

E. ROGERS.
SPARK PLUG.
APPLICATION FILED JULY 30, 1919.

1,340,674.

Patented May 18, 1920

Fig. 1.

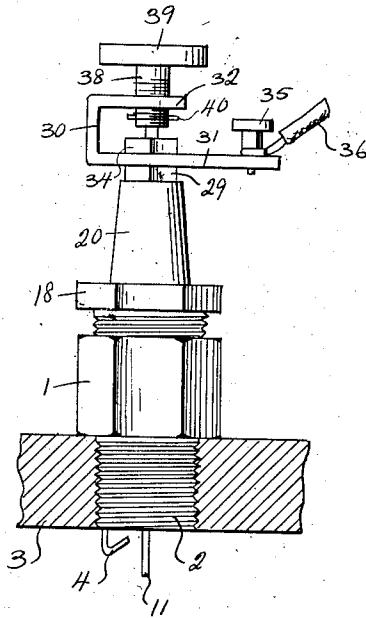


Fig. 2.

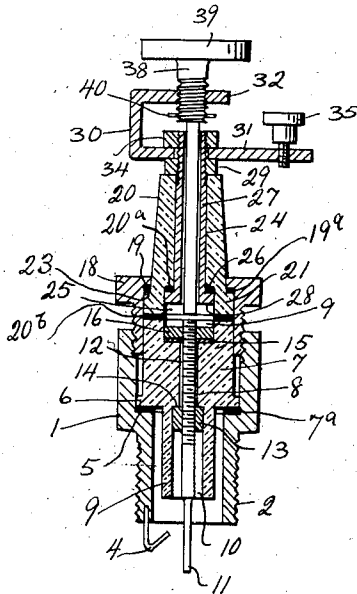


Fig. 3.

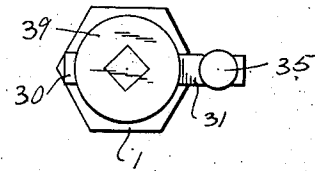
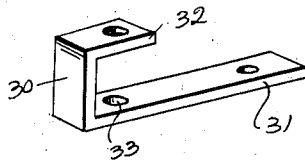


Fig. 4.



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UNITED STATES PATENT OFFICE.

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SPARK-PLUG.

1,340,674.

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To all whom it may concern:

Be it known that I, ERNEST ROGERS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an improved spark plug, for use in connection with internal combustion engines and one of the objects of the invention is to provide an improved device of this kind, which is simple, efficient and practical in construction and may be manufactured for a relatively low cost and sold at a reasonable profit.

A further object of the invention is to provide an improved spark plug, comprising a spark plug casing to hold and support the lower porcelain electrode holder, in combination with a holding cap ring threaded into the spark plug casing, to hold a second porcelain holder adjacent the first porcelain holder, whereby a second electrode may be held and supported, so that the second electrode can be easily and conveniently adjusted.

The invention further aims to provide means whereby the second electrode may be adjusted relatively to the first electrode, for regulating the gap between the two electrodes, in order to increase or decrease the spark between the lower terminal of the first electrode and a terminal which is carried by the spark plug casing. The adjustability of the second electrode also acts to regulate the heat of the spark.

A further object of the invention is to provide a metallic guide mounted in the upper porcelain holder, for the upper electrode, in combination with means for supporting the guide in the porcelain holder.

A further feature of the invention is the provision of means, whereby a conductor or lead may be electrically connected to the second electrode.

While the design and construction at present set forth and illustrated is deemed preferable, it is obvious that as a result of a reduction of the invention to a more practical form for commercial purposes, the invention may be susceptible to changes, and the right to these changes is claimed, pro-

vided they are comprehended within the scope of what is claimed.

The invention comprises further features and combination of parts, as will be hereinafter set forth, shown in the drawings and claimed.

In the drawings:

Figure 1 is a view in side elevation of the improved spark plug constructed in accordance with the invention.

Fig. 2 is a vertical sectional view through the same.

Fig. 3 is a plan view.

Fig. 4 is a detail view of the member to which a lead or conductor is connected for conveying current to the second electrode.

