

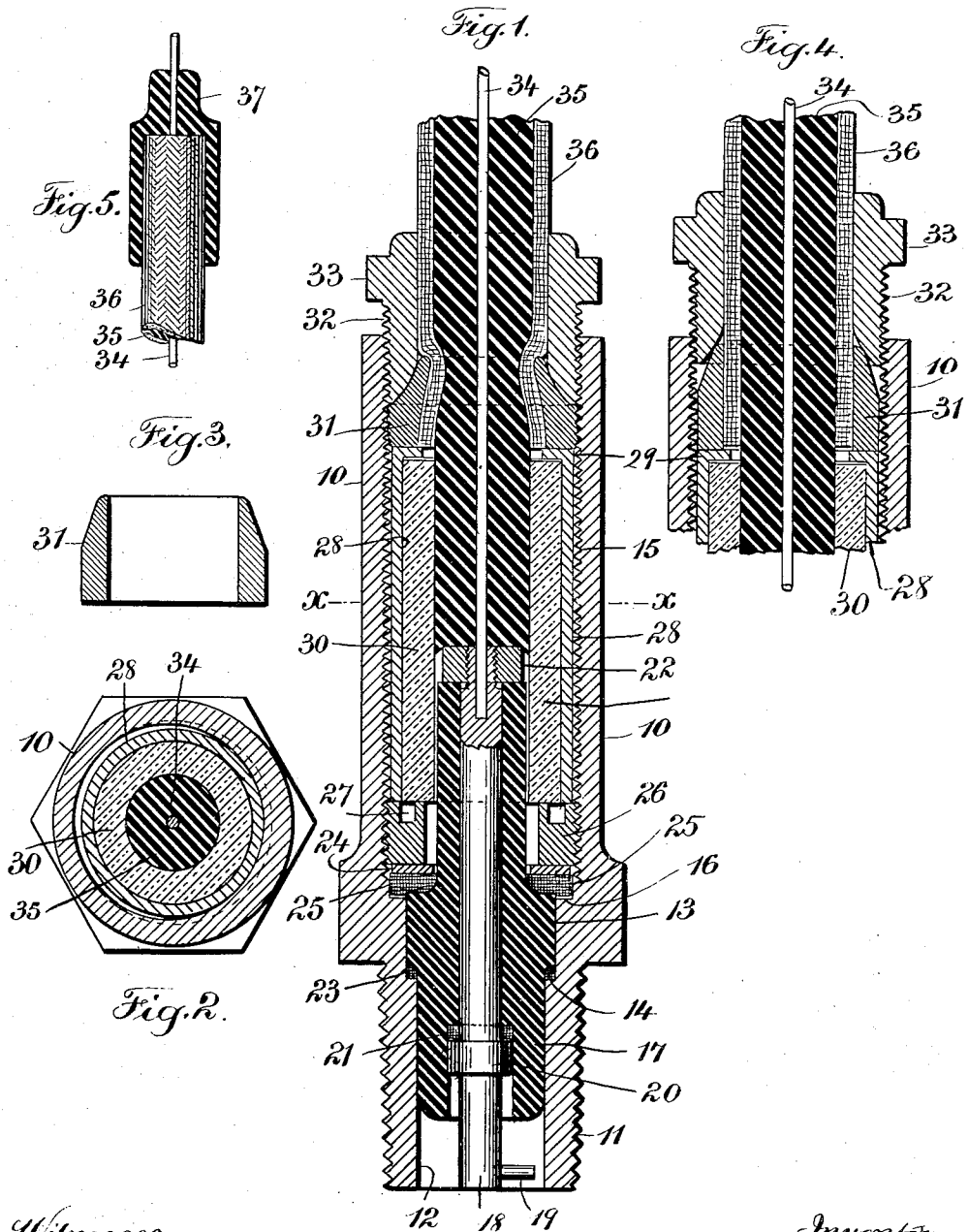
F. H. WEINHAUER.

SPARK PLUG.

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913,595.

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Witnesses

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UNITED STATES PATENT OFFICE.

FRED H. WEINHAUER, OF NEW YORK, N. Y.

SPARK-PLUG.

No. 913,595.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRED H. WEINHAUER, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented an Improvement in Spark-Plugs, of which the following is a specification.

My invention relates to spark plugs commonly employed for the electrical ignition of the explosive mixture in the cylinders of gas and oil engines, and particularly to a spark plug of the so-called jump spark type in contradistinction to that type of spark plug in which a break spark is employed, the object of the present invention being the provision of an improved means for insulating the electrical joint made between the end of the cable and the shell terminal in order to prevent short circuiting between these parts, and also in the employment of a sleeve preferably of soft metal instead of fiber, which sleeve by a suitable bushing is forced into the insulating covering of the cable and against the parts forming the insulation between the shell and the shell terminal in order to hold the cable in position both mechanically and electrically.

