

No. 873,968.

PATENTED DEC. 17, 1907.

F. B. THATCHER.
ELECTRIC SPARK PLUG.
APPLICATION FILED JAN. 31, 1907.

Fig. 1.

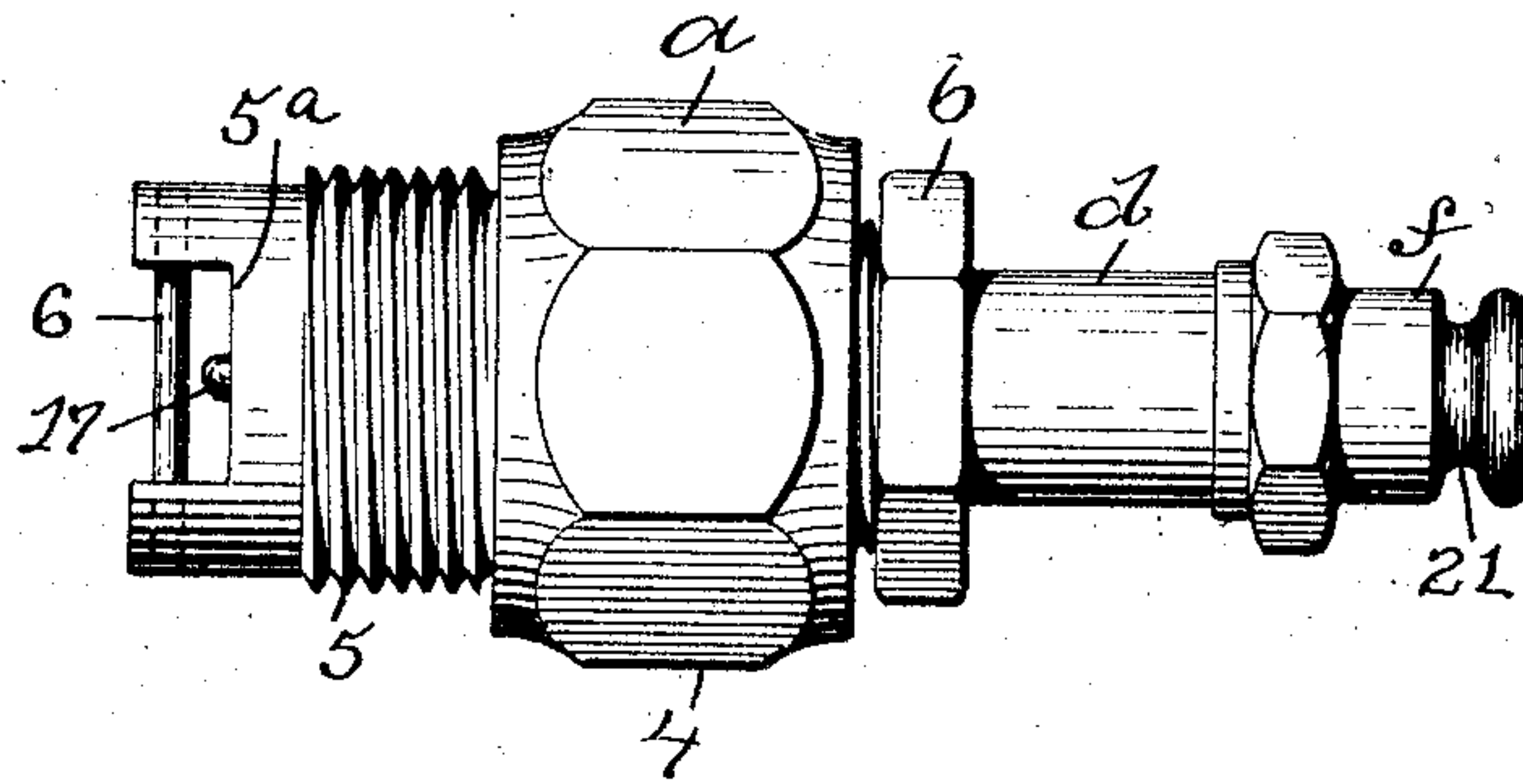


Fig. 2.