Referring more especially to the drawings, 1 designates a spark plug casing, the reduced portion 2 of which is exteriorly threaded, so as to thread into an opening of the wall 3 of the combustion chamber, of an internal combustion motor. The lower marginal edge of the reduced portion 2 is provided with a sparking terminal 4. The inner wall of the casing 1 is provided with an annular shoulder 5, which is adjacent to the shoulder 6 of a porcelain electrode holder 7. This porcelain electrode holder is constructed of any suitable insulating material, preferably fiber or the like, and is provided with a bore 8. The lower portion 9 of the porcelain holder extends through the smaller portion of the casing 1, while the larger portion of the holder engages the larger interior portion of the casing. The upper part of the bore 8 is counter-bored, to provide a recess 9, while the lower portion of the bore 8 is likewise counterbored, to provide an elongated chamber 10. The bore 8 receives the lower electrode 11, which is exteriorly threaded, as shown at 12, but which threads 12 do not thread into the bore 8, in fact the electrode 11 is somewhat loose in the bore 8. A nut 13 is threaded on the electrode 11 and is designed to engage the shoulder 14, which is intermediate the bore 8 and the counterbored portion 10. In fact, this shoulder 14 is at the junction of the bore 8 and its counterbored portion 10. While the nut 13 is threaded upon the electrode and is capable of adjustment, nevertheless when the electrode is in position, it is the design of the invention to fixedly position the nut.

Engaging on the upper end of the elec-

trode 11 is a washer 15, which engages the bottom of the recess 9, and threaded upon the upper end of the electrode 11 and in contact with the washer is a nut 16. By means of this nut 16, the electrode is held in position in the porcelain holder 7, with the nut 13 in contact with the shoulder 14. The lower end of the electrode coöperates with the terminal of the lower marginal edge of the casing 1, to create a jump spark, whereby the charge in the explosion chamber of the motor may be ignited.

A cap ring 18 is threaded into the upper part of the casing 1, and the interior of the cap ring 18 has a shoulder 19. A second porcelain electrode holder 20 is provided. This porcelain holder 20 has an enlargement 21 at its lower portion, there being a shoulder adjacent the shoulder 5. The porcelain holder 20 rests upon and contacts with the porcelain holder 7, the two porcelain holders are held in such positions by screwing the cap ring firmly into the casing 1, thereby drawing the upper porcelain holder closely in engagement with the lower holder. The body of the upper porcelain holder 20 is tapered and has a bore 24, the lower part of which is counterbored as shown at 25, thereby providing the shoulder 26. A suitable metallic guide sleeve 27 is mounted in the bore 24, and the lower end of the guide sleeve has an annular enlargement 28, which contacts with the shoulder 26. The guide sleeve, particularly near its upper portion is exteriorly threaded, to be engaged by the nut 29, thereby holding the guide sleeve in the bore with its annular enlargement (which is at its lower end) in contact with the shoulder 26. A conductor plate 30, which is U-shaped, is provided. This U-shaped conductor plate comprises long and short arms 31 and 32. The longer arm 31 has an opening 33, through which the upper end of the guide sleeve passes, there being a lock nut 34 threaded upon the upper end of the guide sleeve, to coöperate with the nut 29, to hold the conductor plate firmly in position on the guide sleeve. The longer arm 31 also carries a binding screw 35, to which a wire or lead 36 is connected, for conveying current from the battery (not shown) to the conductor plate and thence to the upper electrode.

The upper electrode 27 is mounted in the guide sleeve, and its upper portion has a threaded enlargement 38, which is threaded through the shorter arm 32 of the conductor plate. This threaded enlargement 38 has a thumb piece or finger engaging head 39, whereby the upper electrode may be adjusted, to increase or decrease the gap between the lower end of the upper electrode and the upper end of the lower elec-

trode. By increasing or decreasing the gap between the two electrodes in this manner, the spark between the lower electrode and the terminal of the casing may be increased or decreased, as well as governing the head of the spark. A dowel pin 40 is fixedly though removably mounted transversely of the threaded enlargement 38. This dowel pin is located below the shorter arm 32 of the conductor plate, and constitutes means to limit the upward adjustment of the upper electrode.

