N° 5277 A.D. 1913

Date of Application, 3rd Mar., 1913
Complete Specification Left, 10th Apr., 1913—Accepted, 9th Oct., 1913

PROVISIONAL SPECIFICATION.

A Carburettor for Internal Combustion Engines to use either Petrol or Heavy Hydrocarbon Fuel such as Paraffin.

I, WILLIAM NOBLE, Motor Engineer, Coten End Garage, Warwick, and 76, Greatheed Road, Leamington Spa, do hereby declare the nature of this invention to be as follows:—

This relates to carburettors for internal combustion engines to use either petrol or paraffin as a fuel.

There are two principal parts to this carburettor, the mixing chamber Fig. 1, and the float chambers and 2 way valve Figs. 2, 3.

The float chambers A & A^1 are of the ordinary type, the level of the fuel in the jets B & B^1, governed by metal floats and needle valves, and are fed from the fuel pipes F & F^1. The float chamber A contains petrol and A^1 paraffin. (A^1 only is shown in Fig. 3.) C & C^1 are choke-tubes with adjustable mouths G & G^1, for regulating the amount of air passing in round the jets, and consequently the negative pressure on the fuel in the jets. D is a 2 way valve communicating with the vapourizing pipe E and according to its position with the choke-tubes C or C^1.

H is a bracket cast with the float chambers for supporting this part of the carburettor from the exhaust pipe J of the engine.

The vapourizing pipe E is brazed with the exhaust pipe J at K and is carried along inside the exhaust pipe and through the exhaust mainfold, it comes out through a packing gland by the front cylinder of the engine and enters the mixing chamber O, the gas passing through a slot S in the wall of the mixing chamber and corresponding slot T in the sleeve U which is provided for adjusting the proportion of gas and air to give a correct mixture. Air enters by the pipe P from an open-ended warming jacket round the exhaust pipe. The slots T^1, S^1, correspond more or less according to the position of the sleeve U which has a rotary movement, and work in conjunction with the slots T, S, for regulating the mixture strength.

The slots T and T^1 are uncovered equally by a piston V which rises and falls according to the negative pressure in the mixing chamber O, which in turn is governed by the position of the throttle R and the speed of the engine. Holes W are provided in the piston V for the gas and air to pass through. A dash pot Y with an adjustment X prevents bouncing of the piston V. A Z is a warming jacket connected to the water circulation of the engine.

An adjustment of the mixture for slow running is effected by moving the sleeve U vertically. This gives more or less gas through the slot T but a constant proportion of air through the slot T^1, owing to the slot T^1, being blocked by a key Z. When the piston V is right down the slot T is slightly uncovered but the slot T^1 is completely covered. This gives a rich mixture for starting.

Dated March 1st, 1913.

WILLIAM NOBLE.

[*Price 8d.*]

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COMPLETE SPECIFICATION.

A Carburettor for Internal Combustion Engines to use either Petrol or Heavy Hydrocarbon Fuel such as Paraffin.

I, WILLIAM NOBLE, Motor Engineer, Coten End Garage, Warwick, and 76, Greatheed Road, Leamington Spa, 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 has reference to a carburettor for use in connection with internal-combustion engines and more particularly to that type of such devices that are designed with a view to the use at will of either petrol or a heavy liquid hydrocarbon fuel such as paraffin and in which a separate float chamber and jet are provided for each fuel.

The construction and arrangement of the carburettor is such as to secure complete vaporisation of the fuel prior to its mixing with the main air-supply. Means are also provided for regulating the mixture strength and for adjustment for slow running.

A carburettor constructed according to this invention comprises two main parts, one of which consists of the float chambers for the different fuels together with the necessary jets and choke tubes, and a valve for changing from one fuel to another.

The other part of the carburettor comprises the mixing chamber in which the vaporised fuel meets and mixes with the main air supply prior to passing into the induction pipe by way of the usual throttle.

This mixing chamber is fitted with a floating piston which is subject to the varying negative pressure created in the mixing chamber by the engine piston and by its position at any moment automatically regulates the fuel supply for any given position of the throttle.

The said mixing chamber is also furnished with an adjustable sleeve whereby the mixture strength may be regulated and adjustment effected for slow running.

