Dec. 26, 1922. 1,439,940

R. W. A. BREWER.

INTAKE MANIFOLD FOR INTERNAL COMBUSTION ENGINES.

FILED MAR. 29, 1917.

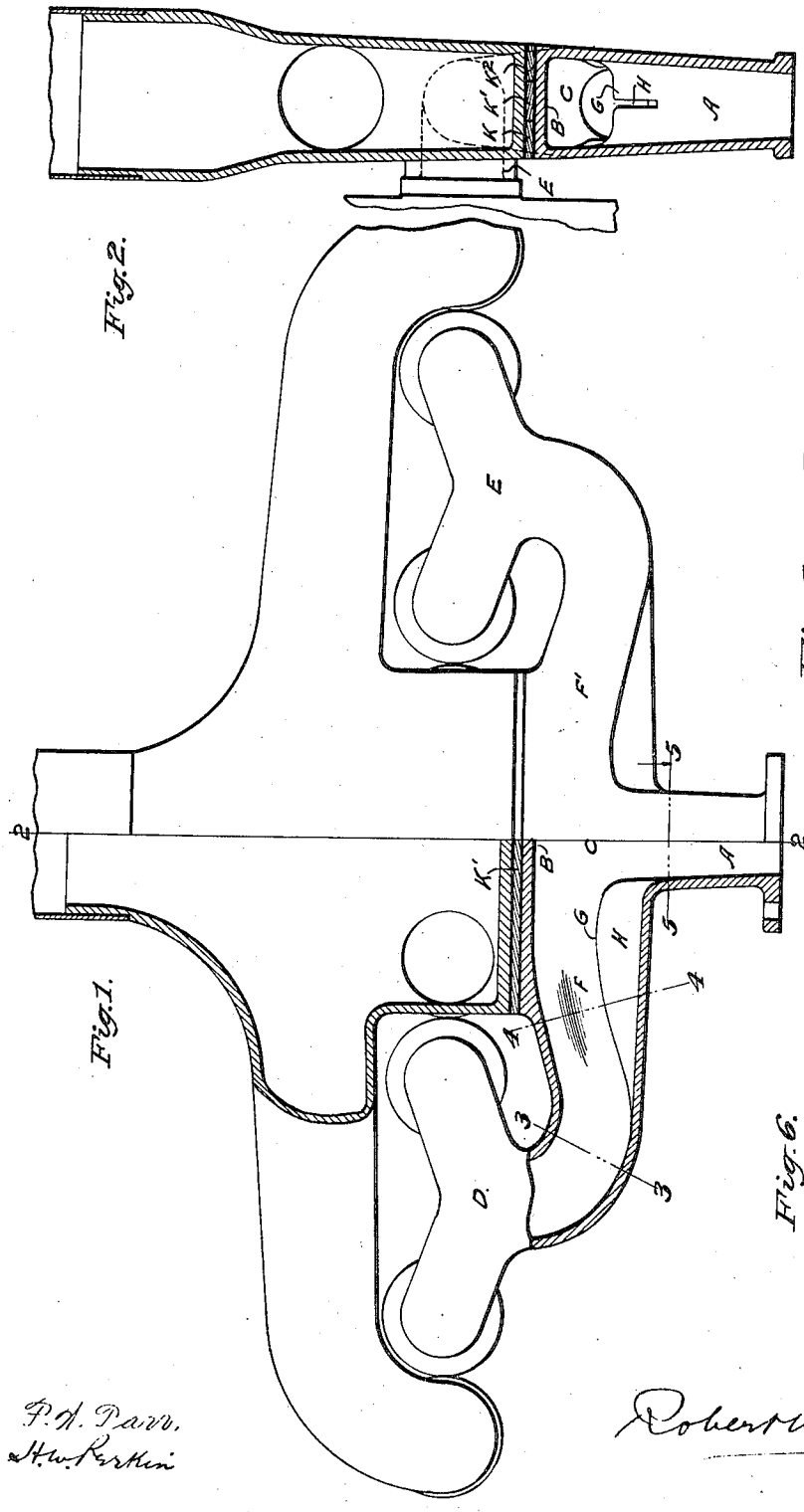


Fig. 2.

Fig. 1.

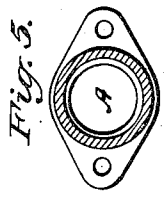


Fig. 5.

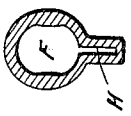


Fig. 4.

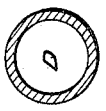


Fig. 3.

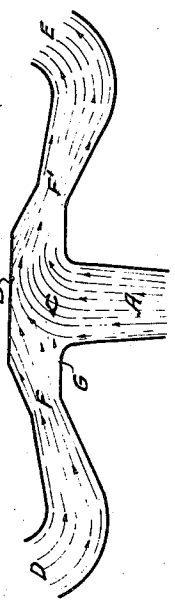


Fig. 6.

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UNITED STATES PATENT OFFICE.

ROBERT W. A. BREWER, OF STOCKTON, CALIFORNIA.

INTAKE MANIFOLD FOR INTERNAL-COMBUSTION ENGINES.

Application filed March 29, 1917. Serial No. 158,208.

To all whom it may concern:

Be it known that I, ROBERT WELLESLEY ANTONY BREWER, a British subject, residing in the city of Stockton, in the county of San Joaquin and State of California, have invented certain new and useful Improvements in Intake Manifolds for Internal-Combustion Engines, of which the following is a specification.

