

March 20, 1928.

1,662,989

F. H. STROUD

CYLINDER HEAD

Filed Dec. 15, 1926

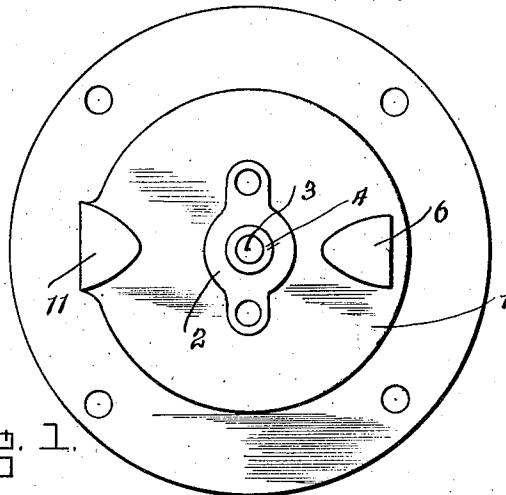


Fig. 1.

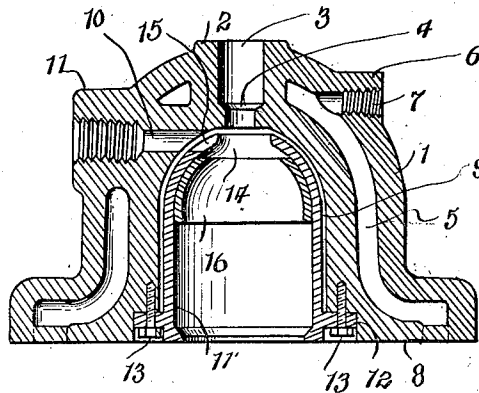


Fig. 2.

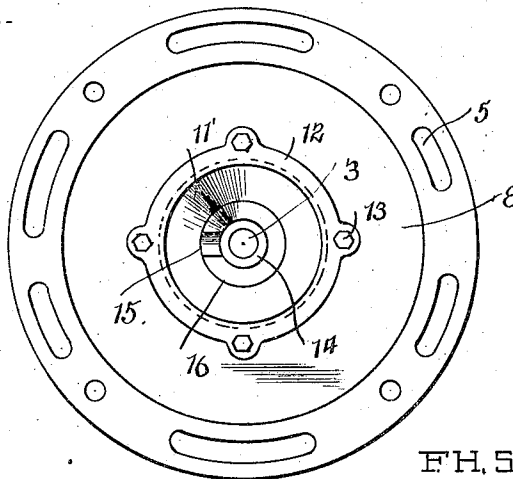


Fig. 3.

Inventor

F. H. Stroud

By

Lacey & Lacey, Attorneys

Patented Mar. 20, 1928.

1,662,989

UNITED STATES PATENT OFFICE.

FRANCIS H. STROUD, OF SEATTLE, WASHINGTON.

CYLINDER HEAD.

Application filed December 15, 1926. Serial No. 155,085.

This invention relates to internal combustion engines of the class which use heavy oils as fuel, and the object of the present invention is to provide a means for starting the engine more quickly than has heretofore been possible and to prolong the useful existence of the heating elements in the cylinder. The invention also seeks to provide means whereby the engine may be operated successfully upon a low compression of the fuel. The present invention has particular reference to a novel construction of the cylinder head whereby the attainment of the stated objects and other objects which may hereinafter incidentally appear is facilitated, and the invention resides in a novel construction which will be particularly defined in the appended claims.

In the accompanying drawing:

Figure 1 is a top plan view of a cylinder head embodying the present invention;

Fig. 2 is a diametrical section of the same, and

Fig. 3 is a bottom plan view.

