J. J. SMITH, JR.

SPARK PLUG.

APPLICATION FILED NOV. 13, 1915.

1,200,663. Patented Oct. 10, 1916.

Fig. 1.

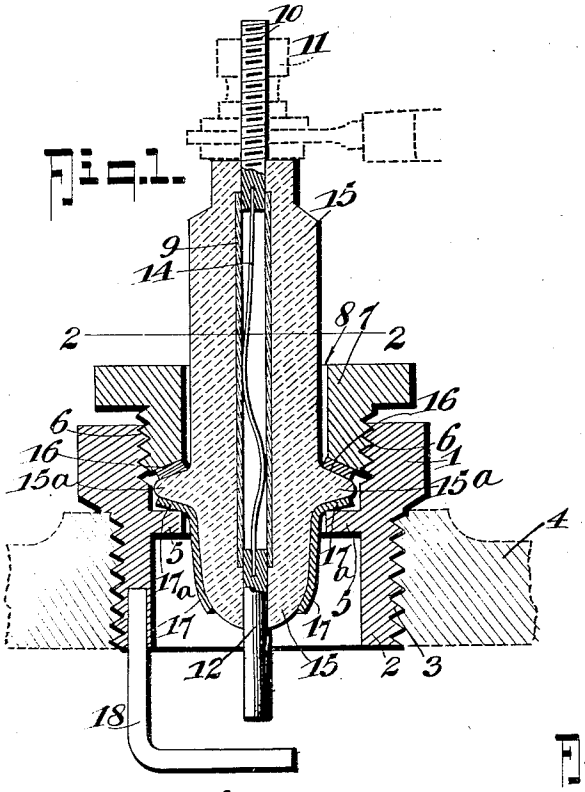
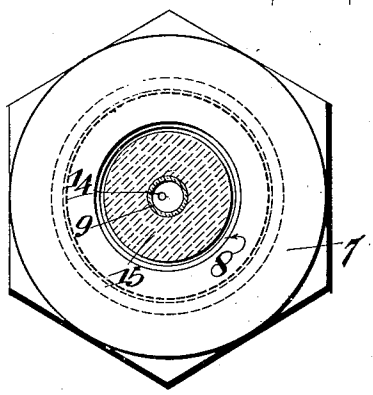


Fig. 2.



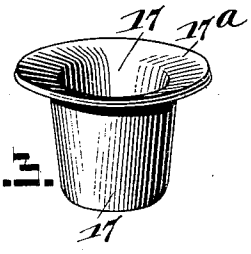


Fig. 3.

Fig. 4.

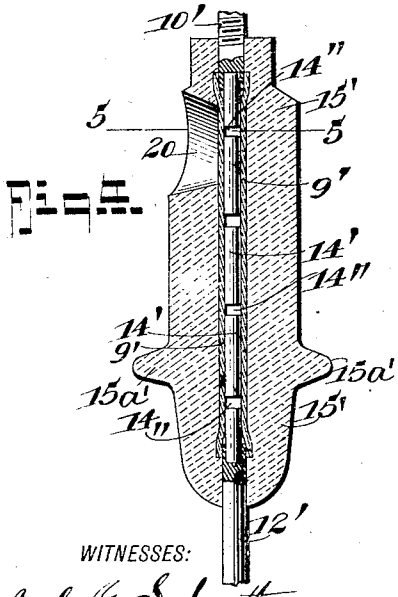
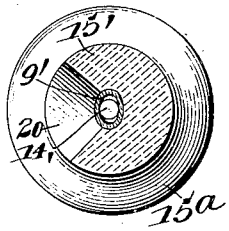


Fig. 5.



WITNESSES:

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SPARK-PLUG.

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To all whom it may concern:

Be it known that I, JOSEPH JOHN SMITH, Jr., a citizen of the United States, and a resident of Benton Harbor, in the county of Berrien and State of Michigan, have invented a new and useful Improvement in Spark-Plugs, of which the following is a specification.

My invention relates to improvements in spark plugs, and it consists in the combination, construction and arrangement herein described and claimed.

An object of my invention is to provide a spark plug having a porcelain core, the parts being so arranged that the core may expand and contract without injuries.

A further object of my invention is to provide a spark plug having means for intensifying the spark.

A further object of my invention is to provide a spark plug having a central glass tube around which is molded a porcelain insulator, said glass tube containing a central conducting member, the conducting member, glass tube and porcelain insulator being made air and gas-tight.

A further object of my invention is to provide a spark plug of the type described which is cheap to manufacture, but strong and durable.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawing, forming part of this application, in which—

Figure 1 is a central section through the device, Fig. 2 is a section on the line 2—2 of Fig. 1, Fig. 3 is a perspective view of a ferrule, Fig. 4 is a sectional view through a modified form of core, and Fig. 5 is a section along the line 5—5 of Fig. 4.

In carrying out my invention I make use of a sleeve or shell 1, which has a threaded portion 2 arranged to enter the opening 3 in the cylinder 4. The sleeve is provided with an inwardly extending flange 5 which forms a shoulder for supporting the core as will be hereinafter explained. The sleeve is threaded internally at 6 to receive a screw plug 7 which is provided with a central opening 8. The construction thus far described is ordinary and forms no part of my invention, except in so far as these parts coöperate with the novel features hereinafter pointed out.