In carrying out my present invention, I preferably employ a shell or body adapted to be connected in and to the cylinder head of the gas, oil or other explosive engine, and this shell as is customary, comprises the ground terminal of the spark plug. Within the shell I employ a shell terminal and an insulating sleeve, means whereby the shell terminal is secured in the insulating sleeve, means for securing the shell terminal and its insulating sleeve within the shell, a cable, means within the shell for gripping the cable to hold the parts in position with the end of the cable in electrical contact with the said shell terminal, an insulating tube surrounding the joint made between the end of the cable and the shell terminal, and a barrel surrounding the said insulating tube and intermediate of the same and the interior of the shell; the said means for gripping the cable being also adapted to bear against the extremity of the said barrel, all of which is hereinafter more particularly described.

In the drawing, Figure 1 is a central longitudinal section illustrating my improved spark plug. Fig. 2 is a section on line x, x, Fig. 1. Fig. 3 is a section of the collar preferably made of soft metal employed to grip the cable in position within the shell of the

plug. Fig. 4 is a partial longitudinal section showing the positions of the parts before the collar is forced into place by the bushing, and Fig. 5 is an elevation and partial section 60 of the end of the cable and the nipple employed thereon in making electrical connection at the coil box.

Referring to the drawing 10, indicates the shell or body of the spark plug, which at one end 11 is exteriorly screw threaded and adapted to be received and so connected in the head of the gas, oil or other similar explosive engine. The end 11 of the shell 10 is provided with a bore indicated at 12. The bore 12 extends along within the shell an appreciable distance and is then enlarged to the diameter of the bore 13, thereby forming a shoulder 14, and the bore in the outer end of the shell is indicated at 15; there being a shoulder 16 between the bores 13 and 15, and furthermore, the bore 15 is interiorly screw-threaded.

17 designates a sleeve of insulating material which centrally is provided with a longitudinal aperture or bore adapted to receive a shell electrode indicated at 18, one end of which latter is provided with a spark pin 19 preferably so placed as to come immediately within the inner extremity of the screw-threaded portion 11 of the shell.

The shell terminal 18 is provided with a peripheral flange 20 adapted to fit within one end of the longitudinal aperture in the insulating sleeve which is enlarged to receive the same, and 21 represents a ring of packing placed between the flange 20 and the adjacent shoulder in the insulating sleeve 17; the opposite end of the shell terminal extending slightly beyond the insulating sleeve and screw-threaded to receive a nut 22 by means of which, as will be understood, the flange 20 on the shell terminal is drawn down tight against the packing ring 21 to form a tight joint between these parts.

One end of the insulating sleeve is adapted to fit within the bore 12 of the screw threaded end of the shell, and adjacent to this part of the sleeve the same is provided with a flange adapted to fit within the bore 13 of the shell; a ring of packing material 23 being employed to make a tight joint between the said flange and the shell by bearing against the flange and the shoulder 14. On the opposite end of the sleeve 17, preferably of appreciably smaller diameter, and surrounding the same, I employ a washer 24

and between the washer and the adjacent portion of the sleeve 17 and shoulder 16 I also employ a ring of packing material indicated at 25.

26 designates a thimble provided centrally with an aperture of sufficient diameter for the reduced end of the sleeve 17 to pass through freely, and exteriorly this thimble 26 is screw-threaded and adapted to be received within the shell 10 and to be turned down therein against the washer 24 to force the same against the packing material 25 and in turn to force the sleeve 17 against the packing material 23 in order that tight joints may be made between these parts and the sleeve 17, and the shell electrode 18 firmly secured in place within the shell, and the thimble 26 may be provided with recesses 27 adapted to receive lugs provided on the extremity of a suitable tool in order that the thimble may be readily turned and screwed to position within the bore 15 of the shell 10. Within the bore 15 I also employ a barrel 28 preferably made of metal and of such a diameter as to fit snugly within the said bore; the lower end of the barrel 28 rests upon the outer surface of the thimble 26 and the upper end is provided with an internal flange 29.

Within the barrel 28 I employ a tube 30 preferably made of glass or other equally good insulating material and the outer diameter of the tube 30 is such that the same fits snugly within the barrel 28 beneath the flange 29 thereof while the inner diameter of the barrel 30 is of such a diameter as to receive an insulating covering of the cable employed to connect the plug with the coil box.

31 designates a collar adapted to fit over the cable and preferably made of lead or an alloy thereof, or any other suitable soft metal. It will be noted however, that the collar 31 is approximately of the same diameter as that of the bore 15 and the inner diameter of the collar is preferably the same as the outer diameter of the cable employed, so that the collar fits snugly over the cable and may be seated within the shell against the flange 29.

