A. C. STEWART.

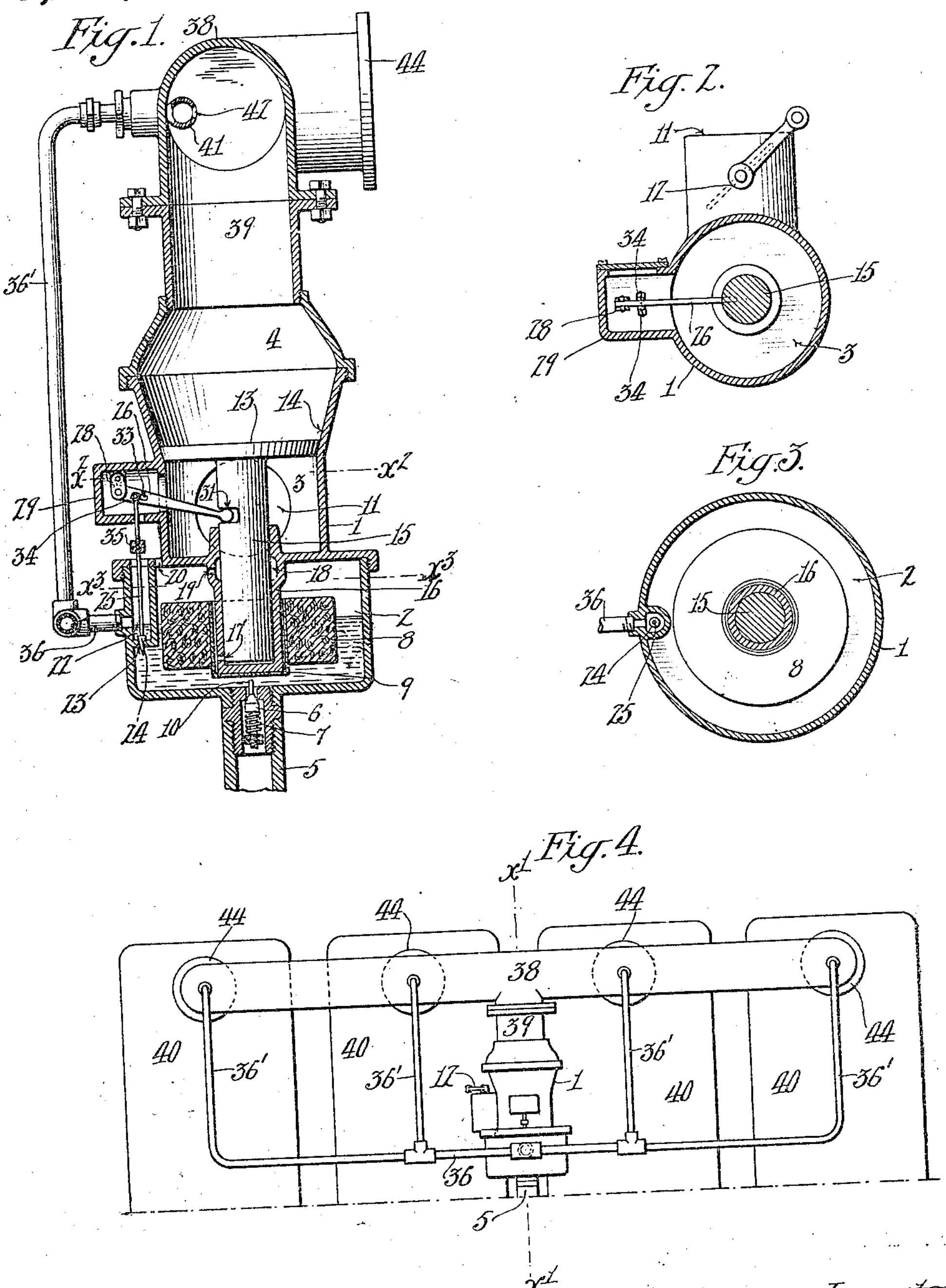
CARBURETER.

APPLICATION FILED APR. 27, 1908.

1,029,897.

Patented June 18, 1912.

2 SHEETS—SHEET 1.



Witnesses:-

Frank L. A. Graham

Louis W. Gra

Inventor;

Alfred C. Stewart

Townsend Lau & Hackley

Attys.

A. C. STEWART.

CARBURETER.

APPLICATION FILED APR. 27, 1908.

1,029,897.

Patented June 18, 1912.