An important feature of the invention consists in the fact that the fuel on its way from either of the jets to the mixing chamber is caused to traverse a vaporising pipe which passes into and is carried along inside the exhaust pipe and through the exhaust mainfold to the mixing chamber. By this means it will be seen that even the heavy fuel is completely vaporised by the time it enters the mixing chamber.

In order that my invention may be clearly understood and readily carried into effect reference is made in describing the same to the drawings left with the Provisional Specification and to the accompanying drawing, Figure 4, which is a sectional representation of a mixing chamber similar to Figure 1 illustrating a slight modification.

Referring to the drawings, Figures 2 and 3, the float chambers, A, A^1 are of the ordinary type, the level of the fuel in the jets B, B^1 being maintained constant by metal floats and needle valves. The two chambers are supplied with their different fuels by the fuel supply pipes F, F^1. One chamber may contain petrol and the other paraffin or other heavy hydrocarbon.

The float chambers may be supported in any suitable manner such as by means of the bracket H depending from an adjacent part of the exhaust pipe J.

The fuel jets B, B^1 project into open-ended choke tubes C, C^1 and the amount of air passing in around the jets and consequently the negative pressure on the fuel in the jets is regulated by making the mouths of the choke tubes

adjustable such as by means of the spring supported and screw operated plates G, G¹ shewn in Figure 2.

The change from the one fuel to the other is effected by means of the valve D whereby either of the choke tubes may be placed in open communication with a vaporising pipe E.

This pipe E is common to the two fuels and passes into and along the exhaust pipe for a suitable distance and through the exhaust manifold passing out of the latter at a convenient place whence it opens into the mixing chamber O, see Figure 1.

The vaporising pipe E may enter and leave the exhaust pipe by way of packing glands, or the said pipe E may be simply brazed in the exhaust pipe at each end.

By reason of the high temperature prevailing in the exhaust pipe and manifold through which the vaporising pipe passes it will be readily understood that by the time either of the fuels reaches the mixing chamber it will be in a completely vaporised or gaseous state.

The mixing chamber O is of cylindrical shape as shewn in Figure 1 and surrounded by a hot water jacket A Z, said jacket being supplied from the cooling water for the engine.

The lower part of the mixing chamber is formed with two ports one S of which is for the entrance of the vaporised fuel from the pipe E and the other S¹ for the admission of the air supply which enters by the pipe P through an open-ended warming jacket round the exhaust pipe.

Regulation of the strength or quality of the mixture and adjustment for slow running is effected by means of a sleeve U arranged within the mixing chamber as shewn in Figure 1 and provided with slots or openings T, T¹ adapted to register with the ports S, S¹ respectively in the mixing chamber.

When tuning up the carburettor the mixture strength is adjusted by rotating the sleeve U for which purpose the latter may carry a stud N projecting through a slot N¹ in the mixing chamber and furnished with a fly-nut N², see Figure 4.

The effect of the rotary movement of the sleeve U is to vary the effective port openings in the mixing chamber and hence the quantity of vaporised fuel and air passing into the mixing chamber. It will of course be understood that for a given rotary movement of the sleeve U the two ports S, S¹ are not adjusted to an equal extent otherwise the quality of the mixture would remain constant. Consequently while the slot T¹ may be made of the same size as the port S¹, the slot T must be made wider than the port S or *vice versa*, so that for at least a part of the rotary movement of the sleeve U the gas port remains fully open while the port S¹ is being partly closed or restricted.

For any given position of the throttle R the amount of mixture passing to the engine is automatically controlled by the latter through the agency of a floating piston V which is free to rise and fall within the sleeve its upward movement being limited by an annular stop L, Figure 4, formed around the inside of the mixing chamber while its movement in a downward direction is cushioned and controlled by an air pocket Y which together with the piston V forms a pneumatic dash-pot. Bouncing of the piston may be prevented by suitably adjusting an air orifice in the closed lower end of the mixing chamber by the screw valve X.

The said piston V is formed with an annular concave portion which is formed with perforations W for the admission into the interior of the mixing chamber of the vaporised fuel and air. The slots T, T¹ in the sleeve U are uncovered equally by the piston as it rises and falls according to the negative pressure in the mixing chamber the degree of which at any moment is determined by the position of the throttle and the speed of the engine.

