M. T. MINOGUE.

SPARK PLUG.

APPLICATION FILED MAY 26, 1914.

1,229,193. Patented June 5, 1917.

Fig. 1.

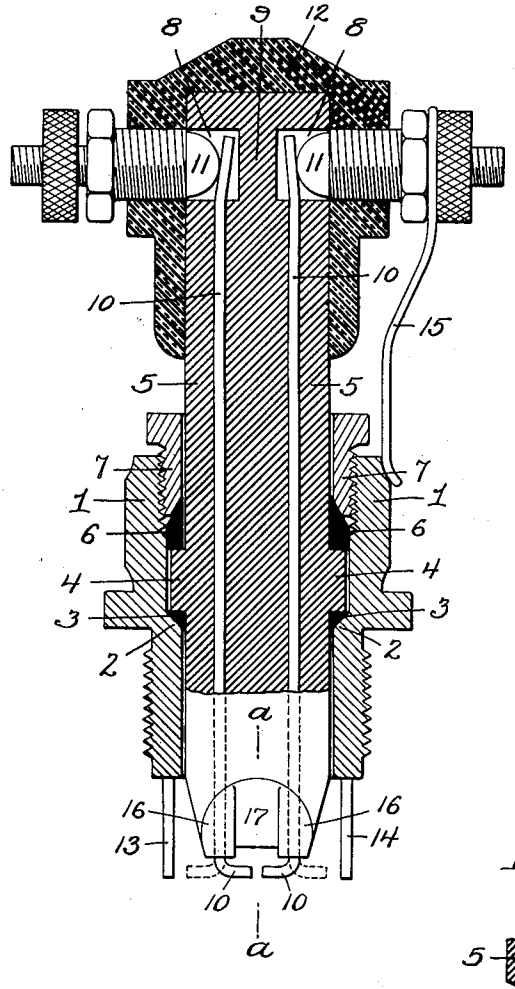


Fig. 2.

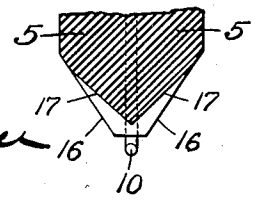
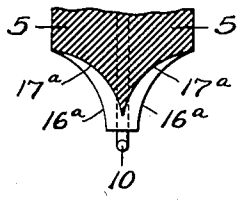


Fig. 3.



WITNESSES

Hamilton S. Turner

Elsie Fullerton

INVENTOR

MARTIN T. MINOGUE

BY HIS ATTORNEY

Harry Smith

UNITED STATES PATENT OFFICE.

MARTIN T. MINOGUE, OF PHILADELPHIA, PENNSYLVANIA.

SPARK-PLUG.

1,229,193. Specification of Letters Patent. Patented June 5, 1917.

Application filed May 26, 1914. Serial No. 840,973.

To all whom it may concern:

Be it known that I, MARTIN T. MINOGUE, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Spark-Plugs, of which the following is a specification.

One object of my invention is to so construct a spark plug for explosive engines as to prevent the accumulation of masses of soot or other form of carbon deposit upon that portion of the plug which projects into the combustion chamber, a further object being to so construct the plug that it can be readily employed either as a single sparking plug, as a double sparking plug in which both sparks are produced simultaneously, or as a double sparking plug in which the sparks are produced independently and at different times.

These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawing, in which—

Figure 1 is a view, partly in vertical section and partly in elevation, of a spark plug constructed in accordance with my invention;

Fig. 2 is a transverse section on the line *a*—*a*, Fig. 1, and

Fig. 3 is a similar view illustrating a modification of one feature of my invention.

In the drawing, 1 represents a plug intended to be screwed into an internally threaded opening in an appropriate part of the engine casing, this plug having an internal shoulder 2 for the support of a packing ring 3 interposed between said shoulder and the lower face of a projecting annular rib 4 on the insulating member 5 of the plug, which may consist of a cylindrical or other suitably shaped body of porcelain, mica, or other insulating material.

Upon the upper face of the rib 4 rests a packing ring 6 upon which bears a follower 7 which is screwed into the internally threaded upper end of the plug 1, the packing rings 3 and 6 thus serving to maintain a gas-tight joint between the plug 1 and the insulating body 5. The latter has, near its upper end, oppositely disposed recesses 8 separated by an insulating wall 9, and extending from these recesses to the bottom of the insulating body 5 are bores for the reception of the electrodes 10 whose upper ends project into the recesses 8 and contact with the inner ends of binding posts 11 which are threaded for adaptation to internally threaded openings formed in the opposite sides of a cap 12, the latter fitting over the upper end of the insulating member 5 of the plug, as shown in Fig. 1, and being itself composed of some insulating material upon which a reliable thread can be cut.

Pressure of the binding posts upon the projecting upper portions of the electrodes may, if desired, be sufficient to deflect the same, as shown in Fig. 1, so as to prevent vertical withdrawal of the electrodes from the insulating body, or vertical displacement of the same therein, each electrode, however, being free to turn around its own axis when the pressure of the binding posts 11 has been removed.

