Oct. 9, 1928. 1,687,353

V. J. SWANSON

CYLINDER HEAD AND COOLING SYSTEM

Filed March 30, 1925

Fig. 1

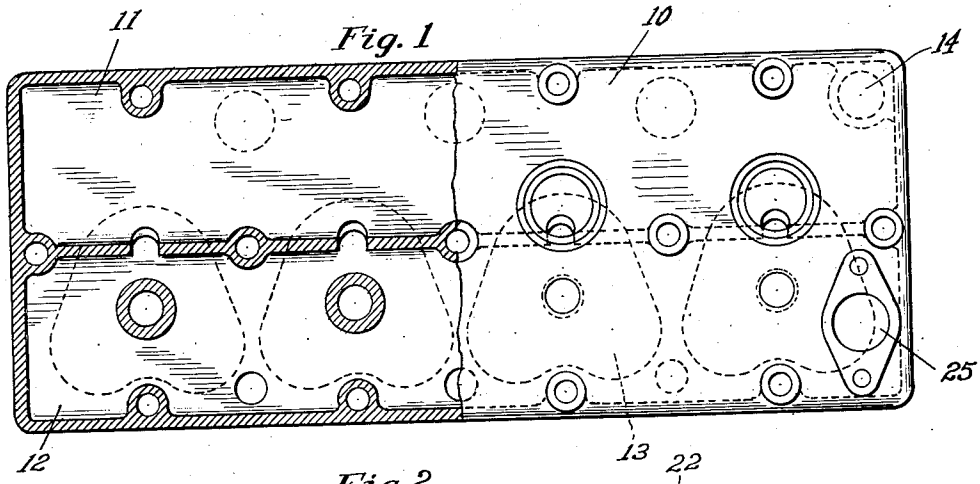


Fig. 2

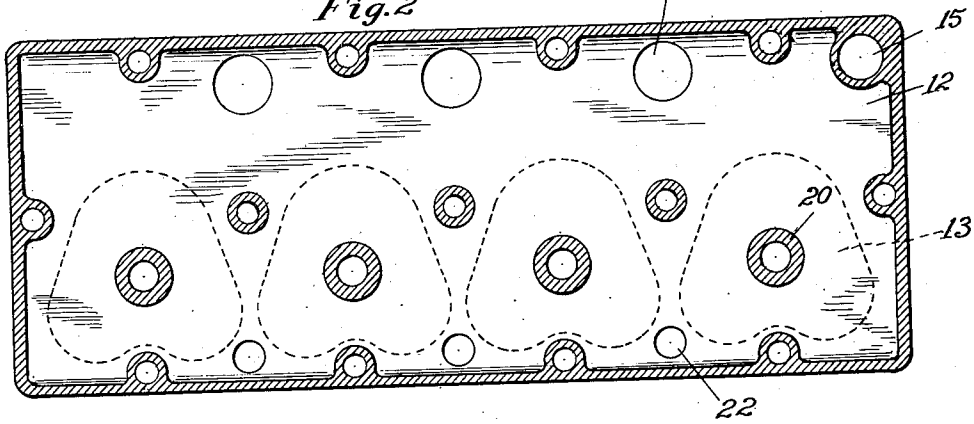


Fig. 3

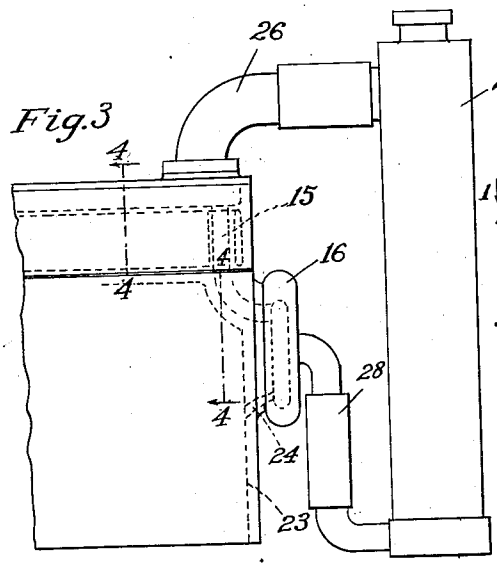
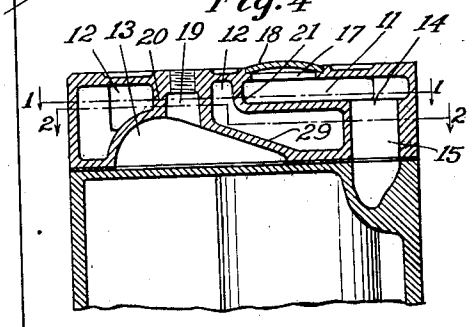


