C. B. KENT.

CARBURETER.

APPLICATION FILED MAR. 23, 1914.

Patented May 25, 1915.

1,141,085.

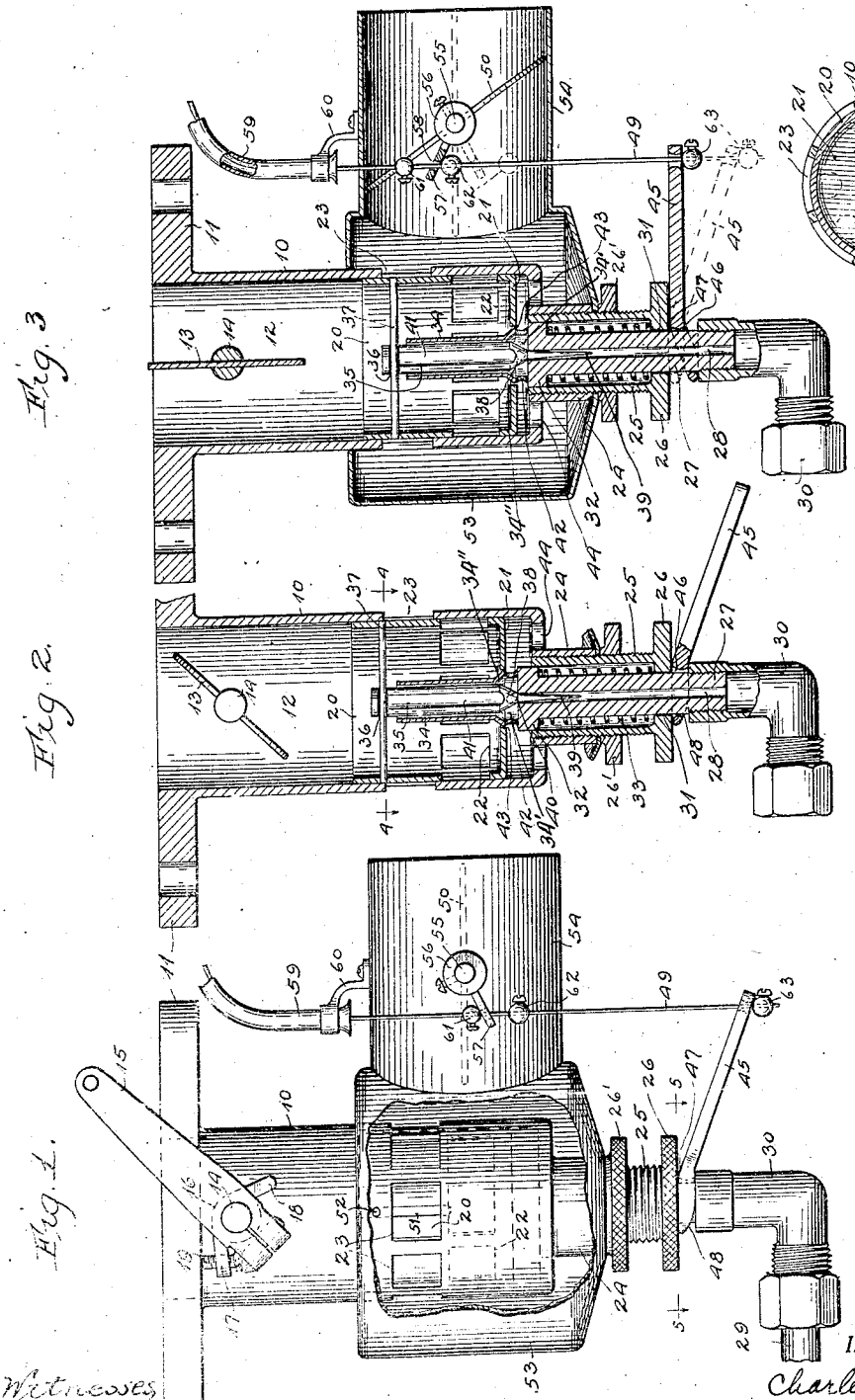

Fig. 3

Fig. 2

Fig. 1

Fig. 4

Fig. 5

Witnesses,
C. J. Schmidt
L. Bellenkel.

INVENTOR.
Charles B. Kent.

BY
Offield, Towle, Graves & Offield
ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES B. KENT, OF KENOSHA, WISCONSIN.

CARBURETER.