The cylinder head is circular in form and is of a general dome shape, as shown at 1 more clearly in Fig. 2. The top of the cylinder head is formed with a flattened boss 2 whereby a clamping element may be engaged with the cylinder head to secure the spray nozzle in the central opening 3 provided for the reception of the same, and it is to be noted that this opening 3 is provided with a beveled annular shoulder 4 providing a seat for the end of the nozzle so that, when the nozzle is clamped in place, it will be firmly held without the formation of screw threads in the cylinder head. The cylinder head is constructed with the usual water space 5 for cooling purposes and, at any convenient point, is formed with a boss 6 having a port 7 therethrough in order that the water may be permitted to escape when desired, said port being normally closed by a plug or other device in an obvious manner and the water being admitted through cored openings in the base or bottom 8 of the head from the water jacket of the engine cylinder. The bottom 8 is flat whereby it may rest firmly upon and be secured to the end of the engine cylinder and within the head is a central chamber 9 in which combustion of the fuel is effected, the said chamber, of course, having its upper end tapered or semispherical in form whereby it will serve to concentrate the fuel as it

is delivered through the opening 3 and also provide for the expansion of the spray as it passes to the cylinder. Immediately adjacent the upper end of the chamber 9, a port 10 is formed through the wall of the cylinder head, said port being formed through a boss 11 so that there will be no weakening of the wall of the cylinder head by the formation of the port. The heating element, which preferably is a resistance coil fed by a battery, is located in this port 10, and it will be noted that it is located directly at the point at which the fuel enters the cylinder head and, consequently, will act upon the fuel in its most easily ignitable condition. A liner 11', conforming to the chamber 9, is disposed within said chamber, and this liner is provided adjacent its lower end with an annular flange 12 through which fastening cap screws 13 may be inserted into the wall of the head to secure the liner in place. This liner is spaced from the surface of the chamber 9 so that an air space will be produced between the liner and the wall of the chamber, and this space will serve to prevent or retard the transmission of heat to the walls of the cylinder head and also retain the heat in the liner. At its upper end the liner 11' is provided with an opening 14 registering with the fuel inlet opening 3 and also is provided with a notch or opening 15 which is aligned with the port 10 containing the heating element. Immediately below the notch 15, I provide a supplemental liner 16 in the form of a ring intimately united with the liner 11' so that the dissipation of heat from the upper portion of the liner will be retarded and, consequently, there will be, in a measure, a storage of heat immediately adjacent the heating element and the point where the fuel enters the cylinder head. As a result of this construction, the concentration of heat will be such that it will not be necessary to spray the liner with a charge of fuel in order to start combustion. The engine can, consequently, be very quickly started when it is cold and the working existence of the heating element is prolonged. Because of the isolation from the cylinder walls, the supplemental liner 16 heats up very quickly when the engine is working and the heat supplied thereby produces rapid gasification and combustion of the fuel so that it is possible to operate the engine efficiently upon lower compression than has heretofore

been considered possible. As a result, the engine is more flexible in its operation and, therefore, susceptible to closer governing than has heretofore been possible. It is to be understood that the resistance coil or heating element in the port 10 is used only for about one minute when starting a cold engine, at the end of which period the supplemental liner is so hot that heat radiated therefrom combined with the heat generated by compression is sufficient to cause ignition without further use of the heating element until the engine is again started from cold. The fuel is injected rapidly by the action of the fuel pump with a high degree of atomization, and it is unnecessary to actually spray the fuel against a metallic surface as was heretofore the usual practice.

Having thus described the invention, I claim:

1. A cylinder head for internal combustion engines provided with a central combustion chamber opening through the bottom of the head and contracted toward the top thereof, there being a fuel-inlet opening in the top of the head and a port for a heating element in the side of the head im-

mediately adjacent the fuel inlet, and a heat-retaining liner secured at its lower end in said combustion chamber and spaced from the wall of the same, said liner being open throughout its lower end and having an opening at its upper end registering with the fuel inlet opening, and a second opening registering with the port for the heating element.

2. A cylinder head for internal combustion engines having a central combustion chamber which opens through the bottom of the head and is contracted toward the top thereof, the head being provided with a fuel inlet through its top and in its side with a port for a heating element located immediately adjacent the fuel inlet, a heat-retaining liner for the combustion chamber secured in the lower end of the same and extending to the top thereof and having openings alining with the fuel inlet opening and the port for the heating element, and a secondary liner integrally united with the first-mentioned liner on the inner surface of the same and near the upper end thereof.

In testimony whereof I affix my signature.

FRANCIS H. STROUD. [L. s.]