C. BROWN.

CARBURETER.

APPLICATION FILED NOV. 25, 1910.

1,042,528.

Patented Oct. 29, 1912.

Fig. 1.

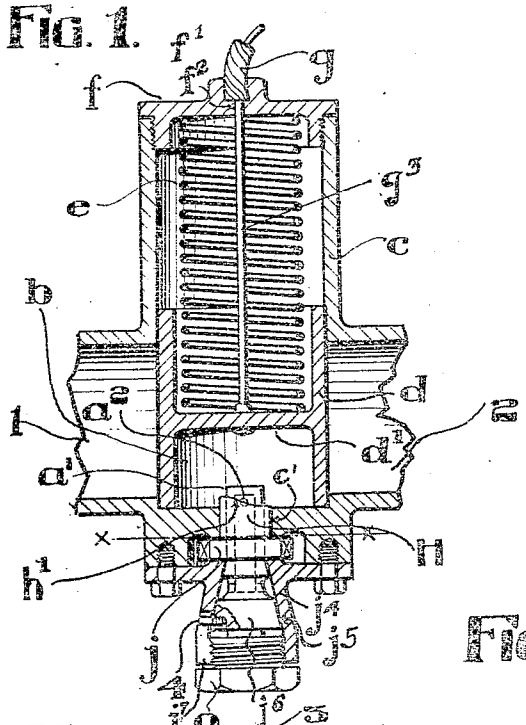


Fig. 2.

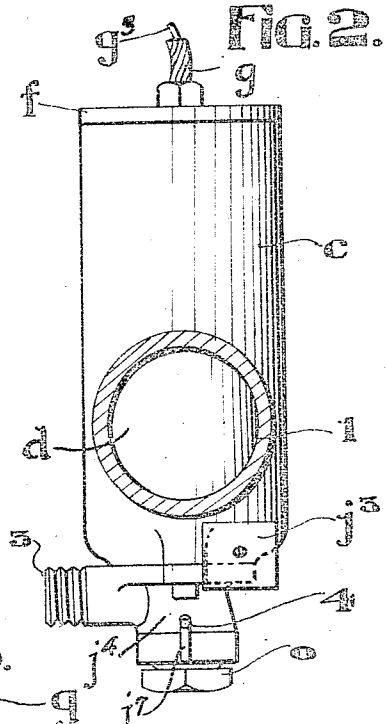


Fig. 3.

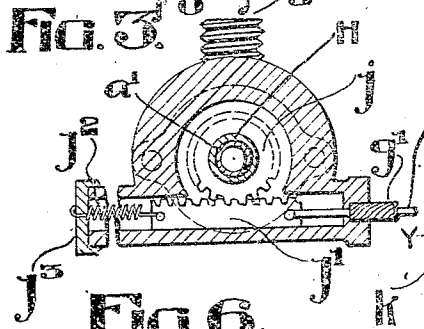


Fig. 5.

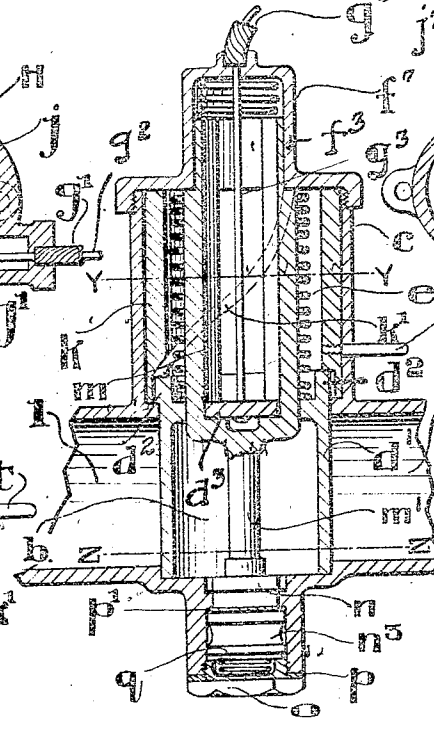


Fig. 4.

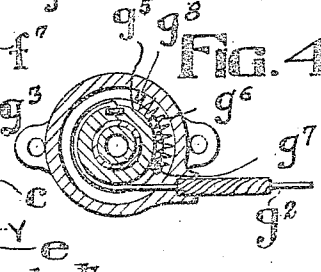


Fig. 6.

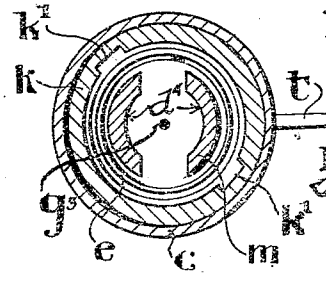
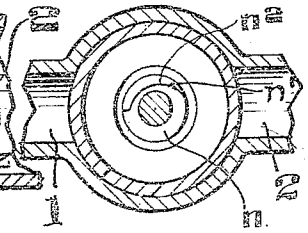


Fig. 7.