2 SHEETS—SHEET 2.

Fig. 5.

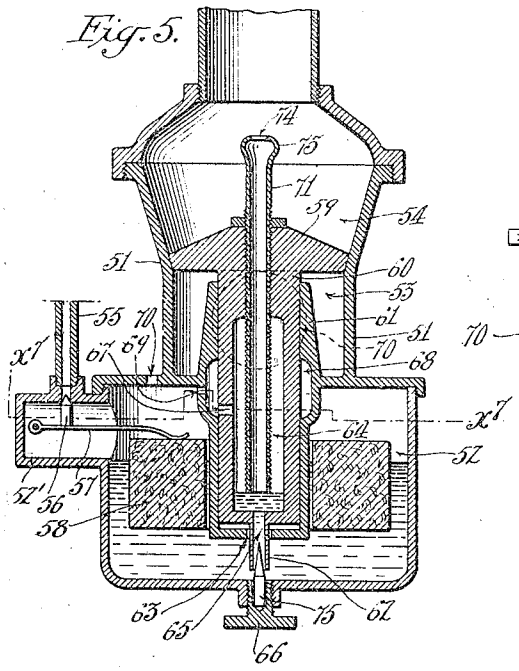


Fig. 6.

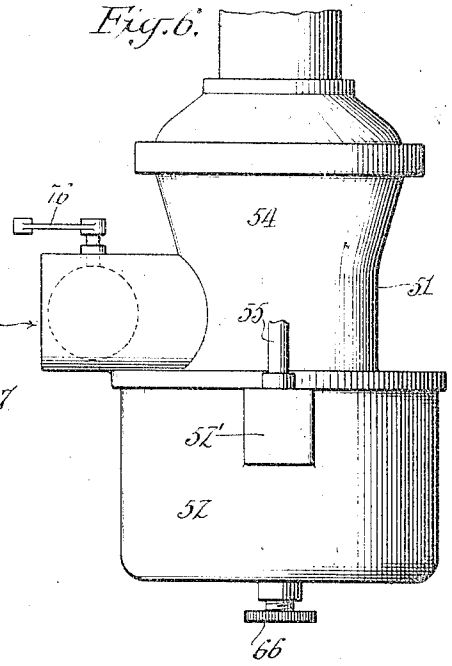
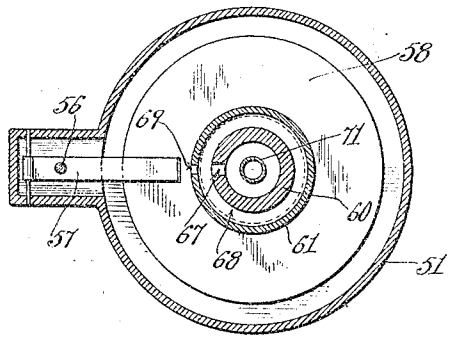


Fig. 7.



Witnesses:-

Frank L. Ashman.

Louis W. Gratz.

Inventor;

Alfred C. Stewart.

by Townsend Lawshe & Seeley

Attys.

UNITED STATES PATENT OFFICE.

ALFRED C. STEWART, OF LOS ANGELES, CALIFORNIA.

CARBURETER.

1,029,897. Specification of Letters Patent. Patented June 18, 1912.

Application filed April 27, 1908. Serial No. 429,563.

To all whom it may concern:

Be it known that I, ALFRED C. STEWART, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Carbureter, of which the following is a specification.

This invention relates to carbureters for use with internal combustion engines, and its main object is to provide a carbureter in which the richness or proportion of fuel to air in the mixture, is increased rather than diminished when the throttle is nearly or quite closed so as to barely keep the engine running.

A further object of the invention is to provide for "flushing" the carbureter in starting.

Another object of the invention is to avoid the presence of any obstacles in the path of the mixture which would interfere with or deteriorate the mixture by baffling the current and condensing the gasolene.

Another object of the invention is to provide for uniform distribution of mixture in manifolding to a number of cylinders, for example, in a six-cylinder engine.

The accompanying drawings illustrate my invention.

Figure 1 is a vertical section of the carbureter. Fig. 2 is a section on line x^2—x^2 in Fig. 1. Fig. 3 is a section on line x^3—x^3 in Fig. 1. Fig. 4 is a side elevation of a multiple cylinder engine provided with the carbureter and its distributing means. Fig. 5 is a vertical section of a different form of the invention more particularly adapted for engines where manifolding is not required. Fig. 6 is a side elevation thereof. Fig. 7 is a section on line X^7—X^7 in Fig. 5.

