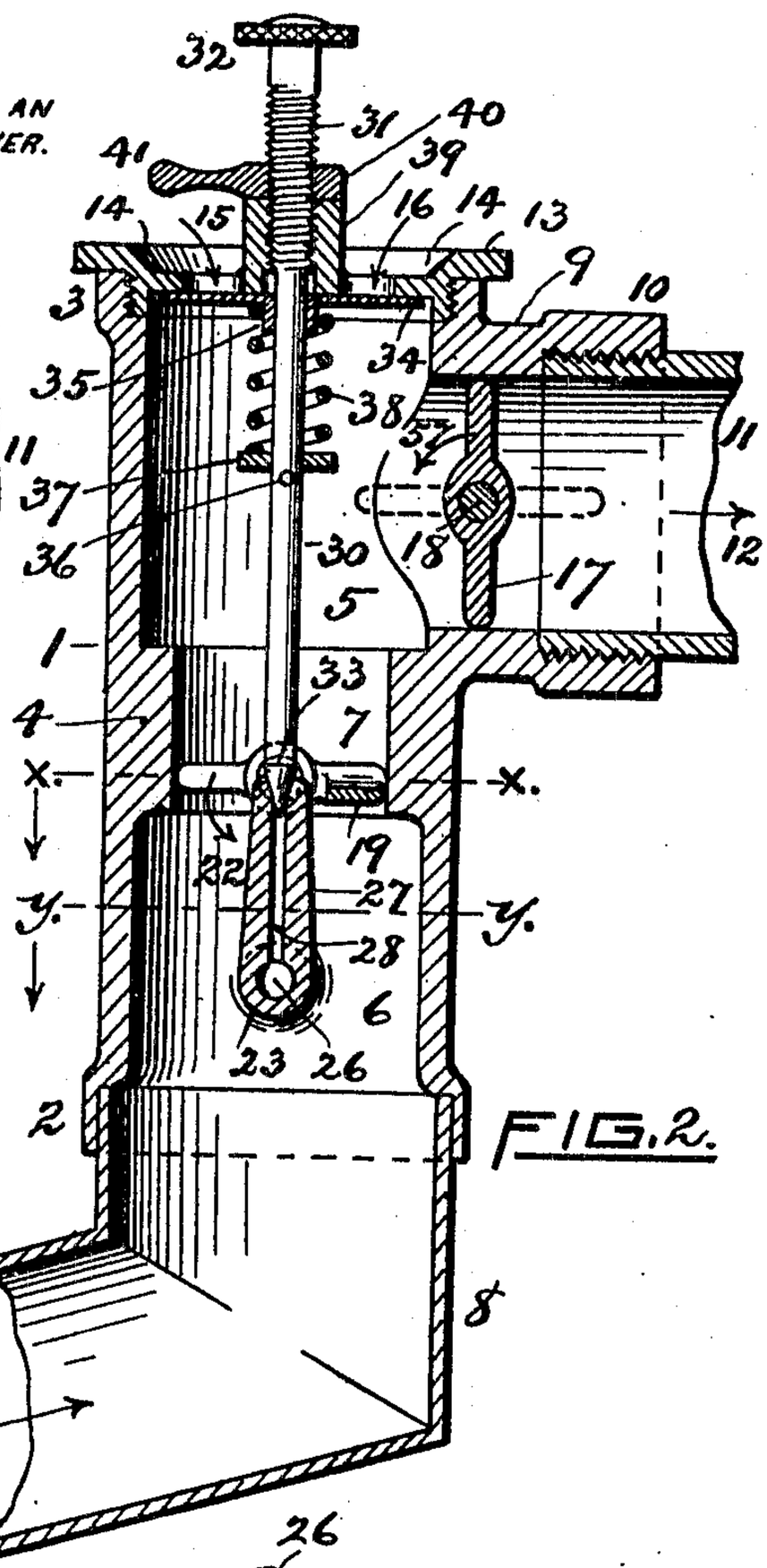

FIG. 2.