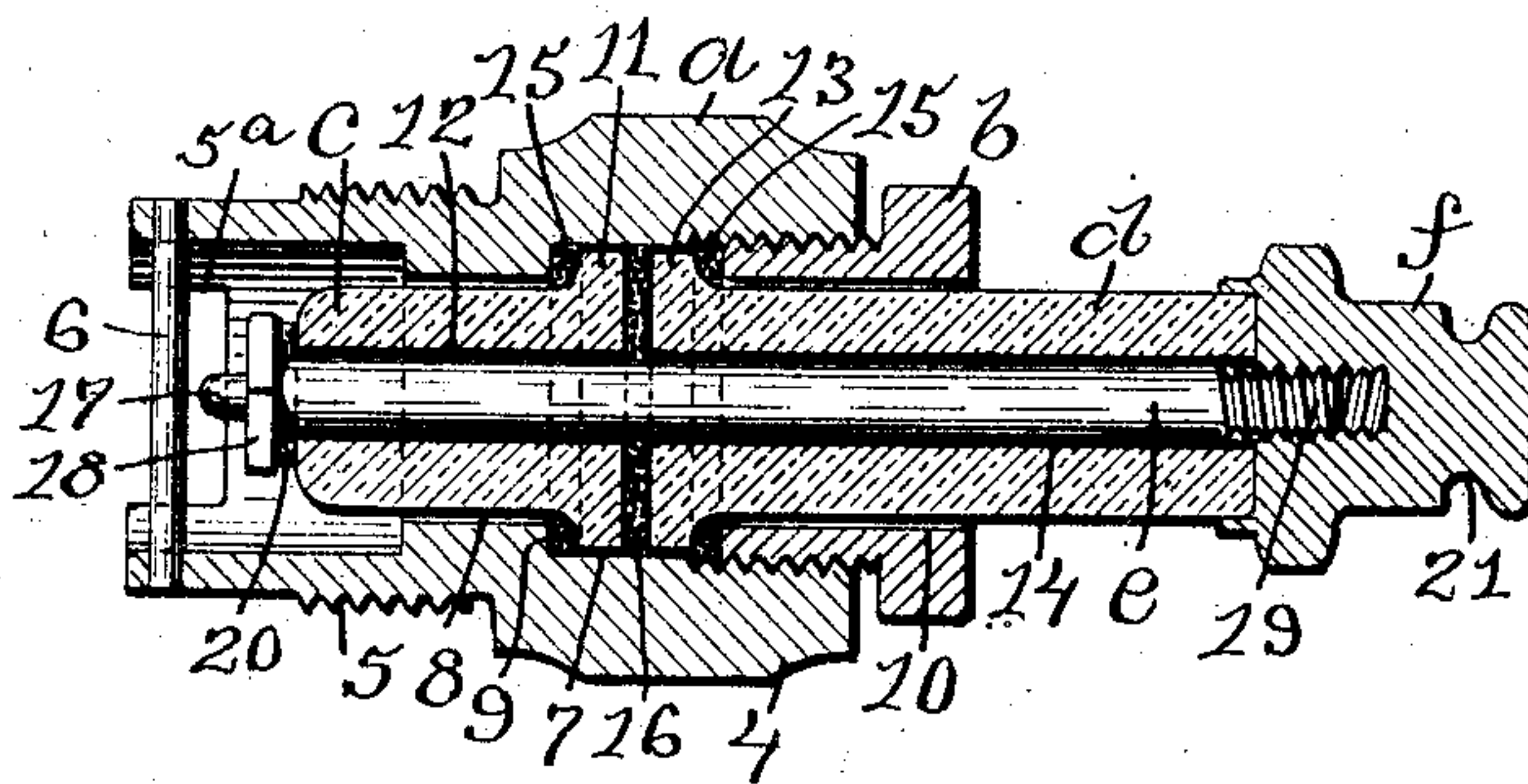
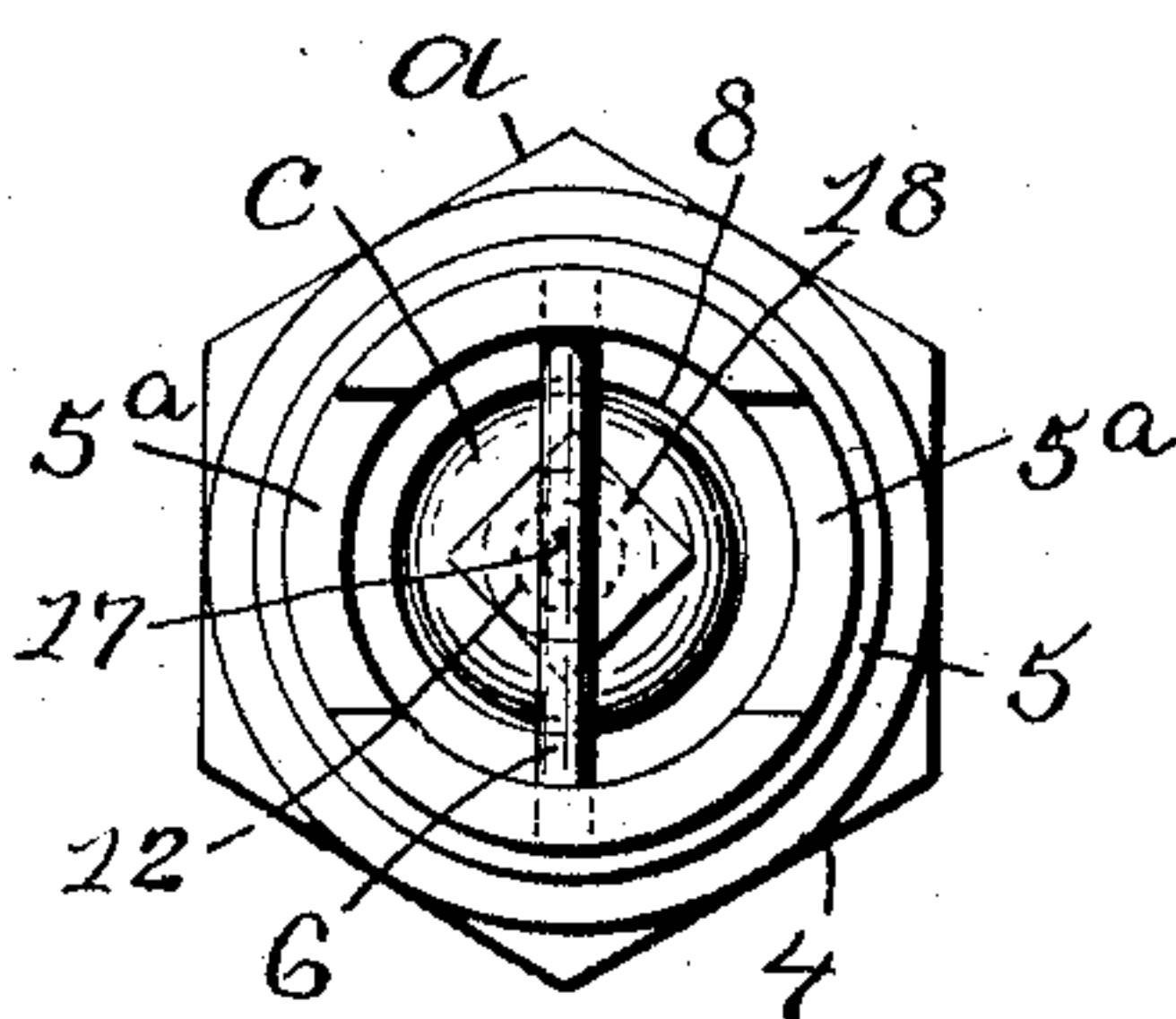