Adjustment of the mixture for slow running is effected by moving the sleeve U vertically within the mixing chamber. This gives more or less gas through the slot T but a constant amount of air through the slot T¹ owing to the slot T¹

being blocked by the pivoted key Z. When the piston V is right down the slot T is slightly uncovered but the slot T^1 is completely closed. This gives a rich mixture for starting.

In the slightly modified arrangement represented in Figure 4 the pivoted key Z is dispensed with and the upper part of the piston provided with keys M, M^1 which slide in the slots T, T^1 respectively in the sleeve U. When the throttle is nearly shut the piston V is in its lowest position and the key M^1 although not at the bottom of the slot T^1 completely covers the port S^1 the latter being shorter than the slot T^1. The port S however being equal in length to the slot T and longer than S^1 is not completely covered by the key M and the supply of gas may consequently be regulated by raising the sleeve U and restricting the remaining uncovered area of the slot T. This also gives a rich mixture for starting.

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. A carburettor of the kind herein referred to for internal-combustion engines comprising two main parts communicating with each other by means of a vaporising device which is common to both fuels, one of which parts comprises two float chambers, fuel jets and choke tubes adapted to regulate and control the supply of one or other of the two different fuels and a multiple way valve for placing the said choke tubes one at a time in communication with said vaporising device, while the other part constitutes a mixing chamber wherein the vaporised fuels meet and mix with the main air supply prior to passing to the engine substantially as herein described.

2. In a carburettor of the kind covered by the preceding claim the combination with the mixing chamber of means such as sleeve U adapted when adjusted in one direction to regulate the quality of the mixture of vaporised fuel and air passing to the engine and when moved in another direction to provide adjustment for slow running substantially as herein described.

3. In a carburettor of the kind covered by Claim 1 the combination with the mixing chamber of means such as the floating piston V for automatically regulating the quantity of mixture passing to the engine at any moment for a given position of the ordinary throttle valve substantially as herein described.

4. A carburettor for internal combustion engines comprising in combination two float chambers fuel jets and choke tubes, a vaporising pipe traversing the interior of the exhaust pipe and manifold, a multiple way valve for placing either of the choke tubes in communication with said vaporising pipe, a mixing chamber provided with ports to receive the vaporised fuel and main air supply and with a throttle, a slotted sleeve adjustably arranged within said mixing chamber and adapted to control said ports to regulate the quality of the mixture and to provide adjustment for slow running, and a floating piston within said sleeve perforated to admit the vaporised fuel and air supply into the interior of the mixing chamber, said piston being free to rise and fall according to the negative pressure in the mixing chamber so as to control the quantity of mixture passing to the engine at any moment for a given position of the throttle.

5. A carburettor for internal combustion engines constructed, arranged and adapted to operate substantially as herein described with reference to the drawings.

Dated this 8th day of April, 1913.

T. FLETCHER WILSON,
Fellow of the Chartered Institute of Patent Agents,
High Street Chambers, Coventry,
Agent for the Applicant.

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A.D 1913. MARCH 5. N° 5277.
NOBLE'S PROVISIONAL SPECIFICATION.

(3 SHEETS)

SHEET 1

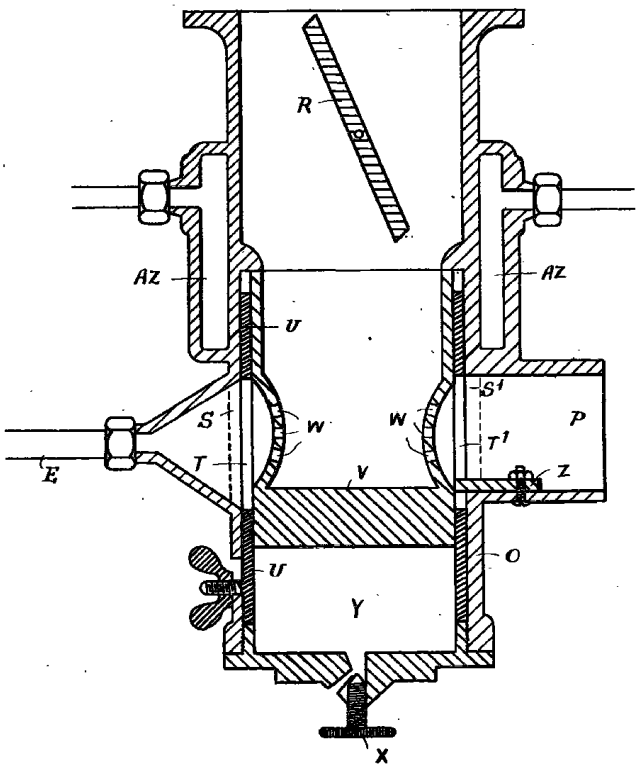


Fig: 1.

