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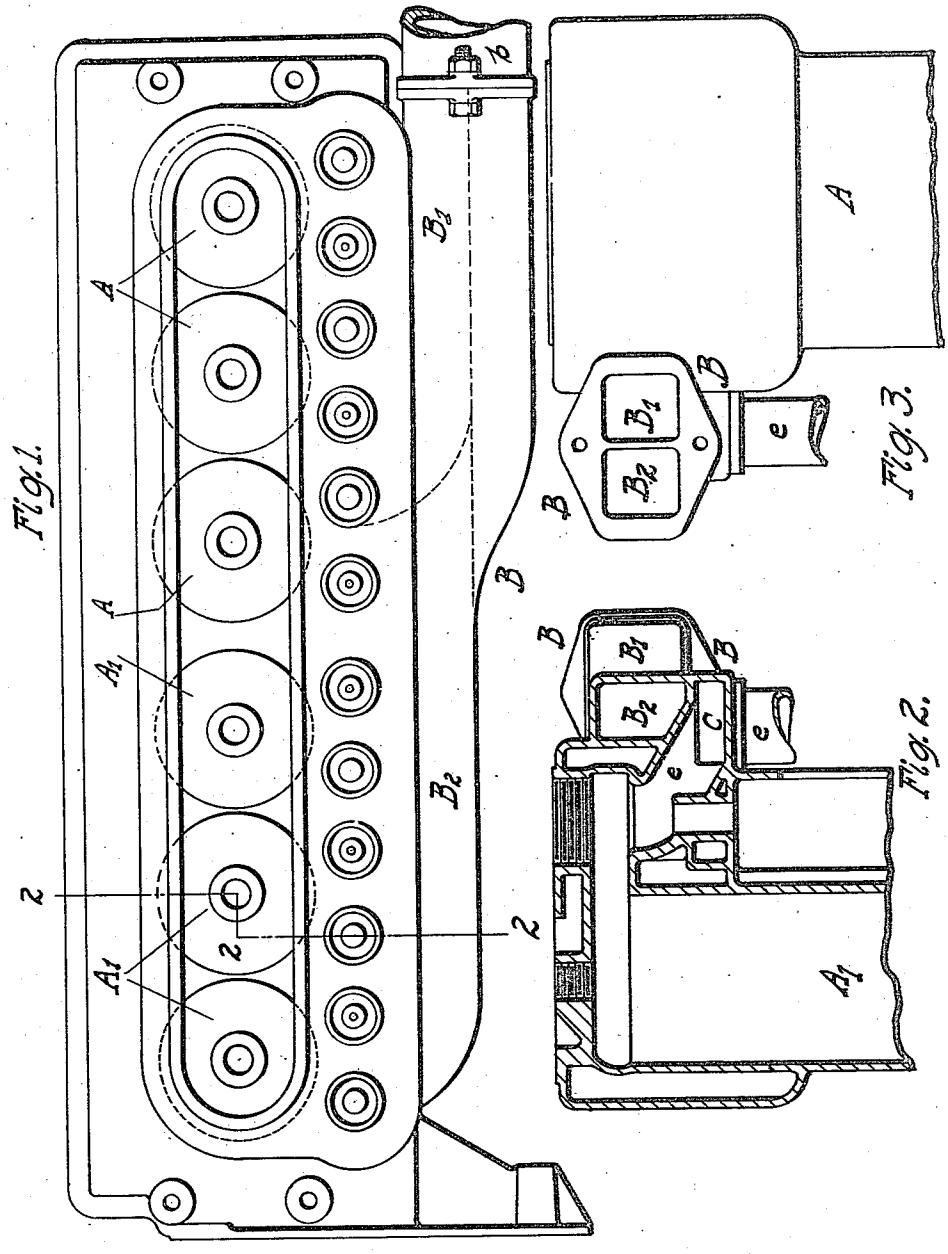
INTERNAL COMBUSTION ENGINE.

APPLICATION FILED MAY 11, 1912.

1,205,095.

Patented Nov. 14, 1916.