1,141,085. Specification of Letters Patent. Patented May 25, 1915.

Application filed March 23, 1914. Serial No. 826,464.

To all whom it may concern:

Be it known that I, CHARLES B. KENT, a citizen of the United States, and a resident of Kenosha, in the county of Kenosha and State of Wisconsin, have invented certain new and useful Improvements in Carbureters, of which the following is a specification.

My invention relates to carbureters, and among the important objects are to provide improved adjustment mechanism for efficiently regulating for relative proportions of air and oil; to provide adjusting mechanism of this nature which can be readily and accurately controlled from the driver's seat where the carbureter is used on a power driven vehicle; to obtain efficient results with a minimum number of light and simple parts; and in general to provide an improved type of carbureter which is of simple and inexpensive contruction and which has a wide range of efficient utility in connection with either stationary or portable engines.

In the accompanying drawings the various features of the invention are clearly illustrated, and in these drawings—

Figure 1 is a side elevational view of the carbureter with parts broken away, Fig. 2 is a vertical diametrical sectional view showing the normal positions of the parts, Fig. 3 is a similar sectional view but showing the adjustment for starting, Fig. 4 is a sectional view on plane 4—4, Fig. 3, and Fig. 5 is a sectional view on plane 5—5, Fig. 1.

The body 10 of the carbureter is cylindrical and cup-shaped and has the top flange 11 by means of which it may be secured to an inlet pipe or manifold. The upper part of the body part forms a mixing chamber 12 from which outlet is controlled by a butterfly valve 13 of usual construction mounted on a shaft 14 from which the actuating lever 15 extends. The shaft also carries a hub 16 from which extend abutment wings 17 and 18, the abutment wing 17 being shown as provided with an abutment screw 19. By adjusting the screw 19 the degree of closure of the valve may be regulated.

The lower part of the body 10 forms a pocket for the piston air valve 20 which is also cup-shaped and freely slidable in the body 10 but sufficiently tight to prevent leakage between its walls and the body walls. Near its bottom wall 21 the air valve has a belt of air passageways or ports 22 and the body 10 has a belt of air inlet ports 23. When the air valve is down the ports are separated and out of register but after the valve has been raised a distance these ports will begin to register and the area of air inlet to the body part will then depend upon the distance that the valve is raised, such raising being effected by the suction of the running engine.

At the lower part of the body part 10 is the internally threaded tubular extension 24 for receiving a threaded sleeve or barrel 25 provided at its lower end with a knurled head 26 by means of which the sleeve can readily be turned to be adjusted vertically with reference to the extension 24, a lock nut 26′ serving to secure the barrel in adjusted position. Slidable in this sleeve or barrel is a stem 27 having the central passageway 28 for gasolene or other fuel delivered through suitable piping 29 and a fitting 30 into which fitting the lower end of the stem 27 threads. The head 26 has the opening 31 through which the stem 27 extends and at the upper end of the stem is the lateral annular flange 32 between which and the head 26 is interposed a spiral compression spring 33 which tends to force the stem upwardly in the sleeve 25. Extending upwardly from the flange 32 is a cylindrical nozzle 34 in which is reciprocable the body of needle valve 35, this valve at its top having a transverse notch 36 for receiving the rod 37 extending diametrically across and supported on the air valve 20. The base of the nozzle is expanded to form valve chamber 34′ and conical wall section 34″. The lower end of the body part of the needle valve is tapered as indicated at 38 and from the end of this taper the needle point 39 extends downwardly and into the bore or passageway 28 of the stem 27, the upper edge 40 around this passageway forming a seat for the tapered end 38. The body of the valve 35 has longitudinal grooves 41 for the passage of air and gasolene. Through the wall of valve chamber 34′ and just above the flange 32 are air inlet openings 42. The bottom 21 of the air valve has the opening 43 for receiving the nozzle base and through the base of the body 10 around the extension 24 are air inlets 44.