SHEET 2.

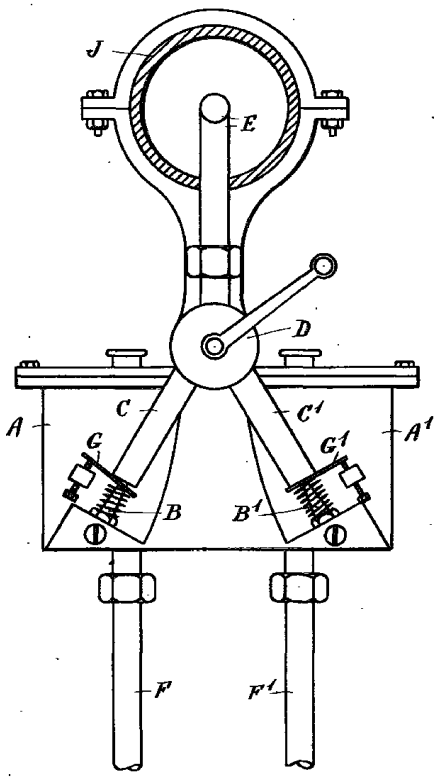


Fig: 2.

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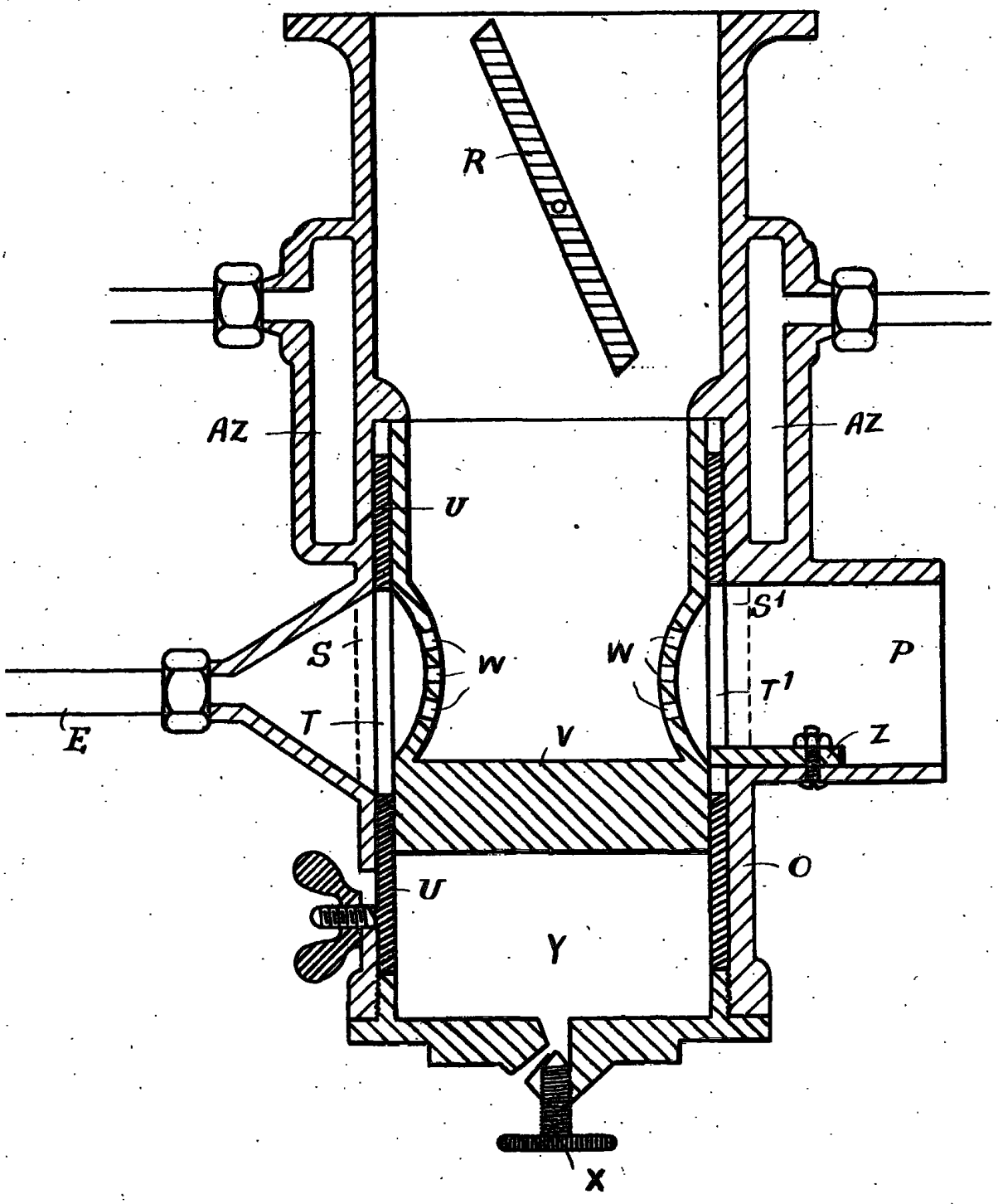


