Feb. 14, 1933. G. FARINA 1,897,191

EXPLOSION ENGINE

Filed July 19, 1930

Fig. 1

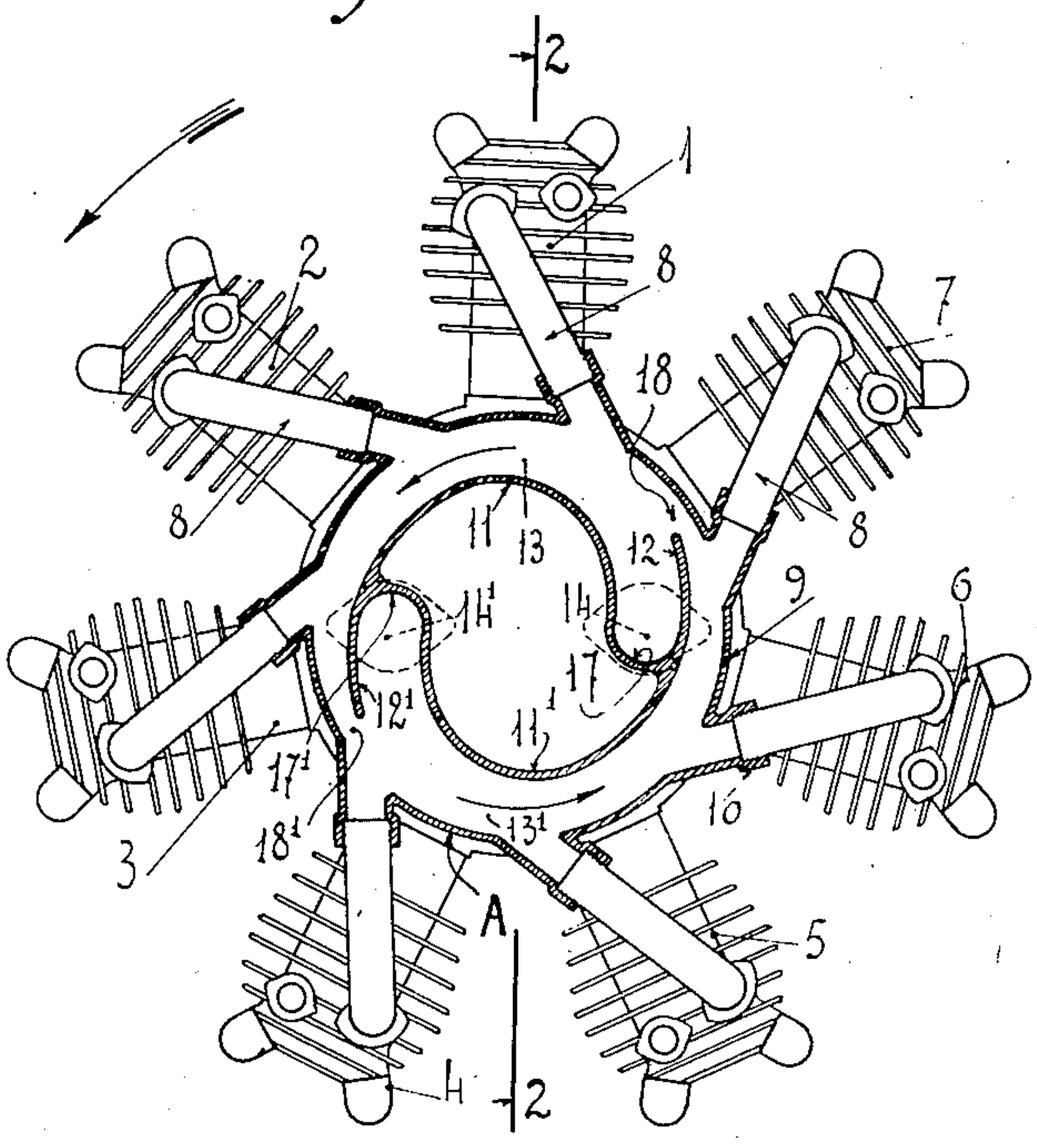


Fig. 2

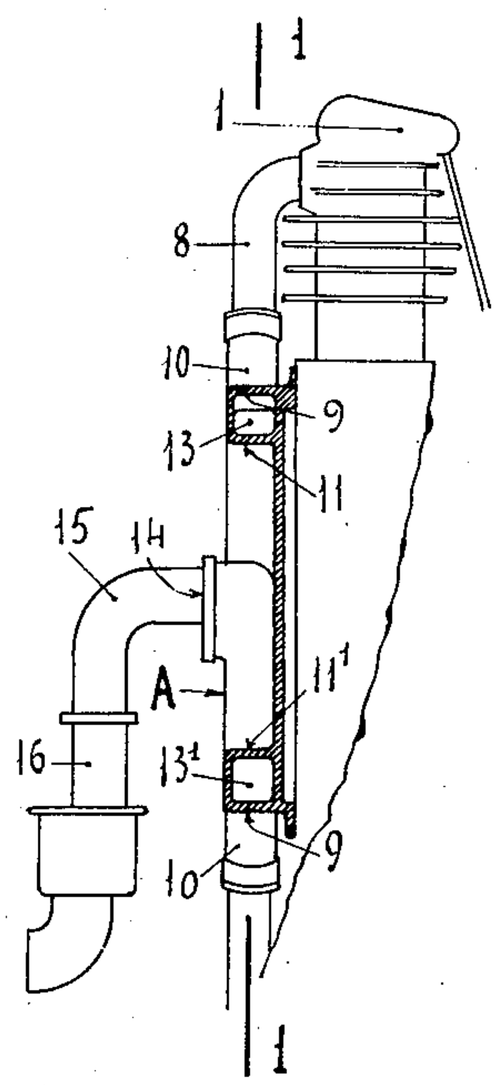
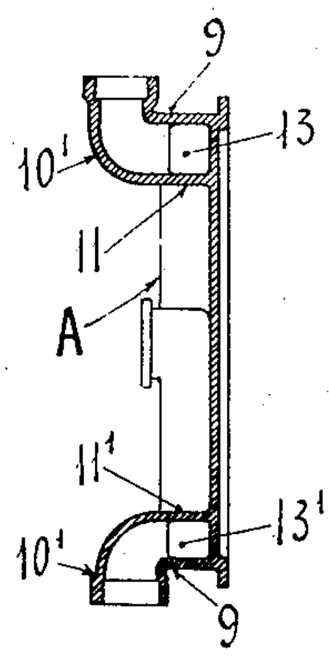


Fig. 3



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UNITED STATES PATENT OFFICE

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EXPLOSION ENGINE

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The present invention relates to internal combustion engines with star or radially arranged cylinders and comprises means for distributing to engine cylinders an explosive mixture supplied by the engine carbureters in the best condition as to uniformity and homogeneity.

It is known that difficulties are found in supplying the several cylinders of a star-cylinder engine with a homogeneous and uniform mixture, and more or less complicated devices and particularly centrifugal fans have been suggested for the purpose of stirring the mixture supplied by the carbureters.

The present invention has for its object means securing such result in a simple manner and without the use of moving parts.

For the above purpose this invention comprises a manifold consisting of an annular duct divided in sections communicating with each other, and each of said sections is provided at its end where mixture is introduced with a pocket open in front of, or opposite and tangentially to, the direction in which the mixture stream is caused to flow.

On the annexed drawing is shown by way of example an embodiment of this invention, and