3 SHEETS—SHEET 1.



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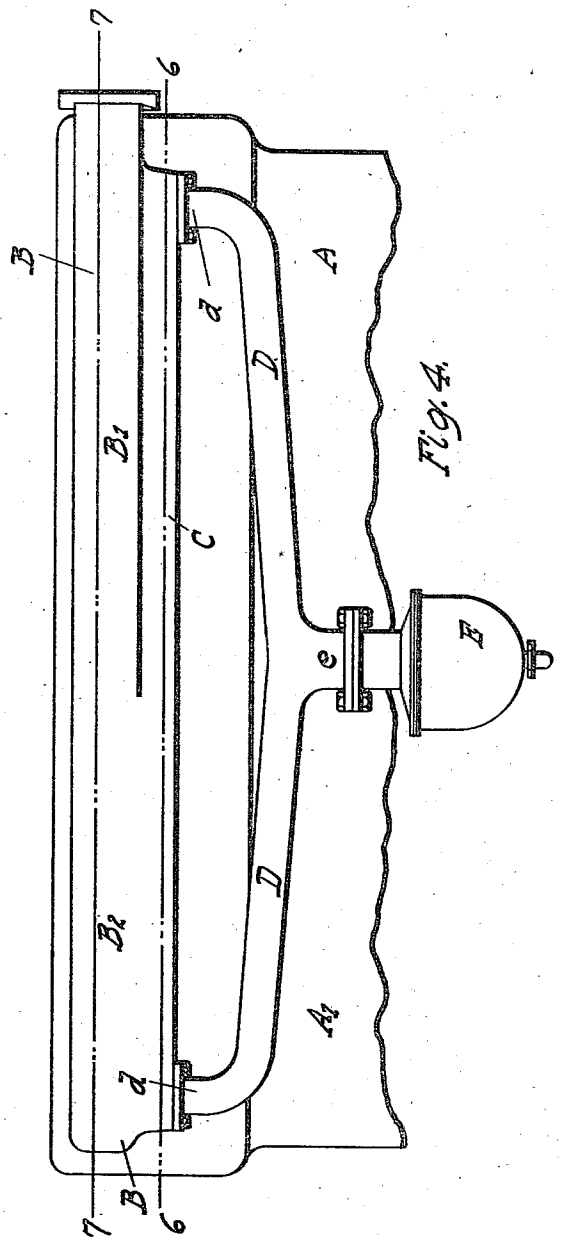


Fig. 4.

