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PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements in or relating to Carburetters for Internal Combustion Engines.

I, ERNEST ROBERT GODWARD, Cycle Manufacturer, of 40, Dowling Street, Dunedin, formerly of Don Street, Invercargill, both in the Dominion of New Zealand, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to carburetters of the kind employing absorbent surfaces to receive the atomised liquid fuel and gradually supply it to the air passing through the apparatus. The invention comprises the arrangement of an expansion chamber lined throughout with absorbent material and expanding towards the induction pipe from the inlet for the fuel mixture, and into which chamber all the mixture of air and fuel enters at one point. A gauze nozzle for fuel can be provided, and a coned helical spring adapted to admit air between its coils under suction by the engine. The absorbent material is preferably gauze, and an upwardly projecting air supply tube can be provided covered with absorbent material, and a bell also covered with absorbent material can be located over the tube and adapted to rest on the bottom of the chamber and to be elevated by the suction of the engine; fuel being fed to the tube through the gauze nozzle. An absorbent permeable screen can be located between the chamber and the induction pipe of the engine. Other features of the invention will be evident from the following description taken in conjunction with the accompanying drawings in which—

Figure 1 is a vertical section through the apparatus showing the parts in the position assumed when the engine is stationary; and

Figure 2 is a similar section showing the altered position of the parts when the engine is running.

The apparatus mainly comprises an inner tube 1, a bell 2, and a chamber 3 arranged vertically at any convenient place between the petrol feed 4 and the induction pipe 5. The inner tube 1 and the chamber 3 are supported on a base member 6 having an inlet 7 for air, and an opening 8 to which an adjustable nozzle 9 is attached, whereby a jet of petrol may be introduced. The petrol feed 4 leads from a float chamber of a known type to supply by gravity fuel to a gauze roll 10 secured to the top of the adjustable nozzle 9 and extended upwards within the inner tube 1 to any convenient height. This gauze roll or nozzle is of a kind previously proposed for use in carburetters and its pur-

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pose is to act as a capillary evaporating surface to supply the petrol evenly into the inner tube 1.

There is a coned helical spring 12 preferably made from spring steel wire, the convolutions of which are closely wound. The internal diameter of the small end 12^B of the cone is made to fit the adjustable nozzle 9 and is adapted to be fixed thereon near its upper end, and the external diameter of the larger end 12^C of the cone is made equal to the internal diameter 1^A of the inner tube 1 and forms a sliding fit therein. This coned spring is of a kind previously proposed to control the admission of air to carburetters and its function is to throttle the air supply, the cone being adjusted automatically by the variation in the vacuum created within the tubes by the varying speed of the engine under different loads.

The coned spring may be inverted and the external diameter of the large end secured to the internal diameter of the inner tube, and the internal diameter of the small end of the spring made a sliding fit over the upper end of the adjustable nozzle.

As before mentioned, the inner tube 1 and the chamber 3 are secured to the base member 6, the inner tube being approximately $1\frac{1}{2}''$ shorter than the chamber and not supported at its upper end 1^B, while the chamber at its upper end 3^A is connected with the induction pipe 5. A gauze disc 13 is placed at the upper end of the chamber to prevent back firing.

The bell 2 is not fixed, but its lateral movement is limited by wire distance pieces 14 or the like attached to the upper end and the lower end of the bell. The bell with its crown 15 is preferably spun from some light material and the crown is in the form of an inverted cone, the point 15^A of which projects downwards to a short distance within the inner tube 1. If desired the bell may be supported at the upper end 1^B of the inner tube.

The bell rises more or less thus increasing or reducing the space 17 and admitting or choking the mixture passing from within the bell to the annular space 2^D, when the engine develops a greater or lesser power according to its load or speed.

The tube 1 and the bell 2 are lined internally and externally with fine gauze indicated at 16, and the chamber 3 is lined internally only. A spring may be introduced to normally hold the bell against the base member, thereby demanding a greater vacuum in the outer tube before the bell will lift.