Referring to Figs. 1 to 4, the carbureter comprises a casing 1, formed with an oil chamber 2 in its lower portion, an air inlet chamber 3 above the oil chamber, and a suction chamber 4 above the air inlet chamber.

An oil supply tube 5 communicates into the bottom of oil chamber 2, through a valve 6, which is closed by a spring 7 and automatically opened by a float 8 in the oil chamber, said float having a depending perforate tube 9 engaging a stem 10 in the valve 6, to open the valve when the oil in the chamber 2 falls below a definite level, the oil being thus maintained at such definite level.

Air inlet chamber 3 communicates with the outer air through a passage 11, controlled by the throttle 12. A valve 13 of frusto conical form rests against and cooperates with the lower part of the upwardly flaring wall portion 14, of the suction chamber, to form an air inlet opening, this valve being exposed to the suction of the suction chamber at its top, so as to be lifted in proportion to the amount of suction from the engine. Valve 13 is guided by its stem 15 working in a guide tube 16 which is perforated at 17 to allow oil to pass in and out, the tube serving as a dash pot. An annular channel 18 is provided in the tube around the stem 15, this channel communicating through opening 19 with the upper part of chamber 2, which through an opening 20, communicates with the outer air. There can, therefore, be no sucking of gasolene up through the space between the stem and the tube, this air communication preventing any condition of suction in the channel 18, so that the stem may work loosely and with slight friction in its guide tube, without leakage of gasolene into the air inlet chamber 3.

A cup pocket or chamber 22, open at its top to the outer air, is formed in the wall of chamber 2, and this cup communicates with the oil chamber through an opening 23, in the bottom of the pocket, such communication being controlled by a valve 24, preferably conical, carried by a stem 25, which is connected by a pivot to a lever 26, pivoted to a link 28 which is pivoted to a bracket in a lateral extension 29 of the air chamber. The free end of lever 26, engages in a notch 31 in the stem 15 of the air supply valve 13. The pivotal connection of stem 25 to lever 26 is preferably adjustable in a slot 33 in lever 26, being set by clamp nuts 34 at any desired position to vary the stroke of the valve, and stem 25 is adjustable by a turn-buckle 35 to properly determine its closure when the main or air valve is closed. A pipe or connection 36 extends from the cup 22 to some point in the connection between the carbureter and the engine; for example, to a header 38 which serves as a manifold between the outlet pipe 39 of the carbureter and the respective cylinders 40 of the engine, the pipe 36 being divided or manifolded in branches 36′ leading into the header 38 at outlets 44 adjacent to the intake of the respective cylin-

ders. The piping 36, 36′ is of relatively small diameter compared to the header 38 and it terminates in a bulb or enlargement 41 having a contracted outlet 42 so that the issuing fluid is atomized by the sudden expansion and by the change of velocity.

The operation is as follows:—The suction from the engine lifts the valve 13, the throttle being open, and air is drawn past the valve and past the oil outlet 42, and there is also a condition of suction through pipe 36, 36′, drawing air from the cup or pocket 22 to the intake of the engine. At the same time the lift of valve 13, operates through connections 26, 25, to open valve 24, and allows oil to flow from chamber 2 to cup 22, the proportions of the inlet opening 23, and the suction connection 36 being such that the amount of oil thus flowing is always less than the capacity of the suction through pipe 36 and the pipe 36 opening into cup 22 at a point below the point of communication with the outer air, that is, below the mouth of said cup so that all the oil passing into pocket 22 is sucked along with the current of air through pipes 36, 36′ to the header 38, and issuing violently against the air in the header is atomized and converted into vapor forming a mixture with the air. There being no throttle valve or other obstruction in the path of the mixture between the place of formation and the engine, all trouble due to deposition with subsequent evaporation and chilling is avoided. When the engine is at rest, the cup or pocket 22 is partly full, namely to the level of the oil in the oil chamber 1, the valve 24 not being so tight as to prevent this partial filling. The mouth of pipe 36 is below this level so that when the engine is started, the first effect is to draw all this accumulated oil through pipe 36 into the air supply in the header, giving a flushed or extra rich mixture which is desirable in starting. When the throttle at air inlet is partly closed while the engine is running there is a condition of suction in the upper part of the carbureter, that is, in the suction chamber 4 and in the header connected thereto, and this tends to draw more air and oil from cup 22 and to lower the pressure in said cup as compared with the condition with full open throttle so that for a given opening of valve 24, more oil will flow with the throttle partly closed than with the throttle fully open. At the same time air valve 13 is allowed to close somewhat on account of decrease in the difference of pressure on its lower and upper faces, and the valve 24 will correspondingly close. The net result is that a smaller amount of air will pass to the engine, but this air will be charged with a relatively larger amount of fuel on account of the increased suction through pipe 36, as above stated, so that a richer mixture is supplied. This is desirable for the reason that when the supply of air is so diminished, enough oil must be supplied to insure explosiveness of the mixture in spite of the diluting effect of the fuel gases in the "clearance".

