Oct. 23, 1923. 1,471,408

A. MERTZ

INTERNAL COMBUSTION ENGINE

Filed June 11, 1920

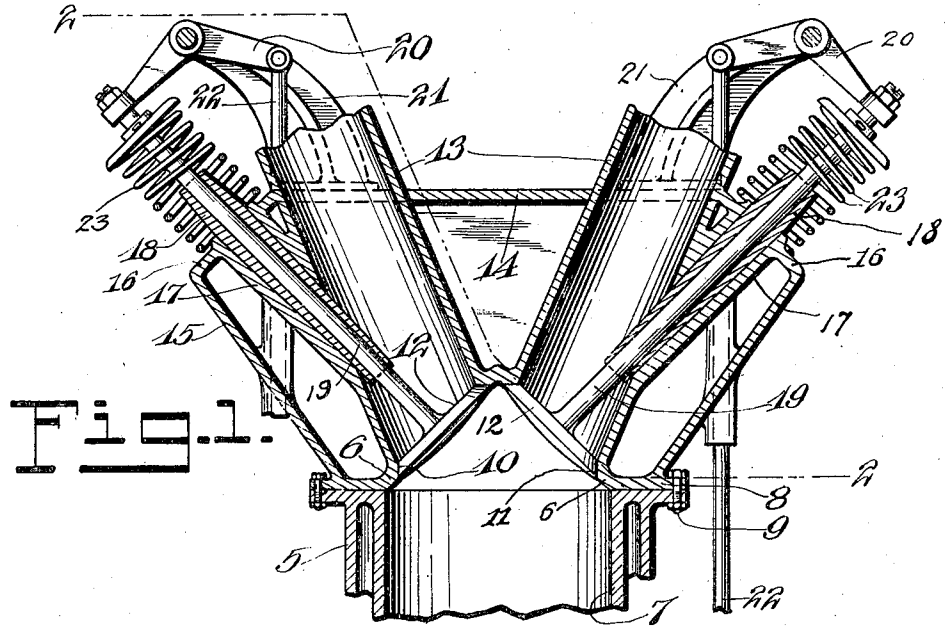


Fig. 1.

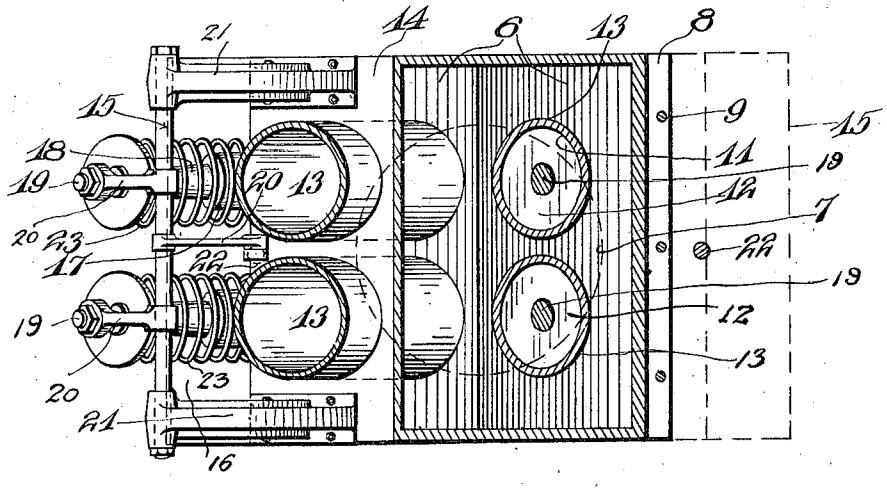


Fig 2.

Albert Mertz. INVENTOR.

BY

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ATTORNEYS.

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UNITED STATES PATENT OFFICE.

ALBERT MERTZ, OF DAYTON, OHIO.

INTERNAL-COMBUSTION ENGINE.

Application filed June 11, 1920. Serial No. 388,330.

To all whom it may concern:

Be it known that I, ALBERT MERTZ, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

This invention relates more particularly to the valve mechanism of internal combustion engines, and its object is to provide a cylinder head of novel and improved design permitting the use of valves of very large area, and also to provide valve passages which are arranged to offer a minimum resistance to the passage of the fuel charges and the exhaust gases therethrough.

The object stated is attained by means of a combination and arrangement of parts to be hereinafter described and claimed, and in order that the same may be better understood, reference is had to the accompanying drawing forming a part of this specification.

In the drawing,

Fig. 1 is a vertical section of so much of the cylinder head as is necessary to illustrate the invention, and Fig. 2 is a section on the line 2—2 of Fig. 1.