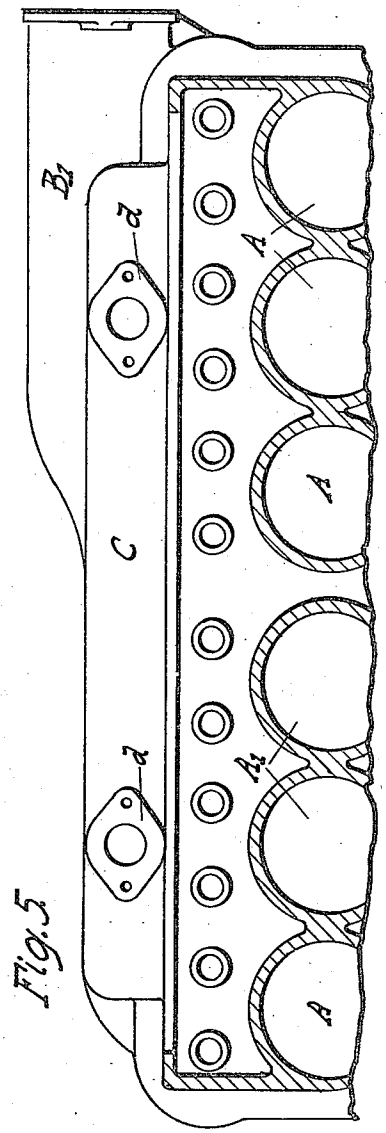


Fig. 5

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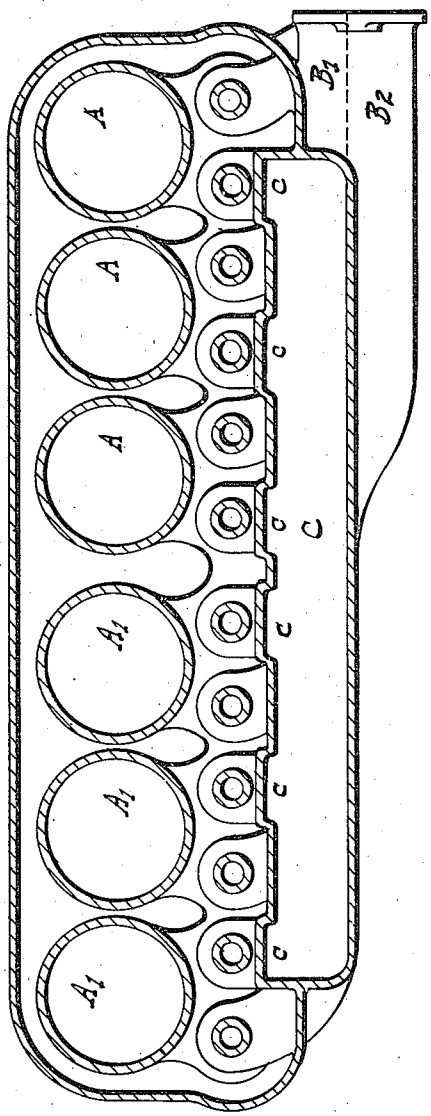


Fig. 6.

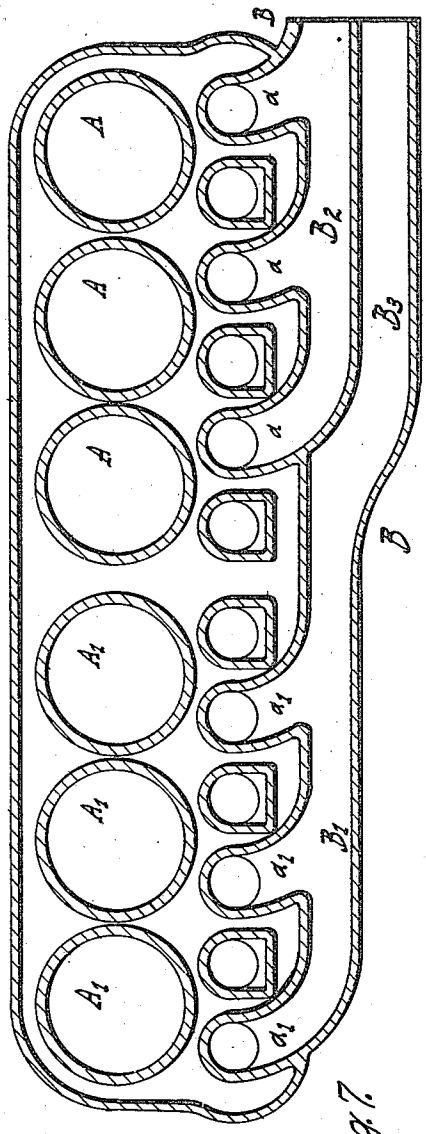


Fig. 7.

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INTERNAL-COMBUSTION ENGINE.

1,205,095. Specification of Letters Patent. Patented Nov. 14, 1916.

Application filed May 11, 1912. Serial No. 696,567.

To all whom it may concern:

Be it known that I, WILLIAM KELLY, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Internal-Combustion Engines, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to internal combustion engines and has for its object to provide an improved internal combustion engine and one in which the passages of the gases through the same is accurately controlled. I attain this object in the device illustrated in the accompanying drawings, in which,

Figure 1, is a plan view of a six-cylinder engine embodying my invention. Fig. 2, is a section on the line 2—2 Fig. 1. Fig. 3, is an end elevation looking at the right of Fig. 1, the pipe *b* for conducting away the exhaust gases being removed. Fig. 4, is a side elevation of the same. Fig. 5, is an inverted plan view of the part shown in Fig. 4, the carbureter and pipe for conducting the intake gases being removed. Fig. 6, is an inverted sectional view, the section being taken on the line 6—6 Fig. 4. Fig. 7, is an inverted sectional view with the section being taken on the line 7—7 Fig. 4.

