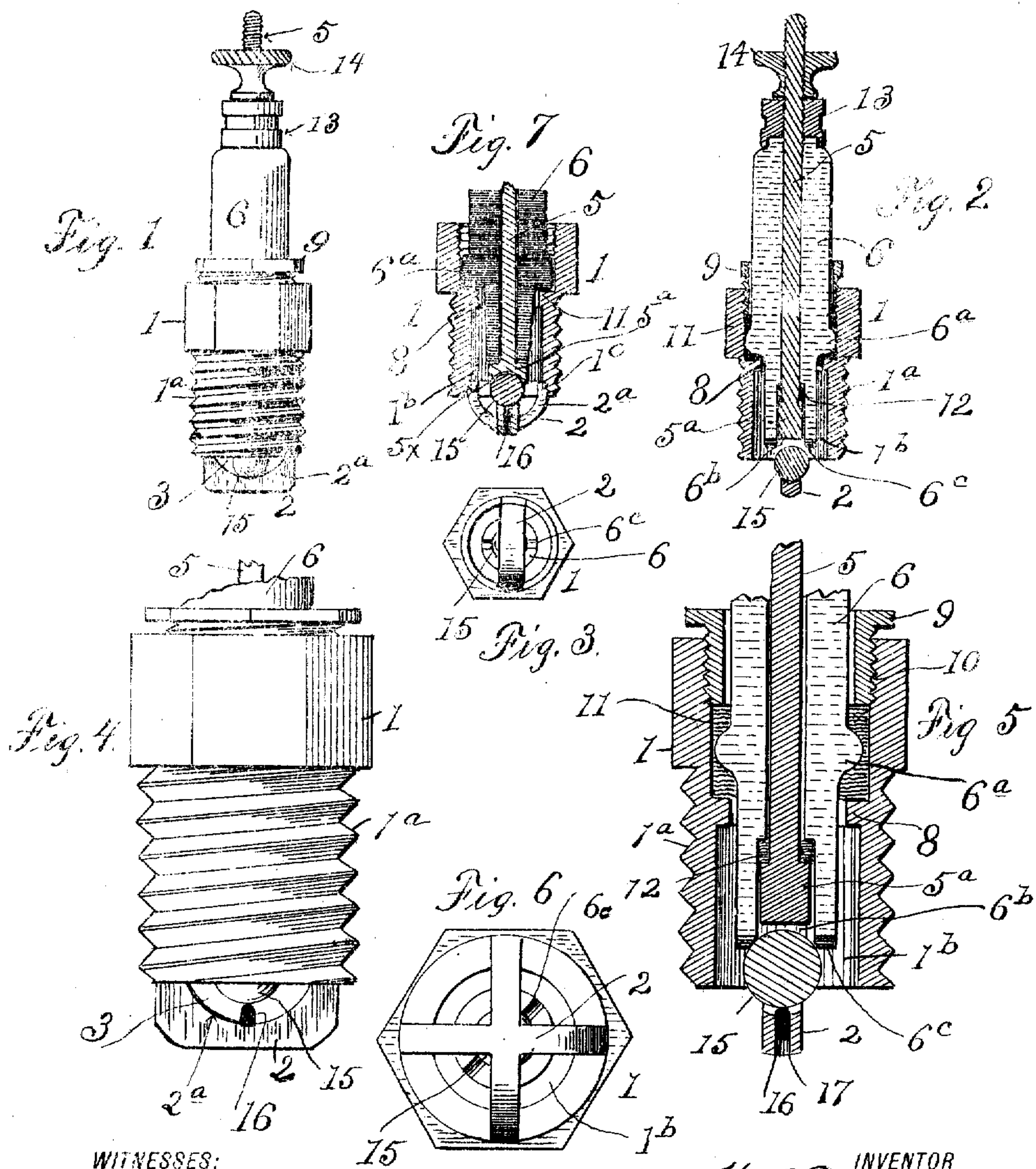


H. F. PARKER.
SPARK PLUG.
APPLICATION FILED DEC. 1, 1908.

913,045.

Patented Feb. 23, 1909.



WITNESSES:

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SPARK-PLUG.

No. 913,045.

Specification of Letters Patent.

Patented Feb. 23, 1909.

Application filed December 1, 1906. Serial No. 345,930.