The carburetting starts within the inner tube. The induction stroke of the engine causes a vacuum in the tubular chamber which raises the bell and pulls apart the convolutions of the coned spring 12 thereby admitting air to the tubular chamber. The air passing through the coned spring plays on to the gauze roll 10 secured to the top of the adjustable nozzle 9, and in its upward passage draws the petrol from the gauze roll. According to the amount of vacuum produced, more or less air passes between the convolutions of the coned spring and takes its charge with it. The mixture passes through the tubular chamber in the direction indicated by the arrows in Figure 2, the bell crown 15 suspended over the inner tube 1 directing the mixture down to the base of the bell. Descending thence the mixture passes from within the space 17 under the lower edge 2^C of the bell, into the annular space 2^D formed between the bell and the outside tube and is carried upwards in the said annular space under the influence of the vacuum and through the wire disc 13 at the top into the combustion chamber of the engine. It will be seen that the fuel mixture during its passage from the inlet for the mixture at the upper end 1^B of the tube 1 to the induction pipe 5, passes through an expansion chamber of increasing size.

It is well known that petrol comprises numerous particles having different degrees of volatility and when fed to apparatus of the class hereinbefore described, the lighter and more volatile hydro-carbons will be immediately absorbed by the air introduced at the inlet end and induced to travel through

the tubular chambers containing the gauze by the vacuum produced by the induction stroke of the engine. The air will only absorb a certain quantity of petrol in the process and when the supply of petrol is greater than the air can absorb, the heavier or less volatile hydrocarbons are caught by the fine gauze and held thereby until absorbed by air. The outer tube of the tubular chamber being of greater diameter than the induction pipe the speed of the mixture in the said outer tube is materially reduced, and there is more time for the heavier hydrocarbons to be absorbed by the partially carburetted air already generated in the intermediate and inner tubes. Consequently the mixture will be uniform and homogeneous.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a carburetter the arrangement of an expansion chamber lined throughout with absorbent material and expanding towards the induction pipe from the inlet for the fuel mixture, and into which chamber all the mixture of air and fuel enters at one point.

2. In a carburetter the combination of an expansion chamber lined with absorbent material and expanding towards the induction pipe from the inlet for the fuel mixture, a gauze nozzle for fuel, and a coned helical spring adapted to admit air between its coils under suction by the engine.

3. In a carburetter the combination of a chamber lined with absorbent material (for example gauze) an air supply tube covered with absorbent material and projecting upwards in the chamber, a bell covered with absorbent material and located over the tube and adapted to rest on the bottom of the chamber and to be elevated by the suction of the engine, and means to feed liquid fuel to the tube.

4. Apparatus as claimed in Claim 1 provided with an absorbent permeable screen between the chamber and the induction pipe of the engine.

5. Apparatus as claimed in Claim 3 provided with steadying distance pieces outside the bell and engaging the chamber wall.

6. Apparatus as claimed in Claim 3 in which the crown of the bell is shaped as an inverted cone for the purpose described.

7. The carburetter substantially as described with reference to the accompanying drawings.

Dated this 1st day of May, 1916.

BOULT, WADE & TENNANT,
111/112, Hatton Garden, London, E.C.,
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[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