In the form of the invention shown in Figs. 5 to 7, the casing 51 is formed with superimposed oil, air inlet and suction chambers 52, 53, 54 and fuel is supplied to the oil chamber through a pipe 55, whose outlet is controlled by a valve 56 carried by a lever 57, operated by a float 58 in the oil chamber to maintain a definite level of oil therein. Valve 56 is in a chamber 52′ opening laterally from oil chamber 52. Valve member 59, whose conical face corresponds with and rests on the upwardly flaring wall of the suction chamber has a stem 60 working freely in a guide tube 61, the stem having an extension 62 passing loosely through an opening 63 in the bottom of the tube 61, so as to allow restricted passage of oil, the tube serving as a dash pot. Said stem is formed with an interior chamber 64, communicating through a bore 65 in the extension 62, and an adjustable needle valve 66 screwing through the bottom of oil chamber 52 has a loose needle 75 which projects into this bore to control flow of oil therethrough. Interior chamber 64 also communicates through an opening 67 with a channel 68 in the wall of tube 61, said channel surrounding the valve stem 60 and communicating through opening 69 with the upper part of oil chamber 52, which is open to communication with the outer air by an opening 70. A tube 71 screws into a screw threaded bore of the valve member 59, and extends down into inner chamber 64, the upper end of said tube having a bulb 73 and constricted opening 74 for atomization of the oil. By turning tube 71 the distance of its lower end from the bottom of chamber 64 may be adjusted. When the engine is at rest the oil will be at the same height in the interior chamber 64 as in the oil chamber, and will extend above the bottom of tube 71, and when the engine starts the fluid will be sucked up through tube 71 until the level falls to the bottom of said tube, thus flushing the carbureter to temporarily enrich the mixture. In normal operation, the suction is sufficient to break any liquid seal that may form at the bottom of tube 71, and to keep the oil level at the bottom of said tube, and the amount of oil supplied is determined by the head or difference in level between the bottom of tube 71 and the oil in chamber 52, and enough air will pass in through openings 70, 69, 67 to pass up with the oil through tube 71 to reduce the oil supply to the proper amount for steady running, for example at maximum output or capacity, this being determined by the size of opening

67. The channel 68 has the same function as above explained for channel 18. As the valve member 59 rises, it varies the height of tube 71 and thus diminishes the feeding head, but this may be compensated by properly shaping the valve 66.

Throttle 76 controls admission of air to air inlet chamber 53 and by its closure regulates the suction and air oil feed as above described for the form shown in Figs. 1 to 4.

What I claim is:—

1. A carbureter comprising an oil chamber, means for maintaining a definite level of oil therein, an oil cup communicating with the outer air and having means of communication with said oil chamber, said means of communication being below said definite level of oil, an oil control valve controlling communication between the oil chamber and the cup, an air inlet chamber, a throttle controlling admission of outer air to said air inlet chamber, outlet means for connecting the air inlet chamber to suction applying means, and a communication from said outlet means to said cup at a part of the cup below the point of communication with the outer air whereby the suction from the outlet means sucks oil together with air from said cup.

2. A carbureter comprising an oil chamber, means for maintaining a definite level of oil therein, an oil cup communicating with the outer air and having means of communication with said oil chamber, said means of communication being below said definite level of oil, an oil control valve controlling communication between the oil chamber and the cup, an air inlet chamber, a throttle controlling admission of outer air to said air inlet chamber, outlet means for connecting the air inlet chamber to suction applying means, and air control valve between the inlet and the outlet means, and operated by the suction at the outlet, said valves being connected to operate in correspondence, and a communication from said outlet means to said cup at a part of the cup below the point of communication with the outer air, whereby the suction from the outlet means sucks oil together with air from said cup.

