June 3, 1930. D. E. ANDERSON 1,761,958

DUAL INTAKE MANIFOLD

Filed Oct. 8, 1927

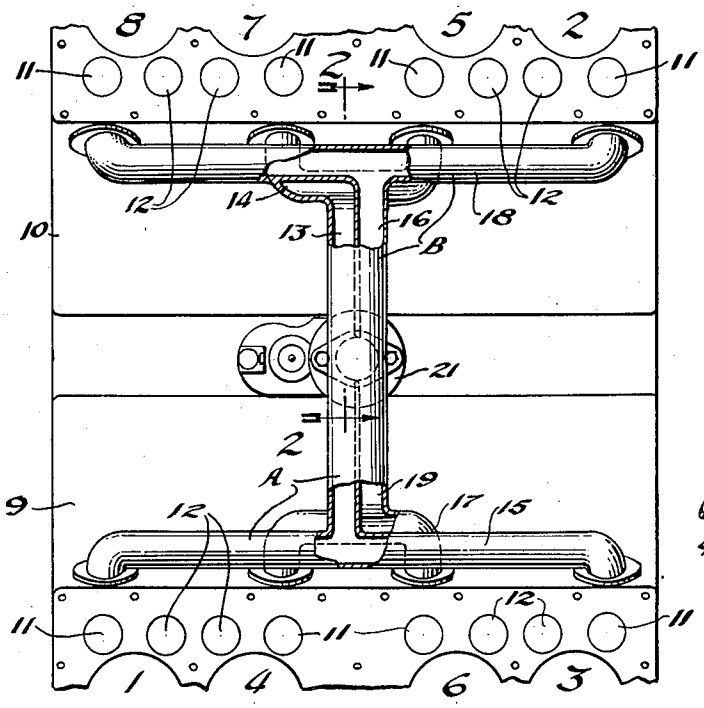


Fig. 1

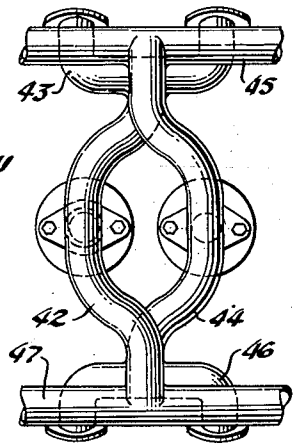


Fig. 4

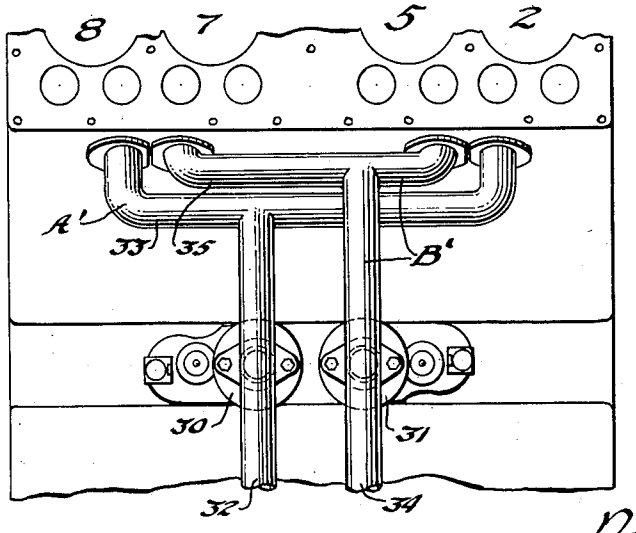


Fig. 3

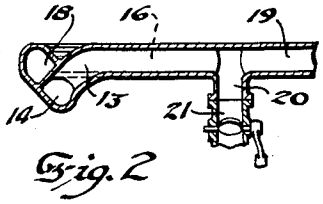


Fig. 2

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UNITED STATES PATENT OFFICE

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DUAL INTAKE MANIFOLD

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The invention relates to manifolds for internal combustion engines and more particularly to intake manifolds designed to supply explosive mixture to the intake ports of multicylinder engines. In certain types of these engines the firing order is such that the charges in two adjoining cylinders are fired successively. If a single branch of the intake conduit supplies mixture to these successively firing cylinders, as is usually the case, there is a tendency to unequal distribution of the charge or of its constituents to the cylinders which draw their charges from the same branch. The principal object of the invention is to provide means whereby this difficulty is obviated and charges which are uniform in quantity and quality may be supplied to adjacent intake ports.

One type of engine in which the difficulty above referred to inheres is the 90° V-type of eight cylinder engine in which the so-called "90°" crankshaft is employed. The arrangement of the cranks in such manner that crankpins 1 and 4 are on opposite sides of the axis, and crankpins 2 and 3 also opposite but at 90° from pins 1 and 4 results in a firing order in which, at least once in every complete engine cycle, two adjacent cylinders in one block fire successively. Such an arrangement of cranks and one of the possible firing orders therefor are disclosed in Balancing of Engines, Sharp, 1907, p. 117–118. Various other firing orders are possible, of course, one of which is referred to herein.

In the accompanying drawings illustrating the application of the invention to an engine of the above-mentioned eight-cylinder type, Fig. 1 is a plan view, partly in section, representing the intake system.

Fig. 2 is a partial vertical section on line 2—2 of Fig. 1.

