E. F. WILD.

CARBURETER.

APPLICATION FILED APR. 15, 1914.

1,280,924. Patented Oct. 8, 1918.

Fig. 1.

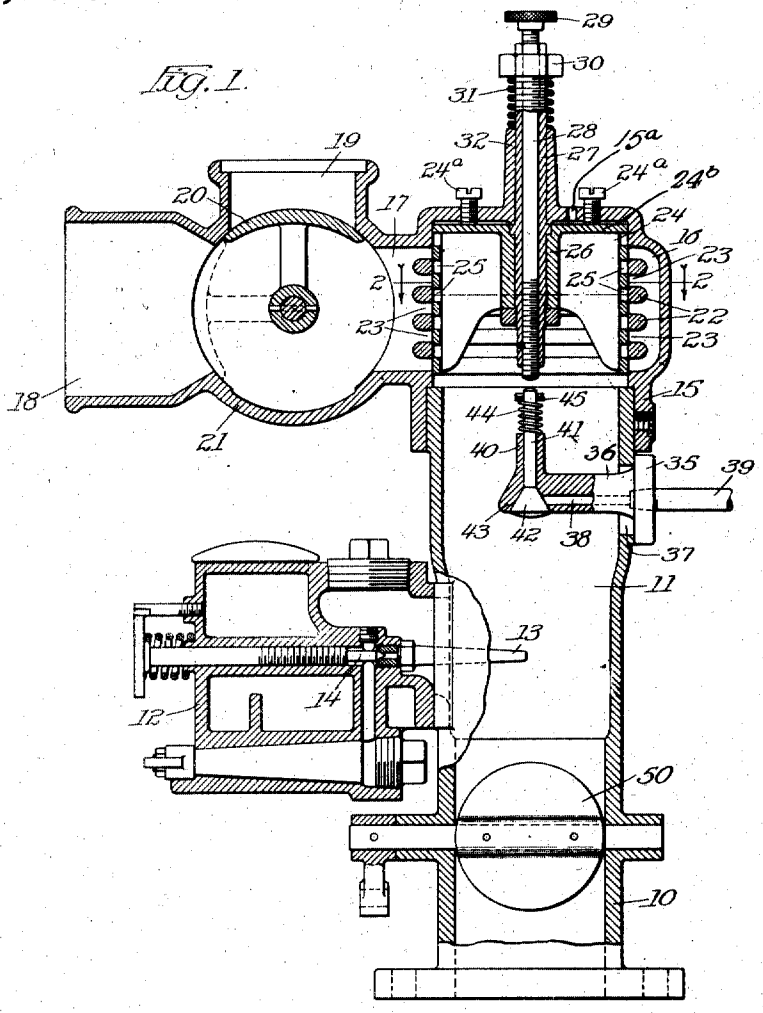
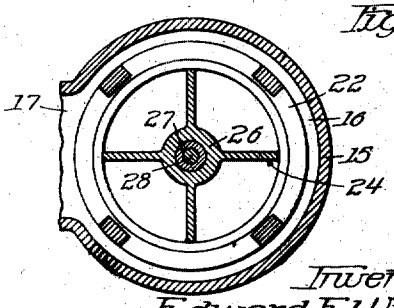


Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

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CARBURETER.

1,280,924. Specification of Letters Patent. Patented Oct. 8, 1918.

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To all whom it may concern:

Be it known that I, EDWARD F. WILD, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Carbureters for Internal-Combustion Engines, of which the following is a full, clear, and exact specification.

This invention relates to carbureters for internal combustion engines.

In the operation of engines using the heavier fuels, such as kerosene, it is desirable, for reasons well known, to admit water into the mixture forming the explosive charge. It is necessary, however, to control the supply of water so that it will not be admitted to the explosive mixture when the engine is cold and first started to operate, and also when the engine is operating on light loads. Furthermore, it is necessary to control the supply of water in a manner such that the water may be admitted when the load on the engine has attained a certain value. The control of the supply of water to the explosive mixture is an important matter for the reason, among others, that the successful and economical operation of an engine using the heavier fuels depends upon the admission of water at the proper time and under proper conditions.