Fig. 3.



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ELECTRIC SPARK-PLUG.

No. 873,968.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed January 31, 1907. Serial No. 355,035.

To all whom it may concern:

Be it known that I, FREDERICK B. THATCHER, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Electric Spark-Plugs, of which the following is a specification.

This invention has reference to an improvement in electric ignition devices for igniting the gas in hydrocarbon or internal combustion engines and more particularly to an improvement in spark plugs adapted to give a jump spark to ignite the gas in the engine.

In the usual construction of spark plugs the porcelain insulating core is formed integral. When in use the inner end of the porcelain core is in the explosion chamber of the engine where it is subjected to the intense heat of the explosions while the outer end, being exposed to the air, is comparatively cold. By this construction the sudden expansion of the inner end of the core caused by the intense heat in the engine is liable to and does at times break the porcelain core, thereby ruining the utility of the plug and disabling the engine.

The object of my invention is to improve the construction of a spark plug, whereby the inner end of the porcelain core is constructed separate from the outer end and insulated from the same to a large extent by a washer of asbestos or other material. An additional packing is formed by the washer between the core and the shell of the plug to prevent leakage from the engine and the sparking point and terminal are constructed to give a more perfect ignition than has heretofore been attained.

My invention consists in the peculiar and novel construction of a spark plug, as will be more fully set forth hereinafter and claimed.

Figure 1 is a side view of my improved spark plug. Fig. 2 is a longitudinal sectional view through the spark plug, showing the construction of the plug, and Fig. 3 is an end view looking at the ignition end of the plug.

In the drawings, *a* indicates the outer shell, *b* the packing sleeve, *c* the inner member, and *d* the outer member of the porcelain core, *e* the sparking point rod, and *f* the fastening nut of my improved spark plug.