Fig. 3 is a view similar to Fig. 1 but showing a modified arrangement of intake passages, and

Fig. 4 is a similar fragmentary view of another modification.

Referring to the drawings, 9 and 10 indicate the blocks of an eight-cylinder V-engine, each block containing four cylinders. The cylinder openings are indicated by numerals 1 to 8, respectively, the arrangement of the numerals serving also to indicate the firing order, i. e., the cylinder indicated by 1 fires first, then the one indicated by 2, and so on. With the arrangement illustrated it will be noted that cylinders 7 and 8 are adjacent.

Intake valve chambers are indicated at 11 and exhaust valve chambers at 12. Communication between these chambers and the combustion chambers ordinarily formed in the heads of the cylinder blocks is controlled by valves in the usual manner. Separate intake ports are provided for each cylinder so that the sucessively firing adjacent cylinders are not required to draw their charges from a common valve chamber.

In order also to provide separate conduits from the vicinity of the carbureter to the valve ports the intake manifold is formed in a double system of passages indicated respectively by A and B. The system A comprises a transverse passage 13 communicating at its ends respectively with longitudinal branches 14 and 15. The branch 14 is connected to the intake ports of cylinders 5 and 7 and branch 15 to the ports of cylinders 1 and 3. The system B comprises similarly a transverse passage 16 communicating at its ends respectively with branches 17 and 18, branch 17 being connected to the ports of cylinders 4 and 6 while branch 18 is connected to the ports of cylinders 2 and 8. The transverse passages 13 and 16 may be formed integrally with a common wall 19 and are both connected at a point intermediate their ends with a riser portion 20 to which the carbureter 21 is attached.

The transverse conduit 13 is curved downwardly at the end where it approaches branch 18, so that branch 14 may lie below branch 18, as shown in Fig. 2, and conduit 16 is similarly arranged at the end adjacent branch 15 to permit branch 17 to lie below branch 15.

By the arrangement above described it will be seen that cylinders 1, 3, 5 and 7 draw their charges from system A while cylinders 2, 4, 6 and 8 are supplied by system B. Thus no two successively firing cylinders draw from the same valve chamber nor from the same manifold branch nor even from the same

system. In other words, each cylinder draws its charge from the riser immediately above the carbureter without being affected, during the flow from that point to the intake port, by reason of the suction from or flow to any other cylinder, or the ramming effect due to flow to a previously opened port. This arrangement is therefore highly conducive to uniform distribution.

In the form shown in Fig. 3 the two manifold systems, indicated as A′, and B′, are wholly separate and are connected respectively to separate carbureters 30, 31. The transverse conduit 32 of the system A′, is connected to a branch 33 supplying cylinders 2 and 8 while transverse conduit 34 of system B′, is connected to a branch 35 supplying cylinders 5 and 7. The connections at the other engine block will be reversed, of course, as in Fig. 1, the conduit 32 supplying the intermediate cylinders and conduit 34 of the end cylinders.

Fig. 4 shows an arrangement similar to that shown in Fig. 3 except that the conduits 42, 44, correspond to conduits 32, 34 of Fig. 3 are here shown as returning to a common transverse plane so as to equalize the distances from the carbureter to the respective ports. In this form again, the conduit 44 is connected at one end to a branch 45 feeding the end cylinders and at the other to a branch 46 feeding the intermediate cylinders while conduit 42 is connected at one end to branch 43 feeding the cylinders intermediate those supplied by branch 45 and at the other to branch 47 feeding the end cylinders of the other block.

Various other modifications in details may be made and therefore I do not wish to be restricted to the specific forms herein described except as required by the language of the claims in view of the prior art.

I claim:

1. The combination with an eight-cylinder V-type engine in which two adjacent cylinders in one block fire in immediate succession and carbureting means therefor of an intake manifolding system including a passage leading from the carbureting means to the end cylinders of a block and another passage leading from the carbureting means to the intermediate cylinders of the block.

2. The combination with an eight-cylinder V-engine of the type in which two cylinders at one end of one block fire in immediate succession and carbureting means therefor of manifolding means including one manifold branch supplying the end cylinders of the block and another branch supplying the intermediate cylinders.

3. Structure as set forth in claim 2, the manifolding means including two systems of passages, each system supplying the end cylinders of one block and the intermediate cylinders of the other block.

4. The combination with an eight cylinder V-engine having four cylinders in each block and carbureting means therefor, of manifolding means comprising two systems of passages, each system arranged to supply fuel mixture to the end cylinders of one block and the intermediate cylinders of the other block.

5. The combination with an internal combustion eight cylinder V engine having the cylinders whose firing orders are 1, 3, 4 and 6 in one block and those whose firing orders are 2, 5, 7 and 8 in the other block of manifolding means comprising two systems of passages, one system arranged to supply fuel mixture to the cylinders whose firing order is 1, 3, 5 and 7 and the other system supplying the cylinder whose firing order is 2, 4, 6 and 8.

6. The combination with an internal combustion eight cylinder V engine having four cylinders in each block and having a firing order such that two adjacent end cylinders in one block fire in immediate succession of manifolding means comprising two systems of passages each supplying mixture to four of said cylinders, one of said adjacent cylinders receiving fuel mixture from one of said systems and the other cylinder receiving mixture from the other system.

In testimony whereof I affix my signature.

DAVID E. ANDERSON.