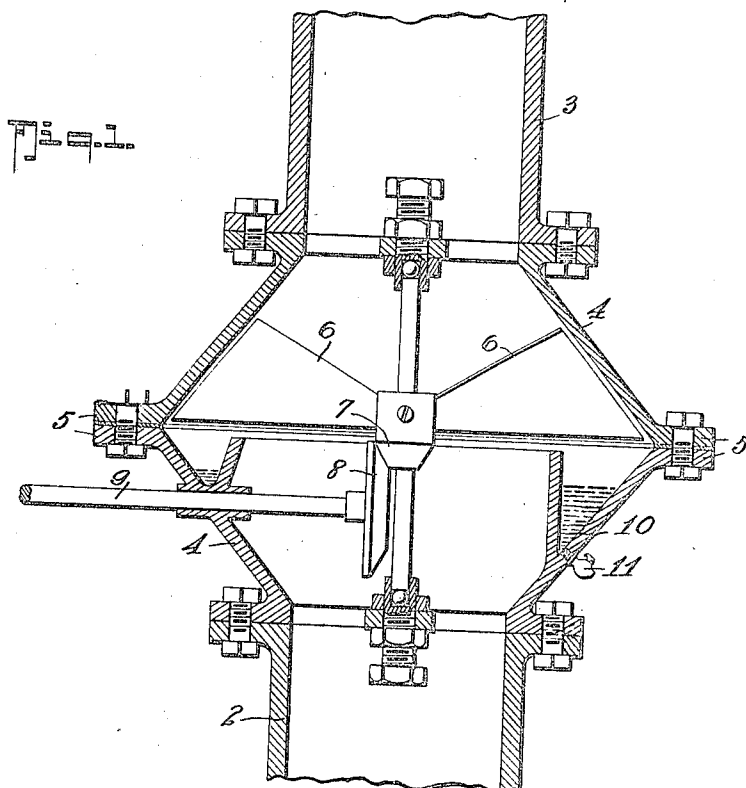
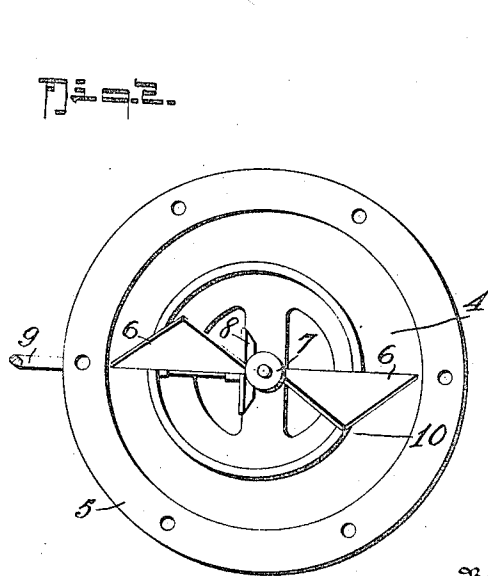
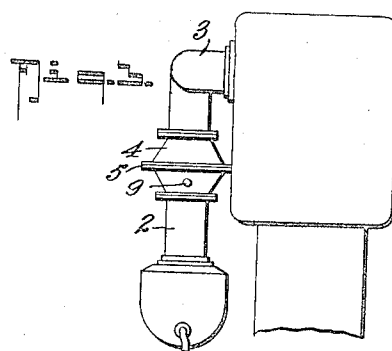


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R. HALL.
MEANS FOR DELIVERING GAS TO INTERNAL COMBUSTION ENGINES.
FILED SEPT. 1, 1921.



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RICHARD HALL, OF VANCOUVER, BRITISH COLUMBIA, CANADA.

MEANS FOR DELIVERING GAS TO INTERNAL-COMBUSTION ENGINES.

Application filed September 1, 1921. Serial No. 497,744.

To all whom it may concern:

Be it known that I, RICHARD HALL, citizen of the Dominion of Canada, residing at Vancouver, in the Province of British Columbia, Canada, have invented certain new and useful Improvements in Means for Delivering Gas to Internal-Combustion Engines (for which I have filed application in Canada, filed May 19, 1916, Patent No. 175,793), of which the following is a specification.

This invention relates to an improved means for thoroughly mixing air with the hydrocarbon vapour and delivering the same under a slight pressure to the cylinders of an internal combustion engine.

These engines usually rely on the suction of the piston's stroke for delivery of the explosive mixture to the cylinder and consequently the gaseous mixture must be more or less attenuated.

The principal object of this invention is to thoroughly deliver the gaseous charge to the cylinders under a light pressure, instead of depending on the suction.

A further object of the invention is to abstract from the inpassing charge any portion of the hydrocarbon which is in a liquid state, that is, not thoroughly vaporized, which liquid, if allowed to pass into the cylinder, not only detracts from the explosive value of the charge, but tends to foul the cylinders and spark plugs by the formation of a carbon deposit.

The means by which these several results are attained are fully set forth in the following specification, reference being made to the drawings by which it is accompanied, in which:

Fig. 1 is a vertical section through the mixing or fan chamber.

Fig. 2 is a plan of the mixing chamber with the upper part removed to show the fan, and

Fig. 3 is an end elevation of the intake manifold of the engine showing the application of the mixer thereto.

