E. J. GULICK.

CARBURETER.

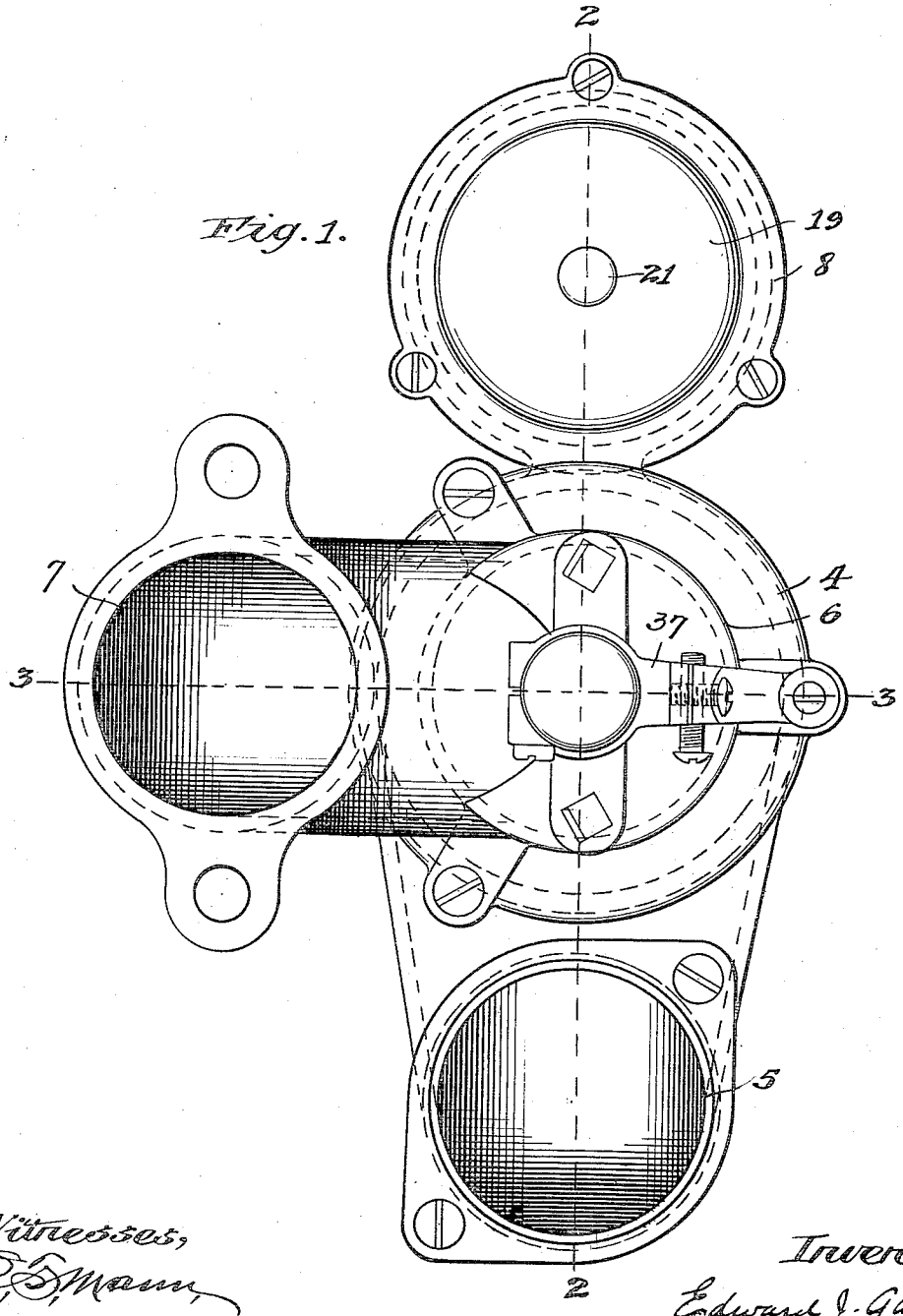
APPLICATION FILED MAY 4, 1907.

