A. C. STEWART.

CARBURETER.

APPLICATION FILED FEB. 23, 1909.

960,601. Patented June 7, 1910.

Fig. 1.

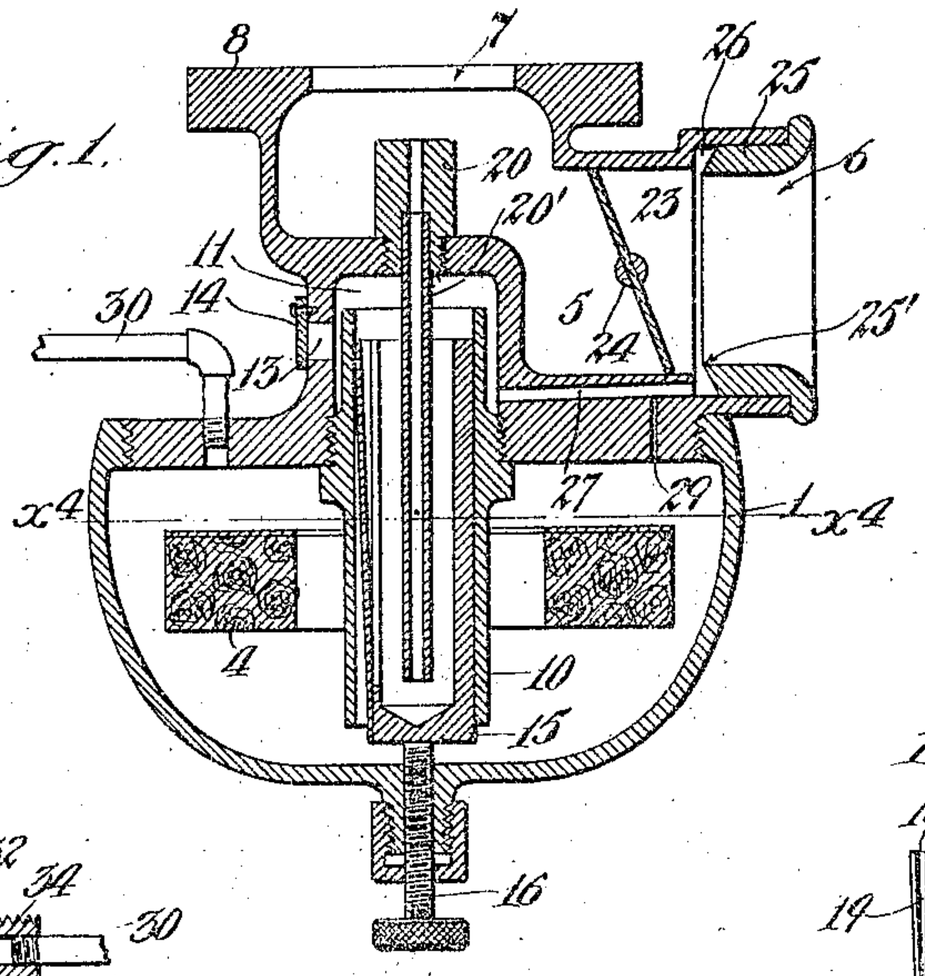


Fig. 2

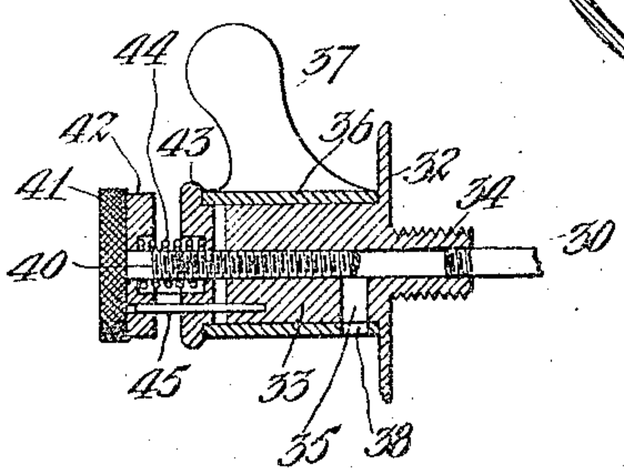


Fig. 3.