Those portions of the electrodes which project beyond the lower end of the insulating body 5 are bent and can therefore be directed toward one another, as shown by full lines in Fig. 1, when a single spark is desired, or, by giving each electrode a half turn around its axis, can be directed away from one another, as shown by dotted lines in Fig. 1, so as to form two sparks, one between the end of one electrode and a downwardly projecting terminal 13 on the plug 1 and the other between the end of the other electrode and a downwardly projecting terminal 14 on the plug.

The upper ends of the electrodes 10 may, if desired, be secured in the recesses 8 by means of cement, in which case the reversal in the direction of their lower ends will have to be effected by bending the same instead of by turning them around their axis.

Carried by one of the binding posts 11 is a switch arm 15 whose free end is adapted to contact with the upper portion of the plug 1 and thereby provide a connection between the binding post and the casing of the engine.

When a single sparking plug is desired two methods of electrical connection may be employed. In one case, one pole of the generator will be connected to the left hand binding post 11 and the other to the right hand binding post 11, the switch 15 being turned so as to be out of contact with the plug and the electrodes being adjusted as shown by full lines in Fig. 1. In the other case, with the same adjustment of the electrodes, one pole of the generator will be connected to the left hand binding post 11 and the other to the engine casing, the connection between the latter and the right hand bind-

ing post 11 being effected by moving the switch 15 into contact with the plug.

In case a simultaneous double spark is desired one pole of the generator will be connected to each of the binding posts 11 and the other pole to the engine casing, the switch 15 being moved out of contact with the plug 1, and the electrodes adjusted as shown by dotted lines in Fig. 1, and when it is desired to produce two sparks independently but not simultaneously, two circuits may be employed, one terminal of one circuit being connected with the left hand post 11, one terminal of the other circuit with the right hand post and the other terminals of both circuits with the engine casing, the switch 15 in this case being out of contact with the plug. When the electrodes 10 are in the position shown in full lines the plug may be employed in series with another plug, and when the electrodes or either of them are in the position shown by dotted lines the plug may be employed singly.

That portion of the insulating body 5 which projects into the combustion chamber of the engine has wedge-shaped side members 16 and an interposed and smaller wedge-shaped member 17, as shown in Fig. 2, the electrodes 10 projecting below the side members 16, and the inwardly bent ends of the electrodes, when the latter are adjusted as shown by full lines in Fig. 1, to produce a single spark, terminating below the central member 17.

When the explosion takes place in the combustion chamber the wedge-shaped lower ends of the insulating body cause lateral deflection of the uprushing volume of gases and the same scour the inclined faces of the wedges so as to prevent the accumulation thereon of masses of soot or other form of carbon deposit, which would tend to short circuit the electrodes.

In that form of my invention shown in Fig. 3, concave wedge faces 16^a and 17^a are employed instead of the straight wedge faces 16 and 17 shown in Fig. 2, the effect, however, being substantially the same in both cases.

I claim:

1. The combination, in a spark plug, of an insulating body having oppositely disposed recesses therein, electrodes passing through bores in said insulating body and into said recesses, and a non-friable insulating cap which receives the outer end of the insulating body and has in its side walls threaded openings for the reception of threaded binding posts which bear upon those portions of the electrodes which project into the recesses in the insulating member.

2. The combination, in a spark plug, of an insulating body having two electrodes, and a binding post for each of said electrodes, one of said binding posts having a switch arm whereby it may be electrically connected to some part of the plug which serves as a terminal for one pole of the circuit, said plug having projecting terminals at opposite sides and said electrodes having projecting ends which can be directed toward or away from each other, so as to form a single spark between them, or so that each will form a separate spark with a plug terminal.

3. A spark plug having an insulating body projecting beyond the plug and into the explosion chamber, said projecting portion of the insulating body being wedge-shaped and presenting opposite sides converging toward a relatively narrow inner end, and electrodes projecting into the explosion chamber beyond the insulating body and having their terminals directed toward one another so as to form the spark inwardly beyond but in line with the narrow end of the wedge.

4. A spark plug having an insulating body projecting beyond the same and into the explosion chamber, said projecting portion being wedge-shaped in cross section and having its narrowest portion at the end of the insulator, said wedge-shaped portion comprising opposite sides, and an intervening portion presenting a sharper wedge.

5. A spark plug having that end which projects into the explosion chamber with wedge-shaped side members and a smaller wedge-shaped central member, and electrodes extending farther into the explosion chamber than said side members and terminating beyond said central member.

6. A spark plug having an insulating member projecting beyond the body of the plug, said projecting portion having wedge-shaped side members and a smaller wedge-shaped central member interposed between said side members.

7. A spark plug having an insulating member projecting beyond the body of the plug into the explosion chamber, said projecting portion having wedge-shaped side members and a smaller wedge-shaped central member, and electrodes extending into the explosion chamber beyond said side members and terminating beyond said central member.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

MARTIN T. MINOGUE.

Witnesses:
KATE A. BEADLE,
HAMILTON D. TURNER.