971,038.

Patented Sept. 27, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

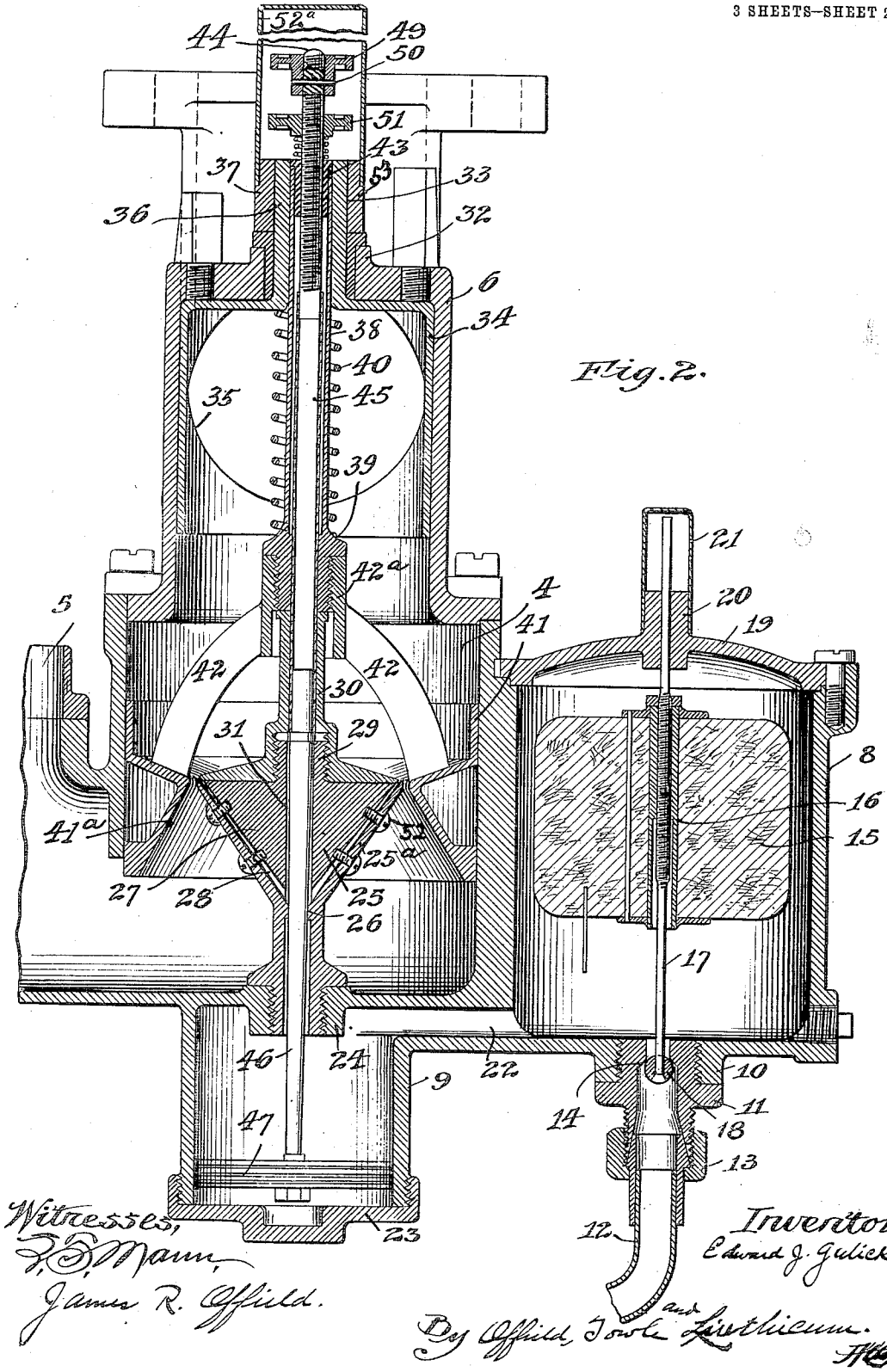

Fig. 2.

