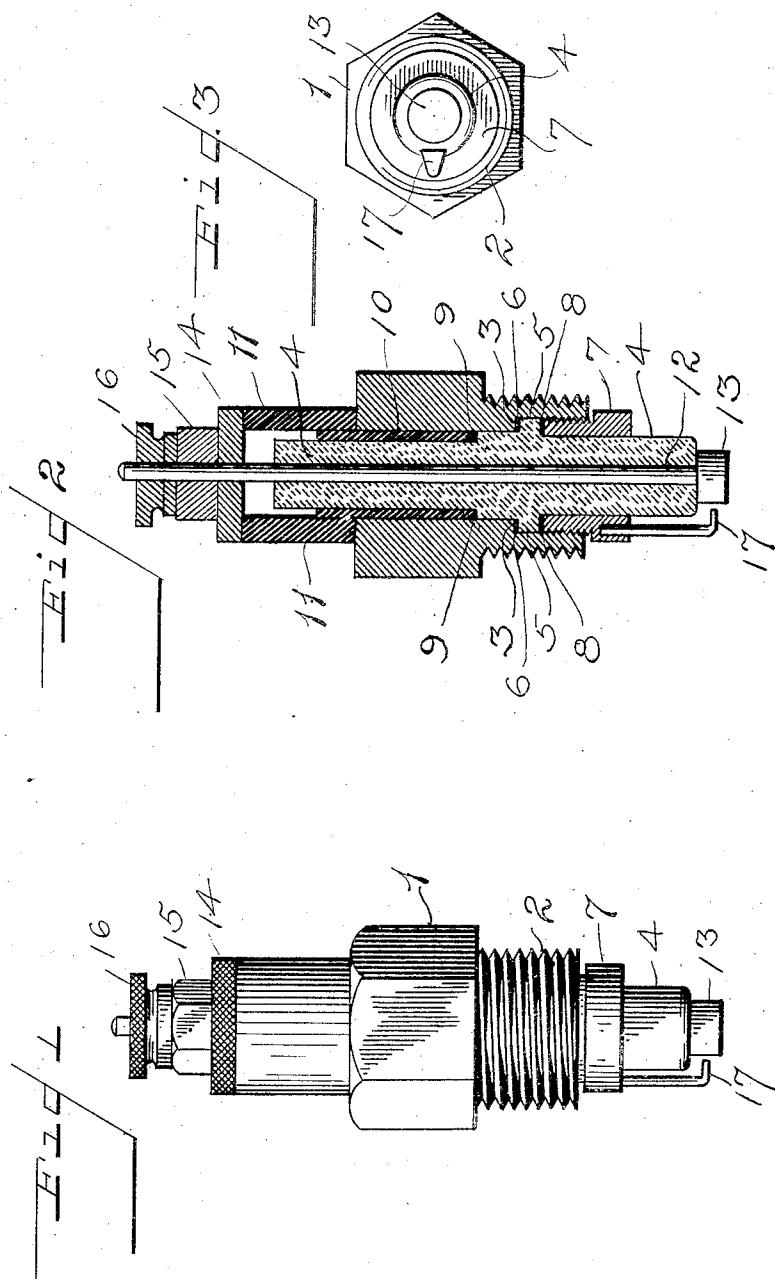


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SPARK PLUG,  
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1,237,264.

Patented Aug. 14, 1917.



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# UNITED STATES PATENT OFFICE.

HARRY N. EASTMAN, OF DAYTON, OHIO, ASSIGNEE, BY DIRECT AND MESNE ASSIGNMENTS, TO THE LA FRENCH POWDER SPARK PLUG COMPANY, OF COLUMBUS, OHIO, A CORPORATION OF OHIO.

## SPARK-PLUG.

1,237,264.

Specification of Letters Patent. Patented Aug. 14, 1917.

Application filed April 28, 1915. Serial No. 23,008.

To all whom it may concern:

Be it known that I, HARRY N. EASTMAN, citizen of the United States, residing at Dayton, in the county of Montgomery and 5 State of Ohio, have invented certain new and useful Improvements in Spark-Plugs, (Case B,) of which the following is a specification.