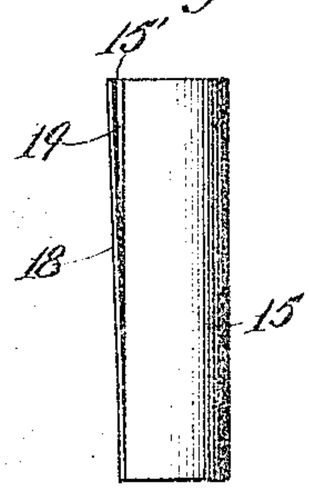


Fig. 4

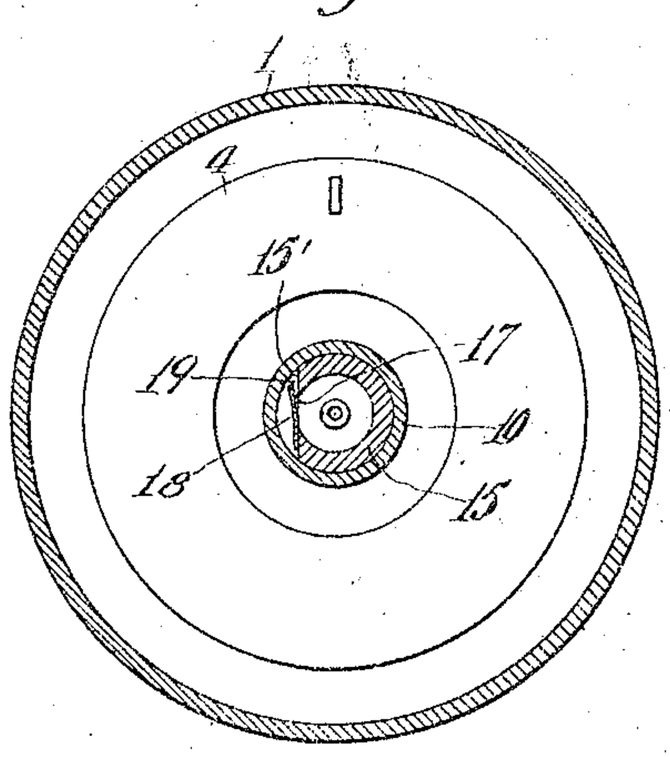
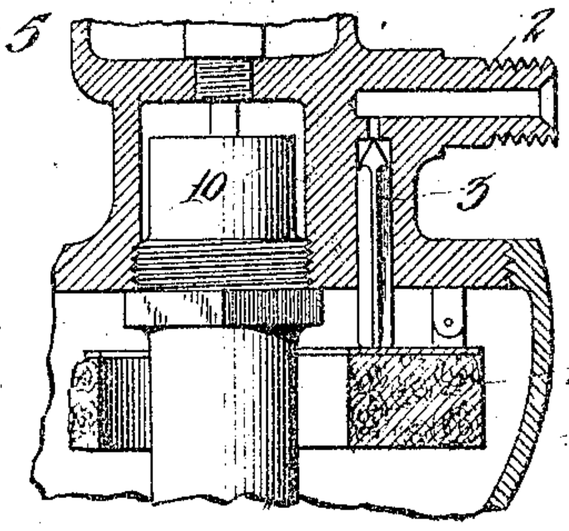


Fig. 5



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UNITED STATES PATENT OFFICE.

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CARBURETER.

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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 Improvement in Carbureters, of which the following is a specification.

This invention relates to carbureters for furnishing an explosive or combustible mixture for use in internal combustion engines, and the main object of the invention is to provide a carbureter wherein the oil and air supply will be regulated automatically in response to the demands of the engine without the use of valves or other moving parts.

A further object of the invention is to provide improved means for control of the operation of the carbureter from a more or less distant point.

Other objects of the invention will appear hereinafter.

The accompanying drawings illustrate the invention.

Figure 1 is a vertical section of a preferred form of the invention. Fig. 2 is a vertical section of the controlling device therefor. Fig. 3 is a side elevation of a regulating tube. Fig. 4 is a horizontal section on the line x^4—x^4 Fig. 1. Fig. 5 is a detail section of an oil feed regulating device.

