R. F. STEPHENSON.

SPARK PLUG.

APPLICATION FILED APR. 16, 1920.

1,420,159. Patented June 20, 1922.

Fig. 1

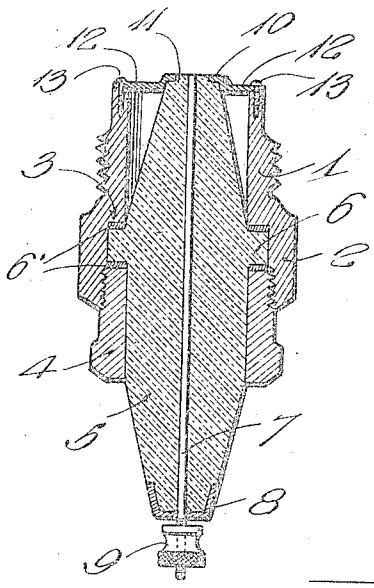


Fig. 2

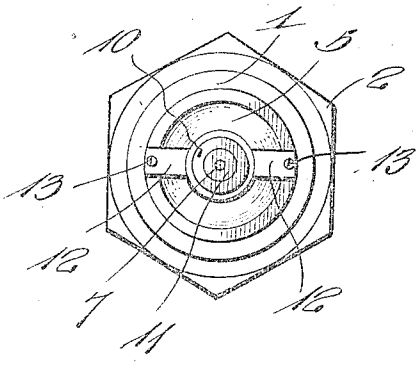


Fig. 4

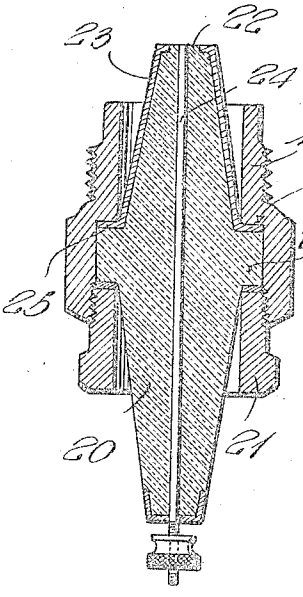


Fig. 3

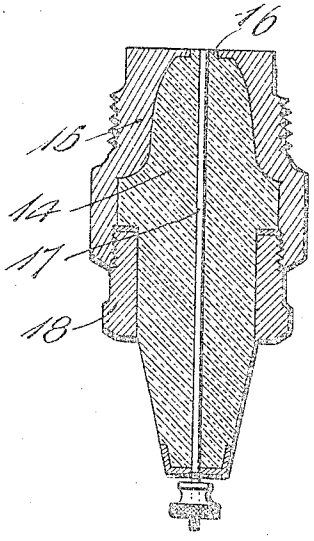
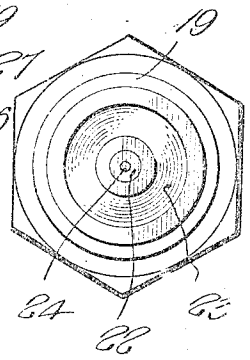


Fig. 5



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SPARK PLUG.

1,420,159. Specification of Letters Patent. Patented June 20, 1922.

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To all whom it may concern:

Be it known that I, ROBERT F. STEPHENSON, a citizen of the United States, residing at Augusta, in the county of Butler, State of Kansas, have invented a new and useful Improvement in Spark Plugs, of which the following is a specification.

This invention relates to an improved spark plug and one object of the invention is to provide a plug which will be self-cleaning and in which a spark will serve to burn carbon off of the plug in case any should attempt to accumulate thereon.

Another object of the invention is to provide a plug which can be cleaned of any accumulated carbon by simply rubbing the end of the plug across a piece of rough cloth.

Another object of the invention is to provide a spark plug which will be very strong and in which the porcelain will not be liable to be easily cracked as it is not necessary to take the plug apart to clean the same.

Another object of the invention is to provide a spark plug so constructed that it will be easy to assemble and when assembled be strong and durable and very serviceable when in use.

This invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a sectional view through one form of the improved plug.

Figure 2 is a view looking at the end of the plug as constructed in Fig. 1.

Figure 3 is a longitudinal sectional view through a modified form of plug.

Figure 4 is a further modification.

Figure 5 is an end view of the form shown in Fig. 4.