To all whom it may concern:

Be it known that I, HENRY F. PARKER, a citizen of the United States, and resident of Montclair, Essex county, New Jersey, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification.

The object of my invention is to provide a spark plug or igniter for internal combustion engines which shall be reliable in operation, produce effective sparking, and be capable of withstanding the work to which it is subjected.

My invention comprises the novel details of improvement and arrangement of parts that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming part hereof, wherein—
Figure 1 is a side view of a spark plug embodying my improvements, Fig. 2 is a vertical section thereof, Fig. 3 is an end view thereof, Fig. 4 is an enlarged detail view of part of the plug, showing the ball engaging insulation, Fig. 5 is a vertical section thereof, Fig. 6 is an end view of the plug, showing a plurality of terminal bars, Fig. 7 is a detail sectional view, showing a modification.

In the accompanying drawings, in which similar numerals of reference indicate corresponding parts in the several views, the numeral 1 indicates the metal body portion of the plug, which is shown as hollow and provided with external threads 1^a for connection with an engine, and serves as a ground for the electric current, and at its open end said body 1 is shown provided with a cross member or terminal 2 which may be made integral with said body by cutting away the metal of the body at its extremity, leaving a space 3 leading to the bore 1^b of said body, the inner surface 2^a of said terminal being shown concave. At 5 is a metal rod or conductor passing through the bore 1^b of the body 1 and insulated therefrom by suitable insulation 6 that extends within the body and projects upwardly therefrom. The insulation 6 may be made in a single piece of suitable material, such as porcelain, or may be made of disks of mica held tightly together, as illustrated in Fig. 7. The insulation 6 has an annular enlargement 6^a to bear against an internal annular shoulder 8 within body 1, and may be held in place

by a nut 9 screwing into threads 10 within the outer part of the bore of body 1 to detachably hold the insulation 6 in place, and by preference I interpose resilient insulation 11, such as asbestos, between the enlargement 6^a, the shoulder 8, and the nut 9 where a friable insulating piece 6, such as porcelain, is used. The insulation 6 is shown of less diameter than the bore 1^b to provide a space between the insulator and body 1 to resist short circuiting by carbon or soot deposit on the walls. The rod 5 is shown provided with a head 5^a located within the depression or bore 6^b in the insulating member 6, resilient insulation, at 12, such as asbestos being preferably interposed in the bottom of depression or bore 6^b against which the head 5^a bears, which insulation, by being made of asbestos, will resist heat, prevent the escape of gases, and provide against breakage of the parts by expansion.

The end of the insulating member 6 within the bore 1^b of body 1, that projects beyond the head 5^a of rod 5, is provided with one or more transverse cuts or depressions, at 6^c, to provide lateral openings in the bore 6^b. The rod 5 may be secured in place within the insulating member 6 by a cap 13 having internal threads engaging the threads upon rod 5, so that when screwed down said cap will bear against the insulation 6 and draw the head 5^a of rod 5 firmly to its seat against the insulation 12. A nut 14 on the threaded part of rod 5 permits connection of said rod with a circuit wire.

At 15 is a movable metal member, shown in the form of a ball, interposed between the head 5^a of rod 5 and the cross bar or terminal 2 of body 1, and forming a portion of the circuit of the plug and from which the sparks will jump to the terminal 2. Said ball fits somewhat loosely between the end of insulating member 6, or conductor 5, and the terminal 2 so as to move about to decrease the tendency for the deposit of soot or carbon on the ball and the parts with which it makes contact, and when said ball fits against or into the open end of the insulating member 6 the depressions or cuts 6^c permit gases to pass behind the ball into the bore or space 6^b, and the insulation 6 keeps the ball from contact with conductor or rod 5, as the terminal end of rod 5 is located within the end of the insulating member 6. To assure that the spark will jump between the ball 15 and

the terminal 2 when the plug is held in the position shown in the drawings, or with the ball hanging down, I provide insulation 16 on the cross bar or terminal 2, which may be a piece of magnesia rod, lavite, or other suitable heat-resisting insulation, inserted in a hole 17 in terminal 2, and which will project a suitable distance inwardly from terminal 2 so that the ball 15 will remain at a suitable distance from terminal 2, providing a gap or space between them, and the ball may then bear more closely against the adjacent end of insulating member 6, and the latter keeps the ball in position in line with conductor or rod 5.