Figure 1 is a front view of an engine with seven star-arranged cylinders having the inlet manifold of this invention in section on line 1—1 of Figure 2;

Figure 2 is a fragmentary side view with said manifold in section on line 2—2 of Figure 1;

Figure 3 is a transverse section of a modified construction.

In Figures 1 and 2, the engine comprises cylinders 1, 2, 3, 4, 5, 6, 7 in which operative stroke is produced in the succession 1, 3, 5, 7, 2, 4, 6; each of said cylinders has a suction duct 8, and said suction ducts 8 lead to an inlet manifold A communicating with the carbureters 16.

In the illustrated embodiment said manifold A comprises an annular duct having a substantially square cross section and confined outwardly by an outer cylindrical wall 9 having connections 10 for the cylinder suction ducts 8; the internal wall of said duct consists of two joined and similar sections 11, 11′ each having the contour of a portion of a spiral line and a baffle 12, 12′ extending into said duct and ending a small distance from the outer cylindrical duct wall 9 intermediate the ports leading to two adjacent cylinders.

Two sections 13, 13′ are thus provided in said manifold A and each of said sections has a cross section which is progressively decreasing from one to the other end, a pocket as 17, 17′ being provided at one end of each section 13, 13′ by the above described baffles 12, 12′ extending thereinto, and in each of said pockets opens a mouth 14, 14′ connected with a duct 15 leading to a carbureter 16.