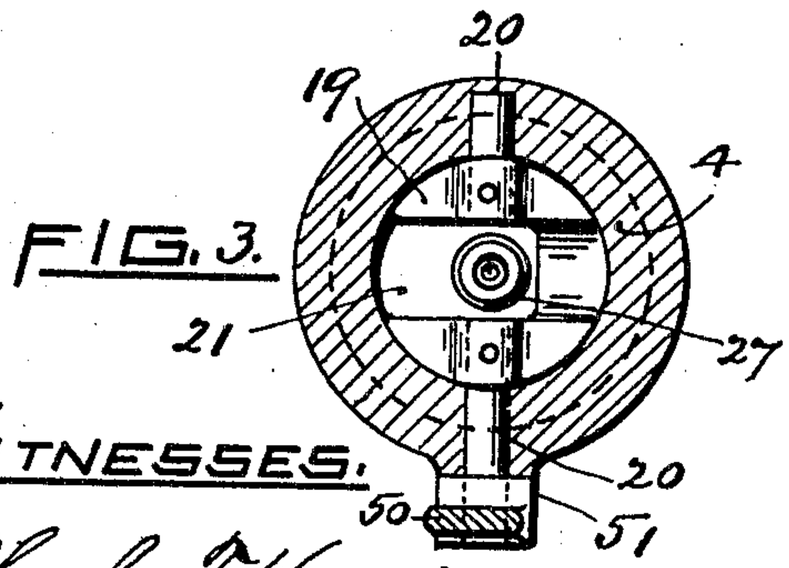

FIG. 3.

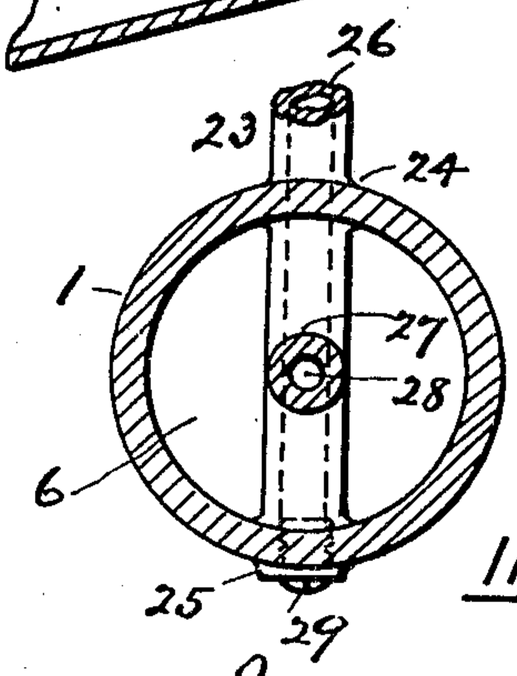

FIG. 4.

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2 SHEETS—SHEET 2.