The carbureter comprises a casing formed with an oil chamber 1 provided with an oil supply connection or pipe 2, and a valve 3 operated by a float 4 in the well known manner to maintain a definite level of oil in the oil chamber. An air inlet chamber 5 at the top of chamber 1 is provided with an air inlet opening 6 and an outlet opening 7 having means 8 for attachment to suction applying means, such for example, as the manifold or intake of an internal combustion engine. A tubular member 10 screws into the bottom of the air inlet chamber and extends upwardly within a recess 11 formed in said air inlet chamber, said recess being closed, except for an opening 13 extending through the wall thereof for communication with the outer air, said opening being controlled by a pivoted valve or closure 14; said tubular member 10 also extends downwardly within the oil chamber 1 near to the bottom thereof. An oil feed regulating member consisting of a well cylinder 15 fitting and sliding vertically within the tubular member 10 is adjustably supported by a set screw 16 working through the bottom of the oil chamber. Said cylinder 15 is cut away on one side, as shown at 15′ in Fig. 3, to leave a vertical channel or opening 17, and a plate 18 is fastened to the cylinder at one edge of this channel and extends across the channel, the upper end of the farther edge of said plate being bent outwardly so as to provide a downwardly diminishing or tapering outlet or passage 19, as shown in Fig. 4, establishing communication between the oil chamber 1 and the interior of the cylinder 15.

An oil communicating tube 20 is secured to the top of recess 11, with its upper end extending adjacent to the outlet 7 of the air inlet chamber and a downward extension 20′ is provided from said tube, extending downwardly within the cylinder 15 nearly to the bottom thereof. A throttle 23 is provided in the air inlet passage and operated through a shaft 24 to control the supply of air. A bushing or collar 25 is inserted in the air inlet, reducing the area of the inlet so as to form a lip over which the incoming air passes in its suction through the carbureter, and directly around and at the rear of this lip is provided an annular channel 26 connected by a passage 27 with the recess 11 aforesaid at the top of the tubular member 40 so that the condition of suction or partial vacuum created in the channel 26 by the injector effect of the air passing the lip 25′ is communicated through the passage 27 to the space or chamber 11. A fine or capillary opening 29 is also provided leading from the passage 27 to the oil chamber 1.

A pipe or tube 30 leads from the upper part of the oil chamber to a suitable controlling means, for example, valve means, shown in Fig. 2, the same comprising a base 32, having a cylindrical stud 33 with an axial bore 34 connected to said pipe 30 and a lateral passage 35 extending from said bore to the outside of the stud. A sleeve 36 fitting on and rotatable around said stud is provided with an operating handle or arm 37, whereby it may be turned to position to open or close the passage 35. By means of an opening 38 in said sleeve moving into or out of register with said passage 35 a screw 40 screwing into the bore 34 serves to restrict the communication between the passages 35, 34, to any desired extent, said screw being operated by the handle or milled

head 41. Two disks 42, 43, are interposed between the outer end of sleeve 36 and the head 41 and a spring 44 presses said disks apart to produce friction on each of the parts for holding the same in any position to which they may be set. A sliding pin 45 prevents rotation of said disks relatively to the stud 33. This device may be mounted on a dash board or other convenient position in an automobile, so that it can readily be thrown to open or closed position or vice versa by kicking over the arm 37. Adjustment for minimum oil feed is provided for by screw 16, and the normal maximum oil feed is determined by setting valve 14.