3. A carbureter comprising an oil chamber provided with means for maintaining a definite oil-head therein, a cup exposed to outer air pressure, a valve-controlling communication between the oil chamber and the cup, an air inlet chamber, a throttle controlling admission of air to the air inlet chamber, outlet means adapted for connection to suction applying means, an air controlled valve between the air inlet and outlet means and operated by the difference of pressure between said air inlet chamber and the outlet means to operate the valve, a connection between the said valves to operate the same in correspondence, and means establishing communication from the cup to the outlet means consisting of a pipe having its inlet end extending into said cup to draw oil together with air from said cup, said pipe terminating in an enlargement with a constricting opening into the outlet means.

4. A carbureter comprising an oil chamber, a cup exposed to outer air pressure, an oil controlling valve controlling communication between the oil chamber and the cup, an air inlet chamber, a throttle controlling admission of outer air to said air inlet chamber, outlet means for connecting the air inlet chamber to suction applying means, and a means for communication from said cup to said outlet means consisting of a pipe having its inlet end extending into said cup to draw oil together with air from said cup, said pipe terminating in an enlargement with a constricting opening into the outlet means.

5. A carbureter for a multiple cylinder engine, comprising oil supply means, an oil cup exposed to outer air pressure, a valve controlling admission of oil from the oil supply means to the cup, an air inlet chamber, a throttle controlling admission of air thereto, outlet means for said air inlet chamber provided with a plurality of outlets for communication with the respective cylinders, and oil communicating means extending into the oil cup to draw oil therefrom, and communicating with the respective outlet means at a plurality of points adjacent to the respective outlets thereof.

6. A carbureter comprising oil supply means, an oil cup exposed to outer air pressure, a valve controlling communication from the oil supply means to said cup, an air chamber, a throttle controlling admission of the air thereto, outlet means provided with a plurality of outlets adapted for connection to separate suction supply means, an air controlling valve operated by a difference in pressure between the air chamber and the outlet means to control passage of air therebetween, a connection to operate the oil controlling valve in correspondence with the air controlling valve, and oil communicating means extending into the oil cup to draw oil therefrom, and leading into the outlet means at a plurality of points in proximity to the respective outlets thereof.

7. A carbureter comprising a chamber open to atmospheric pressure, an oil chamber provided with means for maintaining a definite level of oil therein and provided with means of communication to said open chamber below said definite level to allow oil to flow from said chamber to said open chamber, outlet means provided with means of connection to and communication with suction applying means, an air inlet having

means of communication with said outlet means, communicating means leading from the open chamber to said outlet means and consisting of a pipe having its inlet end extending into said open chamber whereby the suction from said outlet means draws the oil from said open chamber which is supplied thereto from said oil chamber, a valve controlling the communication between the air inlet and the outlet means responsively to the condition of suction in the outlet means, and a manually operated valve for the air inlet means.

8. A carbureter comprising a casing provided with an air inlet and with an outlet, an air controlling valve movably mounted in said casing to control communication between the inlet and outlet, oil supply means, an oil controlling valve means connected to the aforesaid air controlling valve and controlling communication from the oil supply means to the aforesaid outlet, said oil controlling valve means being operated in correspondence with the air controlling valve to restrict the supply of oil as the supply of air is restricted, but to continue to admit oil in restricted quantity after the supply of air is cut off, and a chamber interposed in the communication between the said oil controlling valve means and the outlet to receive a reserve supply of oil when the engine is starting.

9. In a carbureter, a casing provided with an air inlet and a mixture outlet, a mixing chamber between said air inlet and mixture outlet, an air controlling valve mounted to move in the casing to control communication between said inlet and mixing chamber, oil supply means, valve means controlling the oil supply to the mixing chamber, means connected to said air controlling valve and oil controlling valve means to operate the said valve and valve means in correspondence, and a chamber communicating continually with the said oil controlling valve and with the mixing chamber to receive a reserve supply of oil when the engine is stopped and to furnish such oil to the mixing chamber when the engine is starting.

10. A carbureter comprising an air inlet means, and a mixture outlet means, an air valve controlling communication of air from said inlet to said outlet means, oil supply means, an oil accumulating chamber, in continual communication with said oil supply means, and with said outlet means, an oil valve for restricting the supply of oil from said oil supply means to said oil accumulating chamber, and means for operating said oil valve and said air valve in correspondence to restrict the supply of oil as the supply of air is restricted.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 14th day of April 1908.

ALFRED C. STEWART.

In presence of—
ARTHUR P. KNIGHT,
FRANK L. A. GRAHAM.