Engaging between the shoulders 19 and 23 is an asbestos washer 19^a. Engaging the shoulder 26 of the counterbored portion 25 of the porcelain holder 20 is an asbestos washer 20^a. Engaging between the two porcelain holders is an asbestos washer 20^b, and engaging between the porcelain holder 7 and the shoulder 5 is an asbestos washer 7^a. The invention having been set forth, what is claimed as new and useful is:

1. In a spark plug, the combination with a spark plug casing for engagement with the wall of the combustion chamber of the motor, of a porcelain electrode holder mounted in said casing, an electrode mounted in said porcelain holder, the lower end of the casing having a sparking terminal to coöperate with the lower end of said electrode, a second porcelain electrode holder super-imposed and in contact with the first holder, means on said casing to hold the two porcelain holders in position, guiding means in the second porcelain holder, a second electrode mounted in the guiding means and having means whereby the second electrode may be adjusted relatively to the first electrode, and a conductor plate carried by the guide means and being engaged by the second electrode.

2. In a spark plug, the combination with a spark plug casing having a sparking terminal at one end, of an insulating holder mounted therein and including an electrode, a second insulating holder having guide means, means detachably engaging said casing for drawing the two holders together, a conductor plate mounted on the guide means, a second electrode adjustably mounted in the conductor plate, whereby its lower end may be adjusted relatively to the upper end of the first electrode.

3. In a spark plug, the combination with a spark plug casing having a sparking terminal at one end, of an insulating holder mounted therein and including an electrode, a second insulating holder having guide means, means detachably engaging said casing for drawing the two holders together, a conductor plate mounted on the guide means, a second electrode adjustably mounted in the conductor plate, whereby its lower end may be adjusted relatively to the upper end

of the first electrode, and means carried by the second electrode for limiting the same in its adjustment.

4. In a spark plug, the combination with
 5 a spark plug casing having a sparking terminal at its lower end, of an insulating holder mounted therein and including an electrode to cooperate with the sparking terminal, a second insulating holder, means
 10 adjustably carried by the casing to hold the two insulating holders together, and a guide sleeve in the second holder, a U-shaped conductor plate carried by the upper end of the guide sleeve, a second electrode adjustably
 15 mounted in one of the arms of the U-shaped conductor plate and guided in the sleeve, whereby its lower end may be adjusted relatively to the first electrode.

5. In a spark plug, the combination with
 20 a spark plug casing having a terminal at one end, of an insulating holder mounted therein and including an electrode to cooperate with said sparking terminal, a second insulating holder, means adjustable on
 25 the casing for drawing the two holders together, guide means in the second holder, a U-shaped conductor plate comprising long and short arms removably mounted upon said guide means, the longer arm having a
 30 binding post for a conductor wire, a second electrode threaded into the shorter arm of the conductor plate and extending through the guide means, and adapted to be adjusted relatively to the first electrode,
 35 and means carried by the second electrode and cooperating with the shorter arm, to limit the second electrode in its adjustment.

6. In a spark plug, the combination with

a spark plug casing for engagement with the wall of the combustion chamber of the
 40 motor, of an insulating electrode holder mounted in said casing, an electrode mounted in said holder, the lower end of the casing having a sparking terminal to co-
 45 operate with the lower end of said electrode, a second insulating electrode holder superimposed and in contact with the first holder, means on said casing to hold the two holders in position, guiding means mounted
 50 in the second holder, a conductor plate adjustably carried on the upper end of the guiding means, a second electrode mounted in the guiding means and in the conductor plate and having means whereby it may be
 55 adjusted relatively to the first electrode.

7. In a spark plug, the combination with
 a spark plug casing having a sparking terminal at one end, of an insulating holder
 60 mounted therein and including an electrode, a second insulating holder having guiding means, means detachably engaging said casing for drawing the two holders together,
 a conductor plate adjustably mounted on the upper end of said guiding means, a second
 65 electrode engaging the guiding means and adjustably engaging the conductor plate, whereby its lower end may be adjusted relatively to the upper end of the first electrode.

In testimony whereof I hereunto affix my
 70 signature in the presence of two witnesses.

ERNEST ROGERS.

Witnesses:

FRANK NUTTING,
 Mrs. E. ROGERS.