Witnesses:
M. Keesling
C. T. Dustin

Inventor:
Clement Brown
by B. Singer
Atty

UNITED STATES PATENT OFFICE.

CLEMENT BROWN, OF BIRMINGHAM, ENGLAND.

CARBURETER.

1,042,528. Specification of Letters Patent. Patented Oct. 29, 1912.

Application filed November 25, 1910. Serial No. 594,115.

To all whom it may concern:

Be it known that I, CLEMENT BROWN, a subject of the King of Great Britain, residing at 53 Bayswater road, Birchfield, Birmingham, in the county of Warwick, England, have invented certain new and useful Improvements in Carbureters for Internal-Combustion Engines, of which the following is a specification.

My present invention relates to carbureters for internal combustion engines, in which the air intake and mixture outlet are simultaneously controlled, by a piston, common to both, and the hydrocarbon nozzle so disposed as to facilitate intermixing of the hydrocarbon and air.

The principal objects of my invention are to provide a device simple in construction, efficient in action, and inexpensive to manufacture.

Other objects of my invention will appear in the specification in connection with the accompanying drawing, forming a part thereof, and in which drawing:

Figure 1 is a central, vertical, sectional view through a carbureter embodying my invention, parts being shown in elevation to more clearly disclose the invention. Fig. 2 is a side elevation of the carbureter disclosed in Fig. 1. Fig. 3 is a sectional view on the lines x—x of Fig. 1. Fig. 4 is a view similar to Fig. 3 showing a modification of nozzle operating means. Fig. 5 is a central, vertical, sectional view of a carbureter embodying the modification of my invention. Fig. 6 is a cross sectional view on the lines y—y of Fig. 5. Fig. 7 is a sectional view on the lines v—v of Fig. 5.

Similar characters refer to similar parts throughout the several views.

A float and chamber of usual construction (not shown in the drawing) maintains a constant level of liquid hydrocarbon in the carbureter nozzle, which is of the variable orifice type, the normal oil level being indicated at x—x of Fig. 1 of the drawing.

Referring more particularly to Figs. 1, 2 and 3, a cylindrical casing c has in communication therewith transversely extending alined ports 1 and 2, the ports 2 being in communication with the engine. Slidable within and longitudinally movable with respect to the casing c, is a hollow cylindrical piston d, the lower marginal edge of which controls the ports 1 and 2. The controlling edge of the piston d is in a plane parallel to the axis of the ports 1 and 2, so that at any given position of the piston d, the air intake 1 and mixture outlet 2 are regulated to exactly the same degree. Preferably integral with the internal walls of the piston is a transverse diaphragm d', against the upper face of which a helical compression spring e abuts, and the casing has, at the end removed from the ports 1 and 2, a screw closure cap f which forms the upper abutment of the spring. A central circular depression in the inner face of the closure cap f accommodates the adjacent extremity of the spring e and maintains it in concentric relation with the piston. At the outer face of the cap f, concentric therewith, is formed an upstanding flange f' adapted to receive the end of a casing g as the cap has an axially directed aperture f^2 concentric to but relatively smaller than the opening formed by flange f', the casing g abutting against the cap f. The flexible incompressible casing g through which passes a flexible inextensible control cable g^3 is anchored by such flange f'. One terminal of the cable g^3 is attached to the piston, so that the cable may be displaced when it is desired to admit more or less mixture to the engine, and the piston correspondingly moved. This cable g^3 is connected to the piston by a headed nipple which is soldered to the cable, or it may be connected thereto in any suitable manner. In the floor of the chamber, subjacent to the piston d is formed an axially directed aperture c' through which projects the hollow fuel nozzle a' and having a fuel discharge orifice a^2 from which the liquid hydrocarbon is sprayed. This orifice a^2 is open at the periphery of the nozzle and is regulated by the upper curved or helical marginal edge h' of a rotatable sleeve H concentrically surrounding the nozzle a'. When the sleeve H is rotated in relation to the nozzle, the helical cut-off edge h' advances over or recedes from the orifice a^2 according to the direction of rotation, and thus varies the exposed area thereof, and consequently the volume of fuel induced. It is to be noted that the nozzle a' is disposed to project within the recess b of the piston d formed by the walls thereof, and the diaphragm d', or is alined to deliver hydrocarbon to said recess. At the lower end of the sleeve H is a toothed pinion j, the peripheral