Referring specifically to the drawing, 5 denotes a fragment of a cylinder block to which is applied the cylinder head which is the subject matter of the present application for patent. The intake and exhaust valves are carried by the cylinder head, there being two of each of said valves, the intake valves being on one side and the exhaust valves on the opposite side. The block 5 may be provided with any number of cylinders, and the head is designed accordingly, there being provided two intake and two exhaust valves for each cylinder.

The cylinder head is composed of two opposite inclined walls 6 positioned above the bore 7 of the cylinder block 5, and having base flanges 8 for attachment to the latter by any suitable means, such as bolts 9. The cylinder head wall is therefore of inverted V-shape, the angles of the inclines being 45 degrees to the longitudinal axis of the cylinder. In one of the inclined walls are the intake ports 10 and in the opposite wall are the exhaust ports 11. The valves for these ports are shown at 12, the faces thereof following the lines of the inclined walls. From each port extends a conduit 13 for the fuel charges or the exhaust gases. These conduits may be cast integral with the cylinder head, or made separate of steel tubing welded in place. It will be noted that the conduits are also set at an oblique angle to the longitudinal axis to the cylinder, but at a more acute angle than the walls 6, the angle being 23 degrees.

The cylinder head is provided with a water jacket consisting of a top wall 14 and side walls 15 extending downward herefrom to the bottom of the cylinder head. Where the side walls 15 join the top wall 14, the former are parallel to the walls 6, as shown at 16, and from said walls 16 extend tubular holders 17 for guides 18 of the valve stems 19. The guides 18 are tapered and pressed into the holders 17, which latter may be integral with the walls 16. The jacketed construction of the cylinder head provides a very simple and efficient expedient for cooling the valves and their seats.

To the outer ends of the valve stems 19 are connected actuating rocker arms 20 supported by brackets 21 mounted on the wall 14 and operated by push rods 22 which are actuated by the cam-shaft as usual. However, it is to be understood that the valve actuating mechanism is immaterial to the present invention, and nothing is claimed with respect thereto. The valve stems are also provided with the usual closing springs 23.

By arranging the valves at an angle it is possible to employ very large valves to obtain a maximum efficiency and power. The valve passages 13 extend in straight lines from the combustion chamber of the engine, and hence they offer the least resistance to the passage of the fuel charges and the exhaust gases therethrough. This will allow the cylinders to take in a complete fuel charge under high speeds, raising the power peak and producing more power at high speeds, and the spent gases are also completely exhausted at each exhaust stroke as they follow as closely as possible their natural path upon expanding and being forced out by the piston on the exhaust stroke. There are no short bends or restrictions in the exhaust passage to set up a back pressure, or to pocket the gases and thus cause overheating of the wall of the exhaust conduit and the valves and their seats.

An important feature of the invention resides in the construction of the intake con-

duit 13 which is extended angularly upward in a straight line without any bends. This construction has a very distinct advantage in that the gaseous mixture therein will readily drain to the valve. It is well known that a mixture of vaporized gas and air is heavier than air. This being true, by making the intake conduit straight, very little effort is needed to draw the mixture downwardly, whereas considerably more effort would be necessary to draw the mixture upwardly. In the type of intake conduit wherein mixture is drawn upwardly to the intake valve there is considerable likelihood of the gas lying on the side of the conduit and condensing after the valve is closed, which action causes the succeeding cylinder to over load with an improperly vaporized charge. However with my construction, whatever quantity of gaseous mixture remains in the conduit after the valve is closed will drain down to the valve. The heat of the valve will thus tend to keep such residue of the mixture in a vaporized condition so that when the next cylinder begins its intake it will draw this vaporized gas in, in place of the liquid which would otherwise remain in a conduit as heretofore stated.

I claim:

1. In an internal combustion engine, a cylinder, a detachable head closing the outer end of the cylinder and having its portion which covers the bore of the cylinder composed of two opposite walls which are inclined in opposite directions with respect to the longitudinal axis of the cylinder, said inclined walls having valve seats, valves for said seats, and intake and exhaust conduits extending to the ports and positioned at oblique angles to the cylinder axis, and said intake conduit extending and leading from a point above said detachable cylinder head.

2. In an internal combustion engine, a cylinder, a head closing the outer end of the cylinder, and having its portion which covers the cylinder bore composed of two opposite walls which are inclined in opposite directions with respect to the longitudinal axis of the cylinder, said walls having ports which face the cylinder bore and open thereinto at oblique angles to said bore, said ports having valve seats, valves for said seats, intake and exhaust conduits extending to the ports and positioned at oblique angles to the cylinder axis, the angles of the conduit with respect to the cylinder axis being different from the angles of the ports with respect to the cylinder axis, being also more acute with respect to the cylinder axis than the ports, and said intake manifold extending and leading from a point above said head with direct communication with one of said ports to facilitate the gravitation of the mixture of vaporized fuel and air thereto.

In testimony whereof I affix my signature.

ALBERT MERTZ.