Sept. 17, 1929. A. G. ELLIOTT 1,728,749

EXPLOSION CHAMBER OF THE CYLINDERS OF INTERNAL COMBUSTION ENGINES

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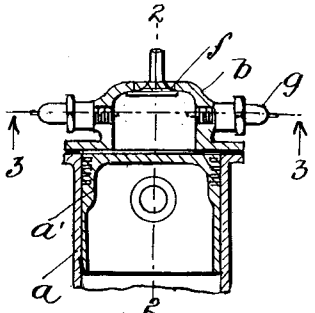


Fig. 1

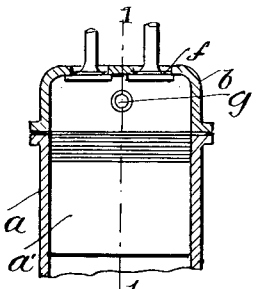


Fig. 2

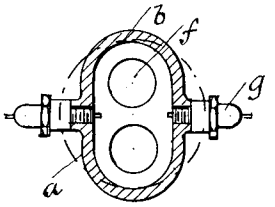


Fig 3

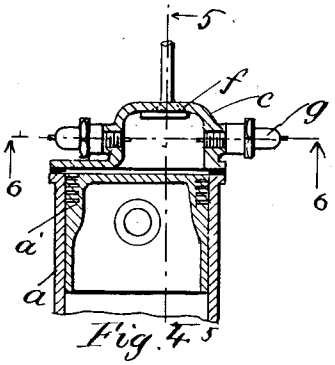


Fig. 4

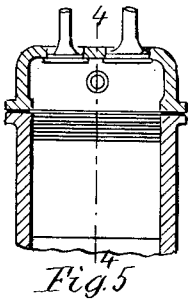


Fig. 5

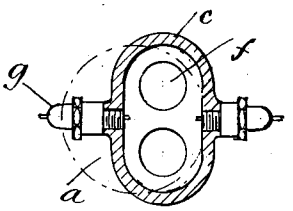


Fig. 6

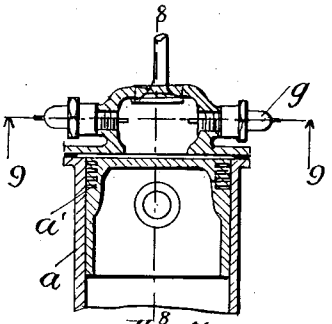


Fig 7

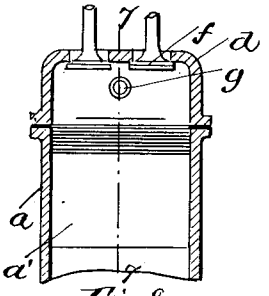


Fig 8

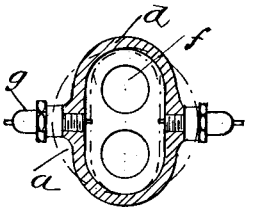


Fig. 9

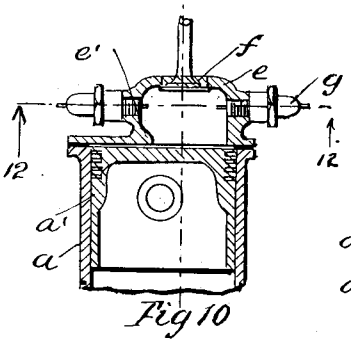


Fig 10

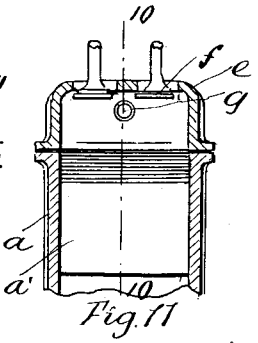


Fig 11

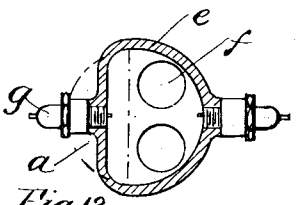


Fig 12

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UNITED STATES PATENT OFFICE

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EXPLOSION CHAMBER OF THE CYLINDERS OF INTERNAL-COMBUSTION ENGINES

Application filed December 22, 1927, Serial No. 241,824, and in Great Britain January 1, 1927.

This invention relates to internal combustion engines of the type in which the explosion chambers are immediately above the respective cylinders, the valves are arranged overhead the explosion chambers, and the fuel in a gaseous state is drawn into the cylinders on the suction stroke.

In all internal combustion engines of the said type it is desirable that the compressed gaseous fuel at or immediately before ignition should be in a state of turbulence.

In engines of the said type as heretofore made the explosion chambers have been either in the form of a circular dome or of a squat cylinder in either case the wall of each explosive chamber being in continuance of the wall of the main cylinder, and consequent on the adoption of such shape a state of turbulence in the compressed gaseous fuel at or before the moment of ignition is entirely absent, or is at a minimum, which state induces a great tendency to detonate, requires a considerable ignition advance, and exercises a detrimental restriction on the permissible pressure of compression.

It has been proposed in internal combustion engines in which the fuel is constituted by injecting oil in liquid form into an explosion chamber, containing highly compressed air, to construct the explosion chamber above the cylinder in either spherical, oviform or ellipsoidal shape, the top of the piston being recessed to conform to such shape, for the purpose of reducing heat losses and providing a suitable path for the injected liquid charge, and this incidentally in some cases has resulted in cylinders and/or cylinder heads having shapes which would on the compression stroke to some extent cause cross currents in the medium under compression. Such constructions however were not aimed at producing turbulence, which in fact was not a desirable incident in such engines, and would not produce turbulence as efficiently as cylinders and heads made according to this invention.