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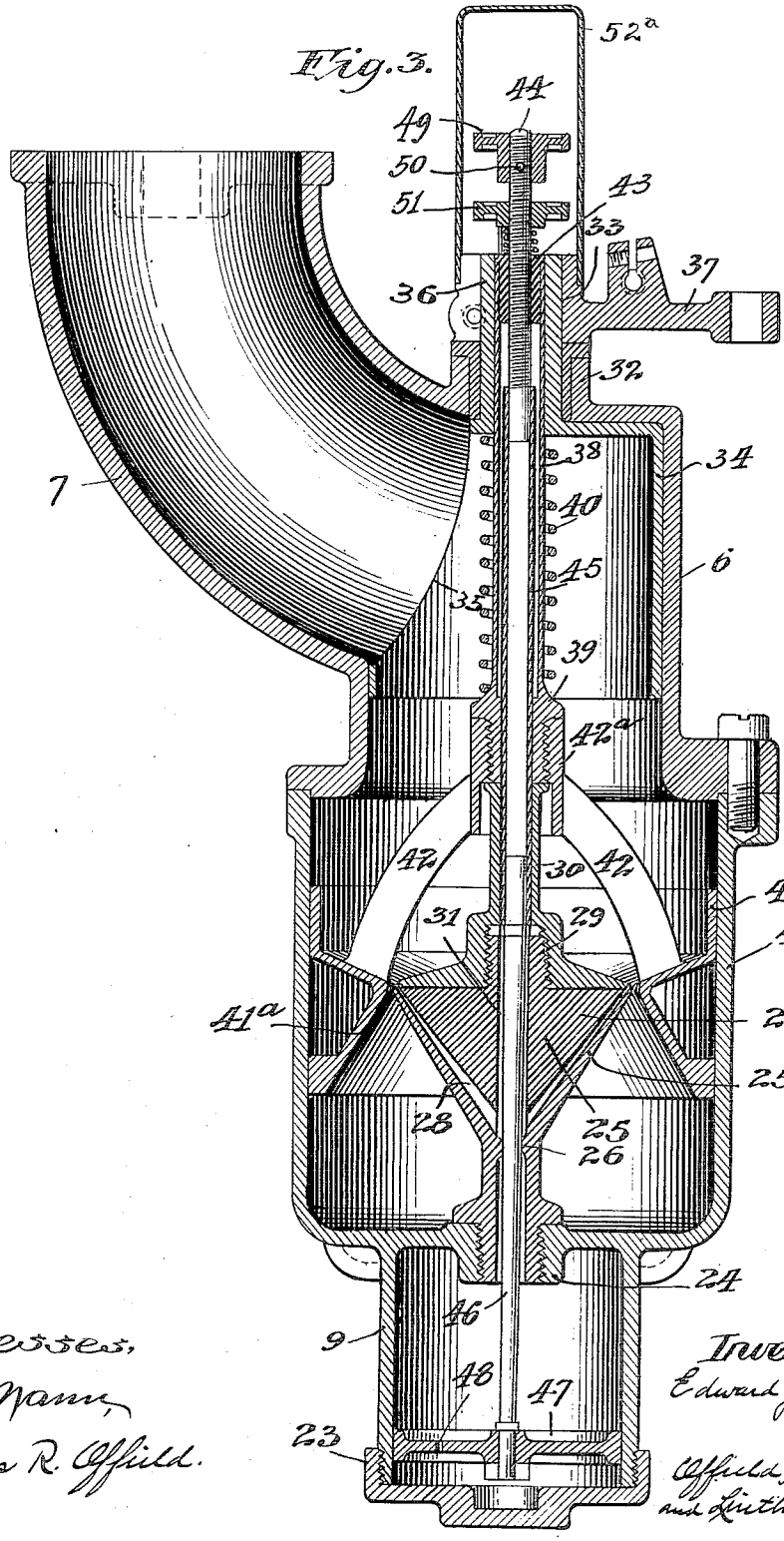
3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

EDWARD J. GULICK, OF MISHAWAKA, INDIANA, ASSIGNOR TO THE SIMPLEX MOTOR CAR COMPANY, OF MISHAWAKA, INDIANA, A CORPORATION OF INDIANA.

