Aug. 1, 1939. J. M. WATTS ET AL 2,168,019

SPARK PLUG

Filed July 9, 1937

Fig. 1.

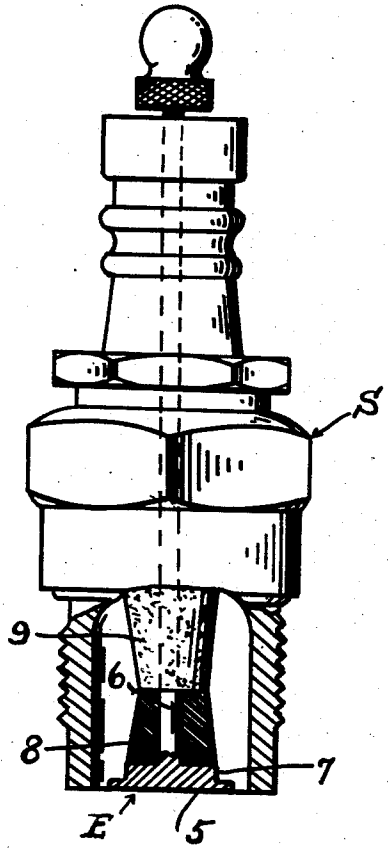



Fig. 2.

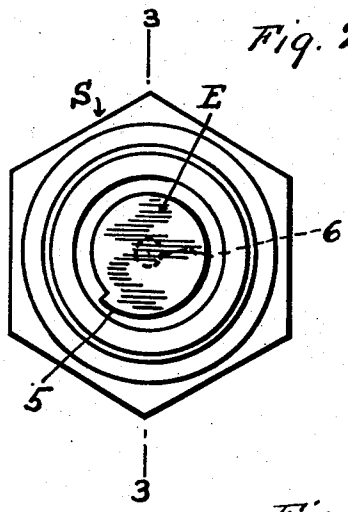



Fig. 3.

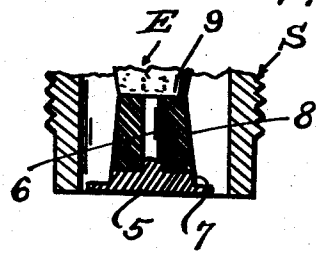



Fig. 4.

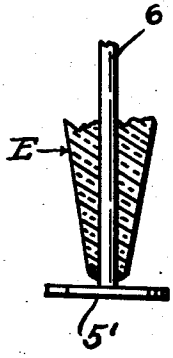



Fig. 5.

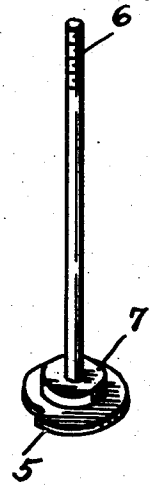
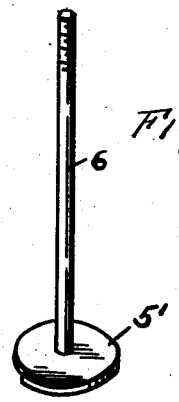



Fig. 6.




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# UNITED STATES PATENT OFFICE

2,168,019

## SPARK PLUG

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Los Angeles, Calif.

Application July 9, 1937, Serial No. 152,840

9 Claims. (Cl. 123—169)

This invention relates to spark plugs and more particularly to an electrode therefor.

The primary object of this invention resides in the provision of a spark plug electrode adapted to be substituted for that set forth in Patent No. 1,952,343 granted to one of the co-inventors of this application.

Another object of this invention resides in the provision of a spark plug electrode possessing all the advantages of the electrode set forth in said patent in addition to eliminating certain objectionable features thereof tending to retard the operation of the same when subjected to heat within the combustion chamber of an internal combustion engine.

A further object of this invention resides in the provision of a spark plug electrode adapted to withstand a high degree of heat without destroying the utility of the electricity conductor thereof.

A still further object of this invention resides in the provision of a spark plug electrode having a particularly constructed electricity conductor.

In addition to the foregoing objects this invention resides in the provision of a spark plug electrode having a particularly constructed electricity conductor associated with insulating material in such manner as will enhance the utility of the same.

Aside from the aforesaid objects this invention resides in the provision of a spark plug electrode having a particularly constructed electricity conductor adapted to be insulated by a particularly constructed dielectric material.

With these and other objects in view this invention resides in certain novel features of construction and arrangement of elements to be hereinafter more particularly set forth in the specification, illustrated in the accompanying drawing and pointed out in the appended claims and, while this disclosure depicts our present conception of the invention, the right is reserved to resort to such changes in construction and arrangement of elements as come within the scope of the claims.