Fig. 4



INVENTOR
Verner J. Swanson
BY Hastings W. Baker
ATTORNEY

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UNITED STATES PATENT OFFICE.

VERNER J. SWANSON, OF QUAPAW, OKLAHOMA, ASSIGNOR TO THE A. L. POWELL POWER COMPANY INCORPORATED, OF MILES CITY, MONTANA.

CYLINDER HEAD AND COOLING SYSTEM.

Application filed March 30, 1925. Serial No. 19,269.

The object of my invention is to provide a cylinder head designed to secure a high degree of turbulence and having a cooling system designed to cool each of the cylinder heads equally.

More specifically, my invention relates to a cylinder head having a novel form of pocket therein, in which the explosive gases are compressed and exploded. On the compression stroke the entire volume of the explosive charge will be forced into this pocket which will increase the velocity of the gases which movement will continue until after the spark has passed.

The opening for the spark plug is located at a point where the maximum distance of flame travel is reduced to a minimum, which reduces the chances of detonation.

The top of the pocket is so formed that any line on the inner surface thereof forms an angle, other than a right angle, with the axis of the spark plug so that there is no surface parallel to the top of the cylinder block. This results in a maximum turbulence of the combustible gases and reduces the chances of detonation since the flame does not strike the wall at right angles.

The hottest part of a combustion chamber is the electrodes of the spark plug and it is these electrodes that generally cause preignition. I have placed the spark plug on the inclined surface of the chamber and so that its axis will be parallel to the axis of the cylinder. I have also provided a means whereby a cooling fluid will be discharged directly against the spark plug boss of each cylinder and the inclined surface of the pocket so that the hottest part of the combustion chamber of each cylinder is effectively cooled. Each of the combustion chambers will by this means be cooled to practically the same extent.

With these and other objects in view, I have designed the cylinder head and cooling system shown in the annexed drawings, in which Fig. 1 is a fragmentary plan view partly in cross section, the cross sectional part being taken on the line 1—1 of Fig. 4, looking in the direction of the arrows. Fig. 2 is a cross sectional view taken on the line 2—2 of Fig. 4, looking in the direction of the arrows. Fig. 3 is a side elevational view of my improved structure and Fig. 4 is a vertical cross sectional view taken on the line 4—4 of Fig. 3.

Referring more particularly to the drawings, I have shown a cylinder head 10 for a four-cylinder engine. The number of cylinders however is wholly immaterial for the invention might be applied to an engine having any number of cylinders. The cylinder head is divided into three distinct parts, being a water distributor 11, extending for practically the entire length of the cylinder head, a chamber 12 and a compression and explosion chamber 13, there being as many chambers 13 as there are cylinders in the engine.

The water distributor 11 is located at the extreme upper part of the cylinder head and extends for approximately one-half the width thereof. The water is pumped to the distributor 11, through a channel 15 which opens into the distributor, as shown at 14. The water distributor is substantially rectangular in cross section and the water flows from the pump 16, thru the passageway 15 and port 14 so as to completely fill the water distributor 11. The water distributor is provided with a plurality of openings 17, one for each cylinder, which openings are closed by means of caps or core disks 18.

The chamber 12 is likewise rectangular in cross section. The chamber 12 is located below and to one side of the distributor 11 and extends thruout the length and breadth of the inner dimensions of the cylinder head.