CARBURETER.

971,038. Specification of Letters Patent. Patented Sept. 27, 1910.

Application filed May 4, 1907. Serial No. 371,840.

To all whom it may concern:

Be it known that I, EDWARD J. GULICK, a citizen of the United States, residing at Mishawaka, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

The invention relates to and has for its objects the supplying of the engine, to which my carbureter is attached, with a thoroughly mixed composition of oil vapor and air.

A further object of the invention is to so automatically control the oil that the proper amount will be fed into the carbureting chamber as the suction or speed of the engine increases or decreases.

My invention relates in particular to the valve and spraying means for automatically regulating the amount of oil and air supplied at various speeds of the engine, and the distribution or spraying of oil within the carbureting chamber.

Other advantages will be apparent in the specification and drawings in which—

Figure 1 is a top plan view of my carbureter; Fig. 2 is a vertical section through line 2—2 of Fig. 1, with a portion of the air inlet pipe broken away; and Fig. 3 is a vertical section through the line 3—3 of Fig. 1.

Referring now more particularly to the drawings, the casing of the carbureter consists in general of the following parts: A hollow casing 4 constituting the carbureting chamber, 5 the air inlet pipe communicating with and opening into the casing 4, 6 the upper portion of the carbureting chamber 5, 7 the feed pipe for connection to the engine that communicates with the upper portion 6 of the carbureting chamber, 8 a float chamber and 9 a dash pot. All of the aforementioned parts are of the usual construction, although the relative arrangement of each to the other may not be precisely the same as the general form of carbureters, and the parts may be formed separately and secured together, or portions of one part formed integral with the other parts, as herein shown.

Referring now to the float chamber 8, at the bottom thereof I provide an annular boss 10 into which is screwed a coupling 11 carrying a feed pipe 12 that communicates with an oil supply tank, which is not shown. The feed pipe is secured to coupling 11 by the nut 13. The internal walls of the coupling are slightly contracted at the upper end to provide a valve seat 14. Within the float chamber is a cork float 15, or any other form of float that may be desired, which is centrally and vertically apertured to receive a hollow tube 16 secured therein in any suitable manner. The hollow tube 16 is internally threaded for a portion of its length, and through the same a float valve stem 17 extends and is threaded to coöperate with the internal threads in the tube.

The valve stem extends down through the annular boss into the coupling 11 and is provided at its lower end with a ball valve 18 to control the flow of oil into the float chamber, while the valve stem extends upward through the cover 19 of the float chamber and through an annular boss 20 thereon which forms a guide for the vertical movement of the float within the float chamber. A cap 21 is provided which fits over the annular boss 20 to protect the valve stem. In order that the oil may flow from the float chamber into the dash pot I provide a passage 22 communicating with the lower portion of the float chamber and with the upper portion of the dash pot. The bottom, 23, of the dash pot is removable in order that any sediment or dirt therein may be easily removed, and is herein shown as screwed on to the lower portion of the dash pot. The top of the dash pot is provided with an annular boss 24 that is internally threaded, and to which is screwed a spray plug designated as a whole by 25. A portion, 25^a, of the spray plug is of funnel form, the stem of which is provided with an annular aperture and opens into the dash pot.