In forming the core of the plug a glass tube 9 is provided. In the upper end is a conducting terminal 10 which is threaded for a binding post 11. In the lower part of the glass tube is secured a terminal 12. Secured to the upper terminal and extending downwardly to the lower terminal 12 is a strip of flexible conducting material 14. A porcelain body portion 15 is now molded around the glass portion 9 and its terminals. This porcelain body portion is provided with an enlarged portion 15^a arranged to enter between the flange 5 and the end of the plug 7. Between the portion 15^a and the plug 7 is disposed a gasket 16. A ferrule 17 which is made of metal fits on the lower portion of the porcelain, and has a flange 17^a. With the parts made as shown in Fig. 1, it will be seen that by screwing the plug 7 firmly down on the gasket 16 the core is held securely. The ferrule 17 serves a double function; its flange 17^a serves as a gasket, while the lower portion serves as a means for retaining any portions of the porcelain core which may crack off. It will be observed that the porcelain has opportunities to expand or contract freely in all directions with the exception of the point at which it is held, to-wit: at the enlarged portion 15^a, or rather on the upper and lower sides of the enlarged portion. Any expansion upwardly or downwardly, of course, will make the joints tighter and thereby prevent the escape of gases.

In Figs. 4 and 5 I have shown a modified form of the device. In constructing this modified form I provide an inner tube 9′ of glass, at the top of which is a threaded terminal 10′ and at the bottom is a terminal 12′. Disposed in the glass tube at equal intervals are conducting members 14′ which are separated by gaps 14″. After the terminals and the conducting members 14′ have been put in place, the glass tube is compressed so as to hold these members securely in position, as shown in Fig. 5. A porcelain body portion 15′ is then molded around the glass tube with its inclosed conducting portions. This body portion is provided with an extension $15^{a'}$ and with a window opening 20, this window opening being opposite one of the spark gaps 14″. In this form of the invention the inner conducting portions

14' being separated by the spark gaps 14'' serve to intensify the spark so that a hot fat spark at the sparking terminals within the cylinder is assured. The window 20 serves the purpose of viewing the working of the device, if desired.

One of the advantages of the spark plug which forms the subject of this invention is that there is no danger of any of the parts working loose, since the core portions are molded together in the manner described. The porcelain core has a smooth appearance and is of durable construction.

I claim:—

1. In a spark plug construction, a core comprising a central tube of glass having terminals held at the opposite ends of the tube, a conducting portion disposed between the terminals inside the tube, and an insulating body portion molded around said central glass portion and said terminals.

2. In a spark plug construction, a core comprising a central tube of glass having terminals held at the opposite ends of the tube, a conducting portion disposed between the terminals inside the tube, an insulating body portion molded around said central glass portion and said terminals, said insulating body portion having a laterally extending portion, a metallic sleeve or shell having an inwardly extending flange, a screw plug, said laterally extending portion being arranged to extend between said annular flange and said screw plug.

3. In a spark plug construction, a core comprising a central tube of glass having terminals held at the opposite ends of the tube, a conducting portion disposed between the terminals inside the tube, an insulating body portion molded around said central glass portion and said terminals, said insulating body portion having a laterally extending portion, a metallic sleeve or shell having an inwardly extending flange, a screw plug, said laterally extending portion being arranged to extend between said annular flange and said screw plug, and a metal ferrule having a flange disposed between said laterally extending portion and said annular flange, the lower part of said ferrule inclosing a portion of the porcelain insulator.

4. In a spark plug construction, a core comprising a central tube of glass having terminals held at the opposite ends of the tube, a conducting portion disposed between the terminals inside the tube, an insulating body portion molded around said central glass portion and said terminals, said insulating body portion having a laterally extending portion, a metallic sleeve or shell having an inwardly extending flange, a screw plug, said laterally extending portion being arranged to extend between said annular flange and said screw plug, a metal ferrule having a flange disposed between said laterally extending portion and said annular flange, the lower part of said ferrule inclosing a portion of the porcelain insulator, and a gasket disposed on the opposite side of the extension from the ferrule flange and arranged to be engaged by said screw plug for clamping the parts together.

5. In a spark plug construction, a central glass tube, a plurality of conducting members disposed within the glass tube and held therein by frictional engagement with the glass tube, said conducting members being spaced apart, a conducting terminal at each end of said glass tube, and a porcelain insulating body portion inclosing said glass tube and a portion of each of said terminals.

6. In a spark plug construction, a central glass tube, a plurality of conducting members disposed within the glass tube and held therein by frictional engagement with the glass tube, said conducting members being spaced apart, a conducting terminal at each end of said glass tube, and a porcelain insulating body portion inclosing said glass tube and a portion of each of said terminals, said porcelain body portion being provided with an opening on one side arranged to register with one of the gaps between adjacent conducting members within the central glass tube.

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Witnesses:

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