Fig: 1.

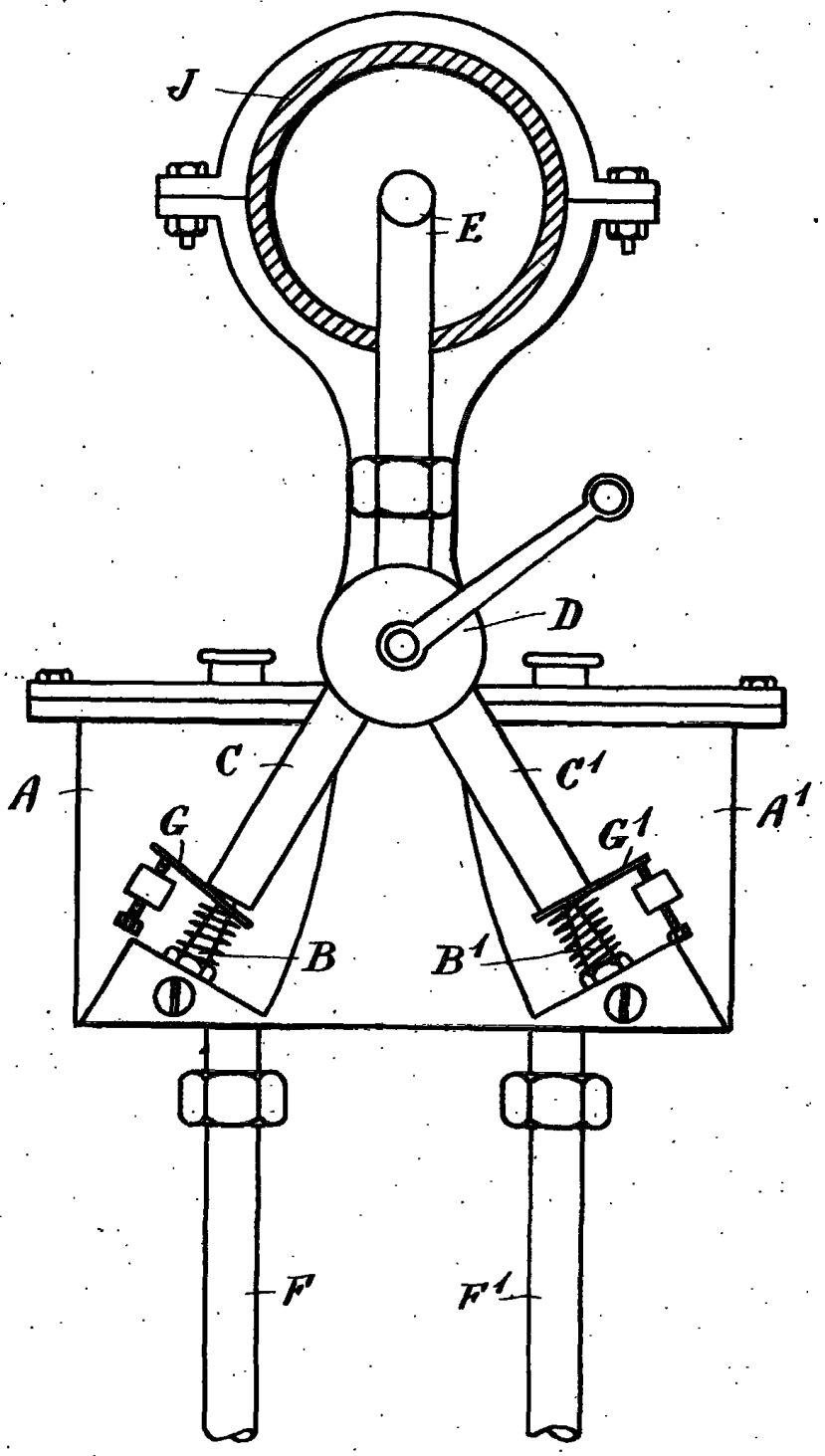


Fig: 2.

