Dec. 18, 1934. M. O'MARRA 1,985,192

SPARK PLUG

Filed March 15, 1932

Fig. 1.

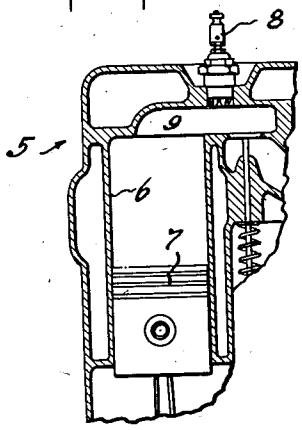


Fig. 2.

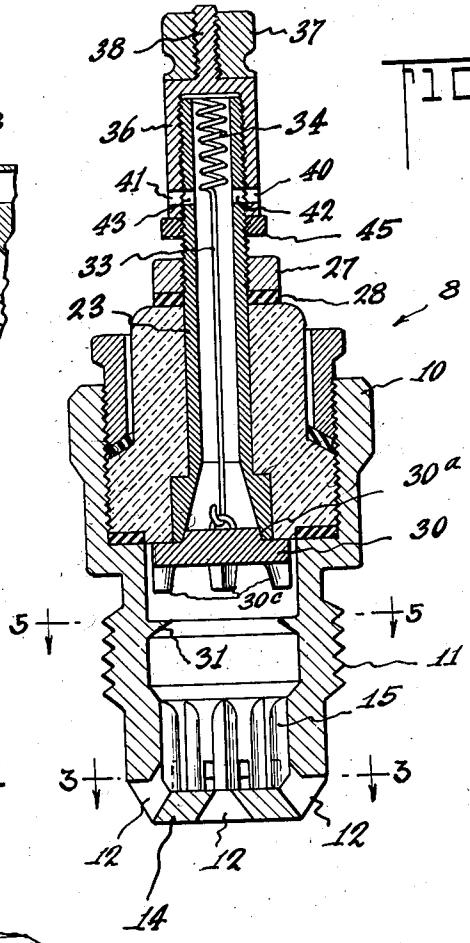


Fig. 4.

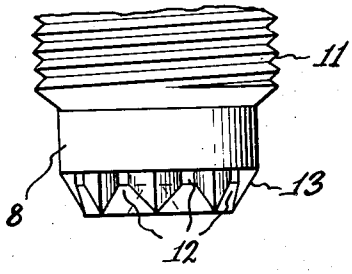


Fig. 5.

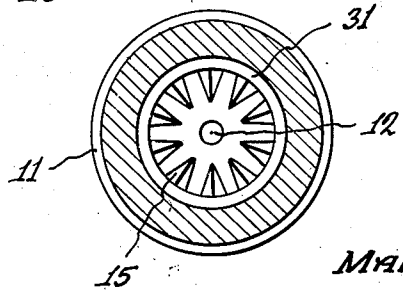
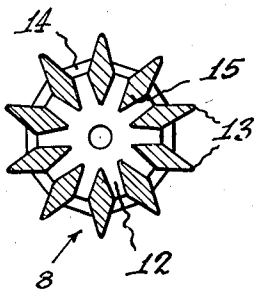


Fig. 3.



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Patented Dec. 18, 1934 1,985,192

UNITED STATES PATENT OFFICE

1,985,192

SPARK PLUG

Martin O'Marra, New York, N. Y.

Application March 15, 1932, Serial No. 599,039

2 Claims. (Cl. 123—169)

This invention relates to spark plugs and it has for one of its objects the provision of a novel spark plug which, when used on an internal combustion engine, will enable the engine to be efficiently run with low grade and therefore cheaper oils as fuel, this on account of the thorough and rapid ignition effected by my improved spark plug.

Another object of the invention is the provision of a spark plug operable without the formation of a carbon deposit thereon.

Another object of the invention is the provision of a spark plug through which may pass the air supply for a cylinder of an internal combustion engine.

Other objects will be appreciated from a reading of the following specification.

The invention will be fully and comprehensively understood from a consideration of the following detailed description when read in connection with the accompanying drawing which forms part of the application, with the understanding, however, that the improvement is capable of extended application and is not confined to the exact showing of the drawing nor to the precise construction described and, therefore, such changes and modifications may be made therefrom as do not affect the spirit of the invention nor exceed the scope thereof as expressed in the appended claims.

In the drawing:

Fig. 1 is a fragmentary longitudinal section through an internal combustion engine showing in side elevation a piston working in a cylinder of the engine and showing, also in side elevation, a spark plug of my invention associated with the motor.

Fig. 2 is mainly a central longitudinal section through the spark plug of my invention, certain parts being shown in elevation.