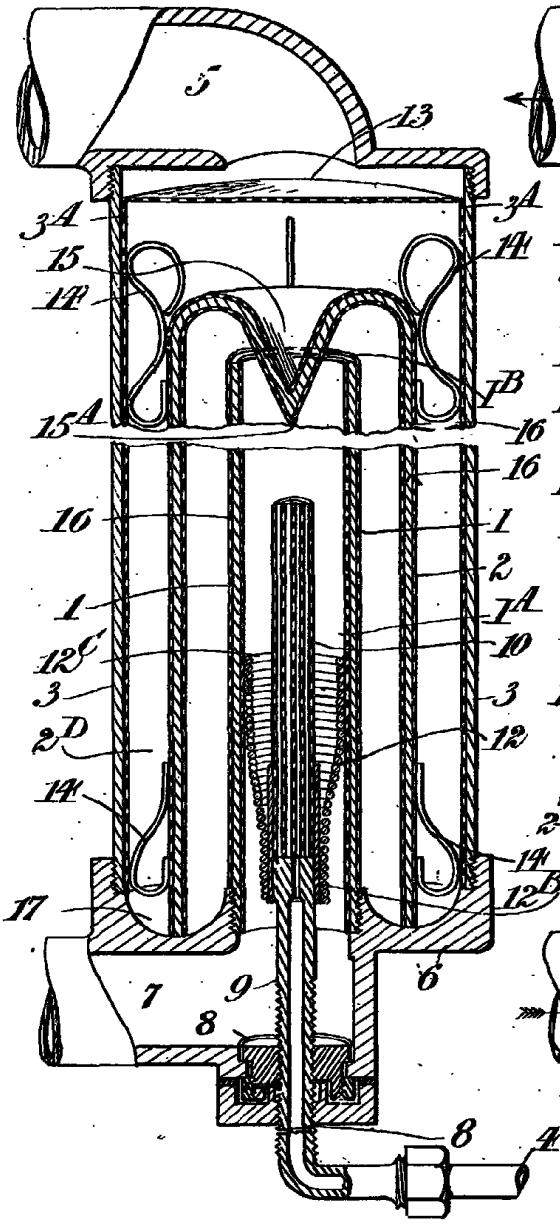
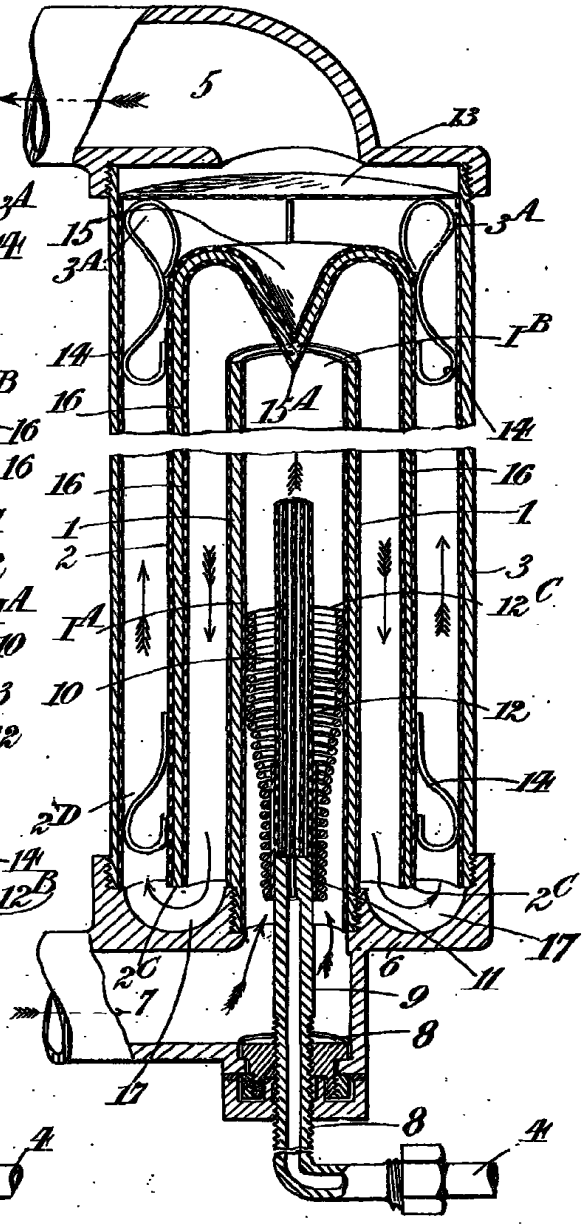


Fig. 2.



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