R. C. BERRY.

SPARK PLUG.

APPLICATION FILED JULY 9, 1919.

1,419,904. Patented June 13, 1922.

Fig. 1.

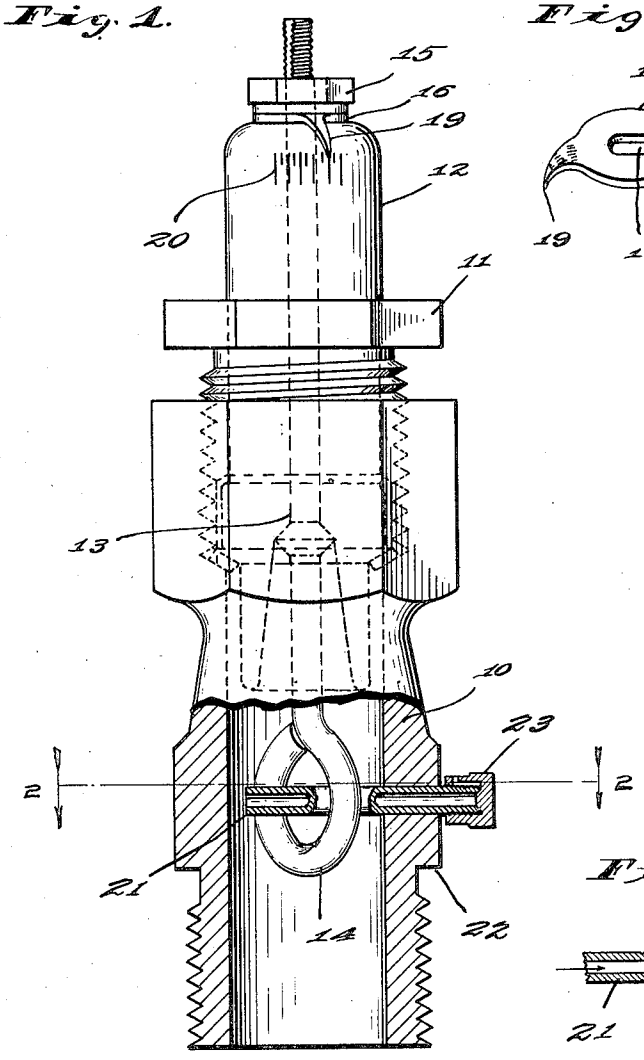


Fig. 3.

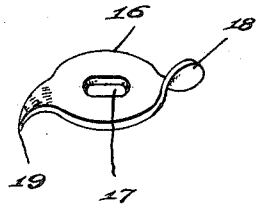


Fig. 4.

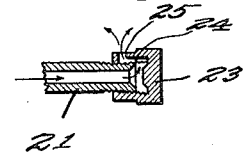
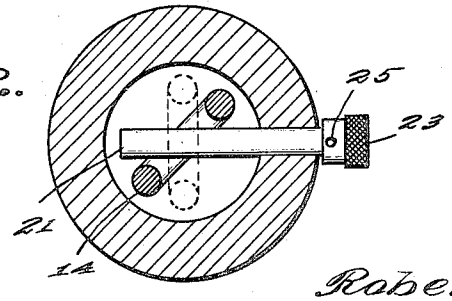


Fig. 2.



Witness
Frank A. Fahle

Inventor
Robert C. Berry,
Hood & Ashley
Attorneys

By

UNITED STATES PATENT OFFICE.

ROBERT C. BERRY, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO DANIEL W. RITTER, OF INDIANAPOLIS, INDIANA.

SPARK PLUG.

1,419,904. Specification of Letters Patent. Patented June 13, 1922.

Application filed July 9, 1919. Serial No. 309,693.

To all whom it may concern:

Be it known that I, ROBERT C. BERRY, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Spark Plug, of which the following is a specification.

It is the object of my invention to provide a spark plug in which the spark gap is adjustable from the outside, without removing the spark plug from the engine; in which the adjustment of the spark gap is indicated on the outside; and in which the electrode may be made to clean itself when necessary by heating by the burning gases within the engine, and this cleaning may be controlled from the outside without removing the spark plug from the engine.

The accompanying drawing illustrates my invention: Fig. 1 is an elevation of a spark plug embodying my invention, with some of the parts in section; Fig. 2 is a section on the line 2—2 of Fig. 1; Fig. 3 is a perspective view of the manipulating and indicating means for the movable electrode; and Fig. 4 is a sectional detail of the outer end of the fixed electrode.

The spark plug comprises the usual shell 10 arranged for mounting on the engine, and a clamping member 11 arranged to clamp the usual porcelain insulating member 12 in place.

Extending axially through the insulator 12 is a rod 13, which at its outer end is both screw-threaded and flattened and at its inner end is bent to form an eye 14. The manner in which this rod 13 is clamped in the insulator 12 is immaterial, save that such clamping is by a clamping nut 15 mounted on the screw threads at the outer end and by the tightening and loosening of which the rod 13 may be clamped or unclamped. Also mounted on the outer end of the rod 13, between the clamping nut 15 and the end of the insulator 12, is a washer-like member 16, provided with a hole 17 which has flat sides to correspond with those of the rod 13 so that such member 16 and the rod 13 will only turn together. The member 16 is provided with a thumb piece 18 by which it may be manipulated to turn the rod 13, and also is provided with a pointer 19 which co-operates with a scale 20 which may be marked on the insulator 12 to indicate the position to which the rod 13 is turned.

