F. L. BRONSON.

SPARK PLUG.

APPLICATION FILED MAR. 5, 1921.

1,433,117. Patented Oct. 24, 1922.

Fig. 1.

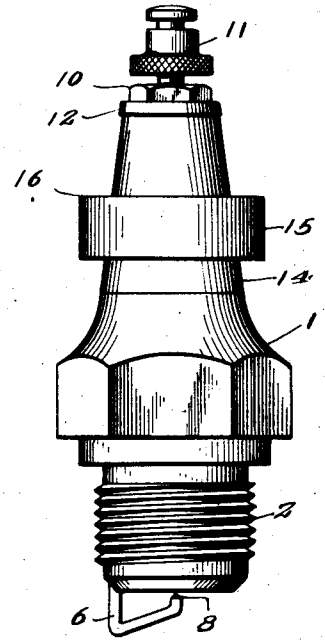


Fig. 2.

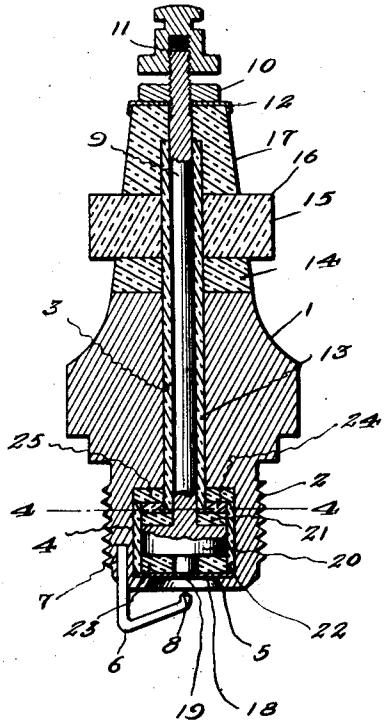


Fig. 3.

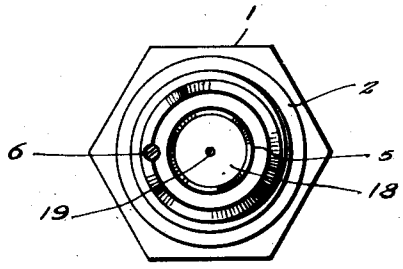
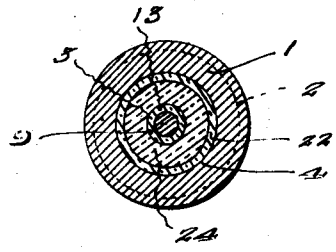


Fig. 4.



P. A. Thomas

Thomas F. Turpin

WITNESSES

Fred L. Bronson INVENTOR

BY Victor J. Evans

ATTORNEY

Patented Oct. 24, 1922. 1,433,117

UNITED STATES PATENT OFFICE.

FRED L. BRONSON, OF WICHITA FALLS, TEXAS, ASSIGNOR OF ONE-FIFTH TO HARRIS ALEXANDER, ONE-FIFTH TO ARTHUR B. JOHNSTON, ONE-FIFTH TO HOWARD EARL JOHNSTON, AND ONE-FIFTH TO ANDY J. ALEXANDER, ALL OF WICHITA FALLS, TEXAS.

SPARK PLUG.

Application filed March 5, 1921. Serial No. 449,923.

To all whom it may concern:

Be it known that I, FRED L. BRONSON, a citizen of the United States, residing at Wichita Falls, in the county of Wichita and State of Texas, have invented new and useful Improvements in Spark Plugs, of which the following is a specification.

One object of my present invention is the provision of a spark plug of simple and inexpensive construction, characterized by efficient exterior and interior insulation, and the capacity to afford an intense spark due to the effective prevention of leakage of current through any path other than that including the main and ground electrodes.

Another object of the invention is the provision of a spark plug in which provision is made to preclude fouling of the plug in carbon.

To the attainment of the foregoing, the invention consists in the improvements as hereinafter described and definitely claimed.

In the accompanying drawings, forming part hereof:—

Figure 1 is an elevation of the spark plug constituting the best practical embodiment of my invention that I have as yet devised; the said plug being especially, though not necessarily, designed for use in aeroplane motors for reasons hereinafter set forth.

Figure 2 is a diametrical section of the plug.

Figure 3 is an inverted plan of the plug.

Figure 4 is a transverse section taken in the plane indicated by the line 4—4 of Figure 2.

Similar numerals of reference designate corresponding parts in all of the views of the drawings.