The operation is as follows:—When the engine is in operation and the throttle valve 33 is opened there is drawn in through the chamber 5 of the carbureter at each suctional stroke of the engine a charge of air. The consequent suction at the upper end of the oil communicating tube 20 causes oil to be sucked up from the bottom of the well or cylinder 15, so that at each suctional stroke a certain amount of oil flows in to the air passing the outlet of oil communicating tube, and an explosive mixture is thereby formed. After each such suctional operation the well aforesaid is recharged more or less by flowing of oil through the slot or passage 19. As the velocity of the engine increases the time allowed for such recharging of the well is correspondingly diminished, so that on increase of speed the amount of oil furnished to the mixture would correspondingly decrease and the mixture would be impoverished. This effect is compensated to any desired extent by the operation of the suctional means 26, 27, the air passing into inlet 6 causing a condition of suction in passages 26 and 27 and in recess 11, so that a greater quantity of oil will tend to pass into the well on account of the excess of pressure in the oil chamber 1 over the pressure in said well. In order to provide for control at will of this operation, the duct 29 aforesaid is provided, which draws air in small quantity from the air space over the oil in the oil chamber, thereby reducing the difference of pressure aforesaid and correspondingly reducing the increase of oil supply to the well at higher speeds, and communicating means 31 to the outer air is provided whereby, under manual or pedal control of the operator, this condition of suction of the oil chamber 1 may be relieved at will, thereby restoring to a greater or less extent the effect of difference of pressure between the oil chamber and the well, so as to provide for more rapid supply of oil if required, for example, in certain emergencies. Thus in normal operation the valve device 35, 38, may be closed so that the oil feeding proceeds under the automatic control of the suction applying means as above described and the operation is then to cut down to some extent the oil supply at high speeds so as to provide for maximum efficiency at ordinary running speeds. If at any time it is desired to increase the speed capacity of the engine irrespective of efficiency the valve device 39 may be kicked over so as to open communication at 36, 38, allowing atmospheric pressure to pass to the oil chamber and increasing by a different amount the feeding pressure on the oil. The extent to which this effect takes place may be regulated by adjustment of the screw valve 40.

It will be seen that according to this invention the regulation is effected by causing a difference of pressure to be produced between the oil receiving well and the oil chamber, responsively to the condition of suction in the air inlet chamber. In the form of the invention above described the effect is secured by reducing the pressure in the well below the pressure in the oil chamber.

The passage 27 in conjunction with the means 25 forms an air communicating means leading from the well to a part of the air inlet at which the condition of suction is less than that in the air chamber 5 on account of the connection being made to the air inlet at the outside of the throttle, this difference of pressure being necessary in order to enable the oil to be sucked up from the well through the oil communicating means 20′. In case the controlling means 33 is in closed condition the air communicating means 29 maintains substantially the same barometric pressure within the oil chamber as that which exists in the well. Under these conditions the oil will seek the same level in the well as in the oil chamber by passing through the opening 19 at the side of the well, but if the controlling valve 33 is partly open this condition of suction in the oil chamber is relieved to a corresponding extent, the air communicating means 29 through which the suction is produced in the oil chamber being sufficiently small to prevent it from maintaining under these conditions the full condition of suction in the oil chamber. Under these circumstances the barometric pressure within the oil chamber will be in excess of that in the well, and the oil will rise to a greater height in the space between the tube 10 and the plate 18 than in the oil chamber so that a greater amount of oil will pass through the opening 19 than would be the case if the pressure within the oil chamber were equal to that within the well, not only on account of the greater height of opening 19 through which it can pass but on account of the fact that said opening flares upwardly. This upward flare of the opening therefore has the effect of rapidly increasing the effective area of the inlet to the well as the oil rises in the

space at the outside of said opening, thereby making the device more sensitive to slight variations in the barometric pressure in the oil chamber under control of the valve 33.

What I claim is:

1. A carbureter comprising an oil supply chamber, means for maintaining a definite level of oil in said chamber a well having communication to receive oil from said chamber, an air chamber provided with inlet and outlet means, a throttle valve in said inlet means said outlet means having means for connection to suction applying means, oil communicating means extending into the air chamber in the path of the suction therethrough and extending downwardly into said well to suck up oil therefrom, and communicating means extending from said well to a point in the air inlet at the outside of the throttle, whereby a conditon of suction is produced in said well which is less than the condition of suction at the outlet of the oil communicating means, and means for admitting air to the oil chamber for maintaining in the oil chamber a barometric pressure in excess of that in the well.

