

F. J. WATT.
SPARK PLUG.
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914,540.

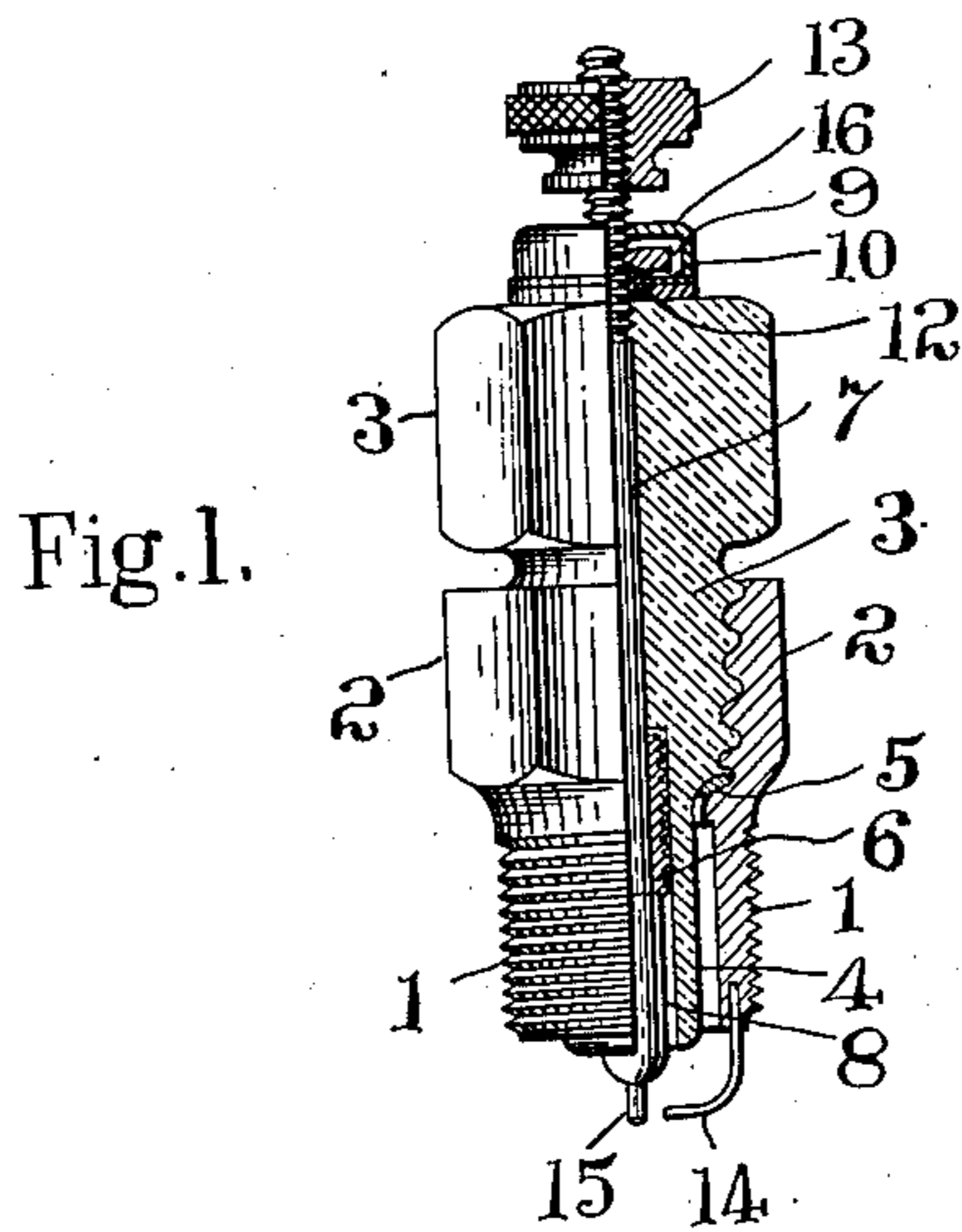


Fig. 2.

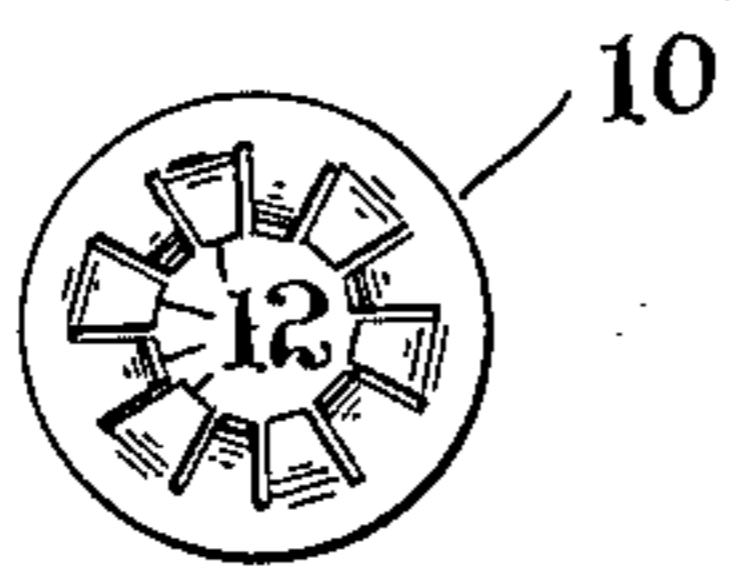


Fig. 3.



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FRANK J. WATT, OF DETROIT, MICHIGAN.

SPARK-PLUG.

No. 914,540.

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To all whom it may concern:

Be it known that I, FRANK J. WATT, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Spark-Plugs, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to spark plugs for explosive engines, and more especially to means therein whereby leakage and breakage from unequal expansion is avoided, and the construction greatly simplified.

