

A. HELWIG.
SPARK PLUG.
APPLICATION FILED FEB. 23, 1909.

940,594.

Patented Nov. 16, 1909.

Fig. 1

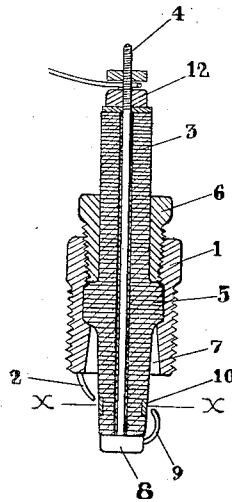


Fig. 3

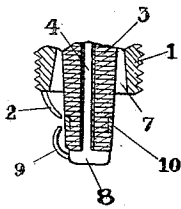


Fig. 2

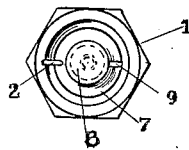
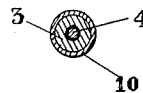


Fig. 4



WITNESSES:

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UNITED STATES PATENT OFFICE.

ALFRED HELWIG, OF DETROIT, MICHIGAN.

SPARK-PLUG.

940,594.

Specification of Letters Patent.

Patented Nov. 16, 1909.

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To all whom it may concern:

Be it known that I, ALFRED HELWIG, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to spark plugs for the ignition systems of explosive engines and more especially to certain improvements therein whereby a double spark gap is provided and whereby the parts may be so adjusted as to give a substantially single spark gap if desired.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a view in longitudinal section of a spark plug embodying features of the invention. Fig. 2 is a view of the inner terminal end thereof. Fig. 3 is a view in longitudinal section of the lower terminal end showing the parts adjusted for producing a single spark. Fig. 4 is a view in transverse section on line $x-x$ of Fig. 1 through a bridge.

Referring to the drawings, an outer shell 1 exteriorly screw-threaded or otherwise fitted for insertion in the wall of a motor's combustion chamber, has a terminal 2 extending from its inner end. An insulating bushing 3, preferably of mica or fiber disks placed on an axial stem 4, has an enlarged center portion 5 by which it is secured in the shell 1, the latter being suitably counter-bored and provided with a clamping nut 6, the parts being so disposed that by releasing said nut the bushing may be adjusted rotatably in the shell. The bushing 3 is considerably longer than the shell 1 and the inner end of the latter is countersunk or provided with an enlarged opening forming an air space 7 around the bushing. A head 8 on the inner end of the stem 4 has a terminal 9 extending toward the shell and so disposed that when turned into register or alinement with the terminal 2 it approaches the latter quite closely and forms an air gap therewith as indicated in Fig. 3. A metal ring 10 is secured on the bushing 3 intermediate the ends of the two terminals with which it forms air gaps. The usual binding post arrangement 12 is provided at the outer end of the stem.

In operation, with normal conditions in the generator for the system for which the plug is used the electrodes are disposed diametrically as in Fig. 1, the two air gaps 60 forming the double jump sparks as required. If for any reason the current weakens, the electrodes may be turned into position indicated in Fig. 3, whereby a wide spark is readily produced, the short air gap between 65 the electrodes together with the proximity of the metal bridge 10 forming an interval which is readily crossed by a current of comparatively low tension.

Obviously, changes in the details of construction may be made, and I do not care to limit myself to any particular form or arrangement of parts.

What I claim as my invention is:—

1. A spark plug comprising an outer shell 75 having a spark terminal on its lower end, an insulated rotatable central stem adjustably secured in the shell having a terminal adapted to form a spark gap with the shell terminal when proximate thereto, and an annular 80 insulated bridge on the stem forming a spark gap with each terminal.

2. A spark plug comprising an outer shell, a spark terminal extending from the lower end thereof, an insulated rotatable central 85 stem adjustably secured in the shell, a terminal on the stem adapted to form a spark gap with the shell terminal when proximate thereto, and an annular insulated bridge on the stem forming spark gaps with 90 the terminals.

3. A spark plug comprising an outer shell having a spark terminal on one end thereof, an insulating bushing rotatably adjustable in the shell, an axial stem in the bushing having 95 a spark terminal on the end adjacent the shell terminal, adapted to form a spark gap therewith when proximate thereto, and an annular bridge on the bushing forming a spark gap with each terminal. 100

4. A spark plug comprising an outer shell having a spark terminal on its inner end, an insulating bushing rotatably adjustable in the shell whose inner end extends past the shell terminal, an axial stem in the bushing 105 having a terminal on its inner end adapted to form a spark gap with the shell terminal when proximate thereto, and an annular bridge on the bushing between and concentric with the two terminals with which it 110 forms spark gaps.

5. A spark plug comprising an outer shell,

an insulating bushing extending there-
through having an enlarged portion medi-
ate its ends seated on a counterbore of the
stem, a clamping nut adjustably securing
5 the bushing, the inner end of the shell hav-
ing an enlarged bore forming an air gap
around the proximate portion of the bush-
ing, a terminal on the inner end of the shell,
an axial stem extending through the bush-
10 ing, a terminal on the inner end thereof

adapted when in register with the shell ter-
minal to form an air gap therewith, and a
metal annular bridge on the bushing adapted
to form an air gap with both terminals.

In testimony whereof I affix my signature 15
in presence of two witnesses.

ALFRED HELWIG.

Witnesses:

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