At the apex of the funnel an internal circumferential flange 26 is formed to slightly contract the opening into the stem of the funnel, for a purpose hereinafter described. Secured within the funnel is a conical plug 27 the apex of which extends downward terminating short of the apex of the funnel, and the adjacent surfaces of the plug and funnel being separated about one one-hundredth of an inch to form an annular cone-shaped passage 28 from the apexes of the plug and funnel to their bases, and through this annular cone-shaped passage 28 the oil is adapted to flow. The plug and funnel may be secured together in any suitable manner as by the screws 52 or the two may be formed integral as by casting, leaving

ribs within the annular cone-shaped passage. The precise distance at which the surfaces of the funnel and conical plug are separated is immaterial, but it is understood that they must be sufficiently close together so that when the oil passes through the cone-shaped passage it will leave the spray plug in a fine film or spray form so that it readily mixes with the air and gasifies quickly. The conical plug is provided at its top with an annular screw-threaded projection 29 to which is screwed the choke tube stop 30; this latter being vertically and centrally apertured to register with the vertical aperture 31 in the conical plug so as to form a continuous passage from the dash pot through the top of the choke tube stop 30. The neck portion 32 of the upper portion of the carbureting chamber 6 is provided with an annular vertical aperture 33. Within the upper portion of the carbureting chamber 6 is a throttle valve 34 that is provided with a lateral opening 35 adapted to register with the opening of the feed pipe 7 into the upper portion of the valve. The throttle valve 34 is provided with a neck 36 that is rotatably mounted in the neck 33, and to which is attached a handle 37 as a means for connecting the throttle valve with the operator's lever of the engine, whereby the throttle valve may be rotated to either open the feed pipe to its full extent or to close the opening of the feed pipe to any degree. Within the stem of the throttle valve is slidably mounted the choke tube stem 38, hollow in form, and extending downward to rest upon the choke tube stop 30, the lower portion being enlarged and threaded, for a purpose hereinafter described.

The choke tube stem is provided with a boss 39 acting as a stop to confine a spring 40 between the boss and the top of the throttle valve 34; the normal tension of the spring being to seat the choke tube stem upon the top of the choke tube stop 30. Within the carbureting chamber 4 I provide an annular choke tube 41 that is of V-form in cross-section the apex of the V extending inwardly from the walls of the carbureting chamber to a position parallel with and almost touching the base of the spraying plug, thereby forming an annular beveled or tapered operating face 41^a on the choke tube; and to the upper side of the V-shaped choke tube a series of ribs 42 are secured, herein shown as formed integral therewith, the ribs at their upper ends being secured to a nut 42^a which is screwed to the lower threaded portion 39 of the choke tube stem. In the top of the choke tube stem is secured an internally threaded nut 43 through which is screwed the needle-valve stem 44. This needle-valve stem, as herein shown, is constructed for a portion of its length of a solid piece of material and threaded to coöperate with the nut 43, and then, for the purpose of lightness, the central portion of the valve stem is of tubular form, herein shown as constructed of a piece of tubing 45 extending downward below the choke tube stop 30 where it is again joined to the solid tapered body of the needle-valve 46. When the choke tube 41 is in its normal position and seated the tapered needle-valve 46 entirely closes the aperture formed by the flange 26; and as the needle-valve rises, the annular opening formed between the flange 26 and the needle-valve becomes larger for the reason that the taper of the needle-valve contracts toward its lower end.

At the lower end of the needle-valve is secured a piston 47 adapted to have a vertical movement within the dash pot and provided with an aperture 48 so that oil may flow on either side of the piston and thereby prevent the vertical movement of the needle-valve from being jerky by reason of the fact that under the varying impulses of the engine the upper portion of the needle-valve stem is threaded through the block 43, the needle-valve may be adjusted vertically relative to the flange 26, thereby regulating the flow of oil through the annular passage in the stem of the funnel; and as a means for adjusting the needle-valve I provide a nut 49 that is secured to the stem by means of a through-pin 50, and a tension nut 51 is also provided with a spring interposed between the nut 43 and the nut 51 so as to prevent the valve stem 44 from rotating when once set. A protecting cap 52^a is adapted to cover the nuts 49 and 51, said protecting cap being slidably mounted upon an annular boss 53, formed upon the handle 37.