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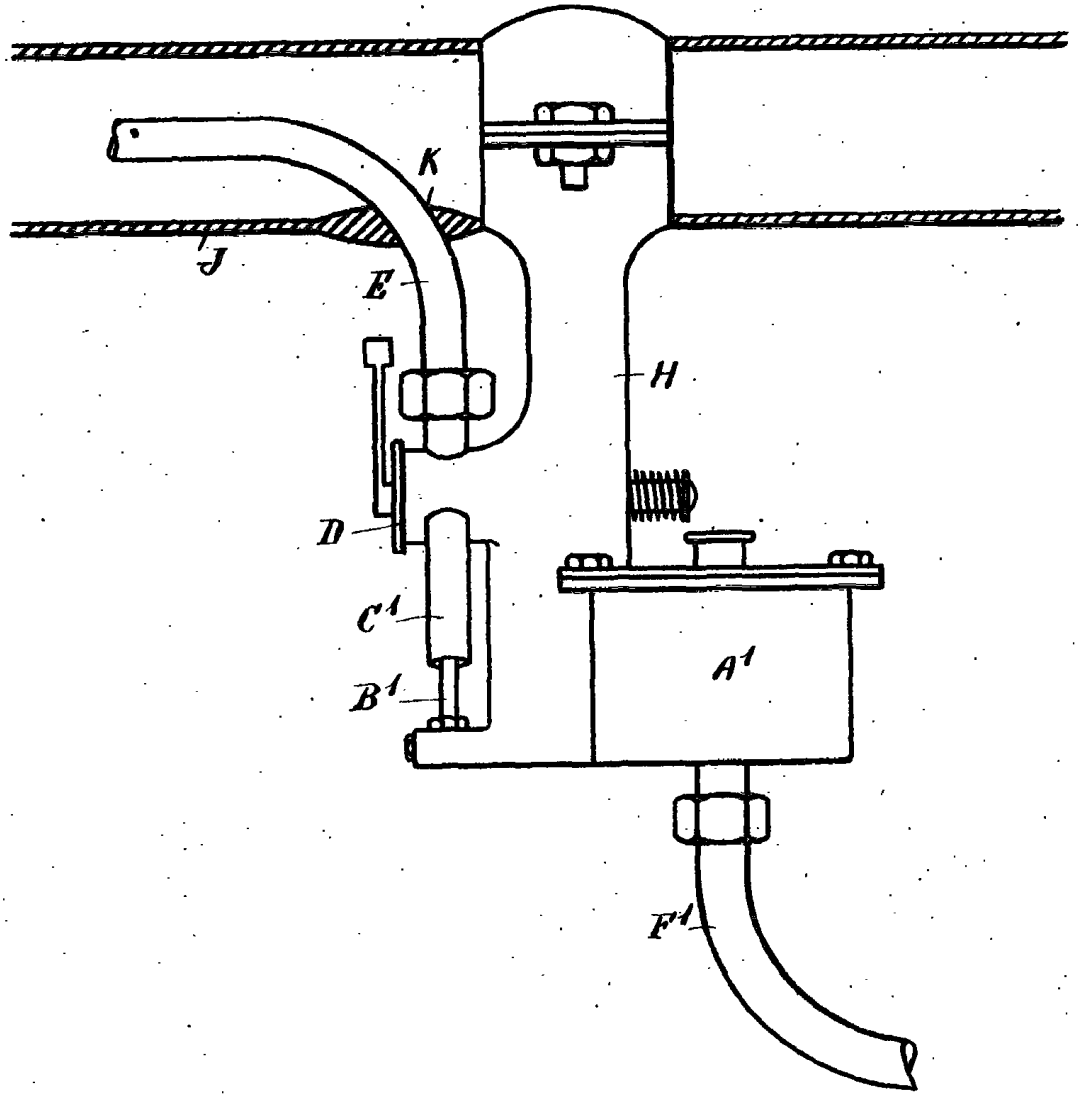


Fig: 3.