My invention relates to a device for assisting the carbureting of air by fuels which are not totally volatile at ordinary temperatures and pressures; for example, decane and the heavier hydrocarbon fuels, kerosene and alcohol.

Further, its object is attained without reducing the weight of charge taken per stroke of the engine, as the application of heat necessary to attain the object in view, is of a local character and can be controlled at will.

This invention is concerned principally with a scientific method of directing the gas flow through conoidal passages in such a manner that the expanding gases are directed against local hot surfaces, the temperature of which is maintained at or above that of the distillation temperature of the major portion of the heavier fractions in the fuel.

Further, sudden changes in direction of the gas flow, caused in the ordinary course of working of an engine, are utilized to direct the gas into the next valve pocket demanding a charge and simultaneously across a heated surface so that the tendency for precipitation of liquid particles is obviated, precipitated liquid is evaporated, and a dry and homogeneous, but not a hot charge of carbureted air is admitted to the engine.

The accompanying drawings illustrate the apparatus by which the objects named are attained, the same letters being used for similar parts in the different views.

Fig. 1 is a view partly in vertical section and partly in side elevation.

Fig. 2 is a transverse section on the line 2—2 of Fig. 1, showing the deflecting means and a contact strip.

Fig. 3 is a section on line 3—3 of Fig. 1.

Fig. 4 is a section on line 4—4 of Fig. 1.

Fig. 5 is a section on line 5—5 of Fig. 1.

Fig. 6 is a diagrammatic view showing stream line flow of gases in intake manifold.

Referring to Figs. 1 and 2, the partly carbureted air, together with particles of liquid fuel, enters the apparatus through the conoidal passage A and flows onward until the liquid particles strike against the heated surface B at the wall of the expansion chamber C, where a change of direction of flow takes place and the mixture is diverted to the branches D and E through the conoidal passages F and F^1 in sequence, which passages are opposite to one another so that the inertia of the gases passing the reverse way through one passage will drive them into the opposite passage in preference to the passage A; this action taking place during the period when flow in the opposite passage is being induced by suction therethrough. The centre lines of the conoidal passages are placed at an angle to each other such that each one is inclined to the horizontal at an angle of about twenty degrees in order that the gases are driven principally towards the heated surface B before passing into the entrant portion of the opposite cone.

Deflectors G form a part of the conoidal passages F and F^1 and are so situated that the heavier particles of fuel in suspension are directed against the locally heated surface B, where they are vaporized.

Slots H may be provided in the deflectors so that any residue of fuel collecting in the engine or pipe may drain out when the engine is stopped. In order to provide an adjustable means of locating the best position and magnitude of the heat conducting means between the source of heat such as the exhaust manifold and the vaporizing means being the intake manifold contact strips K^1, K^2 and K^3 may be provided, preferably of copper, and preferably adjustable as to the area in contact between the exhaust and intake manifolds, to provide a greater surface for transmission of heat for a less volatile fuel such as kerosene than would be required for a lighter distillate of petroleum. This means of adjustment is particularly useful in order to obtain the highest efficiency of combustion and vaporization from the fuel when the engine works under different climatic conditions; for example, a greater heat transference will be required in cold weather than in hot weather, also where an engine runs the greater part of its time under light load and consequently when the exhaust manifold does not attain a maximum degree of temperature, the area of the heat conducting means should be greater than when the same engine is working more nearly under conditions of maximum load-

ing. On any engine the features of which are well known and the fuel of uniform type, direct connection may be made between the intake and exhaust pipes or they may be made in one piece provided that the point of contact extends only to the deflecting means, either the wall B or the deflectors G, where a change in direction of the flow path occurs.

By localizing the areas of high temperature at the deflecting wall B, the main body of the ingoing charge is not materially raised in temperature, the heat flow is so regulated that precipitated liquid is evaporated and a dry mixture supplied to the engine at normal temperature. Further, the conoidal passages materially assist in disintegrating the liquid at a point adjacent to the high temperature spots because of the consequent decrease of pressure upon the liquid particles.

What I claim as my invention and desire to secure by Letters Patent is:—

1. An intake manifold comprising an inwardly-flared intake passage and a pair of oppositely-extending delivery passages, each connecting with the inlet passage at an acute angle on the inlet side, and means for heating a limited area of the wall materially above 100° C. at the junction of the delivery passages opposite the inlet passage, without correspondingly heating adjacent portions of the manifold.

2. An intake manifold comprising an inwardly-flared intake passage and a pair of oppositely-extending delivery passages, each connecting with the inlet passage at an acute angle on the inlet side, and means for heating a limited area of the wall at the junction of the delivery passages opposite the inlet passage, said means comprising a heated member, and intermediate conduction strips removably placed between the heated member and said wall.

3. An inlet manifold comprising a heating chamber into which leads a primary inlet passage increasing in cross sectional area as it approaches the heating chamber, the said heating chamber having a wall arranged to be impinged by liquid particles entering through the primary passage, which wall is locally heated over the area of such impingement, and a delivery passage leading at an angle from the primary passage and adjacent said wall, said delivery passage increasing in cross section from the heating chamber.

4. An inlet manifold comprising a locally heated wall, an inwardly-flared inlet passage directed toward said wall, and a pair of oppositely directed delivery passages lying alongside said wall and forwardly flared, said delivery passages lying end to end and each at an acute angle, on the inlet side, to the inlet passage.

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

ROBERT W. A. BREWER.

Witnesses:
F. W. TARR,
H. W. PERKINS.