teeth of which mesh with a rack j' slidably mounted in the casing and actuated in one direction by a coiled tension spring j^2 attached to a cap j^3, and in the other direction by an inextensible cable g^2 sliding through an incompressible casing g' anchored in the main casing. The cable g^2 is attached to the rack j' in any suitable manner. In order to support the sleeve and appertaining parts, a frusto-conical shell j^4 is secured to the under side of the main casing by screws or in any other suitable manner. Fitting in the conical bore j^5 of the conical shell j^4 is the coned periphery of a depending part j^6 of the nozzle a', which part j^6 is forced into petrol tight contact by a screw plug o screwed into the mouth of the conical shell. A peg 4 fixed in the part j^6 engages a slot j^7 in the shell j^4 and forms a locating means to insure the correct replacement of the parts, in assembling. Liquid hydrocarbon enters through a hollow radial boss 3 shown in Figs. 2 and 3 of the drawing, and flows into the annular space above the conical periphery of the depending part j^6, said space being shown in Fig. 1 of the drawing. The fuel then passes up through the hollow nozzle and is sprayed from the orifice a^2. The inflowing air traverses the port 1, passes under the lower edge of the regulating piston d, adjacent port 1, impinges upon the jet and is thereby carbureted, passes under the lower margin of the piston, port 2, and emerges by way of the latter port from the carbureter.

In the modification illustrated in Fig. 4, the rack and pinion operating means are replaced by a drum g^5 fixed to the lower extremity of the regulating sleeve H, and formed with a circumferential groove in which the operating cable g^2 lies. This cable is attached to the drum in any suitable manner. A helical compression spring g^6 extends around a part of the drum periphery to act in a direction counter to that imparted to the drum by the cable g^2. A pin g^7 fixed to the drum to abut against one extremity of the spring g^6 and a pin g^8 is fixed to the casing to abut against the other extremity of said spring.

In Figs. 5, 6 and 7, the sliding piston and the regulating member of the jet are operatively connected together. In such figures, 1 and 2 are the intake and mixture ports, respectively, c the casing, d' is a piston, e is the spring operating the piston d', f is the closure member of the casing c, g^3 is the operating cable, these parts being similar to the corresponding parts disclosed in Fig. 1 of the drawing. Fitting within the interior of the casing c is a sleeve k having two oppositely disposed helical grooves k' cut in its bore. Said sleeve is normally stationary, but may be manually and independently rotated by a handle t carried thereby. A peripheral slot, (not shown in the drawing), disposed in the casing c allows oscillation of the handle t. At the upper part of the piston are two diametrically opposite peripheral projections, or keying means d^2 which engage the grooves k'. It will be obvious from an inspection of the drawing, that when the piston is displaced axially it is constrained at the same time to revolve by means of the projections d^2 working in the helical grooves k' in the sleeve k. The transverse diaphragm d^3 in the piston d' has two vertical segmental or keying apertures d^4. A bifurcated bridle piece m has its arms of bifurcation of similar shape to the said apertures to slidably engage the same. The top of the said arms are journaled in a hollow boss f^3 of the cap f. The combined sliding and rotating movement of the piston causes the bridle to revolve, but not to slide, by reason of the sliding connection between the bridle piece and the piston diaphragm. The spring e is arranged in the annular space between the sleeve k and the arms of the bridle piece. The bridle piece m is in connection with a stem m', which is connected to a disk valve n the marginal cut off edge n' of which is of a cam shape. Subjacent to the valve n is a nozzle n^3 having a fuel orifice n^2 in its upper face adapted to deliver hydrocarbon to the recess b of the piston d'. When the valve n is rotated, the cam edge more or less closes the fuel orifice. The nozzle is held in place by a spring q which abuts against a screw cap o. Fiber washers p and p' are provided to prevent leakage.

By operatively connecting the sliding piston and nozzle valves, the carbureter is rendered automatic or semi-automatic, but notwithstanding this interconnection, the nozzle may be regulated independently of the piston by moving the lever t, as clearly shown in Fig. 5.

I claim:

1. In a carbureter, the combination of a casing having a vertically disposed bore, means forming an inlet port, and a mixture outlet port open laterally to said bore diametrically opposite and alined with respect to each other, a piston having a recessed bottom, vertically movable in said bore and adapted to control the said inlet and outlet ports simultaneously, according to the position of the lower margin of said piston with respect to the openings of said ports, and a nozzle disposed to deliver hydrocarbon to the said recessed portion of said piston whereby the air, inflowing through said casing, follows a sinuous path from said inlet port under the lower edge of said piston adjacent thereto, over said nozzle and again under the edge of said piston adjacent said outlet port.