The air valve 20 is suspended from the fuel valve 35 by means of engagement of the shaft 37 in the slot 36 and the weight

of this air valve normally holds the fuel valve seated to prevent escape of oil. When the carbureter is connected with an engine the suction effect will tend to draw the air valve upwardly to lift the fuel valve from its seat to allow oil to flow into the valve chamber 34'. The air ports 22 and 23 will not register until the air valve has been raised a distance and therefore air can enter only through passageways 44 in the base of the body part, and this air is deflected against the bottom 21 of the air valve and flows in greater part through passageways 42 into the valve chamber to there mix with the drawn up oil to flow therewith upwardly through the valve passageways 41 and into the mixing compartment 12 to be there further mixed before delivery to the engine. The opening 43 in the base of the air valve is normally in a plane at the base of the conical section 34'' to leave only a small gap so that most of the air must primarily flow into the valve chamber to produce a rich starting mixture. However, the suction quickly increases and the air valve will be gradually lifted to widen the gap as the opening 43 reaches the smaller diameters of the conical section 34'' and a greater quantity of air will pass through the opening and alongside the exterior of the nozzle. Eventually the air ports 22 will come into registration with the ports 23 and additional air will enter in order that the proportion of air may become larger as the engine gets under head way. The ports 23 are radially opposite the outlet of the nozzle 34 and the inflowing air takes a radially upward path to exercise eduction effect on the nozzle together with the eduction effect caused by the air flowing upwardly through and along the outside of the nozzle. As the engine speed and suction varies the air valve will be shifted accordingly to gage the air supply and the suction effect on the nozzle and a proper mixture will be delivered to the engine.

Under certain conditions it is desirable to get a very rich mixture and to maintain such mixture by delaying registration of the main air ports. To enable adjustment for such service conditions I provide very simple and efficient mechanism. An L-shaped adjusting lever 45 has in its base arm the opening 46 for receiving the stem 27 between the top of fitting 30 and the head 26 of the barrel 25. The outer side 47 of the bend of the lever is rounded and the lower side of the base arm is beveled and rounded as indicated at 48. When the outer arm of the lever is raised as by pull on a cord or wire 49, the surfaces 47 and 48 ride respectively against the under side of head 26 and the upper side of fitting 30, the base arm of the lever assuming an inclined position and the fitting 30 together with the stem and nozzle thereon is lowered as indicated in Fig. 3 piping 29 or part thereof being flexible to allow such adjusting movement. The air valve follows the downward movement of the nozzle structure and increases the distance between the ports 22 and 23 so that greater movement of the air valve is necessary before registration will result. Until such ports register there is concentrated air flow by way of passageways 44 and 42 and the nozzle and gradually increasing air flow through the opening 43 as the air valve rises and before the main ports 22 and 23 register the valve needle 39 will have been raised to greatly increase the fuel outlet area and therefore a mixture very rich in oil is delivered. After the main ports register additional air will flow into the mixing chamber. To limit the upward movement of the air valve it is provided with a vertical groove 51 receiving a stop pin 52 extending inwardly from the body 10, upward movement of the valve being stopped when the bottom of the slot reaches the pin.

Under certain conditions, as for example in very cold weather, it is desirable to cut down any air supply as much as possible in order that the engine may be primed. For this purpose I provide a butterfly valve 50 within the inlet neck 54 extending from the drum 53 surrounding the body part 10 and secured by being clamped between the lock nut 26' and the bottom of the extension 24. The valve 50 is mounted on the shaft 55 and is preferably of elliptic shape in order that less angular movement is required to swing it from open to closed position. At the outer end of the shaft is adjustably secured the hub 56 from which extends the arm 57 having the hole 58 through which extends the member 49 connected with the adjusting lever 45. This member 49 is preferably in the form of a steel wire and passes through a tube 59 terminating at the dashboard when the carbureter is used in connection with an engine. A bracket 60 extending from the neck 54 supports the lower end of the tube. Adjustably secured to the member 49 are upper and lower abutment blocks 61 and 62 which coöperate with the arm 57 to effect closure and opening of the valve 50. At the lower end the wire 49 has an adjustable abutment block 63 below the adjusting lever 45 to swing said lever upwardly when the wire is pulled, the pressure of the spring 33 tending to hold the base of the lever in flat condition and to hold arm 45 downwardly in normal position as shown in Figs. 1 and 2. The abutments 61 and 62 are adjusted on the wire with respect to the swing of the lever 45 so that when the lever is fully raised the lower abutment 62 will have coöperated with the arm 57 to move the valve 50 into closed

position and so that when the lever 45 is restored to normal position the abutment 61 will coöperate with the arm 57 to restore the valve 50 to open position, the valve 50 being normally fully open. With this arrangement if it is desired to restrict or shut off the air supply to feed highly carbureted air to the engine the wire 49 is pulled to effect either part or full closure of the valve 50 and to swing lever 45 to effect separation of the main air ports 22 and 23 as before described. When valve 50 is in closed position the air supply is practically shut off, there being of course a slight supply due to leakage past the valve, and a rich mixture will be delivered to the engine. When the engine is started the parts are gradually shifted back toward normal position whereupon the carbureter will operate normally. In order to further increase the efficiency the air supply may be heated by connecting the neck 54 with a stove or drum surrounding the exhaust pipe from the engine or by connecting the neck with any other air heating source.

