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CARBURETER FOR INTERNAL COMBUSTION ENGINES.

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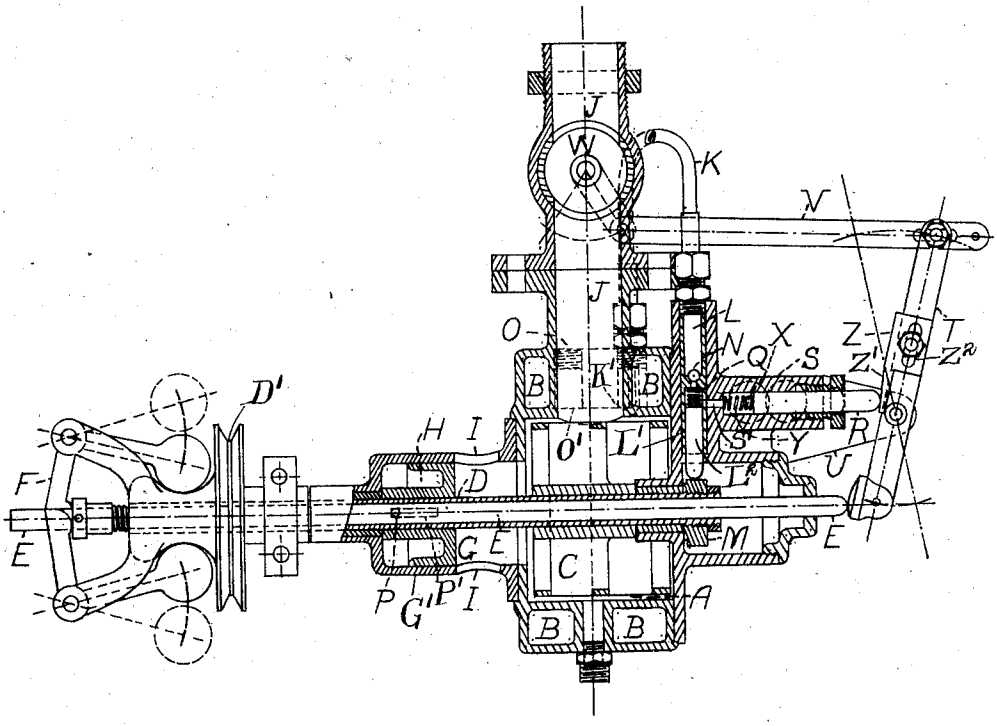
970,429. **Patented Sept. 13, 1910.**



Witnesses.
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UNITED STATES PATENT OFFICE.

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CARBURETER FOR INTERNAL-COMBUSTION ENGINES.

970,429. Specification of Letters Patent. **Patented Sept. 13, 1910.**

Application filed July 15, 1909. Serial No. 507,818.

To all whom it may concern:

Be it known that I, FITZWILLIAM RICHARD DAVIS, a citizen of Great Britain, residing at Kew Gardens, in the county of Surrey and Kingdom of England, have invented certain new and useful Improvements in or Relating to Carbureters for Internal-Combustion Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in carbureters for internal combustion engines.

The principal object of the invention is to provide a carbureter whereby oils heavier than petrol and paraffin may be utilized with equally satisfactory results.

Another object of the invention is to provide automatic means for controlling the admission of air and the admission of the paraffin to the mixing chamber and the delivery of the gaseous mixture from the mixing chamber, whereby the carbureter serves the double function of a carbureter and an engine governor, the speed of the engine being partly controlled by the admission of the gaseous mixture.

The invention is not limited to all of the details shown, but for the purpose of disclosure reference is had to the accompanying drawings, and the particular features of novelty will be more succinctly pointed out in the claims.

In the drawings is shown a view in central longitudinal section.

A designates the mixing chamber which is surrounded by a jacket B, through which is led the exhaust from the engine, causing the interior of the mixing chamber and the parts therein to become heated.

C designates a rotary mixer and may also be of such form as to assist in drawing air into the mixing chamber. The mixer is mounted on a hollow spindle D extending at one end slightly beyond the mixing chamber and at its other end extending a substantial distance beyond the mixing chamber, and provided with any suitable means for driving same, illustrated in the drawings conventionally by the driving pulley D'. Extending through the hollow shaft D is a reciprocating rod E projecting beyond both ends of the hollow shaft a substantial distance and provided on one end with a governor F, and at its other end adapted to constantly engage operating means hereinafter referred to.

G designates an air valve casing in the form of a cylindrical housing, forming at one end a valve seat G' for a rotatable and sliding valve H, and at its inner end provided with a plurality of air inlets or ports I, the inner end of the valve casing communicating directly with the mixing chamber.

J designates an eduction pipe from the mixing chamber to the engine.

K designates a feed pipe communicating at one end, as shown in dotted lines at K', with the mixing chamber, and at its other end connected to a chamber L communicating through a valve controlled port N with the force pump L' containing the pump plunger L^2 forced away from said barrel controlled opening end by a coiled spring Q, and the lower end of said pump plunger L^2 projecting into constant engagement with a cam M mounted on the end of the hollow shaft D. Communicating with the pump L', through a passage S', is a barrel S provided with inlet ports X for introducing the paraffin into the pump through the passageway S', and in this barrel is located a reciprocating plunger R, passing through a suitable stuffing box, and abutting at its one end against the coiled spring Y for holding its outer end in constant engagement with operating mechanism hereinafter referred to.

