J. J. HAGEN.

SPARK PLUG.

APPLICATION FILED SEPT. 26, 1912.

Patented Nov. 3, 1914.

1,115,526.

Fig. I.

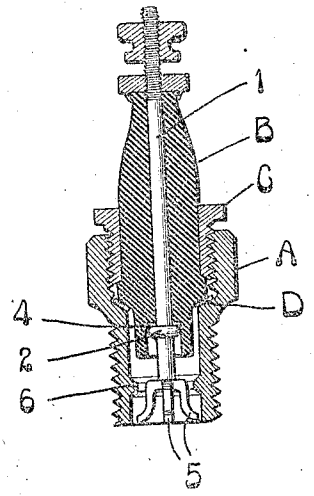
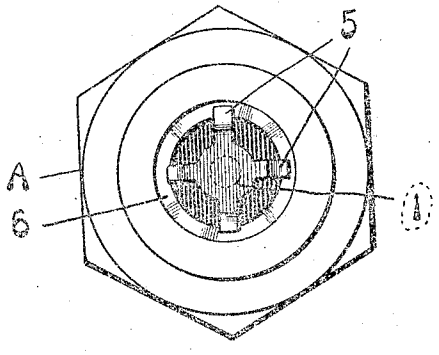


Fig. II.



Witness
Chas. McCauley
E. B. Lincoln.

Inventor:
J. J. Hagen.
by Knight Bros
Attys.

UNITED STATES PATENT OFFICE.

JOSEPH J. HAGEN, OF ST. LOUIS, MISSOURI.

SPARK-PLUG.

1,115,526. Specification of Letters Patent. Patented Nov. 3, 1914.

Application filed September 26, 1913. Serial No. 792,456.

To all whom it may concern:

Be it known that I, JOSEPH J. HAGEN, a citizen of the United States of America, and a resident of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a spark plug for explosive engines, and it has for its object the production of an article of this kind which will be more certain of serviceability than similar articles as heretofore made.

It is a fact well known to users of explosive engines that the sparking points of spark plugs are extremely liable to become coated with deposits of oil or oil and carbon to such a degree as to partially or wholly interfere with the production of sparks for the proper ignition of the gas intended to be ignited by the production of a spark from the spark plug. By my improvement I furnish a spark plug in which the opportunity for the production of the spark is greatly enhanced as compared with the opportunity for the production of a spark in the usual spark plugs, notwithstanding the presence of oil or oil combined with carbon in proximity to the sparking points.

Figure I is a longitudinal section through my spark plug. Fig. II is an enlarged view of the inner end of the spark plug.

In the drawings: A designates a tubular coupling such as ordinarily used in a spark plug to attach the plug to an explosive engine cylinder, B the insulator, and C the retaining screw for securing the insulator in position in the coupling. The insulator rests, as usual upon a suitable gasket D interposed between a seat provided therefore in the coupling and the insulator.

1 designates a stem extending longitudinally through the insulator, and to which one of the circuit wires used in conjunction with the spark plug may be secured as usual. The stem 1 is provided with an annular rib 2, located at the inner end of the insulator B and between which and said insulator is a suitable gasket 4.

The stem 1 has secured to it a plurality of electrodes 5 which radiate from the stem, there being any desired number of these electrodes greater than a single electrode. All of the electrodes extend outwardly from the stem toward the wall of the tubular coupling A which serves as an outer electrode, and between which and said electrodes 5 sparks may be produced by the jumping of an electrical current from the electrodes 5 to the coupling A.

The electrodes 5 terminate, respectively, at different distances from the outer electrode provided by the coupling A, so that one of the electrodes 5 is in comparatively close juxtaposition to the outer electrode, and the other electrodes 5 are more widely separated in different degrees from the outer electrode, as seen in Fig. II.

It will be readily apparent that the provision of a plurality of electrodes affords a multiple of opportunities for the production of a spark, which multiple corresponds to the number of such electrodes 5 and that, should some of such electrodes receive an accumulation of oil or oil and carbon sufficient to prohibit the jumping of an electric spark therefrom to the outer electrode surrounding the electrodes 5, and one or more of the other electrodes 5 be insufficiently coated to such degree as to prevent the jumping of a spark, the spark plug would remain operative and serviceable for the purpose intended. It will also be apparent that due to the electrodes 5 terminating at different distances from the outer electrode, there is opportunity for a greater accumulation of oil, or oil and carbon, on some of the electrodes before the gaps are closed between the electrodes 5 and the outer electrode; and that, consequently, it is possible to secure a spark from the electrodes 5 terminating farthest from the outer electrode, even after the gaps between some of the electrodes 5 have been closed by accumulations of oil or oil and carbon. As an additional means of securing a spark in the use of my spark plug, I provide within the neck of the coupling A an annular rib 6, that surrounds the inner portions of the electrodes 5. The electrodes 5 extend outwardly from the stem 1 opposite this rib, so that their inner portions are in such close proximity thereto as to permit the jumping of a spark from the inner portions of the electrodes to such rib. The rib 6 is, however, in such position relative to the inner ends of the electrodes 5 that an electric current will, under normal conditions, pass more readily to the terminals of said electrodes 5 than from the electrodes 5 to the rib. When,

however, there is sufficient deposit or oil and carbon between all of the terminals of the electrodes 5 and the outer electrode surrounding them to prevent sparking between these members, a spark will be produced between the inner ends of the electrodes 5 and the rib 6, at which point the parts are much less susceptible of accumulation of oil and carbon produced in the cylinder of an explosive engine supplied with my spark plug.

I claim:—

A spark plug comprising an outer tubular electrode having an internal rib intermediate of its ends, an inner electrode stem extending longitudinally within said outer tubular electrode, and a plurality of electrodes carried by said stem, the said electrodes including primary spark terminals arranged at different sparking distances from said outer tubular electrode aside from said internal rib, and having secondary spark elements located opposite said internal rib and at a greater distance therefrom than the distance between any of said primary spark terminals and said outer electrode.

JOSEPH J. HAGEN.

In the presence of—
A. J. McCauley,
E. B. Linn.