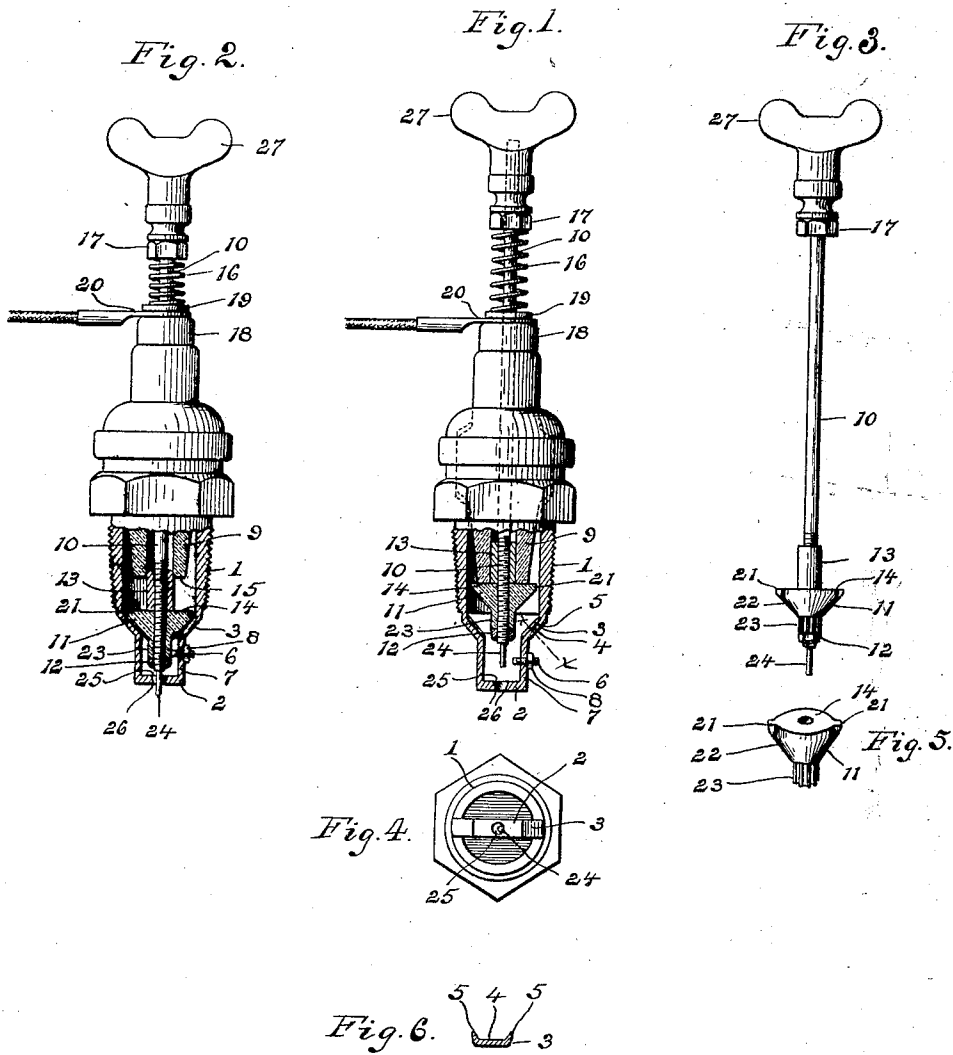


W. M. SLEAFORD.
SPARK PLUG.
APPLICATION FILED NOV. 16, 1907.

932,338.

Patented Aug. 24, 1909.



WITNESSES:

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WILLIAM M. SLEAFORD, OF BRIGHTON, MICHIGAN.

SPARK-PLUG.

932,338.

Specification of Letters Patent. Patented Aug. 24, 1909.

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To all whom it may concern:

Be it known that I, WILLIAM M. SLEAFORD, a citizen of the United States of America, residing at Brighton, in the county of Livingston 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.

During the use of spark plugs of the "jump-spark" type in internal combustion motors, the terminals become more or less coated with the products of combustion, and thereby become short circuited or the efficiency is impaired in other ways.