O designates conventionally a nozzle or opening communicating with the mixing chamber, as shown in dotted lines at O', for initially introducing a supply of petrol for starting the engine.

P represents a pin connected to the valve H and the reciprocating rod E, operating through a longitudinal slot P' in the hollow spindle D, whereby the three members conjointly rotate while the valve and the rod E are free to reciprocate relatively to the hollow driving spindle D.

T designates on operating bar pivoted intermediate of its end to a bracket U, and provided at its lower end with a knob constantly engaged by the projecting end of the reciprocating rod E, the pivot rod T being connected at its upper end by a connecting link V with any suitable throttle valve W located in the eduction pipe J.

The projecting end of the plunger R is adapted to be engaged by the operating pivoted bar T, the position of the pivot of said bar being below the position of said plunger. In the drawings, however, I have illustrated an attachment or fitting Z having its inner face beveled, as at Z′, which beveled face Z′ is adapted to be engaged constantly by the projecting end of the plunger R, and the whole attachment Z being adjustable longitudinally of the bar T by a suitable slot and bolt connection indicated at Z^2. By moving the attachment Z along the bar the normal position of the plunger rod R, with respect to the paraffin inlet port, is determined, and hence the flow of paraffin to the feed pipe may be initially controlled independently of the automatic control when the engine is running.

In initially starting up the engine the gaseous mixture is supplied by spraying petrol through the nozzle O into the mixing chamber, and as the engine is cranked the rotating fan C will draw in air and mix it with petrol, the gaseous mixture being conducted to the engine through the eduction pipe. At the same time the rotating cam M operates the force pump and a flow of paraffin is discharged into the mixing chamber, where it volatilizes by the action of the heated exhaust passing through the jacket B and is thoroughly commingled with the incoming air by the revolving mixer, and the engine having fairly started the petrol supply is cut off and the mixture of air and vaporized paraffin is then drawn into the explosion cylinders of the engine through the eduction pipe, the engine continuing to work on the mixture of air and vaporized paraffin. It is also obvious that should the engine exceed a normal speed the governor will cause the reciprocating rod E to move the operating bar T on its pivot, and in so doing the valve H is moved inwardly to partly cover up the air inlets and the plunger R is moved inwardly to partially obstruct the admission of paraffin through the inlet X, while the throttle valve W partly closes up the eduction conduit by the action of the connecting link V between the valve and the upper end of the rod T, the whole coöperating to control the admission of air and paraffin to the mixing chamber and the flow of gaseous mixture from the mixing chamber, thereby reducing the supply of explosive mixture to the engine and causing a reduction of the speed of the engine. As the engine slows down the reverse action obtains, and thus it will be seen that the carbureter performs the double function of carbureter and engine governor.

Having thus described the invention, what I claim is:—

1. The combination of a heated mixing chamber provided with a fuel inlet, an eduction pipe and a hollow projecting valve casing communicating with said chamber and provided with air inlets intermediate of its ends, a rotatable sliding valve normally located in the outer end of said casing beyond said air inlets, a rotatably mounted sleeve passing through said casing and chamber, a reciprocating rod extending through said sleeve, a longitudinal slot in said sleeve, a pin operating in said slot and connected to said valve and rod, a governor for said rod, means for rotating said sleeve, throttling means controlling said fuel inlet and eduction pipe, and means coöperating between said throttling means and reciprocating rod, whereby the flow of fuel and air to the mixing chamber and the flow of gaseous mixture from the mixing chamber is controlled by the movement of said rod, substantially as described.

2. The combination of a heated mixing chamber provided with a fuel inlet, an eduction pipe, and an air inlet, a sleeve passing through said mixing chamber, a reciprocating rod extending through said sleeve, connections between said rod and sleeve providing conjoint rotation and independent reciprocation of said rod, a governor for said rod, driving means for said sleeve, a pump disposed in said fuel inlet line, a plunger barrel communicating with said pump, said barrel being provided with a fuel inlet port, a reciprocating spring-controlled plunger mounted in said barrel and coöperating with said port, a valve mounted on said sleeve cooperating with said air inlet, a valve mounted in said eduction pipe, an arm pivotally mounted intermediate of its ends and having one end constantly engaged by said reciprocating rod, said arm being also constantly engaged by the end of said plunger, and means connecting the other end of said arm with said eduction pipe valve, whereby the flow of fuel and air to the mixing chamber and the flow of gaseous mixture from the mixing chamber is controlled by said governor, substantially as described.

3. In a carbureter of the character described, a fuel pump chamber, a plunger barrel communicating therewith, said plunger barrel being provided with a fuel inlet port, in combination with a spring-controlled plunger rod, a reciprocating rod provided with a governor, an eduction pipe, a

throttle valve therefor, a pivoted arm engaged at one end by said reciprocating rod and at its other end connected with said throttle valve, and an adjustable member on said arm provided with an inclining face engaging the end of said plunger rod, substantially as described.

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

FITZWILLIAM RICHARD DAVIS.

Witnesses:
BERNARD QUARITCH HOLMES,
ARTHUR ERNEST COPELAND.