Extending transversely through the eye 14 is a fixed electrode 21, which is mounted in the side wall of the shell 10, usually by a press fit, and extends through such side wall at a point above the usual shoulder 22 with which the shell is provided to bear against the engine cylinder, so that the outer end of the fixed electrode 21 is in the exposed part of the shell. The fixed electrode 21 extends substantially centrally through the eye 14; but the diameter of such fixed electrode is materially smaller than the diameter of the eye 14, so that when the plane of the eye is perpendicular to such fixed electrode the spark gap between the two electrodes is quite large. By turning the rod 13 about its axis, which may be done by loosening the clamping nut 15 and manipulating the rod by the thumb piece 18 of the member 16, the plane of the eye 14 may be made either perpendicular or oblique to the fixed electrode 21, as is clear from Fig. 2, thus varying the spark-gap distance between the fixed electrode and those parts of the eye 14 which lie in the plane of the fixed electrode perpendicular to the axis of the rod 13. By this adjustment, the spark gap may be made anything desired. Proper indication of the spark gap distance is given by the pointer 19 on the scale 20. This adjustment of the spark gap distance may be made without disturbing the spark plug as a whole, and without dismounting it from the engine; and may even be made while the engine is in operation, so that the effect of such adjustment may be noted in the engine operation.

The stationary electrode 21 is preferably a tube, and does not extend completely across the opening provided in the shell 10 and in which opening the electrodes are located, so that one end of such fixed electrode is open within such space. The other end of the fixed electrode, where it projects outside the shell 10, is screw-threaded, and on it is mounted a cap 23. When this cap is tightened, it closes the outer end of the tubular electrode 21. However, by loosening the cap 23, the outer end of the tubular electrode 21 is opened to the atmosphere, through a longitudinal groove 24 along the screw threads of such cap and in communication with a peripheral hole 25. Figs. 1 and 4 show the cap tightened and loosened respectively. When the cap 23 is loosened

while the engine is in operation, some of the burning gases from within the combustion space of the engine are forced out through the tubular electrode, and these heat such electrode sufficiently to burn off any carbon deposit which may have accumulated thereon. In this way, the electrode may be cleaned when desired.

I claim as my invention:

1. In a spark plug, the combination of suitable electrode-supporting means including a shell and a porcelain tube, a rod mounted in and positively axially clamped in said porcelain tube but rotatably adjustable therein about its axis, said rod at its inner end being provided with an offset portion which constitutes one of the electrodes, and a second electrode mounted on said electro-supporting means and co-operating with the first electrode to form the spark gap, said second electrode extending transversely of said rod past the axis thereof, the distance between said two electrodes being adjustable by such rotative adjustment of such rod.

2. In a spark plug, the combination of electrode-supporting means including a shell and porcelain tube, an axially extending rod mounted in said porcelain tube and positively axially clamped therein but rotatably adjustable therein about its axis, said rod having an offset portion at its inner end and rotative adjusting means at its outer end, indicating means associated with the outer end of said rod for indicating its rotative position, and a member extending transversely of said rod past the axis thereof and co-operating with said offset portion to form a spark gap the length of which is adjustable by the rotative adjustment of said rod.

3. In a spark plug, the combination of electrode-supporting means including a shell and porcelain tube, an axially extending rod mounted in said porcelain tube and positively axially clamped therein but rotatably adjustable therein about its axis, said rod having an offset portion at its inner end and rotative adjusting means at its outer end, and a member co-operating with said offset portion to form a spark gap the length of which is adjustable by the rotative adjustment of said rod, said member extending transversely of said rod and substantially through the rotative axis thereof.

4. In a spark plug, the combination of electrode-supporting means, an axially extending rod accessible at its outer end and provided at its inner end with an eye which forms one of the electrodes, and a second electrode extending transversely through said eye, the distance between said second electrode and the sides of said eye being adjustable by the rotative adjustment of said rod.

5. In a spark plug, the combination of electrode-supporting means, an axially extending rod accessible at its outer end and provided at its inner end with an eye which forms one of the electrodes, a second electrode extending transversely through said eye, the distance between said second electrode and the sides of said eye being adjustable by the rotative adjustment of said rod, said second electrode consisting of a tube mounted in and extending to the outside of said electrode-supporting means, and means for opening and closing the outer end of said tube.

6. In a spark plug, the combination of electrode-supporting means including a shell and a porcelain tube, an electrode mounted in said porcelain tube, a second electrode carried by said shell, said second electrode extending transversely of the first and comprising a tube extending to the outside of the shell, and a cap mounted on the outer end of said tube and adjustable to open and close it.

7. In a spark plug, the combination of electrode-supporting means including a shell and a poreclain tube, an electrode mounted in said porcelain tube, a second electrode carried by said shell, said second electrode extending transversely of the first and comprising a tube extending to the outside of the shell, and a cap mounted on the outer end of said tube and adjustable to open and close it, said tube and cap being associated so that by the adjustment of the cap an opening of variable size to the atmosphere is provided.

8. In a spark plug, the combination of electrode-supporting means, two electrodes mounted therein and insulated from each other, one of said electrode comprising a rod having an eye at its inner end, and the other electrode comprising a rod transverse to the first rod and extending through said eye, the rod having the eye being rotatively adjustable about its axis to vary the distance between said eye and the other rod.

In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 3rd day of July, A. D. one thousand nine hundred and nineteen.

ROBERT C. BERRY.