Assuming the carbureter to be suitably connected to an oil engine its operation would be as follows: Oil would pass through the supply feed tube 12 into the float chamber, which has been properly adjusted in the ordinary way, and would flow therethrough into the dash pot and rise within the vertical passage in the stem of the funnel. If the needle-valve was in a position as herein shown, that is—in contact with the periphery of the flange 26, a further upward flow of the oil would be prevented; but we shall assume that the needle-valve is slightly raised from its present position and the oil passes upward through the annular cone-shaped passage flowing from the spraying nozzle in a fine, thin film or spray. The suction of the engine would then draw the air through the air intake pipe 5, which air would commingle with the fine spray emanating from the spray plug nozzle and would be drawn upward and intermixed with the spray being finally drawn through the feed pipe 7. As the suction of the engine increases, or its speed increases, it would require more composition or more gasolene to feed the proper

supply of mixture to the engine, and consequently as the suction increases the choke tube 41 is drawn upward against the tension of the spring 40 which increases the area of the opening between the tapered operating face of the V-shaped choke tube 41 and the orifice of the spray plug nozzle, as well as increases the opening formed by the flange 26 as the needle-valve rises, so that there is an automatic regulation of the oil as the suction increases as well as an automatic regulation of the air. When the lower end of choke tube 41 is in the same horizontal plane as the orifice of the spray plug nozzle, the area between these two points will form an opening equal to the area of the opening of the feed pipe into the casing 6. The spring 40 is of very low tension and serves to always start the choke tube 41 quickly downward when the suction of the engine diminishes so that the mixture or composition of oil and air will conform and be proper to the amount required by the engine.

It is obvious that various changes might be made by one skilled in the art to which this invention pertains, and therefore without limiting the precise details of construction and arrangement of parts,

I claim:

1. In a carbureter, the combination of a casing having branches for the intake of air and for connection to the suction side of an engine, of a carbureting chamber situated between said branches, an annular choke tube within the walls of said carbureting chamber and having a beveled operating surface thereon, a spray plug in said carbureting chamber, said spray plug provided with a conical annular passage terminating opposite the beveled surface of the annular choke tube, a needle-valve seated at the apex of said annular passage, and connected to said choke tube whereby the suction of said engine moves said choke tube and needle-valve relative to said spray plug to increase or decrease the amount of air and oil delivered to said engine, and means for returning said choke tube and needle-valve to their seated positions, substantially as described.

2. In a carbureter, the combination of a casing having branches for the intake of air and oil and for connection to the suction side of an engine, a carbureting chamber situated between said branches, an internally tapered annular choke tube slidable within said carbureting chamber, a spray plug within said carbureting chamber having formed therein an axial passageway provided with an annular valve-seat and, beyond said valve-seat with an annular flaring passageway the walls whereof converge toward their upper end, the upper end of said annular passageway terminating opposite the tapered side of said slidable choke tube, and a needle-valve extending through said spray plug and coöperating with said annular valve-seat to control the amount of oil admitted, substantially as described.

3. In a carbureter, the combination of a casing having branches for the intake of air and oil and for connection to the suction side of an engine, a carbureting chamber situated between said branches, an internally tapered annular choke tube slidable within said carbureting chamber, a spray plug within said carbureting chamber having formed therein an axial passageway provided with an annular valve-seat and, beyond said valve-seat with an annular flaring passageway the walls whereof converge toward their upper end, the upper end of said annular passageway terminating opposite the tapered side of said slidable choke tube, a needle-valve extending through said spray plug and cooperating with said annular valve-seat to control the amount of oil admitted, and a dash pot cylinder on the lower end of said carbureting chamber, and a dash pot piston connected to the lower end of said needle-valve, substantially as described.

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