A carbureter involving the above features may be constructed at comparatively little expense and may be made very light. The body 10 with its flange 11 may be stamped integral from sheet metal and likewise the piston valve may be formed integral of sheet metal. A minimum number of parts is employed and these are all of very simple construction, and the arrangement is also so simple that there is very little chance for derangement or loss of adjustment. No oil reservoir or float chamber is necessary which further greatly simplifies the operation. Only two adjustment devices need be provided for the operator, namely, one for effecting adjustment of the throttle valve 15 and another for shifting the wire 49 to simultaneously effect adjustment of the nozzle structure and the air valve 50. I do not, however, desire to be limited to the precise construction and arrangement shown as changes and modifications can no doubt be made which would still come within the scope of the invention, and

I claim as follows:

1. In a carbureter, the combination of a cup-shaped body part having a band of radial air inlets, a nozzle structure extending upwardly through the base of the body part and having a valve chamber, a fuel valve reciprocable in said nozzle to operate with said seat to control the flow of oil, a cup-shaped air valve reciprocable within said body part and suspended from said needle valve, the weight of said air valve tending to keep the fuel valve against its seat and suction effect tending to raise the air valve to withdraw the fuel valve from its seat, air ports in said air valve normally out of register with the body part air inlets but adapted to register therewith when the air valve is raised, additional air inlets in the base of the body part, and air inlets through the nozzle wall to the valve chamber below the base of said air valve.

2. In a carbureter, the combination of a cup-shaped body part having a band of radial air inlets, a nozzle structure extending upwardly through the base of the body part and into the body part, said nozzle structure just above the base of the body part being expanded to form a valve chamber, the base of the body part having air inlets and the valve chamber having air inlets, a fuel valve reciprocable in said nozzle structure to seat in said valve chamber, a cup-shaped air valve reciprocable in the body part and secured to the upper end of the fuel valve, the weight of said air valve tending to hold the fuel valve against its seat, said air valve having a band of radial air ports normally below the body part air passageways, the base of said air valve having an opening to receive the nozzle structure and being normally directly above the valve chamber air inlets whereby when the air valve is raised by suction effect air will flow primarily through the air passageways in the base of the body part and into the valve chamber through the valve chamber air inlets and then through the nozzle, further raising of the air valve causing the air valve ports and the body part ports to register to admit additional air.

3. In a carbureter, the combination of a cylindrical cup-shaped body part having a band of radial air inlets, a nozzle structure mounted in the base of the body part to be vertically reciprocable with reference to the body part, said nozzle structure having a valve seat, a fuel valve reciprocable in said nozzle structure to coöperate with said seat to control the flow of fuel, a cup-shaped air valve reciprocable in said body part and secured to the upper end of the fuel valve, said air valve tending to hold the fuel valve against its seat and subject to suction effect to be raised to withdraw the fuel valve from its seat, said air valve having a band of radial air passageways normally out of register with the body part air inlets.

4. In a carbureter, the combination of a cylindrical body part having a zone of radial air inlets, a nozzle extending through the base of and into the body part and having a valve seat, a fuel valve reciprocable in said nozzle, a cylindrical air valve reciprocable within the body part and suspended from the upper end of the fuel valve, said air valve having a zone of radial air passageways normally below the body part air inlets, and means controllable from a distance for effecting vertical bodily shift of the nozzle whereby the fuel valve and air valve suspended therefrom are correspond-

ingly shifted and the normal distance between the air valve air inlets and the body part air inlets is adjusted.

5. In a carbureter, the combination of a cylindrical body part having a belt of air inlets and having a tubular extension from its base, a barrel vertically adjustable in said extension, a nozzle within said barrel and extending upwardly into the body part, said nozzle having a valve seat, a fuel valve reciprocable in said nozzle to coöperate with said seat to control the flow of fuel, a cylindrical air valve reciprocable in the body part and suspended from the top of the fuel valve, said air valve tending to hold the fuel valve to its seat and subject to suction effect to raise the fuel valve from its seat, said air valve having a belt of air passageways normally below the body part air inlets, and means controllable from a distance for effecting vertical shift of the nozzle and the fuel valve and air valve carried thereby whereby to adjust the normal distance between the air valve pasageways and the body part air inlets.