32 designates a screw-threaded bushing adapted to engage the screw threads of the bore 15 and provided with a flat-sided head 33 by means of which the bushing may be turned.

34 designates the conductor wire in the cable employed, while 35 indicates the insulating sheath thereof, and 36 its outer cover which is customarily made of fabric.

As indicated in Fig. 4, the cable is passed through the bushing 32, through the collar 31 and the end thereof is passed into a recess provided therefor in the outer extremity of the shell electrode 18; a portion of the insulating sheath being cut away for this purpose and a further portion of the cover

being cut away so that the insulating sheath of the cable may pass into the insulating tube 30; sufficient of this covering being cut away to permit the extremity of the insulating sheath to bear against the nut 22 and the extremity of the cable cover 36 to extend substantially through the collar 31.

It will be noted that the bushing 32 is interiorly beveled and the outer surface of the collar 31 is also beveled, and it will be understood that when the bushing is turned down within the shell 10, the collar 31 from the nature of the soft metal of which it is made will be forced to assume approximately the position shown in Fig. 1, in which the metal is forced into the adjacent screw threads, against the face of the flange 29 on the upper end of the barrel 28, and also into the cover 36 and insulating sheath 35 of the cable. This as hereinbefore intimated not only forms a strong mechanical joint between the cable and the shell plug, but also forces the end of the cable into firm electrical contact with the shell electrode 18 and maintains the same in position therein.

At the opposite end of the cable or that to which connection is made with the coil box, I prefer to employ a nipple indicated at 37, Fig. 5, in order to obviate any possible short circuiting between the ground electrode and the shell electrode.

I claim as my invention:

1. A spark plug comprising a shell, a shell electrode, means for securing the shell electrode within the shell, means for connecting a cable both mechanically and electrically within the said shell and to the shell electrode a barrel and an insulating tube, the one within the other and both within the said shell and surrounding the joint between the said cable and the said shell electrode.

2. A spark plug comprising a shell, a shell electrode adapted to receive and make connection with one end of a cable, means for securing the said shell electrode within the said shell, a collar of soft metal adapted to fit within the said shell, means for forcing a portion of the said collar into the cover of the cable to secure the same to the plug, and means for insulating the joint between the said shell electrode and cable from the said shell.

3. A spark plug comprising a shell, a shell electrode adapted to receive and make electrical connection with the end of a cable, means for securing the shell electrode within the said shell, a barrel fitting within the said shell, a tube within the said barrel, both of said parts surrounding the joint between the shell electrode and the end of the cable, a collar of soft metal surrounding the cable and fitting within the said shell and means for forcing the said collar into the cover of the cable and against the said barrel to secure the cable in position and maintain the elec-

trical connection between the cable and the shell electrode.

4. A spark plug comprising a shell, a shell electrode adapted to receive and make electrical connection with the end of a cable, a sleeve of insulating material, means for securing the shell electrode within the insulating sleeve, means for securing the insulating sleeve and its shell electrode within the said shell, a barrel fitting within the said shell, a tube within the said barrel, both of said parts surrounding the joint between the shell electrode and the end of the cable, a collar of soft metal surrounding the cable and fitting within the said shell and means for forcing the said collar into the cover of the cable and against the said barrel to secure the cable in position and maintain the electrical connection between the cable and the shell electrode.

5. A spark plug comprising a shell, a shell electrode adapted to receive and make electrical connection with the end of a cable, an insulating sleeve, means for securing the shell electrode within the insulating sleeve, a thimble adapted to screw down within the said shell to secure the insulating sleeve and shell electrode in position, a barrel fitting within the said shell, a tube within the said barrel, both of said parts surrounding the joint between the shell electrode and the end

of the cable, a collar of soft metal surrounding the cable and fitting within the said shell and means for forcing the said collar into the cover of the cable and against the said barrel to secure the cable in position and maintain the electrical connection between the cable and the shell electrode.

6. A spark plug comprising a shell, a shell electrode adapted to receive and make electrical connection with the end of a cable, an insulating sleeve, means for securing the shell electrode within the insulating sleeve, a thimble adapted to screw down within the said shell to secure the insulating sleeve and shell electrode in position, a barrel fitting within the said shell, a tube within the said barrel, both of said parts surrounding the joint between the shell electrode and the end of the cable, a collar of soft metal surrounding the cable and fitting within the said shell, and a screw-threaded bushing adapted to be turned down in said shell and force said collar into the cover of the cable and against the barrel to secure the parts in position.

Signed by me this 12th day of October 1908.

FRED H. WEINHAUER.

Witnesses:

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