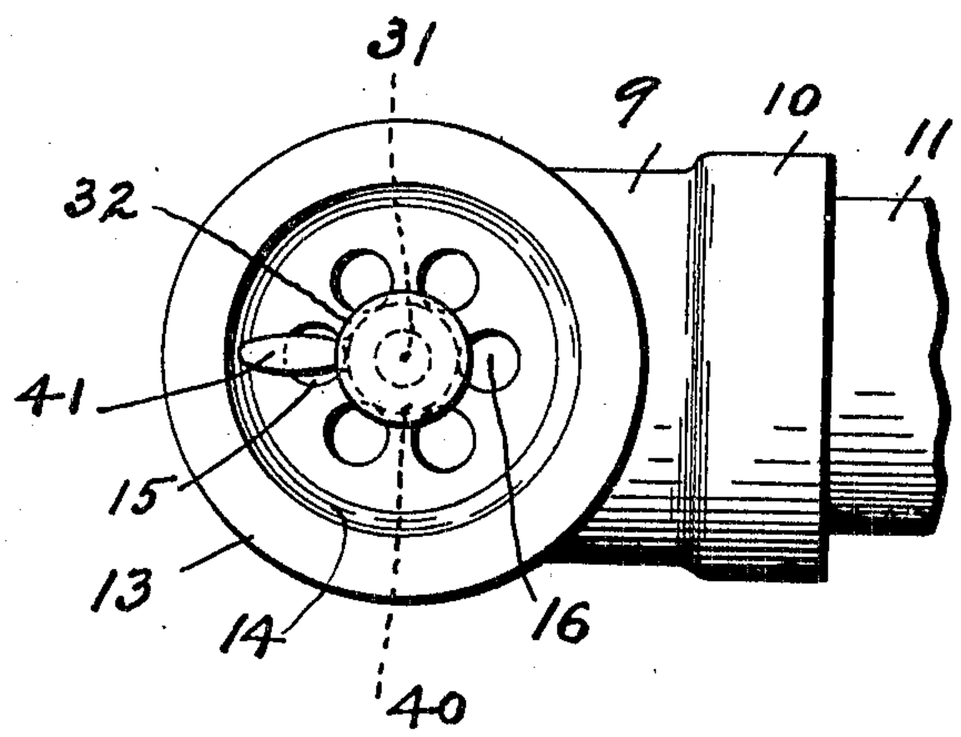

FIG. 5.

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UNITED STATES PATENT OFFICE.

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CARBURETER.

No. 871,730. Specification of Letters Patent. Patented Nov. 19, 1907.

Application filed July 24, 1906. Serial No. 327,541.

To all whom it may concern:

Be it known that I, JAMES A. McHARDY, a subject of the King of England, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Carbureters, of which the following is a specification, reference being had therein to the accompanying drawings.

Like reference numerals indicate like parts.

Figure 1 is an elevation of my improved carbureter. Fig. 2 is a central vertical section of the same. Fig. 3 is a cross-sectional view on line *x x* of Fig. 2. Fig. 4 is a cross-sectional view on line *y y* of Fig. 2. Fig. 5 is a plan view of the top of said carbureter.

My invention relates to the class of carbureters for use with internal-combustion engines to supply the same with the vapors of hydrocarbon oil, and it consists of the novel construction and combination of the several parts as hereinafter described and specifically set forth in the claims.

In the drawings 1 represents the case or body portion of a carbureter. It is preferably cylindrical and provided with the annular enlargements and sockets 2 and 3 at its upper and lower ends, respectively. It also has an inwardly extending flange 4, thus affording the chambers or spaces 5 and 6, of equal diameters, and the central intermediate chamber or space 7, of less diameter than the diameters of the chambers or spaces 5 and 6, but all said chambers or spaces are continuous with each other in the same axial line. The upper space 5 is the carbureting chamber, the lower space 6 is the air chamber and the central space 7 is the spraying chamber.

A supply pipe 8 conducting air from the external atmosphere is connected to the carbureter case or body 1 in the socket or annular enlargement 2 thereof. A tube or sleeve 9 opens into the carbureter case or body 1 at its upper end on one side and is provided with the annular flange 10, which has an interior screw-thread, as shown in Fig. 2. A pipe 11 has screw-threads at its inner end, which engage the screw-threads of the flange 10. The pipe 11 conducts the products of the carbureting chamber 5 to the cylinder of the engine in the direction indicated by the arrow 12 in Fig. 2.

In the upper socket 3 of the body or case 1 a screw cap 13 is mounted and engaged therewith by the screw-threads, as illustrated in Fig. 2, the knurled flange of said cap extending out beyond the upper edge of the annular enlargement 3 of the case or body. This screw-cap has a central depression 14 and web, the latter having a plurality of apertures for the admission of air, as indicated by the arrows 15 and 16.

A throttle valve 17 is mounted fast on a rod or pivot 18 in the pipe 9. Said valve is circular, and its diameter equals the diameter of said pipe 9, so as to close said pipe 9 when the valve is in the position shown in solid lines in Fig. 2.

An air-intake valve 19 is mounted fast on a rod or pivot 20. One end of the pivotal rod 20 is mounted rotatably in the interior annular flange 4 and the opposite end of the pivotal rod 20 passes through said flange and projects out diametrically, as illustrated in Fig. 3. The valve 19 has a rectangular opening or aperture 21, shown in top plan in Fig. 3, and indicated by the arrow in Fig. 2. The diameter of the valve 19 is equal to that of the bore of the chamber 7, so that said valve, which is circular, closes said bore (except for the rectangular space 21) when the valve is in the position shown in Fig. 2.