The diameter of ball 15 is such, preferably, as to permit it to have some free motion between the insulator 16 and the insulating member 6, and yet the ball need not be in contact with the head 5^a of rod 5 the ball being shown in Fig. 5 as of such size as to enter the depression in insulating member 6 to hold the ball in line with conductor 5.

When the current flows it will pass from rod 5 to the ball 15 and thence will jump to the terminal 2, and may also jump between the ball and rod 5, and usually will produce several sparks which will play between the ball and terminal 2, or rod 5, or both, and the independent movement of the ball will serve to assist in keeping its surface and the surfaces it engages more or less clear from the deposit of soot and carbon. Adjustment can be made between the ball and rod 5 by changing the thickness of the insulation 11 or 12, or both.

In Fig. 7 the terminal 2 instead of being made integral with the body 1 is shown as made in a separate piece, which may be in the nature of a plurality of arms having spaces between them and provided with threads 1^c to engage corresponding threads within the bore 1^b of the body 1, and thereby adjustment may also be made between the ball and terminal 2. In this figure also the insulating member 6, which may be of mica as before stated, is pressed against by the head 5^a, and the end of the latter may be curved, as at 5^x, where it opposes and receives ball 15, to keep the ball in position at the end of rod 5.

In all the views, the sparks will jump to or from the ball in whatever position the plug be held, for if the plug be inverted with the ball extending upwardly the sparks will jump from the ball to terminal 2, and if the plug, arranged as in Figs. 1 and 2, has the ball depending the sparks will jump from rod 5 to the ball as well as to terminal 2. In all cases the opening 3 and the internal bores permit gases that enter the plug to be ignited by the jump spark.

Having now described my invention what I claim is:

1. A spark plug comprising a hollow body

provided with a terminal at one end, an insulating member within the body provided with a bore, a rod within said bore, insulating means between the rod and said insulating member and between said member and said body making gas-tight joints therebetween, and a movable metallic member between said rod and said terminal, the distance between the rod and the terminal being greater than the diameter of said movable member, and means for detachably securing said insulating member within said body.

2. A spark plug comprising a hollow body provided with a terminal at one end, an insulating member within said body having a bore and a depression in its end leading to said bore, a conductor within said bore having its terminal end located within said depression, a movable member located between the end of said insulating member and said terminal and of less diameter than the distance between the conductor and said terminal, means to make gas-tight joints between said body and the insulating member and between said member and said conductor, and means to detachably secure said insulating member within said body.

3. A spark plug comprising a hollow body having a terminal at one end provided with an inwardly projecting insulating piece, a conductor within the body terminating at a distance from said insulating piece, means for insulating said conductor from said body, and a movable conductor member located between said insulating piece and said conductor of less diameter than the distance between said conductor and said insulating piece.

4. A spark plug comprising a hollow body having a terminal at one end provided with an inwardly extending insulating piece, an insulating member within said body provided with a bore and having a depression at its end, a conductor within said member having its end at a distance from said insulating piece, and a metal ball located between said conductor and said insulating piece, whereby the latter maintains the ball out of contact with said terminal.

5. A spark plug comprising a hollow body having a cross-bar terminal at one end integral therewith and extending across in line with the open end of said body providing an open space leading to the bore of said body, a conductor within said body having its end located at a distance from said terminal, means for insulating said conductor from said body, and a metal ball interposed between said terminal and said conductor.

6. A spark plug comprising a hollow body provided with a terminal at one end having an inwardly extending insulating piece, a conductor within said body, an insulating member within said body having a bore and a depression receiving said conductor, and a

metal ball located between the end of said insulating member and said insulating piece, said ball being of such size as to partly enter the depression of said insulating member to hold the ball in line with said conductor, and means for securing said insulating member within said body.

7. A spark plug including two terminals, and a movable ball intermediate the two and normally in engagement with but one of them.

8. A spark plug, including a body having the inner end thereof substantially hemispherical and provided with a plurality of slots subdividing said inner end into bars forming an open cage, an electrode extend-

ing in proximity to said cage, and a movable body within said cage and supported thereby but out of engagement with said electrode.

9. A spark plug comprising a hollow body provided with a terminal at one end, an insulating member within the body provided with a bore, a rod within said bore and a movable metallic member between said rod and said terminal, the distance between the rod and the terminal being greater than the diameter of said movable member.

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Witnesses:

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