According to this invention the wall of each explosion chamber (whether the heads are formed separately from the cylinders or integral with the cylinders) is not in symmetrical continuation with the wall of the cylinder, but at one or more places is projected inwards so that as the gaseous fuel is being compressed a volume of it is caused to traverse the cylinder and explosion chamber and produce violent cross currents in the mixture, and in the preferred form the face of the inwards projection or projections towards the piston is normal to the cylinder axis and the top of the piston is flat and in a plane normal to the said axis.

In the accompanying drawings four examples of my generic invention are diagrammatically illustrated.

Fig. 1 is a central vertical sectional view of a cylinder having a dome located centrally above the same.

Fig. 2 is a similar sectional view of the cylinder shown in Fig. 1, on the line 2—2.

Fig. 3 is a horizontal sectional view of the same cylinder taken through the dome on the line 3—3 of Fig. 2.

Fig. 4 is a central vertical section of a modification, in which the dome is located at one side of the axis of the cylinder.

Fig. 5 is a central vertical section on the line 5—5 of Fig. 4.

Fig. 6 is a horizontal section on the line 6—6 of Fig 4.

Fig. 7 is a vertical central sectional view of a further modification, showing the dome with inwardly bent sides.

Fig. 8 is a section on line 8—8 of Fig. 7.

Fig. 9 is a horizontal section on the line 9—9 of Fig. 7.

Fig. 10 is a vertical sectional view of a further modification, in which the dome is of semi-cylindrical form.

Fig. 11 is a sectional view on the line 11—11 of Fig. 10.

Fig. 12 is a horizontal section on the line 12—12 of Fig. 10.

Referring to all the figures, a is the cylinder and a^1 the piston.

Referring to Figures 1, 2 and 3, b is the cylinder head in the shape of an elliptical dome extending across the centre of the cylinder.

Referring to Figures 4, 5 and 6, c are the

heads in the form of elliptical domes across one side of the cylinder.

Referring to Figs. 7, 8 and 9, *d* are the heads in the form of an elliptical dome across the centre of the cylinder with the side walls turned inwards as at d^1 horse shoe fashion.

Referring to Figures 10, 11 and 12, *e* are the cylinder heads in the shape of elliptical domes across one side of the cylinder with one wall turned inwards as at e^1

In all the cylinders *f* are the valves and *g* the sparking plugs.

What I claim is:—

1. In an internal combustion engine of the type in which the explosion chamber is directly over the cylinder and the fuel is drawn into the cylinder in a gaseous state on the suction stroke, the combination with the cylinder of a cylinder head containing an explosion chamber, in shape an elliptical dome, extending over part only of the cross section area of the cylinder, and forming a flat roof over the other part of the cross section area of the cylinder, normal to the axis of the cylinder, the angle of junction of the said flat roof and the sides of the dome being substantially a right angle.

2. In an internal combustion engine of the type in which the explosion chamber is directly over the cylinder and the fuel is drawn into the cylinder in a gaseous state on the suction stroke, the combination with the cylinder of a cylinder head containing an explosion chamber in shape an elliptical dome extending over the central part of the cross section area of the cylinder, and forming a flat roof over the other part of the cross section area of the cylinder, the angle of junction of the flat roof and the sides of the dome being substantially a right angle.

3. In an internal combustion engine of the type in which the explosion chamber is directly over the cylinder and the fuel is drawn into the cylinders in a gaseous state on the suction stroke, the combination with the cylinder of a cylinder head containing an explosion chamber in shape an elliptical dome with its sides bent slightly inwards and extending over part of the cross section area of the cylinder, and forming a flat roof over the other part of the cross section area of the cylinder normal to the axis of the cylinder, the angle of junction of the said flat roof and the sides of the dome being substantially a right angle.

4. In an internal combustion engine of the type in which the explosion chamber is directly over the cylinder, the fuel is drawn into the cylinder in a gaseous state on the suction stroke, and the top of the piston is flat, the combination with the cylinder head containing an explosion chamber in shape an elliptical dome extending over part of the cross section area of the cylinder, and forming a flat roof over the other part of the cross section area of the cylinder normal to the axis of the cylinder, the angle of junction of the flat roof and the sides of the dome being substantially a right angle.

5. In an internal combustion engine of the type in which the explosion chamber is directly over the cylinder and the fuel is drawn in to the cylinders in a gaseous state on the suction stroke and the top of the piston is flat, the combination with the cylinder of a cylinder head containing an explosion chamber in shape an elliptical dome, extending over the central part of the cross section area of the cylinder, and forming a flat roof over the other part of the cross section area of the cylinder normal to the axis of the cylinder, the angle of junction of the flat roof and the sides of the dome being substantially a right angle.

6. In an internal combustion engine of the type in which the explosion chamber is over the cylinder and the fuel is drawn into the cylinders in a gaseous state on the suction stroke, and the top of the piston is flat, the combination with a cylinder of a cylinder head containing an explosion chamber in shape, an elliptical dome with its sides bent slightly inwards and extending over part of the cross section area of the cylinder and forming a flat roof over the part of the cross section area of the cylinder normal to the axis of the cylinder, the angle of junction of the flat roof and the sides of the dome being substantially a right angle.

In witness whereof I have signed this specification.

ALBERT GEORGE ELLIOTT.