2. A carbureter comprising an oil supply chamber, means for maintaining a definite level of oil in said chamber a well communicating with said chamber to receive oil therefrom, an air chamber provided with inlet and outlet means, a throttle valve in said inlet means said outlet means having means for connection to suction applying means, oil communicating means extending into the air chamber in the path of the suction therethrough and extending downwardly into said well to suck up oil therefrom, air communicating means extending from the well to the air inlet at a point where the suction is less than that in the air chamber, to establish in the well a corresponding condition of suction, and means for maintaining in the oil chamber a condition of suction less than that in the well, said means consisting of a connection from the oil chamber to the air communicating means, and means for admitting atmospheric air to the oil chamber.

3. A carbureter comprising an oil supply chamber, means for maintaining a definite level of oil in said chamber a well communicating with said chamber to recive oil therefrom, an air chamber provided with inlet and outlet means, a throttle valve in said inlet means said outlet means having means for connection to suction applying means, oil communicating means extending into the air chamber in the path of the suction therethrough and extending downwardly into said well to suck up oil therefrom, and means responsive to the condition of suction through the air chamber for varying the pressure in the oil chamber and simultaneously varying the relation of the pressure in the oil chamber to the pressure of said well, and means establishing communication to the oil chamber from the outer air.

4. A carbureter comprising an oil supply chamber, means for maintaining a definite level of oil in said chamber a well having communication to receive oil from said chamber, an air chamber provided with inlet and outlet means, a throttle valve in said inlet means said outlet means having means for connection to suction applying means, oil communicating means extending into the air chamber in the path of the suction therethrough and extending downwardly into said well to suck up oil therefrom, and means responsive to the condition of suction through the air chamber for varying the pressure in the oil chamber and simultaneously varying the relation of the pressure in the oil chamber to the pressure in said well, and valve controlled means establishing communication to the oil chamber from the outer air.

5. In a carbureter, a casing provided with an inlet chamber having means for attachment thereto of suction applying means, an air inlet to said chamber, a throttle for said air inlet, oil communicating means opening into said chamber, an oil chamber, a member provided with a well into which said oil communicating means extends, means for vertical adjustment of said member, said member formed with a lateral opening communicating with the oil chamber, the size of said opening increasing upwardly, a tube surrounding said well and communicating at its lower end with the oil chamber, means for maintaining a definite level of oil in the oil chamber, and regulatable means for controlling the condition of pressure in the oil chamber.

6. In a carbureter, a casing provided with an inlet chamber having means for attachment thereto of suction applying means, an air inlet to said chamber, a throttle for said air inlet, oil communicating means opening into said chamber, an oil chamber, and a member provided with a well into which said oil communicating means extends, said well being exposed to the condition of suction through said air inlet, said member formed with a lateral opening communicating with the oil chamber, the size of said opening increasing upwardly, whereby when the level of oil in the well is increased by the increased suction at the air inlet, the enlarged size of the lateral opening will allow a greater amount of oil to flow therethrough in an amount corresponding to said suction.

7. In combination with a carbureter comprising an air chamber, an oil chamber, a well communicating with said oil chamber, an oil communicating means from said well to said air chamber through which the oil is sucked from the well into the air chamber

by the suction of the carbureter, air communicating means communicating with the suction passage of the carbureter and with the well to produce a difference of pressure between the well and the oil chamber for varying the supply of oil to the well in response to variation in the suction through the carbureter, a controlling device having a passage communicating with said oil chamber and provided with a lateral opening from said passage, an operating member rotatably mounted and provided with an opening to open and close the aforesaid opening in different angular positions of said member, and means independent of the operation of said operating member for adjustably restricting communication between said opening and the said passage.

8. In combination with a carbureter comprising an air chamber, an oil chamber, a well communicating with said oil chamber, an oil communicating means from said well to said air chamber through which the oil is sucked from the well into the air chamber by the suction of the carbureter, air communicating means communicating with the suction passage of the carbureter and with the well to produce a difference of pressure between the well and the oil chamber for varying the supply of oil to the well in response to variation in the suction through the carbureter, a controlling device having a passage communicating with said oil chamber and provided with a lateral opening from said passage, an operating member rotatably mounted and provided with an opening to open and close the aforesaid opening in different angular positions of said member, and means independent of the operation of said operating member for adjustably constricting communication between said opening and the said passage, and means for retaining the operating member in either open or closed position.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 17th day of February, 1909.

ALFRED C. STEWART.

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