It is the primary object of my invention, therefore, to control the supply of water to an explosive mixture in a manner to render the operation of an internal combustion engine, which is supplied with explosive mixture, most efficient and economical.

Another object of this invention is to provide a simple and compact carbureter having coöperating parts adapted to be actuated in a manner to produce the best results.

These objects are accomplished by providing a carbureter having a mixing chamber, fuel, water and air supply means associated therewith, and means for controlling the air supply to said mixing chamber which also controls the water supply thereto.

The invention is illustrated on the accompanying sheet of drawings, in which—

Figure 1 is a vertical sectional view of a carbureter embodying my invention; and

Fig. 2 is a fragmentary sectional view of the same taken in the plane of line 2—2 of Fig. 1.

Various novel features of my invention will be apparent from the description and drawings, and will be particularly pointed out in the appended claims.

My improved carbureter includes a conduit 10, having a mixing chamber 11, associated with which is a fuel supply cup 12, the nozzle 13 of which projects into the mixing chamber 11, the supply cup 12 being secured to the conduit 10. This fuel supply cup 12 may be of any suitable design, having a needle valve 14 for controlling the passage of fuel, such as gasolene or kerosene, through said nozzle 13. Secured to the top of the conduit 10 is a member 15, having an annular air space 16 communicating with the air passageway 17, adapted to receive hot air from any suitable source through passageway 18, or cold air from any suitable source through passageway 19, or receive both at the same time, the supply of hot and cold air being controlled by a valve 20 operatively arranged within the cylindrical portion 21 of the member 15. Fixed within the air chamber 16 is a grid comprising a series of supported rings 22, separated a predetermined amount to form openings 23. Adapted to operate within this grid is a cylindrical valve 24, having ports 25 adapted to register with the air passageways 23 to permit the flow of air from either or both of the air passageways 18 or 19 to the mixing chamber 11. This valve is provided with a central tubular portion 26 secured to a hollow member 27, through which passes a stem 28, which stem is adjustable within said hollow member 27 by means having a threaded engagement therewith, said stem being adjusted by means of a head 29. Threaded onto the hollow member 27 is a nut 30, against which a spring 31 presses, said spring also bearing against a projecting portion 32 of the member 15 for pressing the valve 24 in one direction in opposition to the suction created upon each inhalation stroke of the engine piston. The extent to which the valve 24 may be closed can be adjusted by adjusting screws 24^a passing through the upper part of member 15 and bearing against the head 24^b of said valve. This valve 24 is operated or controlled by the suction of the engine to which the carbureter is attached; that is, upon each inhalation stroke of the piston of the engine

the valve 24 is drawn down an amount dependent upon the degree of the suction, permitting the air passageways 23 and the ports 25 in the valve 24 to register with each other to permit a flow of air from the air supply means to the mixing chamber.

This downward movement of the piston valve is due to the unequal pressures on the valve head 24^b, due to the fact that the pressure inside the valve and on the underside of the valve head 24^b is less than the atmospheric pressure on the upper side of the valve head. The space above the valve head communicates with the atmosphere through the passage 15^a.