In operation, the mixture supplied by the carbureters 16 is caused to flow in a stream which is not affected by suction acting thereon, in register with cylinder suction ducts 8–10, and further, the stream in each section 13, 13′ is assisted by the stream coming from the other manifold section, said sections communicating with each other at their ends through restricted passages 18, 18′ provided by baffles 12, 12′.

As shown in Figure 1, the shape and arrangement of the described inlet manifold assist in directing to the cylinders the mixture flowing into said manifold through mouths 14, 14′, and further, they cause the mixture to circulate in a constant direction throughout said manifold, which direction is the same as that of succession of ignitions in engine cylinders.

Assuming the suction is taking place in cylinder 1, this cylinder receives directly the mixture supplied by mouth 14 and cooperating duct 15 and carbureter 16, the incoming mixture stream being directed thereto by baffle 12; thereafter in the engine cycle the suction takes place in cylinder 3 and this cylinder is still supplied by mouth 14. On the contrary, the next suction in cylinder 5 is supplied by mouth 14′ and the cooperating carbureter, and at this time the baffle 12 prevents the mixture supplied through mouth 14 from being drawn into said cylinder 5, said baffle further assisting the supply to cylinder 7 adjacent thereto.

The same description applies to the suction in other cylinders. As above described, the mixture which enters the manifold through mouths 14, 14′ flows permanently in a given direction through sections 3, 3′, as shown by arrows, and no reversal may take place in the flowing mixture which is evenly and uniformly distributed to the several engine cylinders and provides a continuously circulating stream, this fact assisting the filling-in of cylinders.

Of course, the present invention is capable of many embidments other than that illustrated by way of example, but falling within the spirit of the appended claims; thus, mouths 10 for the connection of the engine cylinder suction ducts instead of being radial, as in Figures 1 and 2, may be arranged frontally of the manifold and elbow shaped as in the construction of Fig. 3, where said elbow connections are shown by reference 10′.

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

1. A manifold for internal combustion engines with star-arranged cylinders, comprising walls providing an annular space, the outer one of said walls having a cylindrical profile, outlets departing from said outer wall and each leading to one of the engine cylinders, the inner wall of said space being shaped to a plurality of volute arches following each other which separate the annular space in compartments communicating through restricted passages, pockets formed in said inner wall intermediate the beginning and the end of two subsequent volute arches, said pockets opening tangentially in said annular space, means for supplying fuel mixture, and a connection from each of said pockets to said means for supplying fuel mixture.

2. A manifold for internal combustion engines with star-arranged cylinders, comprising outer and inner walls providing an annular space, outlets departing from said outer wall and each leading to one of the engine cylinders, intermediate walls separating said annular space in compartments communicating through restricted passages, means for supplying fuel mixture and a connection from said means to each of said compartments, said connection terminating in said compartment at a point adjacent to the restricted passage and separated from said passage by said intermediate wall.

3. A manifold for internal combustion engines with star-arranged cylinders, comprising an outer wall having a circular profile and an inner wall providing with said outer wall an annular space, outlets departing from said outer wall and each leading to one of the engine cylinders, intermediate walls separating said annular space in compartments communicating through restricted passages, means for supplying fuel mixture and a connection from said means to each of said compartments, said connection terminating between said inner wall and one of said intermediate walls.

4. A manifold for internal combustion engines with star-arranged cylinders, comprising walls providing an annular space, the outer one of said walls having a circular profile, outlets departing from said outer wall and each leading to one of the engine cylinders, the inner wall of said space being shaped to a plurality of volute arches following each other which separate the annular space in compartments communicating through restricted passages, inlets in said inner wall intermediate the beginning and the end of two subsequent volute arches, said inlets opening tangentially in said annular space, means for supplying fuel mixture and a connection from each of said inlets to said means for supplying fuel mixture.

5. A manifold for internal combustion engines with star-arranged cylinders, comprising walls providing an annular space, the outer one of said walls having a regular profile, outlets departing from said outer wall and each leading to one of the engine cylinders, the inner wall of said space being divided into sections which separate the annular space in compartments communicating through restricted passages, inlets in said inner wall intermediate the beginning and the end of two subsequent sections, said inlets opening tangentially in said annular space, means for supplying fuel mixture and a connection from each of said inlets to said means for supplying fuel mixture.

In testimony whereof, I affix my signature.

GIOVANNI FARINA.