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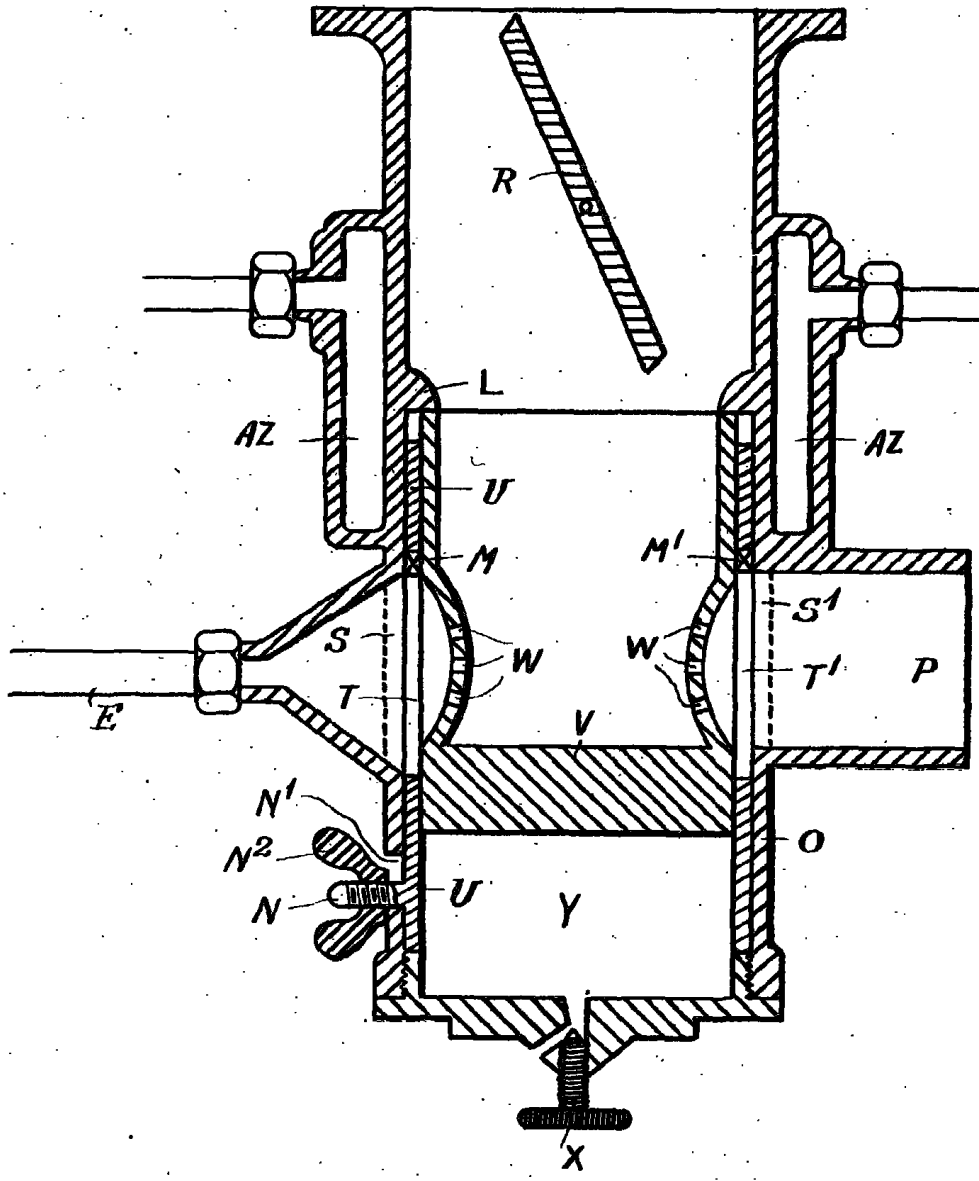


Fig: 4.

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