Fig. 3 is a horizontal section taken approximately on the line 3—3 of Fig. 2, looking in the direction of the arrows; and

Fig. 4 is an elevational view, partly broken away and partly in section, showing the construction of the lower end portion of the spark plug; and

Fig. 5 is a section taken on line 5—5 of Fig. 2.

Referring to the drawing for a more detailed description thereof, the numeral 5 indicates an internal combustion motor having a cylinder 6 in which reciprocates a piston 7. A spark plug 8 of my invention is shown in Fig. 1 as secured to the motor or engine 5, the lower end of said spark plug being in a combustion chamber 9, which is in communication with the interior of the cylinder 6.

The spark plug 8 comprises a hollow body portion 10 which, intermediate its ends, is provided with exterior threads 11 so that the spark plug may be screwed to a motor. The lower end of the spark plug is provided with a plurality of apertures 12, which are square in cross-section and tapered, the inner edge of the plug adjoining these apertures being beveled at an angle of 45°. The mentioned apertures 12 are outlet orifices whereby air drawn into the spark plug may pass from the interior of the same into the combustion chamber 9 and are formed in the tapered end portion 13 of the spark plug and, as shown, there is one formed in the bottom wall 14 of the plug. Radially disposed walls or partitions 15 project inwardly from the spark plug between the mentioned apertures or orifices.

The body of the spark plug is interiorly threaded as indicated by the numeral 16 and is threadedly connected to a hollow insulating member 17, which seats on a gasket 18 resting on an annular shoulder 19 formed in the interior of the plug. A threaded nut 20 threadedly engages the body 10 of the plug and holds in place the mentioned insulating member 17, being seated on a gasket 21, which rests on an annular shoulder 22 formed on said insulating member 17. A brass tube 23, provided with a conical valve seat 24 at its lower end, is disposed centrally in the insulating member 17 and is held in position by a shoulder 25 pulled against a corresponding shoulder in the mentioned member 17 and held against said shoulder by a nut 27 threaded to the tube and seated on a gasket 28, which rests on the top of the insulating member 17.

Electrodes 30 and 31 are disposed in a chamber 32, which is an enlargement of the passageway which extends through the spark plug. The electrode 30, which has four depending triangular members 30*c*, is preferably the positive electrode and includes a conical portion 30*a* at its upper end adapted to open and close the passageway through the spark plug by moving from and to the valve seat 24 formed on the tube 23. The electrode 31 is a ring extending from the inner wall of the body of the plug. The electrode 30 is connected to the lower end of a fine wire spring which includes a straight portion 33 and a helical portion 34, the top coil of which is larger than the other coils and rests on the upper end of the tube 23 and is held thereon by means of a cap 36 threadedly connected to the upper end portion of the tube 23. A nut 37 is threadedly connected to a reduced portion 38 of the cap 36 and is adapted to hold between itself and the cap just

mentioned, a conducting wire, which is well understood.

Opposed apertures 40 and 41 are formed in the wall of the cap 36 and are in alignment with aligned or opposite apertures 42 and 43 formed in the wall of the tube 23, the mentioned apertures 40 to 43, inclusive, being inlets by which air may enter the spark plug, the air being that necessary for admixture with the fuel to form an explosive mixture. The effective area of the mentioned inlets may be varied by adjusting the position of the threaded cap 36, which is apparent. A lock nut 45, which threadedly engages the tube 23, is turned, after any adjustment of the cap 36, to contact with the bottom of the latter. Means are thus provided for regulating the amount of air which passes through the spark plug.

The mentioned electrode 30, which functions also as a valve to open and close the air passageway of the spark plug, opens when the pressure within the cylinder 6 is subatmospheric and closes when the pressure within the cylinder is slightly greater than that of the atmosphere, thus closing the passageway before compression begins. It is evident that a downward movement of the electrode 30 to open the mentioned passageway, allows the air to pass through the spark plug into the combustion chamber 9 and from there into the cylinder 6.

The chamber 32 may be termed a firing chamber since the gas-fuel mixture, which is contained therein, is fired by the sparks passing between the electrodes 30 and 31, the firing of the charge within the chamber 32 resulting in flashes of burning fuel being emitted through the outlet orifices 12 to ignite the charge in the combustion chamber 9 and in the cylinder 6. The structure described will evidently accomplish the objects of the invention.

What is claimed as new is:

1. A spark plug provided with an air inlet and a plurality of air outlets and a passageway connecting said inlet and outlets, and an electrode adapted to open and close said passageway, and means for adjusting the effective size of said inlet, said means comprising an apertured terminal cap threadedly adjustable relative to said inlet to vary the effective area of the same.

2. A spark plug comprising a casing having a firing chamber intermediate its ends, a pair of electrodes in said firing chamber, one of said electrodes being resiliently mounted and having a plurality of depending projections and the other electrode having a plurality of points.

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