As currents of air are drawn past said valve 24 into the mixing chamber 11, fuel is also drawn thereinto to form an explosive mixture preparatory to passing into the combustion chamber of an internal combustion engine. When the lighter hydrocarbons, such as gasolene, are used, such gasolene and air mix in the mixing chamber to form a proper explosive mixture for operating conditions. When relatively heavy fuels are used, such as kerosene, it is also necessary to admit a certain amount of water to the mixture. The water, however, is not to be admitted to the explosive mixture when the engine is cold, as in starting or when the engine is working under light load conditions; but it is desirable for water to be admitted into the explosive mixture when the engine is operating on over 30 per cent. of its rated horse power. It is necessary, therefore, that the water supply means be controlled in some manner such that the water may be admitted when the load on the engine is increasing from 30 per cent. of its rated horse power, and shut off when the load on the engine is decreasing from 30 per cent. of its rated horse power. To control the admission of water most accurately the valve controlling the water supply should be operative in response to the variation of the suction produced on the inhalation stroke of the piston, which suction is responsive to the load on the engine. To this end applicant has provided a member 35 secured to the side of the conduit 10, having an arm portion 36 passing through an opening 37 in said conduit 10, and having a passageway 38 through which water may flow from any suitable source of water supply indicated by the connection 39. This member 35 also has an integrally formed sleeve 40, through which passes the stem 41 of a valve 42, having a ported seat 43 through which water may pass from the passage 38. This valve 42 is normally held against this seat 43 by a spring 44 which bears against the upper end of sleeve 40, and also against a washer 45 held on the upper end of the valve stem 41. This valve stem is in vertical alinement with the adjustable stem 28, which is movable with the valve 24. With this arrangement it is apparent that upon each inhalation stroke of the piston the suction in drawing the valve 24 downwardly to permit the admission of air causes the stem 28 to approach the stem of valve 42. The stem 28 will not pass into engagement with the valve stem 41 to open said valve to permit the admission of water into the mixing chamber 11 until water should be admitted to the mixture, which is the case when the increasing load on the engine has reached about 30 per cent. of the rated horse power of the engine. As the load continues to increase the stem 28 presses the water controlling valve 42 more and more downwardly and away from its seat to admit more freely the supply of water on each inhalation stroke of the engine piston. When the load on the engine decreases to a point below 30 per cent. of the rated horse power the stem 28 no longer passes into engagement with the stem of valve 42 on each inhalation stroke, thereby permitting said water controlling valve to remain closed to prevent a supply of water to the mixing chamber. With certain other grades of fuel it may be desired to admit and shut off the water supply to the explosive mixture at different engine loads. This may be accomplished by adjusting the valve stem 28 with respect to the valve stem 41. This carbureter is provided with the usual mixture throttling valve 50.

By means of the above described arrangement the supply of water to the explosive mixture is controlled in accordance with operating conditions and in a manner to render the operation of the engine most efficient and economical to meet commercial requirements.

There may be various modifications of the invention other than herein disclosed, and it is my intention to cover all such modifications which do not involve a departure from the spirit and scope of my invention as set forth in the following claims.

What I claim as new is:

1. In a carbureter for internal combustion engines, the combination of a mixing chamber, fuel supply means, water supply means, air supply means, means for controlling the supply of fuel to said chamber, means for controlling the supply of air to said chamber and separate means for controlling the supply of water thereto, said separate water control means being controlled by said air control means and operable only after the air control means has been operated.

2. In a carbureter for internal combustion engines, the combination of a mixing chamber, means for supplying fuel, air and water thereto, means for controlling the supply of air, and means controlling the supply of water, said air and water control

means being relatively adjustable and said water control means being controlled by said air control means.

3. In a carbureter for internal combustion engines, the combination of a mixing chamber, fuel, air and water supply means associated therewith, a valve for controlling the supply of air, a valve for controlling the supply of water, said valves having portions normally out of engagement with each other to prevent a supply of water and in engagement with each other under certain operating conditions to permit a supply of air and water to said mixing chamber, and means for changing the normal relationship between said valves.

4. In a carbureter for internal combustion engines, the combination of a mixing chamber, an air supply means for said chamber, a valve for said air supply which may be closed when no air is being drawn into the mixing chamber, fuel supply means independent of said valves, and a water supply valve operable by the air supply valve after said air supply valve has reached a predetermined position.

5. In a carbureter for internal combustion engines, the combination of a mixing chamber, an air supply means for said chamber, a valve for said air supply which may be closed when no air is being drawn into the mixing chamber, fuel supply means independent of said valves, a water supply valve operable by the air supply valve after said air supply valve has reached a predetermined position, and means for adjusting the predetermined position at which the water valve will open.

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

EDWARD FULLER WILD.

Witnesses:

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L. B. SPERRY.