In these drawings 2 represents the pipe delivering the mixture of hydrocarbon vapour and air from the carburetter to the intake manifold 3 of the engine.

Between the pipes 2 and the connection to 3 a fan chamber 4 is introduced, in which chamber a bladed fan 6 is rotatably mounted on an axis coincident with that of the

pipe connections and therefore in the line of the flow of the gas.

The chamber 4 is preferably formed in two parts, each being a frustum of a hollow cone, the bases of which are joined together at 5.

The spindle of the fan 6 is carried in an anti-friction bearing supported in each connecting end of the chamber 4 and the blades of the fan are angled upward from the plane of the joint 5 and conform generally to the inside of the upper part of the chamber. This fan 6 is rotated at a high rate of speed by any convenient means, preferably by friction from a conical hub 7 resting on a correspondingly coned wheel 8 secured on a shaft 9 rotatably mounted in the lower part of the chamber 4 and driven by any suitable means by power derived say from the engine shaft.

The hydrocarbon vapour and air as delivered from the carburetter are thus in-drawn by the fan 6 and thoroughly mixed, and the gaseous mixture is forcibly delivered to the intake manifold 3 of the engine.

It will also be seen, by reference to the drawing, that the peripheral tips of the fan blades 6 are disposed at a plane approximately at the jointure of the frustum bases and by reason of such, and the relation thereof with the eccentrically disposed upwardly projecting wall which forms the channel or sump 10, any liquid particles of the hydrocarbon that are not vaporized by the high velocity of the said fan are, by centrifugal force, thrown outward off of the said peripheral tips at a point out of and beyond the path or line of travel of the upwardly sucked gas and thereby allowed to trickle down into the said sump without any possibility of being picked up again from off the upper frustum wall and carried on by the upwardly rushing gas. The channel wall is disposed eccentrically, for the purpose of providing a convenient bearing for the driving shaft 9 and also to form a channel 10 shallow at one side and deep at the other, to allow for the perfect drain thereof, periodically, through the small pet cock 11 provided at its deepest point as shown.

It will be understood that the fan 6 and its casing 4 and the channel or sump 10 for collecting any liquid precipitate are entirely supplementary to the carburetter and the

intake manifold, and do not in any way interfere with the function of these parts.

Having now particularly described my invention, I hereby declare that what I claim as new and desire to be protected in by Letters Patent, is:

1. In a device of the class described, a fan chamber composed of two parts each being the frustum of a hollow cone, the larger bases of which are jointed together, a fan within the casing the axis of the fan coinciding with the axis of the chamber and the blades of the fan extending angularly upward approximately from the plane of the casing joint, means for driving the fan by friction from an external source of power, and a sump adapted to collect any precipitate thrown from the fan blades.

2. In a device of the class described, a fan casing composed of two parts each being the frustum of a hollow cone, the larger bases of which are jointed together, a fan within the casing, the axis of the fan coinciding with the axis of the casing and having the blades thereof extending angularly upward approximately from the plane of the casing joint, a channel forming wall within said casing with the upper edge thereof being approximately in the plane of the casing joint, the peripheral tips of said fan blades extending out of the path of the upwardly rushing gas as it leaves said upper edge of said channel forming wall and means for driving the fan from an external source of power.

3. In a device of the class described, a fan casing composed of two parts each being the frustum of a hollow cone, the larger bases of which are jointed together, a fan within the casing, the axis of the fan coinciding with the axis of the casing and having the blades thereof extending angularly upward from a plane approximately in the plane of the casing joint, an eccentrically disposed channel forming wall within said casing for forming a channel deep at one side and shallow at the other and adapted to collect any precipitate thrown from said fan blades, a drain cock in the deepest point of said channel, the upper edge of said channel forming wall being disposed in a plane

approximately in the plane of the casing joint, the peripheral tips of said fan blades extending out of and beyond the path of the upwardly rushing gas as it leaves the said upper edge of said channel forming wall and means for driving the said fan by friction from an external source of power.

4. As a new article of manufacture, a means for delivering fuel to an internal combustion engine, comprising a fan casing composed of two parts each being the frustum of a hollow cone, the larger bases of which are provided with flanges for being joined to each other, the smaller bases of which are provided with flanges for flange connecting the device within the intake manifold of an internal combustion engine, a cross web in each of said smaller base, an adjustable bearing carried by each of said webs, a fan shaft carried in said bearings with the axis thereof coinciding with the axis of said fan casing, a fan on said shaft, the blades of said fan extending angularly upwardly approximately from the plane of the frustum's larger base jointure, means for driving the fan by friction from an external source of power, and a sump adapted to collect any precipitate thrown from the fan blades.

5. In a device of the class described, a fan casing composed of two parts each being the frustum of a hollow cone, the larger bases of which are jointed together, a fan within the casing, the axis of the fan coinciding with the axis of the casing and having the blades thereof extending angularly upward from a plane approximately in the plane of the casing joint, an eccentrically disposed channel forming wall within said casing for forming a channel deep at one side and shallow at the other and adapted to collect any precipitate thrown from said fan blades, a drain cock in the deepest point of said channel, the peripheral tips of said fan blades extending out of and beyond the path of the upwardly rushing gas as it leaves the said upper edge of said channel forming wall and means for driving the said fan from an external source of power.

In testimony whereof I affix my signature.

RICHARD HALL.