2. In a carbureter, the combination of a

casing having a vertically disposed bore, a cap for the upper end of said bore having an aperture therein, means forming an air inlet port and mixture outlet port open laterally to said bore diametrically opposite and alined with respect to each other, a cylindrical shell piston vertically movable in said bore, having a diaphragm disposed intermediate the upper and lower margins and adapted to control the said inlet and outlet ports simultaneously according to the position of the lower margin of said piston with respect to the openings of said ports, a compression spring interposed between said cap and said diaphragm, a nozzle disposed to deliver hydrocarbon to said recessed portion of said piston whereby the air in flowing through said casing follows a sinuous path from said inlet port under the lower margin of said piston adjacent thereto, over said nozzle and again under the edge of said piston adjacent said outlet port, and means operatively connected with said piston and extending through the said aperture in the cap to actuate the piston against action of said spring.

3. In a carbureter, the combination of a casing having a vertically disposed bore provided with helical grooves open thereto, means forming an air inlet port and mixture outlet port open laterally to said bore diametrically opposite and alined with respect to each other, a piston having a recessed bottom movable longitudinally within said bore, provided with keying portions fitting into said helical grooves, whereby the said piston rotates in its longitudinal movement within said bore, said piston being adapted to control the said inlet and outlet ports simultaneously according to the position of the lower margin of said piston with respect to the openings of said ports, a nozzle disposed to deliver hydrocarbon to said recessed portion of said piston, a rotatable valve for controlling said nozzle, a stem for said valve disposed concentric to the axis of said piston, and keying means connecting said stem with said piston to impart circumferential movement of the piston to said stem, but not longitudinal movement of the former to the latter.

4. In a carbureter, the combination of a casing having a vertically disposed bore provided with helical grooves open thereto, means forming an inlet and a mixture port open laterally to said bore diametrically opposite and alined with respect to each other, a piston having a recessed bottom movable longitudinally within said bore, provided with keying portions fitting into said helical grooves, whereby the said piston rotates in its longitudinal movement within said bore, said piston being adapted to control the said inlet and outlet ports simultaneously according to the position of the lower margin of said piston with respect to the openings of said ports, a nozzle disposed to deliver hydrocarbon to the said recessed portion of said piston, a rotatable valve for controlling said nozzle, and means operatively connecting said piston and valve to impart circumferential movement but not longitudinal movement of the former to the latter.

5. In a carbureter, the combination of a casing having a vertically disposed bore provided with helical grooves open thereto, means forming an air inlet port, and a mixture outlet port open laterally to said bore diametrically opposite and alined with respect to each other, a cylindrical shell piston, longitudinally movable within said bore, having a diaphragm disposed intermediate its upper and lower margins, and having keying portions fitting into the helical grooves, whereby said piston rotates in its longitudinal movement within said bore, said diaphragm being provided with keying apertures, and said piston being adapted to control the said inlet and outlet ports simultaneously according to the position of the lower margin of said piston with respect to the openings of said ports, a nozzle disposed to deliver hydrocarbon to the recess formed in said piston below said diaphragm, whereby the air flowing through said casing follows a sinuous path from said inlet port under the lower edge of said piston adjacent thereto, over said nozzle and again under the edge of said piston adjacent said outlet port, a rotatable valve for controlling said nozzle, and keying means extending through the said apertures in said diaphragm and operatively connected with said valve to impart circumferential movement of said piston to said valve, but not longitudinal movement of the former to the latter.

6. In a carbureter, the combination of a casing having a vertically disposed bore provided with helical grooves open thereto, a cap for the upper end of said bore having an aperture therein, means forming an air inlet port and a mixture outlet port open laterally to said bore diametrically opposite and alined with respect to each other, a cylindrical shell piston longitudinally movable within said bore having its diaphragm disposed intermediate the upper and lower margins thereof and having keying portions fitting into the said helical grooves whereby the said piston rotates in its longitudinal movement within said bore, said diaphragm being provided with keying apertures, and said piston being adapted to control the said inlet and outlet ports simultaneously according to the position of the lower margin of said piston with respect to the openings of said ports, a compression spring interposed between said cap and said diaphragm, a nozzle disposed to deliver hydrocarbon to the recess formed in said piston below said dia-

phragm, a rotatable valve for controlling said nozzle, keying means extending through the said keying apertures in said diaphragm and operatively connected to said valve to impart circumferential movement but not longitudinal movement of said piston to said valve, and means operatively connected to said piston and extending through the said apertures in said cap to actuate said piston against action of said spring.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

CLEMENT BROWN.

Witnesses:
ARTHUR H. BROWN,
HOLLIS F. BROWN.