Among other elements my novel spark plug comprises a body 1, threaded at 2 for connection to a motor cylinder and provided with a longitudinal central bore 3, and a chamber 4; the said chamber 4 being in communication with the bore 3 and being located in the inner end portion of the body 1 and partly defined by an annular flange 5 at the inner end of the said body. The plug also comprses a ground electrode 6 carried at 7 by the body 1 and having its terminal 8 located in the longitudinal center of the plug. For cooperation with the ground electrode 6 the plug includes a main electrode 9 adapted to be connected at its upper end in any approved manner with a wire leading from a source of electric energy, though I prefer to provide for the purpose a nut 10 and a cap nut 11, threaded on the upper end portion of said electrode. Surrounding the main electrode 9 and arranged immediately below the nut 10 is a flanged cap plate 12 which may be of metal or any other appropriate material. Occupying the bore 3 of the body 1 and extending down into the chamber 4 and upwardly beyond the body 1 is a dielectric or insulating tube 13. The said tube 13 is preferably formed of a sheet of mica wound laterally about the main electrode 9. Superimposed on the body 1 and surrounding the tube 13 is an insulating annulus 14, preferably of mica. This annulus 14 may be in one unit or may be composed of a plurality of superimposed disks, in the discretion of the manufacturer and without involving departure from the scope of my invention. Immediately above the insulating annulus 14 is an insulating annulus 15 also preferably of mica and adapted to be formed in one unit as illustrated or of a plurality of superimposed units or disks as desired. The annulus 15 is of larger diameter than the annulus 14 in about the proportion illustrated to afford an overhanging portion above the annulus 14 and the metallic body 1, and is characterized by sharp square corners 16 for an important purpose hereinafter set forth. Surrounding the upper portion of the tube 13 and the main electrode 9 and interposed between the annulus 16 and the cap plate 12 is an insulating cap member 17 of mica or other appropriate material. This cap member 17 may be in one unit as shown or may be formed of a plurality of superimposed sections as is found most desirable.

It will be apparent from the foregoing that the annulus 16 constitutes an efficient guard flange having the capacity in combination with the lower and upper insulating members 14 and 17, to prevent dissipation of current exteriorly of the plug between the metallic upper portion thereof and the metallic body 1; experience having demonstrated that water is not sufficient to carry current around sharp square corners.

The lower end of the main electrode 9 is arranged immediately above a centrally apertured insulating disk 18, preferably of

mica which is superimposed on the body flange 5. From this it follows that the aperture 19 in the disk 18 is spaced from the terminal 8 of the ground electrode 6 and is adapted to be kept at all times clear of carbon by the passage of the spark or the creation of the arc between the main electrode 9 and the ground electrode 6. In this way fouling of the plug in carbon is precluded, and efficient operation of the plug under all conditions and at all times may be depended upon which is a desideratum in the art. In order to prevent interior leakage of current I provide the spark plug with the construction illustrated in Figures 2 and 4. The said construction includes a flange 20 on the main electrode at a point slightly above the lower end thereof, an insulating washer 21 preferably of mica, arranged on said flange 20 and below the lower end of the insulating tube 13, an insulating cylinder 22, preferably of mica, lining the chamber 4 and surrounding a lower insulating or mica washer 23 as well as the washer 21 and the flange 20 and a mica washer 24 superimposed on the washer 21 and surrounding the lower end of the tube 13, and a mica washer 25 superimposed on the cylinder 22 and the washer 24 and surrounding the lower portion of the tube 13. Manifestly it is within the purview of my invention to form the washers 24 and 25 in one unit of mica or other appropriate insulating material. At this point I would have it understood that I prefer to employ mica for the dielectric or insulating elements of the spark plug, though I do not desire to be understood as confining myself specifically to mica.

It will be apparent from the lower portion of Figure 2 considered in connection with Figure 4 that the interior construction of the lower portion of the spark plug is such that joints are broken and it is necessary for corners to be turned in order for the current to be dissipated from the main electrode 9 to the body 1, and hence there is no liability of current passing directly from the main electrode 9 to the body 1 with the result that the intensity of the spark or arc between the lower end of the main electrode and the ground electrode through the aperture 18 is preserved at all times and under all conditions, and with the further result that the collection of carbon between the electrodes is absolutely inhibited, this latter being due to the fact that the intensity of the spark or arc may be depended upon to burn the carbon away and keep the aperture 18 and the space between the said aperture 18 and the terminal of the electrode 6 clear at all times.

It will be observed by particular reference to Figure 2 that the upper end of the dielectric tube 13 is square and therefore presents a sharp square corner calculated to preclude the passage of electricity from the portion of the main electrode 9 to the body 1 along the outer side of the dielectric tube 3.

I have entered into a detail description of the construction and relative arrangement of parts embraced in the present and preferred embodiment of my invention in order to impart a full, clear and exact understanding of the said embodiment. I do not desire, however, to be understood as confining myself to the said specific construction and relative arrangement of parts inasmuch as in the future practice of the invention various changes and modifications may be made such as fall within the scope of my invention as defined in my appended claims.

Having described my invention, what I claim and desire to secure by Letters-Patent, is:—

1. In a spark plug, the combination of a body, the inner portion of which is chambered, a ground electrode, a main electrode in the body and having a flange disposed in the chamber, and dielectric or insulating means arranged in the chamber and in association with the flange of the main electrode to break joints and provide corners for the prevention of dissipation of current from the main electrode to the body, said dielectric means including a portion with an aperture interposed between adjacent portions of the ground and main electrodes.

2. A spark plug comprising a metallic body having a chamber in its lower portion and an inturned flange at its lower end, and also having a central bore, a ground electrode carried by the body and having a terminal disposed in the longitudinal center of the plug, a main electrode extending through the bore of the body and into the chamber and having a flange within the chamber, dielectric material aranged in the chamber and surrounding and disposed above and below the electrode flange, a dielectric disk in the chamber and on the body flange and having a central aperture immediately adjacent to the lower end of the main electrode, a dielectric tube in the bore of the body and surrounding the main electrode and extending above the body and down into the chamber thereof, means at the upper end of the main electrode to connect the same electrically with a source of energy, and dielectric means interposed between said connection means and the body and surrounding the main electrode and the dielectric tube and including a guard flange overhanging the body.

In testimony whereof I affix my signature.

FRED L. BRONSON.