My invention relates to explosive engines 10 and more particularly to ignition or spark plugs therefor.

The object of the invention is to simplify the structure as well as the means and mode of operation of such devices whereby they 15 will not only be cheapened in construction, but will be more efficient in use, capable of being easily and quickly assembled and disassembled, compression tight, and unlikely to get out of repair.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, the mode of 25 operation, or their equivalents, as herein-after described and set forth in the claims.

Referring to the drawings, Figure 1 is a side elevation of the assembled spark plug. Fig. 2 is a longitudinal sectional view thereof. Fig. 3 is a bottom plan view thereof.

Like parts are indicated by similar characters of reference throughout the several views.

In the drawings 1 is the main bushing 35 comprising a hexagonal head having a screw threaded extension 2 adapted to be secured in the wall of the engine cylinder or ignition chamber thereof. The inner end of the bushing or that end communicating with the cylinder or ignition chamber is counter bored to form therein a seat or shoulder 3. Inserted within the bushing from the inner or screw threaded end thereof is a core of 40 porcelain, lava, fire clay, or some similar material. This core 4 is provided with a peripheral flange or integral collar 5 adapted to be seated upon the shoulder 3 or upon an interposed gasket or washer 6 of soft copper or other heat resisting packing material. The screw threaded extension 2 is 45 provided with internal threads to receive a packing gland or sleeve 7 which surrounds the insulating core 4 and is screw threaded within the main bushing where it serves to firmly seat the insulating core upon the

shoulder or seat 3. This gland or seat 7 bears upon a washer or gasket 8 likewise of soft copper or other heat resisting material interposed between the inner end of the gland and the flange or collar 5 of the core 60 4. The pressure of the collar or flange of the insulating core upon the seat 3 with the interposed gaskets or washers of packing material forms a compression tight joint adjacent to the inner end of the spark plug. 65 It is to be noted that in lieu of the usual construction in which the joints between the porcelain or other core and the bushing or housing are necessarily arranged to resist the pressure of the explosive charge, in the 70 present case the relation of the parts is reversed from that usually employed, the core being introduced from the inner end of the bushing and the joint so arranged that instead of the pressure of the explosive charge 75 tending to open the joint the said pressure in the present instance would merely tend to seat the core 4 more firmly upon its seat 3 and compress the packing material. The pressure of the explosive charge is thereby 80 utilized to more securely seal the joint against leakage. The core 4 is slightly reduced in diameter above the flange or collar 5 to form an offset or shoulder 9. Projecting within the main bushing and surrounding the core 4 is a sleeve 10 of fiber or other insulating material seated upon the offset or shoulder 9. In many spark plugs now in use the porcelain or other insulating core projects beyond the bushing or main 85 housing and is openly exposed. Spark plugs, being subject to more or less rough usage, the exposed portion of the porcelain core is frequently broken, thereby either destroying entirely or materially decreasing 90 the efficiency of the spark plug. In the present instance a sleeve or collar 11 of hard rubber, fiber, or other insulating material surrounds the protruding end of the core 4 and sleeve 10 and rests upon the upper face 95 of the main bushing 1. This sleeve 11 projects somewhat beyond the extremity of the core 4. Extending through the core 4 is an electrode 12 having at its inner end a terminal head 13. The stem of this electrode is 100 screw threaded to receive a compression collar or disk 14 and a lock nut 15. The compression collar or disk 14 bears upon the outer end of the sleeve 11. The headed electrode 12 thereby forms a retaining or clamp- 105 110

ing bolt by which the several parts are clamped tightly together independent of the packing gland 7. The construction is such that even though the porcelain sleeve 4 may be cracked or broken the bolt like electrode 12 will hold such broken parts closely in contact one with the other to prevent the arcing of the current through the cracks or openings. At its extreme end the 10 stem of the electrode carries a binding nut 16 for the attachment of the circuit wires. The head 13 of the bolt-like electrode is substantially cylindrical in form, although a flat sided or polygonal head might be employed in lieu thereof. Projecting from the 15 packing gland 7 is a second electrode, the terminal of which is bent laterally toward the head 13 and is flattened to form a broad sparking foot 17 in lieu of the usual point. 20 It is found in practice that this construction affords a broad spark of great intensity.