In the chamber or space 6 is the gasolene or oil feed-pipe 23, extending diametrically across it and passing through bosses 24, 25, as seen in Fig. 4. The bore of this pipe is indicated at 26. A stand pipe or discharge pipe 27 extends up from the pipe 23, the bore 28 of said pipe 27, opening into the bore 26 of the pipe 23, as seen in Figs. 2 and 4. The upper end of the bore 28 of the stand pipe 27 has a conical depression or valve seat, as seen in Figs. 2 and 3. The feed pipe 23 at its outer end is closed by a screw plug 29. Gasolene, or other hydro-carbon oil, flows from a tank or chamber (not shown) through the feed-pipe 23, and up through and out of the bore 28 of the stand pipe 27, from which it is drawn by the suction of the piston of the engine. The gasolene or other oil is maintained in the tank or chamber by a float valve or other suitable device (not shown) at a level somewhat below the upper end of the stand pipe, so as normally to prevent an overflow or discharge therefrom.

A needle valve 30 has a portion of its shank screw-threaded, as shown at 31, separated by

intervening radially-extending ribs, as seen in Fig. 2. Its upper end has a knurled head 32 and its lower end is formed into a conical point 33, which is adapted to close the bore 28 of the stand pipe 27 in the conical valve seat thereof.

An auxiliary air-valve consists of a circular disk 34, whose diameter is nearly equal to the diameter of the chamber 5, so that said disk is movable in said chamber, as shown in Fig. 2. The disk 34 has a tubular stem 35. A cross pin 36 extends through the shank of the needle valve 30. A collar 37 surrounds the shank of the needle valve and rests upon the cross pin 36. A spiral spring 38 surrounds the tubular stem 35 and the shank of the needle valve, one end of which spring abuts the under surface of the disk 34 and the other end of which abuts the upper surface of the collar 37. From the center of the web or depression of the screw-cap 13 on the upper side thereof a tube 39, integral therewith, extends, which has a screw-threaded bore to engage the threaded portion 31 of the needle valve 30. The spiral spring 38 presses the disk 34 into contact with the under surface of the screw-cap 13. A check nut 40 fits tightly on the threaded portion 31 of the needle valve shaft and is in contact with the upper surface of the sleeve or tube 39. A handle 41 projects from the check nut 40.

A bent or V-shaped lever 42, 42′, has a hub 43 at its apex, and is there split, as at 44, and provided with two clamping ears 45. The hub 43 fits upon the rod or pivot 18 of the throttle valve 17 and is secured thereto by the screw 46, which draws and tightens the clamping ears 45 toward each other. A rod 47 is mounted at its end upon a pivot 48 and is held from displacement by a spring pin 49. A lever arm 50 has a hub 51, by which it is fitted to the rod or pivot 20, and fastened by a spline 52. A link bar 53 is connected to the lever arm 42′ by the pivot 54 and to the lever arm 50 by the pivot 55.

The operation of my improved carbureter is as follows: By one pull of the rod 47 in the direction indicated in Fig. 1 by the arrow 56, the throttle valve 17 and the air valve 19 are simultaneously opened, and by one push of the rod 47 in the reverse direction both said valves are simultaneously closed. The valve 17, in opening moves in the direction indicated by the arrow 57, and in closing it moves in the opposite direction. The valve 19 in opening moves in the direction indicated by the arrow. The cross-hatched portion of the valve 19 represented in Fig. 2 constitutes the stop, limiting the movement of the valves 19 and 17 to 90° in opening, at which limit said portion of the valve 19 comes up into contact with the shank of the needle valve 30 and can move no farther. The needle valve 30 is in threaded engagement with the tube 39. By turning the head 32 the position of the needle valve lengthwise in said tube is adjusted. and thus is determined the length of that portion of the needle valve extending from the bottom of the tube 39 toward the conical valve seat in the upper end of the stand pipe 27. When the needle valve 30 has been so adjusted, it is held by tightening the check nut 40 against the tube 39. In this manner the desired vent between the conical valve point 33 and said valve seat is maintained until changed by the operator.

