A. A. RADTKE.

SPARK PLUG.

APPLICATION FILED JUNE 7, 1917.

1,290,780.

Patented Jan. 7, 1919.

Fig. 1.

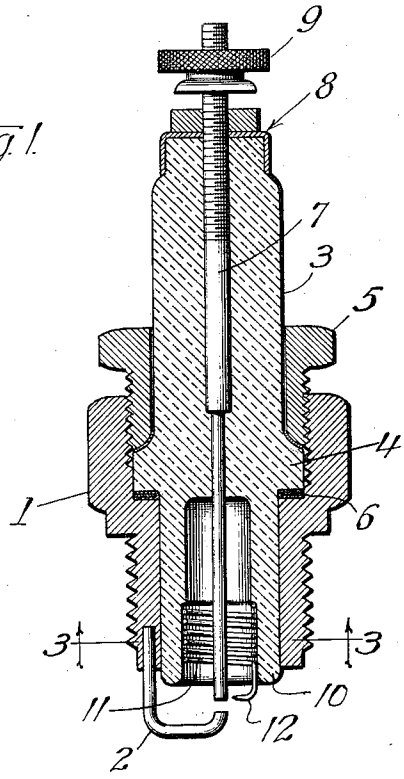


Fig. 2.

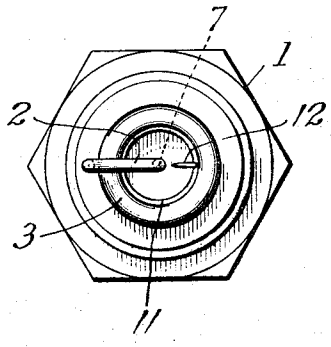
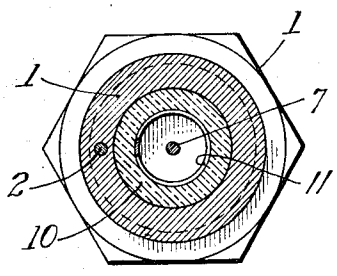


Fig. 3.



Witnesses:
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ALBERT A. RADTKE, OF CHICAGO, ILLINOIS.

SPARK-PLUG.

1,290,780. Specification of Letters Patent. Patented Jan. 7, 1919.

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To all whom it may concern:

Be it known that I, ALBERT A. RADTKE, a citizen of the United States, residing at the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification.

My invention relates to ignition devices for internal combustion engines, and particularly to that form of ignition devices known as spark plugs, in which a spark is caused to jump a gap for the purpose of igniting the explosive mixture. It is well known that when a potential is pressed upon electrodes separated by a spark gap there is a definite time lag between the impressing of the potential and the passing of the spark, and that in all forms of potential producing devices, such as magnetos, induction coils and spark coils, the potential produced is of a wave form which rises and falls, and, consequently, the time lag of the spark is frequently so long that the potential wave falls below the sparking potential before the discharge takes place.

The object of my invention is to reduce the time lag and facilitate the passage of the spark. I have found that if a side spark or discharge is produced near one of the electrodes, so that the spark gap and the spark electrodes are subjected to the action which accompanies and results from the side spark, the main or ignition spark is produced much more easily and without the time lag, and that the spark potential may even be reduced to some extent by this means. This secondary discharge or spark is produced by having an isolated point projecting into the proximity of the electrodes. By isolated I mean having no conductive connection with any portion of the electrical circuit, and likewise having no connection with a condenser connected in or to the circuit.

The principle and construction of my invention are set forth in the accompanying drawing, in which—

Figure 1 is a sectional elevation;

Fig. 2 a bottom view, and

Fig. 3 a section on line 3—3.

Further describing my invention with reference to the drawings, which show one form of my plug which embodies these features: 1 is the threaded metal shell, which screws into the engine and to which the ground electrode 2 is fastened. The insulator 3, extending through the shell is formed with a flanged projection 4 so as to form a sealed joint with the shell when held in place by the screw cap 5 and the metal gasket 6. In the porcelain insulator there is formed a central bore, through which extends the central electrode 7, which is threaded into the terminal cap 8, and the terminal nut 9. Within the petticoat portion 10 of the insulator 3, and engaging therewith, there is secured a coil of wire 11, one end of which 12 is pointed and bent up so as to approach the end of the central electrode 7. I have found that this member should preferably be a conductor, but that an insulator produces the desired result. I have used various forms of construction with success, but prefer to describe my invention in the form here shown.

The operation of the device is as follows: When the potential of the electrodes is raised or lowered they have a potential consequently higher or lower than the coiled wire member 11, and as a result a discharge takes place between the center electrode and the point of the coiled wire member, and since the distance of the coiled wire member to the center electrode is small, a comparatively small potential relative to the main spark potential will cause this discharge, and this discharge acts on the main spark gap and spark electrodes and facilitates the passage of the ignition spark. In operating this plug in parallel with other spark plugs of even less spark gap I find that my form of plug shows a more intense and more uniformly occurring spark.

I claim:

1. In a spark plug, the combination with the usual shell and insulator, of main electrodes respectively carried by said parts and forming the working spark gap directly between themselves, of an auxiliary electrode supported by said insulator, said auxiliary electrode comprising a discharge point projecting toward and disposed adjacent one of the main electrodes, and a body portion surrounding such main electrode, and in inductive relation thereto.

2. In a spark plug, the combination with the usual shell and insulator, of electrodes respectively carried by said parts, and forming a spark gap directly between themselves, and a metallic member supported by said insulator, said member having a portion associated with but insulated from one of

said electrodes, and a portion projecting toward and into proximity to the end of the same electrode, but out of electrical contact therewith.

3. In a spark plug, the combination with the usual shell and insulator, of a central electrode carried by said insulator, axially thereof, a coöperating electrode carried by said shell, and a member supported by said insulator out of contact with said electrodes, said member having a portion disposed in inductive relation to said central electrode and a portion projecting toward the same and extending at substantially right angles thereto.

4. In a spark plug, the combination with the usual shell and insulator, of a central electrode carried by said insulator axially thereof, a coöperating electrode carried by said shell, and a wire coil supported by said insulator, said coil surrounding said central electrode, but insulated from both electrodes, and one end of the wire projecting into proximity to the end of said central electrode.

In witness whereof, I have hereunto subscribed my name this 28th day of May, 1917, at Chicago, Illinois.

ALBERT A. RADTKE