6. In a carbureter, the combination of a cylindrical body part having a belt of air inlets and having a tubular extension from its base, a barrel vertically adjustable in said extension, a nozzle within said barrel and extending upwardly into the body part, said nozzle having a valve seat, a fuel valve reciprocable in said nozzle to coöperate with said seat to control the flow of fuel, a cylindrical air valve reciprocable in the body part and suspended from the top of the fuel valve, said air valve tending to hold the fuel valve to its seat and subject to suction effect to raise the fuel valve from its seat, said air valve having a belt of air passageways normally below the body part air inlets, and lever mechanism controllable from a distance to effect bodily depression of the nozzle together with the fuel valve and air valve carried thereby whereby to increase the normal distance between the air valve air passageways and the body part air inlets.

7. In a carbureter, the combination of a cylindrical body part, a nozzle extending upwardly into the body part from the base thereof, the lower part of the nozzle being expanded to form a valve chamber and a conical wall section, a fuel valve reciprocable in the nozzle to coöperate with the valve seat to control the flow of fuel, air inlets in the walls of the valve chamber and air inlets through the base of the body part, a cup-shaped air valve reciprocable in the body part and having an opening at its base to receive the nozzle, said opening being normally in line with the lower edge of the conical wall section whereby air entering through the body part air inlets will be deflected by the base of the air valve into the valve chamber through its air inlets and thence through the nozzle, suction effect on the air valve causing raising thereof and increase of the gap between the air valve and the conical wall section whereby air will flow in increasing quantities through the air valve base opening and alongside the exterior of the nozzle.

8. In a carbureter, the combination of a cylindrical body part, a nozzle extending upwardly into the body part from the base thereof, the lower part of the nozzle being expanded to form a valve chamber and a conical wall section, a fuel valve reciprocable in the nozzle to coöperate with the valve seat to control the flow of fuel, air inlets in the walls of the valve chamber and air inlets through the base of the body part, a cup-shaped air valve reciprocable in the body part and having an opening at its base to receive the nozzle, said opening being normally in line with the lower edge of the conical wall section whereby air entering through the body part air inlets will be deflected by the base of the air valve into the valve chamber through its air inlets and thence through the nozzle, suction effect on the air valve causing raising thereof and increase of the gap between the air valve and the conical wall section whereby air will flow in increasing quantities through the air valve base opening and alongside the exterior of the nozzle, said body part having a belt of main air inlets and said air valve having a belt of air passageways normally below the body part air inlets but adapted to register therewith after said air valve has been raised a predetermined distance.

9. In a carbureter, the combination of a body part having a belt of air inlets, a fuel nozzle extending through the base of and into the body part, said nozzle having a valve seat at its lower end, a fuel valve reciprocable in said nozzle to coöperate with said seat to control the flow of fuel, a cylindrical air valve reciprocable in said body part and suspended from the upper end of said fuel valve, said air valve tending to hold the fuel valve to its seat and responding to suction to raise the fuel valve from its seat, said air valve having a belt of air passageways normally below the air inlets of the body part, a main air valve for controlling the flow of air to said body part inlets, and means for simultaneously effecting adjustment of said main air valve and bodily vertical adjustment of said nozzle to gage the normal distance between the body part air inlets and the air valve passageways.

10. In a carbureter, the combination of a body part having a belt of air inlets, a fuel nozzle extending through the base of and into the body part, said nozzle having a

valve seat at its lower end, a fuel valve reciprocable in said nozzle to coöperate with said seat to control the flow of fuel, a cylindrical air valve reciprocable on said body part and suspended from the upper end of said fuel valve, said air valve tending to hold the fuel valve on its seat, said air valve having a belt of air passageways normally below the air inlets of the body part, a main air valve for controlling the flow of air to said body part inlets, lever mechanism connected with said nozzle for effecting bodily vertical adjustment thereof to gage the normal distance between the body part air inlets and the reciprocating air passageways, an actuating lever connected with the main air valve, and a common means controllable from a distance connecting with both levers to effect simultaneous adjustment thereof.

In witness whereof, I hereunto subscribe my name this 19th day of March, A. D., 1914.

CHARLES B. KENT.

Witnesses:
O. N. YULE,
F. G. RENNIE.