Feb. 6, 1923. 1,443,944

A. P. BRUSH.

MANIFOLD FOR MULTICYLINDER INTERNAL COMBUSTION ENGINES.

FILED JUNE 11, 1920.

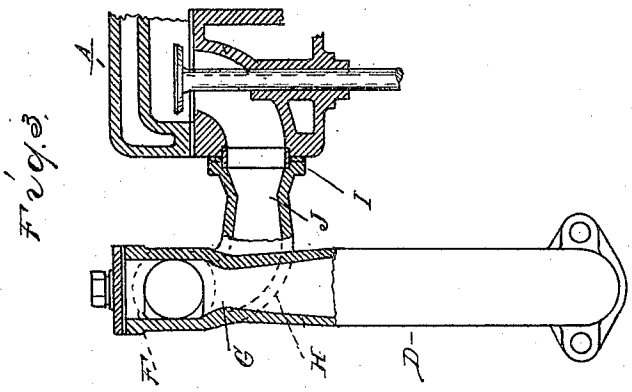


Fig. 3.

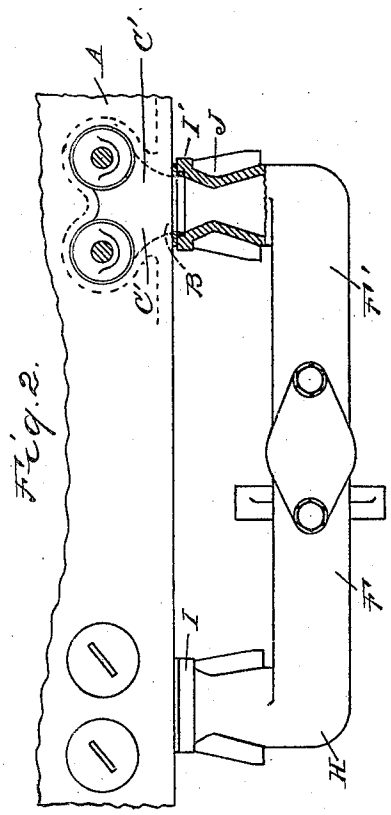


Fig. 2.

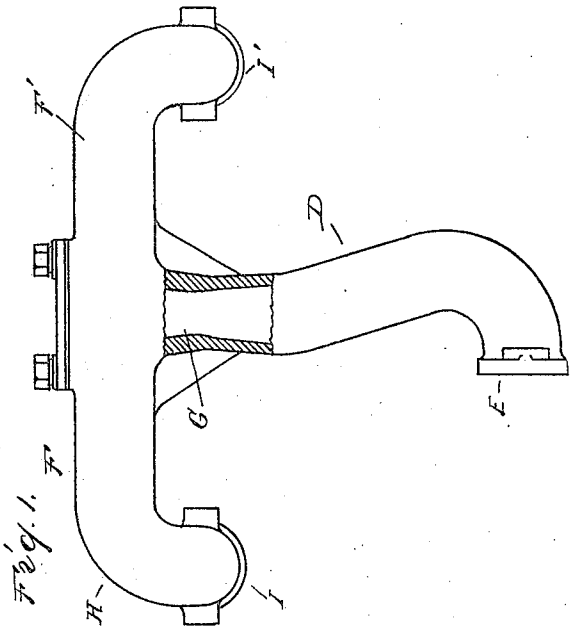


Fig. 1.

Inventor
Alanson P. Brush

By Whittemore Hulbert & Whittemore
Attorneys

Patented Feb. 6, 1923. 1,443,944

UNITED STATES PATENT OFFICE.

ALANSON P. BRUSH, OF DETROIT, MICHIGAN.

MANIFOLD FOR MULTICYLINDER INTERNAL-COMBUSTION ENGINES.

Application filed June 11, 1920. Serial No. 388,188.

To all whom it may concern:

Be it known that I, ALANSON P. BRUSH, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Manifolds for Multicylinder Internal-Combustion Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to a method for symmetrizing the explosive gases supplied to an internal combustion engine to insure uniformity of quantity and quality thereof, after leaving the carburetor or other vaporizing means, and to the means for carrying out this method, namely, manifolds for multi-cylinder internal combustion engines. One of its objects is the obtaining of a manifold construction in which the explosive mixture will be distributed uniformly, both as to quality and quantity, to the several cylinders. It is a further object to form the manifold so that it may be used as a replacement construction on engines having manifolds of different construction.