In a multiple cylinder internal combustion engine it has been found that the different cylinders would act differently and therefore an even impulse was frequently not obtained. In six-cylinder engines, or those in which one cylinder would exhaust before the exhaust gases were completely discharged from another, it was found that the last to exhaust would force the gases back into the one that had not completed its exhaust stroke, and in the intake it was found that different cylinders produced a different draft on the intake pipe, and therefore were supplied with explosive mixture in different quantities.

An object of my invention is to remedy these defects by utilizing the inertia of the gases themselves in the passages.

A and A^1 designate the cylinders of a six-cylinder motor.

B, is the exhaust conduit consisting of two passages B^1 and B^2. The three cylinders A have their exhaust ports *a a a* opening into the passage B^2 and the three cylinders A^1 have their exhaust passages a^1 a^1 a^1 opening into the passage B^1. The passages B^2 and B^1 are separated from each other by an intervening wall B^3 and extend parallel to each other along the length of the engine and are cast integral with each other and with the cylinders. At one end of the cylinder casting both of the passages B^1 and B^1 open into a single conduit pipe *b* (Fig. 1). The action of the engine is such that the cylinders exhaust alternately in the passages B^1 and B^2. In this way there is a considerable distance interposed between the exhaust ports which are opened at the same time and the inertia of the gases is sufficient to prevent the backing up or the interference of one exhaust with the other.

C, is an intake manifold, or chamber, from which the intake passages *c c c c c c* lead to the respective cylinders. The chamber, or manifold, C is below the exhaust passage or manifold B and is cast integral therewith, there being a common intervening wall. At each end of the manifold C there is an opening *d* for the pipe D leading from the carbureter E.

e, is a pipe leading from the carbureter E and extending in two equal branches D D and communicating with a manifold C by ports or openings *d d* at each end of said manifold. By this construction the chamber or manifold C contains sufficient gases and has sufficient included space so that the draft of each cylinder is cushioned and equalized and the chamber C is supplied at each end from the pipe D leading from the carbureter and pipe *e*, thus each of the cylinders takes in the same quantity of explosive mixture. The branching pipe D D and pipe *e* leading to the carbureter form a second chamber of considerable included space so that the draft of the engine upon the carbureter is cushioned and equalized by the chamber C in the first place and in the second place by the chamber formed by the pipes D D and *e*.

What I claim is:—

1. In a multiple cylinder internal combustion engine in which the exhaust takes place in one cylinder while the exhaust port to another cylinder is still open, an ex-

haust manifold to all of said cylinders comprising a passage communicating with the exhaust ports of a part of said cylinders, and a passage communicating with the exhaust ports of the rest of said cylinders, said cylinders being arranged to exhaust into said passages so that of the cylinders whose exhaust ports are open at the same time one shall exhaust into a different one of said passages from that into which the other exhausts, said passages being arranged with their discharge ends opening in the same direction adjacent to each other and in the same inclosure, the construction and arrangement being such that the gas issuing from one of said passages shall be carried by its *vis viva* away from the opening to the other of said passages.

2. In a multiple cylinder internal combustion engine in which the exhaust takes place in one cylinder while the exhaust port to another cylinder is still open, an exhaust manifold to all of said cylinders comprising a passage communicating with the exhaust ports of a part of said cylinders, and a passage communicating with the exhaust ports of the rest of said cylinders, said cylinders being arranged to exhaust into said passages so that of the cylinders whose exhaust ports are open at the same time one shall exhaust into a different one of said passages from that into which the other exhausts, said passages being arranged with their discharge ends opening in the same direction adjacent to each other and in the same inclosure, the construction and arrangement being such that the gas issuing from one of said passages shall be carried by its *vis viva* away from the opening to the other of said passages, and shall produce a lowering of pressure at the said opening to the other passage.

In testimony whereof, I sign this specification in the presence of two witnesses.

WILLIAM KELLY.

Witnesses:

STUART C. BARNES

VIRGINIA C. SPRATT.