The compression and explosion chamber 13 is a modification of the well known Ricardo head. It is substantially heart-shaped in plan view and a vertical cross sectional view taken across the engine would look something like the half of a wedge, the large end of the wedge however being the arc of a circle having its center located to one side of the center line of the spark plug. The top wall slopes downwardly from the highest part of the said arc and away from said arc to the bottom of the cylinder head, terminating in a small arc of a circle a short distance from the outer extremity of the said chamber. A bore 19 is provided on the sloping top wall of the chamber 13 for the insertion of a spark plug. The said bore 19 extends upwardly thru the chamber 12, and is surrounded by a boss 20.

A port 21 communicates with the distributor 11 and the chamber 12 adjacent the boss 20, so that the cooling medium is led from the distributor 11 so as to impinge against each of the bosses 20, and a sloping wall 29, of

the explosion chamber 13, to the end that the hottest portion of each of the explosion chambers may be cooled equally.

The ports 22 are provided in the lower wall of the chamber 12, which ports communicate with a cylinder jacket 23. The water passes into the cylinder jackets and remains therein until it is heated sufficiently to be converted into steam. Ordinarily the temperature of the water in the cylinder jackets when the engine is running, would be at approximately the boiling point of water, so that the cylinder wall is maintained at a fairly high temperature while the hottest part of the cylinder head is effectively cooled. A communicating means 24 having a small bore connects the cylinder jackets 23 with the lower portion of the pump 16.

The water is pumped from the pump 16 thru the opening 15 into the distributor 11, from which it passes thru the ports 21 to the parts of the chamber 12 adjacent the bosses 20. Some of the water in the chamber 12 passes thru the ports 22 into the cylinder jackets 23. From the cylinder jackets 23, the water or steam may pass upwardly thru the ports 22, or thru the communicating means 24, into the pump 16. The water in the chamber 12 passes thru the port 25, upwardly into the outlet tube 26, thru the radiator 27 and from the lower portion of the radiator 27 thru the tube 28 into the pump 16.

I fully realize that many changes may be made in the specific form shown herein without departing from the spirit of this invention. I therefore do not care to limit myself to the specific form shown herein but desire to protect the invention in its broadest form.

I claim:—

1. A cylinder head comprising a distributor and a water chamber, a spark plug boss extending thru said water chamber, a wall separating said distributor and chamber and provided with a port extending therethru adjacent said boss.

2. A cylinder head provided with a distributor and a water chamber, a wall separating said distributor and chamber and provided with a port extending therethru, a wall forming the bottom of said chamber, a part of said last mentioned wall being sloping and forming the top of a combustion chamber, a spark plug boss extending from the upper portion of said sloping portion of the wall, said port being so placed that the cooling fluid will impinge against said boss and said sloping portion of the wall.

3. A cylinder head used in association with a cylinder jacket, provided with a distributor and a water chamber, a wall separating said distributor and water chamber and provided with a port extending therethru, a wall forming the lower portion of said chamber and provided with a port communicating with a cylinder jacket, the cooling fluid being adapted to pass from said distributor into said chamber and from said chamber into said jacket.

4. A cooling system consisting of a cylinder head having a distributor and a chamber therein, a wall separating said distributor and said chamber and provided with a port communicating with said distributor and chamber, a pump, means connecting said pump and distributor, a radiator, communicating means between said chamber and said radiator and communicating means between said radiator and said pump.

5. In a cooling means for an internal combustion engine, a cylinder head having a wall therein, a distributor located on one side of said wall and a chamber on the other side thereof, communicating means between said distributor and chamber, a cylinder water jacket, communicating means between said jacket and said chamber, a pump, communicating means between said jacket and pump, communicating means between said pump and distributor, a radiator, means connecting said chamber and said radiator, means connecting said radiator and pump, said pump being adapted to force a cooling fluid thru the communicating means between the pump and distributor, thru said distributor, into said jacket, thru the communicating means between said chamber and radiator, thru the radiator and thru the means connecting the radiator and pump.

6. A cylinder head having a distributor and a chamber formed therein, a wall separating said chamber and distributor and having a port formed therein, a wall forming the upper portion of said distributor, said last mentioned wall having an opening therethru adjacent said port and means whereby said opening may be closed.

In testimony whereof I affix my signature.

VERNER J. SWANSON.