In the construction of multi-cylinder engines it is quite usual to supply the explosive gas to pairs of cylinders through a common port in the engine block and to supply the gas to these ports through a branched manifold. In operation, it frequently happens that the quality of explosive gas delivered to one cylinder is very different than that delivered to another, so that the engine is ununiform in its operation. To avoid this result I have designed a construction of manifold in which there is; first, mixing means in advance of the branch in said manifold for insuring a uniform quality of the gas passing into the branch conduits; second, a symmetrical arrangement of said branches with respect to the supply portion of the manifold; third, mixing means in advance of the port openings in the cylinder block for insuring uniform quality of mixture to the engine cylinders connected thereto; and fourth, a symmetrical arrangement of the portion of the manifold for supplying gas to said ports in the engine block. The result is that the mixture is uniform in both quantity and quality in its distribution to the several cylinders.

In the drawings I have shown a specific construction of manifold partly designed for use in connection with the engine on a Ford motor car, but also applicable to other constructions.

Figure 1 is a sectional front elevation;

Figure 2 is a sectional plan view; and

Figure 3 is a transverse section showing a portion in the central plane of the manifold and a portion in the plane of the port opening into the engine block.

A is the engine block having formed therein the port openings B, which are arranged symmetrically with respect to branch passages C and C′ leading to pairs of cylinders. D is my improved construction of manifold which, if desired, may be used to replace the construction first installed on the engine. This manifold has a portion E for connecting with the carburetor and which extends upward in the central transverse plane of the engine block and at its upper end connects with aligned horizontally extending branches F and F′. Just in advance of the point of juncture with these branches is a restriction in the portion E, preferably in the form of a venturi, as indicated at G, the effect of which is to both increase the velocity and to cause a thorough commingling of the constituent portions of the gases. The branches F and F′ are provided with bends H, which connect the same with portions I and I′ extending perpendicular to the engine block and having therein restrictions, also preferably in the venturi form, as indicated at J. These will cause a further commingling of the gases, so that uniform quality is produced for distribution between the branches C and C′.

With the construction described the explosive mixture, which is proportioned by the carburetor, passes through the manifold to the branches F and F′ thereof, but before entering the branches the stream is symmetrized by passing through the venturi restriction G. This will insure that the quality of mixture passing through said branches will be uniform. The stream passing through each branch will again be symmetrized before entering the engine block and will then be symmetrically sub-divided between the cylinders. The final result is that each of the cylinders will receive a charge equal to that of every other cylinder, so that the engine will operate smoothly and

the fouling of spark plugs to over-richness of the mixture will be avoided.

What I claim as my invention is:

1. The combination with a multi-cylinder internal combustion engine provided with more than two cylinders, of a manifold therefor having a main portion, a pair of symmetrically arranged branches leading therefrom, a venturi restriction in said main portion immediately adjacent to said branches for effecting a thorough commingling of the gases delivered to said branches, a plurality of cylinders having inlet ports connecting with and symmetrically arranged with respect to each of said branches, and venturi restrictions in said branches immediately in advance of the connections to said cylinders for effecting a thorough commingling of the gases by the subsequent re-expansion before and during entrance to the cylinders.

2. The combination with a multi-cylinder internal combustion engine provided with more than two cylinders, of a manifold therefor comprising a main portion for receiving the explosive mixture, a pair of branches arranged symmetrically in respect to said main portion, said branches terminating in portions extending perpendicular to the engine block, a venturi restriction in the main portion of said manifold adjacent to the branches connecting therewith, and venturi restrictions in the portions of said branches perpendicular to said engine block at an interval from the entrance to the block for the purpose as stated.

3. The combination with an engine block having a plurality of pairs of cylinders, each pair having a common inlet port in said block, of a manifold comprising a main portion, a pair of branches arranged symmetrically with respect to said main portion, each of said branches terminating in a portion extending perpendicular to said engine block and connecting with the common port for a pair of cylinders, and venturi restrictions in said manifold, one being located in said main portion close adjacent to said branches, and the others in said branch portions close adjacent to said ports.

4. The combination with a multi-cylinder internal combustion engine having more than two cylinders, of a manifold provided with symmetrically arranged branches, venturi restrictions immediately in advance of said branches for symmetrizing the stream to be divided therebetween, and venturi restrictions in each branch for again symmetrizing the stream immediately in advance of the sub-division of the same between the respective cylinders.

5. The combination with a multi-cylinder internal combustion engine, of a manifold therefor comprising a main portion for receiving the explosive mixture from the carburetor, branches symmetrically arranged with respect to said main portion, venturi restrictions immediately in advance of said branches for symmetrizing the stream of mixture passing through the main portion, means for further symmetrically sub-dividing each branch, and venturi restrictions immediately in advance of the last mentioned sub-dividisons for similarly symmetrizing the stream.

In testimony whereof I affix my signature.

ALANSON P. BRUSH.