The shell *a* has a body portion 4 in the form of a nut with a cylindrical screw-threaded open inner end 5 having oppositely-dis-

posed openings 5^a 5^a formed in the side of the end 5 and extending inward from the end, a round wire sparking terminal 6 secured at each end in the wall of the end 5 adjacent the open end and extending centrally across the end, as shown in Figs. 2 and 3, an internally-screw-threaded chamber 7 in the body 4 and a central bore 8 extending from the chamber 7 into the cylindrical end 5 and forming an internal annular shoulder 9 at the inner end of the chamber 7.

The packing sleeve *b* is adapted to screw into the chamber 7 and has a central bore 10, as shown in Fig. 2.

The inner member *c* of the porcelain core has an annular lip 11 on its inner end in the chamber 7, and a central longitudinal hole 12, and extends into the cylindrical end 5. The outer member *d* of the porcelain core has an annular lip 13 on its inner end in the chamber 7 and a central longitudinal hole 14 and extends outward through the bore 10 in the packing sleeve *b*. Packing rings 15 15 of asbestos or other material are placed intermediate the annular shoulder 9 and the annular lip 11 and the annular lip 13 and the inner end of the packing sleeve *b*, and a combined insulating and packing washer 16 of asbestos or other non-heat conducting material is placed intermediate the flat inner ends of the members *c* and *d* of the core.

The sparking point rod *e* has a sparking point 17 adjacent the sparking terminal 6, a nut-shaped collar 18 adjacent the point 17, and a screw-threaded end 19. This rod *e* extends through the holes 12 and 14 in the members *c* and *d* of the core. A packing ring 20 of asbestos is placed on the rod intermediate the collar 18 and the end of the member *c* of the core.

The fastening nut *f* is adapted to screw onto the end 19 of the rod *e* and abut against the end of the porcelain core. This nut *f* may have an annular groove 21 to receive a special wire connection or may be constructed to receive any of the well known forms of electric wire connections. By tightening the nut *f* on the end of the rod *e* the members *c* and *d* of the core are drawn together, the washer 16 is compressed between the ends of the members and forced outward against the wall of the chamber 7, thereby forming an additional packing to prevent leakage from the engine through the chamber in addition to its function of thermally insulating the members *c* and *d*.

The packing ring 20 is compressed between the collar 18 and the end of the member *c* of the core, thereby preventing leakage from the engine through the holes 12 and 14 in the members *c* and *d* of the core, and by tightening the sleeve *b* the core is firmly secured in the shell *a* in a position to bring the sparking point 17 the required distance from the sparking terminal 6, as shown in Fig. 2.

10 In the use of my improved spark plug, I find that there is no liability of the porcelain cores breaking through heat from the engine, no loss of power in the engine due to escape of gas through the plug, and by the transverse position of the wire sparking terminal 6 15 relative to the sparking point 17 the flame generated by the spark strikes the wire terminal and spreads fan-shape into the explosion chamber, thereby giving a more perfect combustion and increasing the power of the engine. The outer end of the porcelain core being separate from the inner end may be given a slight lateral movement by accident or other causes, without breaking the 25 core or changing the sparking point 17, relative to the sparking terminal 6.

Having thus described my invention I claim as new and desire to secure by Letters Patent;—

30 1. In a spark plug, an outer shell having one end formed with screw threads on its interior and its opposite end formed with screw threads on its exterior, a shoulder formed on the interior of said shell intermediate its length, an outer core member extending in one end of said shell, and having 35 an inner annular lip, a packing sleeve around said outer member engaging said interior

threads and abutting said lip, an inner core member extending within the other end of 40 said shell and having a lip engaging said interior shoulder of the shell, the outer portion of said last named end of the shell being enlarged on its interior, a sparking point rod extending through said core members, a 45 sparking point on said rod projecting into said enlarged interior of the shell, a collar on said rod to the rear of said point abutting said inner core member, said end of the shell surrounding the inner core member being 50 formed with two oppositely disposed openings which expose said sparking point, and a wire terminal secured to said last named end of the shell at right angles to said openings thereof.

55 2. In a spark plug an outer shell, an inner and an outer core member in said shell, a sparking point rod extending through said members, a sparking point on said rod, a collar on the rod to the rear of said point 60 abutting said inner core member, said shell being formed with an extension which incloses said inner core member and projects therebeyond, said extension being formed with a pair of oppositely disposed openings 65 of a depth to expose said sparking point, and a wire terminal secured to said extension beyond said sparking point.

In testimony whereof I have signed my name to this specification in the presence of 70 two subscribing witnesses.

FREDERICK B. THATCHER.

Witnesses:

ADA E. HAGERTY,
J. A. MILLER.