This invention relates to a spark plug of the "jump spark" type provided with means whereby the terminals may be mechanically cleaned at any moment at will of the operator, without removing or disturbing the plug.

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

Referring to the drawings, Figure 1 is a view partially in elevation and partially in section, of a spark plug embodying features of the invention, with the terminals in normal position. Fig. 2 is a similar view with the parts in position for cleaning. Fig. 3 is a view in detail of a central movable electrode. Fig. 4 is a view in end elevation of the lower part of the plug. Fig. 5 is a view in detail of a cleaning member. Fig. 6 is a view in section of line $x-x$ of Fig. 1.

In the drawings, 1 indicates an outer metal sleeve tapered, screw-threaded and fitted for insertion in the customary manner in an engine cylinder, where it forms the usual grounded connection. A bridge 2 depends from the lower end of the sleeve, with which it is preferably integral, and has upper convergent arms 3 with concave inner faces 4 which present sharp edges 5. A terminal 6 of suitable metal is screw-threaded in or otherwise suitably secured in a lower leg 7 of the bridge so as to project radially inward, a check-nut 8 holding it in adjusted position, or it may be permanently set, if desired.

A bushing 9 of insulating material, preferably porcelain, is secured concentrically in the usual manner in the sleeve, and a rotatable metal stem 10 is longitudinally reciprocable in the axial aperture. A conical cleaner 11 of porcelain or like insulating material is

secured in any suitable manner on the lower end of the stem beyond the bushing, as between an outer bur 12 and inner nut 13 screw-threaded on the stem, the latter nut being preferably elongated and cylindrical to form a guide sliding in the lower end of the bushing. The upper face 14 of the cleaner is ground to seat itself tightly on the correspondingly fitted annular face 15 of the bushing, against which it is normally held by a spring 16 encircling the upper projecting part of the stem 10 in compression between a head or cap-nut 17 on the outer end of the stem and the bushing, a hollow ferrule 18 and washer 19 affording suitable retaining means for a wire connection 20, and allowing free rotation of the stem.

Two or more projections or spurs 21 on the upper part of the cleaner with reasonably sharp corners are adapted to sweep the inner face of the sleeve 1, and the conical periphery 22 of the cleaner corresponds in pitch to the inner faces 4 of the oblique arms of the bridge, so that it contacts therewith when the stem is projected. A lower cylindrical part or nipple 23 of the cleaner with slightly roughened, corrugated or fluted periphery, is likewise adapted to scrape the end of the terminal 6 when the cleaner bears against the arms.

A cylindrical axial terminal stud 24 of suitable material is secured in the end of the stem 10 so that it is separated by a proper spark interval from the other terminal 6 when the stem is in normal position. A circular aperture 25 in the bridge 2 allows the terminal to pass through when the stem is projected and is slightly eccentric to the terminal so as to contact therewith at one point of its periphery. The aperture is inwardly tapered so as to form a sharp edge 26 which scrapes the terminal when the latter is pushed through. A nut 27 of insulating material and appropriate design affords means for manipulating the stem.

In operation, by pushing the stem down and turning it as it is advanced, the cleaner sweeps off any deposit inside the sleeve, and from the end of the stationary terminal, and its conoidal face is in turn scraped off by the edges of the oblique arms of the bridge. At the same time the terminal stud on the stem is being cleaned by the sharp corner of the bridge aperture.

The main feature of the device is the fact that all deposits may be positively cleaned off from the inner parts of the plug without removing it from the engine or disturbing its adjustment, thus keeping the terminals in good working condition and preventing short circuiting and other troubles.

Obviously the particular form of the terminals may be varied as desired, and other changes in the general details of construction may be varied without departing from the spirit of the invention and I do not care to limit myself to any particular form or arrangement of parts.

What I claim as my invention is:—

1. In a spark plug, a fixed terminal on the inner end thereof, and a movable terminal provided with a cleaning member adapted to be brought into rubbing contact with the fixed terminal and an adjacent interior surface formed on the plug, by manipulation of said terminal.