In the accompanying drawing forming a part of this application:

Fig. 1 is a side view of a conventional spark plug partly in section showing the electrode thereof constructed in accordance with this invention, the lower portion of the electrode also being partly in section.

Fig. 2 is an inner end view of the spark plug.

Fig. 3 is a detail vertical sectional view approximately on line 3—3 of Fig. 2 of the inner portion of a spark plug.

Fig. 4 is a detail side view of the inner portion of a modified form of electrode, the insulating material thereof being shown in section.

Fig. 5 is a detail perspective view of the electricity conductor illustrated in Fig. 1.

Fig. 6 is a similar view of the electricity conductor illustrated in Fig. 4.

In the present illustration of this invention the letter S illustrates a conventional spark plug which, among other elements, consists of an electrode E.

The electrode E constituting the subject matter of this application consists of a metallic electricity conductor comprising a stem 6 having a head 5 formed integral therewith and partially disposed eccentrically to the longitudinal axis of the stem in order to adjust the spark gap between the head and body of the spark plug by simply rotating the electrode on the axis of the stem; of course, it being understood adjustment as aforesaid is permitted only after loosening certain adjuncts of the spark plug.

In that form of electrode illustrated by Figs. 1, 2, 3 and 5 the head 5 is provided with a shoulder 7 upon which is disposed a collar 8 formed of mica or other suitable dielectric material, said collar preferably tapers inwardly into contact with a dielectric sleeve 9, formed of porcelain or the like, which is of the conventional type and is adapted to perform the usual function of insulating the electricity conductor from the body of the spark plug.

Through the instrumentality of the aforesaid construction an electrode is provided which will not only withstand a high degree of heat but assurance against disintegration is established by protecting the one-piece electricity conductor as set forth.

In the modified form of electricity conductor illustrated by Figs. 4 and 6 the stem 6 is provided with a head 5' similar to that shown in the first mentioned figures, the shoulder being omitted and with the conventional type of insulation utilized therewith, of course, it being understood that the same may be insulated as shown in the aforesaid figures without destroying its utility.

With this invention set forth it is manifest a spark plug electrode is produced which will readily permit adjustment to form the proper spark gap for different types of internal combustion engines and, through the instrumentality of the particular insulating medium thereof, the elec-

tricity conductor will not break down nor disintegrate when subjected to intense heat.

Having thus described our invention what we claim and desire to protect by Letters Patent is:

1. In a spark plug electrode comprising a metallic stem, a head having a cam-shaped periphery of the step type formed on the stem, a shoulder formed on the head, and insulating material bearing on the shoulder and surrounding the major portion of the stem.

2. In a spark plug electrode comprising an electricity conductor, a head of cam-shaped configuration formed on one end of the conductor, a lug formed on the periphery of the head, a shoulder formed on the head, an insulating sleeve resting on the shoulder and surrounding the adjacent area of the stem and a dielectric material contacting the sleeve and surrounding the major portion of the stem.

3. In a spark plug electrode comprising an electricity conductor, a cam-shaped head formed integrally therewith, a lug formed on the periphery of the cam-shaped head with its outermost wall gradually merging into the periphery of the cam and a dielectric material bearing on the head and surrounding the major portion of the stem.

4. In a spark plug electrode comprising a metallic stem, an eccentrically disposed metallic head integrally formed on one end of the stem and insulating means surrounding the major portion of the stem the major portion of the insulating means being tapered toward the inner end of the spark-plug and the minor portion thereof tapered toward the outer end of the spark-plug.

5. In a spark plug electrode the combination of, an electricity conductor having a head on the inner end thereof, and insulation of different heat resisting materials abutting inwardly of the head of the electrode and tapering in opposite directions from the point of contact thereof, said insulating materials enclosing a certain area of the conductor with the greater heat resisting material disposed adjacent the inner end of the conductor.

6. In an article of manufacture in the form of an electricity conductor for the electrode of spark plugs consisting of a piece of material formed into an eccentric head of the step type having an elongated stem formed integrally therewith.

7. In an article of manufacture in the form of an electricity conductor for the electrode of spark plugs consisting of a piece of material formed into a step-type eccentric head having a dsc-shaped shoulder formed thereon at one extremity of an elongated stem, said stem having its opposite end threaded.

8. In a spark plug comprising a metallic stem, a head formed on the stem and insulating means surrounding a certain area of the stem and having its diameter of reduced thickness between its opposite ends.

9. In a spark plug comprising a metallic stem, a shoulder formed on the inner end of the stem, an eccentric of greater diameter and of lesser thickness than the shoulder formed on the inner end thereof, a substantially conical dielectric collar disposed on the stem and bearing on the shoulder and a substantially conical dielectric sleeve disposed on the stem and having its small end bearing on the smaller end of the collar in close proximity to the shoulder.

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