From the above description it will be apparent that there is thus provided a device of the character described possessing the 25 particular features of advantage before enumerated as desirable but which obviously is susceptible of modification in its form, proportion, detail construction, or arrangement of parts, without departing from the 30 principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to certain 35 structural features, it is to be understood that the invention is not limited to any specific details but that the means and construction herein described comprise but one mode of putting the invention into effect 40 and the invention is therefore claimed broadly in any of its possible forms or modifications within the scope of the appended claims.

Having thus described my invention, I 45 claim:

1. A spark plug comprising a main bushing having its inner end counterbored to form an integral seat, a core of non-conductive material introduced into the bushing 50 from the inner end thereof, a peripheral shoulder on the core engaging with the shoulder within the bushing, a second shoulder on said core, a sleeve of insulating material within the bushing seated on said second shoulder of the core and an electrode comprising a bolt extending through the core and having a bearing upon the main bushing adapted to draw the core into engagement with its seat within the bushing.
2. A spark plug comprising a bushing having an offset or shoulder therein, a shouldered core of non-conductive material introduced into the bushing from its inner 60 or high pressure side and engaged with the shoulder of the bushing, a bolt forming one

electrode of the spark plug extending through the core, adjusting means carried by the stem of the electrode, a sleeve of non-conductive material bearing upon the main bushing and engaged by the adjusting 70 means, and a second electrode in electrical communication with the bushing.

3. A spark plug comprising a main bushing having an interior peripheral seat therein, a core of non-conductive material having a peripheral flange extending within the bushing and engaging the interior peripheral seat thereof, a sleeve of insulating material extending within the bushing and surrounding the core, a second sleeve of insulating material concentric with the core bearing at one end upon the bushing, a bolt forming one electrode extending through the core and sleeve last mentioned, and a nut screw threaded upon the bolt and bearing 80 upon the last mentioned sleeve.

4. A spark plug comprising a bushing, an integral offset seat or shoulder formed therein by counterboring the inner or high pressure side of the bushing, a shouldered core 90 of insulating material introduced into the bushing from its inner or high pressure side with the shoulder of the core and that of the bushing coacting to limit the relative movement of the bushing and core in one direction, a sleeve surrounding said core and bearing upon the outer face of the bushing, adjusting means carried by the core and engaging the sleeve which serves as an abutment to draw the shoulders of the core and 100 bushing one toward the other, and independent electrodes supported by the core and bushing substantially as specified.

5. A spark plug comprising a bushing, an integral offset seat or shoulder formed 105 therein by counterboring the inner or high pressure side of the bushing, a shouldered core of insulating material introduced into the bushing from its inner or high pressure side with the shoulder of the core and that of the bushing coacting to limit the relative movement of the bushing and core in one direction, independent telescopic sleeves of insulating material surrounding 110 said core, adjusting means for relatively moving the core and bushing to cause the shoulders of said members to approach one toward the other and independent electrodes supported by the core and bushing to cause the shoulders of said members to approach 115 one toward the other, and independent electrodes supported by the core and the bushing respectively.

6. A spark plug comprising a bushing, an integral seat or shoulder therein formed by 120 counterboring the inner or high pressure side of the bushing, a core of insulating material introduced into said bushing from the inner or high pressure side, a peripheral seat or shoulder formed upon said core, 125

said core and bushing shoulders coacting to limit the relative movement of said members in one direction, means for adjusting the core and bushing to move said shoulders one toward the other, an enlarged disk like electrode carried by the core, and a second electrode supported by the bushing the terminal of which extends in substantially radial direction in rela-

tion with the enlarged disk like electrode, 10 substantially as specified.

In testimony whereof, I have hereunto set my hand this 19th day of April, A. D. 1915.

HARRY N. EASTMAN.

Witnesses:

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