2. In a spark plug, a fixed terminal on the inner end thereof, a terminal longitudinally and rotatably movable in the plug, a cleaning member adapted to be brought into rubbing contact with the fixed terminal and adjacent interior surfaces formed on the plug, by manipulation of the movable terminal, and means for manipulating the movable terminal.

3. A spark plug comprising an outer metal sleeve, a terminal secured to the inner end thereof, an insulating bushing in the sleeve, a stem longitudinally movable in the bushing having a terminal on its inner end and a cleaner on the stem adapted to be brought into rubbing contact with the fixed terminal and the adjacent inner face of the sleeve by the movement of the stem.

4. A spark plug comprising an outer metal sleeve, a terminal secured to the inner end thereof, an insulating bushing in the sleeve, a stem longitudinally movable in the bushing having a terminal on its end adjacent the fixed terminal, a spring adapted to hold the stem normally retracted with the terminal in operative relation to the fixed terminal, and a cleaner on the stem adapted to be brought into rubbing contact with the fixed terminal and the adjacent inner surfaces of the sleeve when the stem is moved from its retracted position.

5. In a spark plug, an outer metallic sleeve, an insulating bushing secured therein, a bridge spanning the lower end of the sleeve, a terminal in the bridge extending radially inward, a rotatable stem longitudinally movable in the bushing having an axial terminal on its end adjacent the bridge terminal, and a cleaning member on the stem adapted to be brought into rubbing engagement with the bridge and its terminal when the stem is moved.

6. In a spark plug, an outer metallic

sleeve, an insulating bushing secured therein, a bridge secured by convergent upper arms to the lower end of the sleeve, a terminal in the bridge extending radially inward, a rotatable stem longitudinally movable in the bushing having an axial terminal on its end adjacent the bridge terminal, a cleaning member of porcelain on the stem having spurs adapted to sweep the inner face of the sleeve below the bushing, a periphery coned to contact with the arms, and a fluted nipple adapted to scrape the end of the bridge terminal when the stem is rotatively projected toward the bridge, and a spring adapted to hold the stem normally retracted with the terminals in operative relation.

7. In a spark plug, an outer metallic sleeve, an insulating bushing secured therein, a bridge secured by convergent upper arms to the lower end of the sleeve, a terminal in the bridge extending radially inward, a rotatable stem longitudinally movable in the bushing having an axial terminal on its end adjacent the bridge terminal, a cleaning member of porcelain on the stem having spurs adapted to sweep the inner face of the sleeve below the bushing, a periphery coned to contact with the arms, and a fluted nipple adapted to scrape the end of the bridge terminal when the stem is rotatively projected toward the bridge, and a spring adapted to hold the stem normally retracted with the terminals in operative relation, said arms having concave inner faces corresponding to the cleaner periphery and sharp lateral inner edges.

8. In a spark plug, an outer metallic sleeve, an insulating bushing secured therein, a bridge spanning the lower end of the sleeve, a terminal in the bridge extending radially inward, a rotatable stem longitudinally movable in the bushing having an axial terminal on its end adjacent the bridge terminal and a cleaning member on the stem adapted to be brought into rubbing engagement with the bridge and its terminal when the stem is moved, the bridge having a circular aperture slightly eccentric to the axis of the stem terminal with a beveled margin adapted to contact with and to scrape the periphery of the stem terminal when the latter is projected through the bridge by the stem movement.

9. In a spark plug, an outer metallic sleeve, an insulating bushing secured therein, a bridge spanning the lower end of the sleeve, a terminal in the bridge extending radially inward, a rotatable stem longitudinally movable in the bushing having an axial terminal on its end adjacent the bridge terminal, a cleaning member of porcelain on the stem having spurs adapted to sweep the inner face of the sleeve below the bushing, a periphery coned to contact with the arms, and a fluted nipple adapted to scrape the end of the bridge terminal when the stem is rota-

tively projected toward the bridge, the inner annular face of the cleaner being adapted to seat itself on the lower end of the bushing and form a tight joint therewith when the stem is retracted, and a spring adapted to hold the stem normally retracted with the terminals in operative relation.

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

WILLIAM M. SLEAFORD.

Witnesses:

C. R. STUKNEY,
OTTO F. BARTHEL.