The spark plug in the form shown in Figs. 1 and 2 is provided with a shell or body 1 having one end portion enlarged to provide a wrench-engaging portion 2, the enlarged end portion 2 being formed internally to provide a seat 3 and having its outer portion threaded to receive the packing nut 4 by means of which the porcelain will be firmly secured in place. This porcelain 5 extends through the body as shown in Fig. 1 and is provided with an outstanding angular shoulder 6 which will be engaged by the packing nut 4 and thus the porcelain securely but releasably held in place when the nut is tightened. Gaskets 6' are provided upon the porcelain as shown, so that there will be no danger of the porcelain being cracked and further to provide a gas-tight joint when the securing nut is tightened. The electrode 7 extends through the porcelain as shown and at its end extends beyond the cap 8 and carries the securing nut 9 by means of which conductor wires may be secured to the plug. At the inner end, the electrode terminates flush with the end of the porcelain. A bridge is mounted upon the inner end portion of the porcelain and connected with the shell or body 1 and is provided with a cup-shaped central portion 10 which fits upon the inner end of the porcelain and is provided with a central opening through which extends the reduced end portion 11 of the porcelain. Arms 12 extend from this cup-shaped central portion and are provided with openings through which the securing screw 13 may pass and into threaded sockets formed in the shell. It should be noted that the openings through which the extended or reduced end portion of the porcelain 11 passes, is relatively small and therefore a very small space will be left between the electrode and the cup. This space is so small that the spark may easily jump across the porcelain to the bridge or electrode 10 which is ground to the outer shell 2 by screws 13. If carbon should gather upon one portion of the extended end of the porcelain between the electrode and the bridge, the spark would pass through the carbon as this would be the point of less resistance and this small deposit of carbon would thus be burnt. If however, a sufficient quantity of carbon should gather upon the end of the plug to interfere with proper operation of the plug, it would simply be necessary to remove the plug and rub the bridge and end portion 11 of the plug along a piece of cloth or other rough substance. This would serve to very effectively remove the carbon and would leave the porcelain clean. If for any reason, dirt should accumulate in the space between the tapered end portion of the porcelain and the body portion of the plug, this will not interfere with the proper functioning of the plug for as long as the end surface 11 remains clean and the porcelain body is not cracked, the plug will function properly.

In the form shown in Fig. 3, the porcelain 14 fits within and entirely fills the major portion of the spark plug shell or body 15 and is provided with a reduced end portion 16 which corresponds to the end portion 11 and

extends through a small opening formed in the body 15. The end of the electrode 17 terminates flush with the extended end 16 of the poreclain and the porcelain is flush with the end of the body 15. Therefore, the spark could jump easily across the small circle of porcelain to the body of the plug and carbon which may accumulate upon the porcelain could be easily wiped off after the manner set forth in connection with the form shown in Figs. 1 and 2. In this form, the porcelain is held in place by means of a nut 18 similar to the nut 4 which would be removed when it is desired to remove the porcelain and either thoroughly clean it or replace it with a new one.

In the form shown in Figs. 4 and 5, the body or shell 19 of the plug is similar in construction to the form shown in Fig. 1 and the porcelain is also of a construction similar to that shown in Fig. 1. This porcelain 20 is held in place by a securing nut 21 similar to the nut 4. The porcelain in this form is extended beyond the end of the shell and provided with a reduced end 22 which corresponds to the reduced end 11. Instead of providing a bridge or other similar structure, there has been provided a cap or jacket 23 which fits upon the tapered end portion of the porcelain and is provided with a small opening in its outer end through which the reduced end portion 22 of the porcelain extends with the end of the porcelain terminating flush with the end of the cap and the electrode 24 terminating flush with the end of the porcelain. This cap is provided at its inner end with an outstanding flange or collar 25 which is clamped between the outstanding shoulder 26 and abutment shoulder or seat 27 of the spark plug body. This outstanding collar 25 takes the place of one of the gaskets 6' as well as providing means for permitting the cap or jacket to be securely held in place. It will thus be seen that in each form the electrode terminates flush with the reduced end of the porcelain and this reduced end extends through a small opening so that the end of the electrode is separated from the metal leading to the body of the plug by a very small space of porcelain across which the spark can easily jump. It will further be noted that in each form the plug provides a structure which can be easily and quickly cleaned but which in most cases will be self-cleaning and may be thoroughly cleaned by simply rubbing across a piece of rough cloth.

I claim:

A spark plug comprising a body, a porcelain secured in said body and having a reduced end, an electrode extending through the porcelain and having its end terminating flush with the poreclain at the reduced end thereof, and a bridge having a central portion fitting upon the porcelain and provided with an opening receiving the reduced end thereof, and the outer face of the central portion of the bridge being flush with the end of the porcelain, arms extending from the central portion of the bridge and connected with the body of the plug at the end thereof.

In testimony whereof I affix my signature.

ROBERT F. STEPHENSON.