15 The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a view, partially in elevation and partially in section of a spark plug embodying features of the invention. Fig. 2 is a view in detail of a spring washer. Fig. 3 is a view in section of the washer.

Referring to the drawings, a tubular metal nipple has a lower portion 1 exteriorly screw-threaded or otherwise fitted to be removably secured in an engine. The upper part 2 of the nipple is slightly expanded and interiorly screw-threaded, its exterior being adapted for application of a wrench or the like. A bushing 3 of porcelain or like refractory insulating material, is inserted in the nipple, its central portion having a molded screw-thread engaging the upper part and its lower end 4 extending concentrically through the screw-threaded portion, a washer 5 of proper material insuring a tight joint and there being an annular air space between the lower part of the bushing and the nipple. The head of the bushing extends well above the nipple and is enlarged to overhang and protect the nipple rim. The axial aperture of the bushing is counterbored from the lower end and a metal bushing 6 cemented therein or otherwise properly secured, the periphery of the bushing 6 being screw-threaded, corrugated or roughened to anchor it firmly in the cement which adheres closely to the unglazed inner surface of the porcelain. The lower end of the bushing 6 is turned or faced off square.

A metal stem 7 extends axially through the bushing 3 and has a head 8 shouldered to seat itself closely on the lower end of the inner bushing and form a tight joint therewith.

The head is proportioned to leave an annular air space between it and the insulating bushing. The upper projecting end of the stem is screw-threaded for a clamping nut 9 which bears against a spring washer 10 and soft washer 11 of asbestos or the like. The spring washer has a plurality of inner arms 12 bent alternately in opposite directions and a solid rim. A cap 16 is seated on the washer rim over the clamping nut and a hand nut 13 forming with the cap a binding post is placed on the stem outside the cap. There is a sparking terminal 14 on the nipple and an axial one 15 on the stem in operative relation thereto. By this arrangement, the insulating bushing is held in place without the use of an outer clamping collar or cap, as in the usual construction, and is free to expand without liability to fracture. The stem is yieldingly seated against the inner bushing by the spring washer so that expansion or contraction does not affect it. Furthermore, the joint between this bushing and the stem head is readily made air tight by proper dressing of the metals, the difficulty of making a close fit between metal and the vitreous, irregularly surfaced insulating bushing being avoided.

What I claim as my invention is:—

1. A spark plug for an explosive engine comprising a tubular metal nipple, a bushing of insulating material screw-threaded into the nipple, a metal bushing secured in the bore of the insulating bushing mediate its ends, a metal stem extending through the insulating bushing having a head seated on the inner metal bushing, a spring washer on the stem, a clamping nut forcing the washer against the insulating bushing head, a terminal on the stem and one on the nipple in operative relation thereto.

2. A spark plug for an explosive engine comprising a tubular metal nipple, an insulating bushing of refractory material screw-threaded into the nipple having a counter-bored lower end, a metal bushing seated in the counterbore, a metal stem extending through the inner bushing having a head adapted to be seated on the end of the inner bushing and a screw-threaded upper end extending above the insulating bushing head, a spring washer on the stem and bushing head, a clamping nut on the stem engaging the spring washer, a cap on the stem over the clamping nut bearing against the washers, a

hand nut on the stem beyond the cap, a terminal on the lower end of the nipple and a terminal on the stem head.

3. A spark plug for an explosive engine comprising an interiorly screw-threaded metal nipple, an insulating bushing of refractory material having an exteriorly screw-threaded portion engaging the nipple screw-threads, a lower portion of less diameter than the nipple extending concentrically there-
10 through, and a head projecting above the nipple, a metal bushing permanently secured in the insulating bushing mediate its ends, a metal stem extending through the inner bush-
15 ing having a head adapted to be seated on the end of the inner bushing and a screw-threaded upper end extending above the insulating bushing head, an insulating washer on the stem and bushing head, a spring
20 washer on the insulating washer, a clamping nut on the stem engaging the spring washer, a cap on the stem over the clamping nut bearing against the washers, a hand nut on
25 the stem beyond the cap, a terminal on the lower end of the nipple, and a terminal on the stem head.

4. A spark plug for an explosive engine comprising a tubular metal nipple, a bushing
30 of insulating material screw-threaded into the nipple, a metal bushing secured in the bore of the insulating bushing mediate its ends, a metal stem extending through the insulating bushing having a head seated on
35 the inner metal bushing, a spring washer on the upper end of the bushing having a solid rim and inner radial spring arms bent alter-

nately in opposite directions, a clamping nut on the stem bearing against the spring arms, a cap over the nut seated on the rim, a nut on the stem outside the cap, a terminal on
40 the head of the stem, and a terminal on the nipple in operative relation thereto.

5. A spark plug for an explosive engine comprising an interiorly screw-threaded metal nipple, an insulating bushing of re-
45 fractory material having an exteriorly screw-threaded portion engaging the nipple screw-threads, a lower portion of less diameter than the nipple extending concentrically there-
50 through, and a head projecting above the nipple, a metal bushing permanently secured in the insulating bushing mediate its ends, a metal stem extending through the inner bushing having a head adapted to be seated
55 on the end of the inner bushing and a screw-threaded upper end extending above the insulating bushing head, a washer of insulating material on the upper end of the bushing, a
60 spring washer having a solid rim and inner radial spring arms bent alternately in opposite directions, a clamping nut on the stem bearing against the spring arms, a cap over
65 the nut seated on the rim, a nut on the stem outside the cap, a terminal on the head of the stem, and a terminal on the nipple in opera-

In testimony whereof I affix my signature in presence of two witnesses.

FRANK J. WATT.

Witnesses:

OTTO F. BARTHEL,
C. R. STICKNEY.