The parts being adjusted as described, and the carbureter and engine inoperative, if it is desired to set the engine in motion, the chauffeur draws the rod 47 in the direction of the arrow 56. This movement of the rod 47 moves the bent lever 42, 42′, in the direction indicated by the arrow 59, and at the same time, by means of the link connection 53, 50, moves the lever arm 50 in the direction indicated by the arrow 60. If the rod 47 is drawn to the full extent possible, the throttle valve 17 is thereby moved from the position shown in Fig. 2 in solid lines to the position shown in said figure in dotted lines, and the air valve 19 is moved from the position shown in Fig. 2 to a vertical position (not shown) 90° therefrom. Air from the external atmosphere rushes through the pipe 8, as indicated by the arrow 58, into the air chamber 6, through the aperture 21 of the valve 19 and into the spraying chamber 7. The gasolene or oil spray is dissipated and evaporated in the chambers 7 and 5 in the well-known manner, and the carbureted air thus produced passes out through the pipe 11 to the engine, as indicated by the arrow 12.

It is to be observed that the bore or diameter of the chamber or space 7 is somewhat less than the bore or diameter of the throat or pipe 9, so that the suction of the piston of the engine tends to cause a partial vacuum in the carbureting chamber 5, thus facilitating the dissipation of the gasolene or oil spray, and the result is a uniformity of proportion of the atmospheric air and the hydrocarbon vapor in the mixture, at all times, and in all operative positions of the valves 19, 17, to whatever degree or extent said valves may be open. In case the suction of the piston exceeds a predetermined limit, and thereby creates an undesirable vacuum in the carbureter, the pressure of the external atmosphere overcomes the tension of the spring 38, whereupon the disk 34 moves inwardly and allows the outer air to flow into the chamber 5 through the apertures 15 and 16, as indicated by arrows in Fig. 2, until the vacuum is relieved, and the spring 38 then closes the disk 34 to the screw-cap 13 again.

In my device above described, the bores, spaces, or chambers 5, 6, 7 are experimentally tested and determined in order to get an ex-

act relation between the valves 17 and 19, so that the carbureter is balanced, and positive, uniform results are obtained, whereby the product carried to the engine is of the same quality and density and has the same proportion of air and gaseous ingredients at whatever position or degree of opening the valves 17 and 19 may stand.

I claim as a novel and useful invention and desire to secure by Letters Patent:

1. In a carbureter, the combination of a case or body portion, a carbureting chamber, an air chamber, a spraying chamber which chambers are within said case or body, means for conducting gasolene to the spraying chamber, an air pipe to conduct atmospheric air to the air chamber, a discharge pipe to conduct the mingled gasolene vapor and air from the carbureting chamber, an air valve mounted in the spraying chamber adapted to rotate on a pivot rod which extends diametrically across the spraying chamber, a throttle valve located in the discharge pipe of the carbureter and rotatably mounted on a pivot rod which extends diametrically across said discharge pipe of the carbureter, a V-shaped lever secured at its apex to the pivot rod of the throttle valve on the outer side of the case or body, a lever arm secured on the pivot rod of the air valve on the outer side of said case or body, a link bar pivotally connected at its ends respectively to said lever arm and to one end of said V-shaped lever, and a rod pivotally connected to the other end of said V-shaped lever.

2. In a carbureter, the combination of a circular spraying chamber, a circular air valve having a permanent air passage through it which valve has a diameter equal to that of the chamber, a gasolene-discharge pipe extending through said valve aperture into said chamber, a needle valve adapted to open and close said discharge pipe, a diametrically-arranged pivot rod upon which said air valve is mounted in said chamber, and means for rotating said air valve, said valve being so arranged that its solid part opposite to said air passage therein when said valve is moved to open position comes into contact with the needle valve to limit the rotation of the valve to 90°.

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

JAMES A. McHARDY.

Witnesses:
WILLIAM E. PREW,
WARREN R. PERCE.