G. F. KNORR.

SPARK GAP.

APPLICATION FILED OCT. 6, 1913.

1,111,963. Patented Sept. 29, 1914.

Fig. 2.

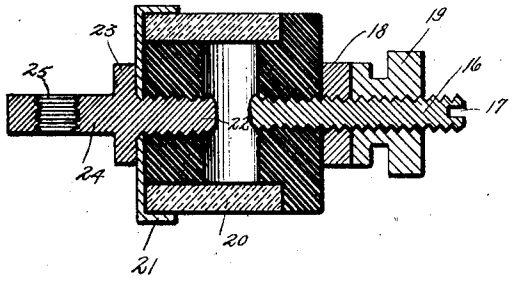


Fig. 1.

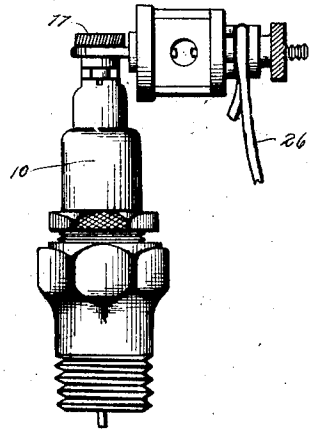
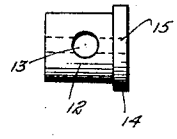


Fig. 3.



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UNITED STATES PATENT OFFICE.

GOTTLIEB F. KNORR, OF DES MOINES, IOWA.

SPARK-GAP.

1,111,963. Specification of Letters Patent. Patented Sept. 29, 1914.

Application filed October 9, 1913. Serial No. 793,956.

To all whom it may concern:

Be it known that I, GOTTLIEB F. KNORR, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented a certain new and useful Spark-Gap, of which the following is a specification.

The object of my invention is to provide a spark gap of simple, durable and inexpensive construction especially designed to be mounted on a spark plug of an internal combustion engine.

More particularly, it is my object to provide a spark gap which may be placed in an electric circuit and is provided with transparent means whereby the spark may be watched.

Still a further object is to provide a spark gap of the kind mentioned so constructed that it may be placed in an electric circuit with the spark or insulating parts, and with parts so constructed and arranged as to vary the length of the gap.

Still a further object is to provide such a device having means especially adapted to be mounted on a spark plug and designed for strengthening the spark on the interior of the cylinder.

My invention consists in certain details, in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 shows a side elevation of a spark gap embodying my invention installed on a spark plug. Fig. 2 shows a vertical longitudinal, sectional view through the spark gap, and Fig. 3 shows a side elevation of the fiber body forming a part of my spark gap.

In the accompanying drawing, I have used the reference numeral 10 to indicate generally a spark plug which may be of the ordinary construction provided with ordinary screw threaded wire or rod at its outer end to receive a nut 11.

My improved spark gap comprises a body 12 made of fiber or other suitable insulating material which may be readily molded. The body 12 is preferably cylindrical and is provided with a transverse cylindrical opening extending through it from side to side and with a longitudinal, central opening 15, shown by the dotted lines in Fig. 3, extending through it from end to end and preferably screw threaded.

Formed on one end of the body 12 is a circumferential annular flange 14. The opening 15 extends through the flange 14. Received in the opening 15 and extending through the flange 14 and a portion of the body 12 is a screw threaded rod 16, the inner end of which extends into the opening 13 and the outer end of which is provided with a notch 17 to receive a screw driver. On the screw threaded rod 16 is an ordinary nut 18 and a thumb nut 19.

Mounted on the body 12 is a hollow cylinder 20 preferably of glass or other suitable non-conducting transparent material which seats against the flange 14 as a shoulder and preferably extends flush with the edge of the opposite end of the body 14, as shown in Fig. 2. Received on the end of the body 12 opposite the flange 14 and on the end of the glass casing or cylinder 20 is a retaining cap 21 having a central opening which registers with the opening 15. Received in the opening in the cap 21 and extending into the opening 15 in the body 12 as far as the opening 13 is a screw threaded rod 22; formed on said rod just outside the cap 21 is a circumferential annular flange 23. Formed on said rod beyond the flange 23 is a flat portion 24 having a screw threaded opening 25 designed to be received on the screw threaded outer end of the current conducting wire or rod of a spark plug in the manner shown in Fig. 1. A current conducting wire 26 may be also secured to the rod 16 between the nuts 18 and 19, as shown in Fig. 1.

In the practical use of my improved spark gap, the portion 24 is secured to the spark plug and the rod 16 to the current carrying wire 26. The rod 24 is arranged to project into the opening 13. It will readily be seen that by loosening the nuts 19 and 18, the rod 16 may be screwed into or out of the body 12 for varying the distance between the inner ends of the rods 16 and 24.

When my spark gap is used on an internal combustion engine, the engineer may ascertain at a glance which, if any, of the spark plugs are not working properly and can also easily determine the strength of the spark which he is obtaining in each plug. While the spark in the gap and the spark in the

plug are not exactly the same they have a definite relation so that with a little experience the engineer can determine from the spark in the gap what spark he is obtaining in the plug.

My improved spark gap has a number of advantages. It utilizes the well known electrical phenomenon that, where the current is broken or forced to jump the gap, the spark at the next gap will be stronger than would otherwise be the case. I have therefore found it to be a fact that by the use of my gap, I can increase the strength of the spark in the plug. Where my spark gap is used the current thereafter will follow the conducting wire or rod more readily and a spark plug will work in oil or with a broken porcelain. I am therefore enabled to make a considerable saving in making it possible to use plugs that would otherwise have to be discarded. The bodies 12 may be molded or turned out at a very small expense for labor or material. The cap 21 is preferably formed with a die. The cylinders 20 may be purchased at a very small price and the other parts are comparatively inexpensive so that the cost of manufacturing my spark gap is very small, due to the simplicity of the parts. No screws are needed except those which are formed on the current conducting rods.

Another advantage of my gap lies in the fact that the current conducting rods are thoroughly insulated over their portions adjacent to their inner ends.

I claim as my invention:

1. A spark gap, comprising a cylinder made of insulating material and having a transverse opening extending through it and a longitudinal opening extending through it, said cylinder being formed with an annular flange at one end, a hollow cylindrical transparent body mounted on said cylinder resting against said flange, a cap on said transparent cylinder and said first cylinder on the ends thereof opposite said flange, a screw threaded rod extending into said longitudinal opening to said transverse opening through said cap, said rod having a flange formed outside of said cap, and means formed on its outer end for securing it to a spark plug, and a screw threaded rod received in the other end of said longitudinal opening.

2. In a device of the class described, a body of insulating material having a transverse opening extended through it, screw threaded rods mounted longitudinally in the ends of said body and extending into said body to said opening, said body being formed with an annular flange at one end, a transparent cylinder received on said body and resting against said flange, and a cap on said body and on said cylinder on the end of the body opposite the flange, one of said screw threaded rods being provided with a flange for holding said cap in position for securing said transparent cylinder on said body.

Des Moines, Iowa, September 25, 1913.

GOTTLIEB F. KNORR.

Witnesses:
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