No. 770,927. PATENTED SEPT. 27, 1904.

W. ROCHE.

IGNITION PLUG FOR EXPLOSIVE ENGINES.

APPLICATION FILED DEC. 4, 1903.

NO MODEL.

Fig. 1.

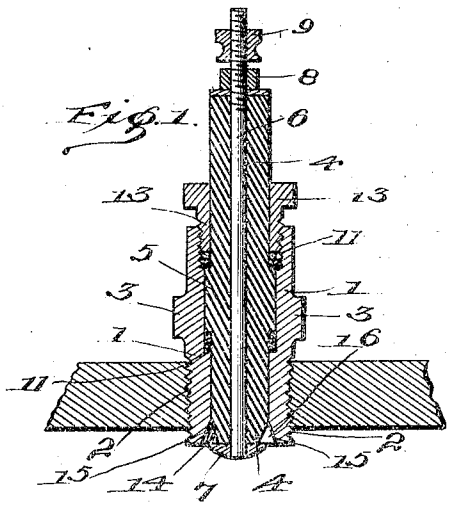


Fig. 2.

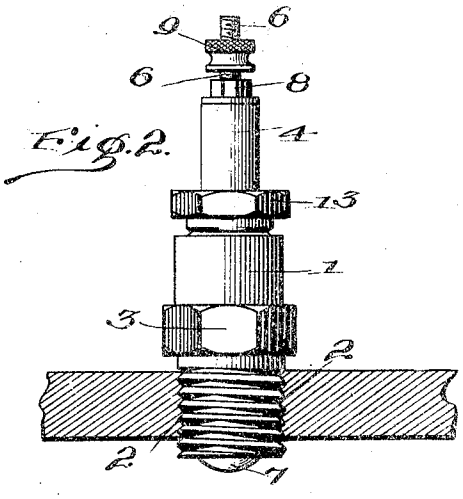
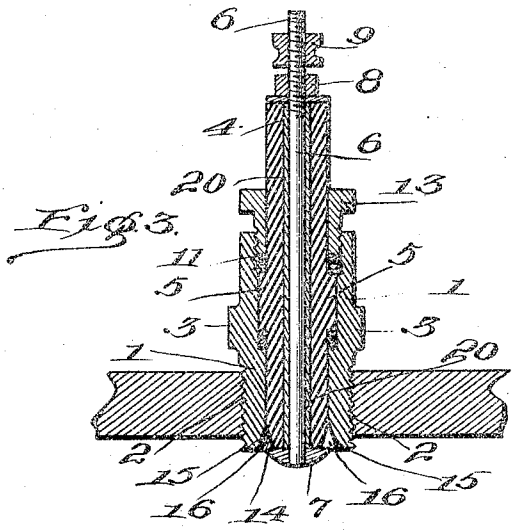


Fig. 3.



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No. 770,927. Patented September 27, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM ROCHE, OF JERSEY CITY, NEW JERSEY.

IGNITION-PLUG FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 770,927, dated September 27, 1904.

Application filed December 4, 1903. Serial No. 183,718. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ROCHE, a citizen of the United States, and a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Ignition-Plugs for Explosive-Engines, of which the following is a specification.

My invention relates to an improvement in ignition-plugs for explosive-engines, and comprises certain features which will be hereinafter pointed out in the claims.

The object of my invention is to improve and simplify the construction of such devices and to secure better and more reliable results therefrom.

In the drawings, Figure 1 shows a longitudinal section of my invention. Fig. 2 is an elevation thereof. Fig. 3 is a longitudinal sectional view of a modification, showing the insulating-sleeve in position.

Corresponding parts in all the figures are denoted by the same reference characters.

The outer member of my plug consists of a tubular plug 1, having a central bore, said bore being formed of two diameters, the larger portion of which is in the outer end of the plug, the two parts being joined by a shoulder or ledge. The inner end of the plug is provided with an exterior thread 2, whereby it may be screwed into a threaded opening. The plug is provided centrally or at any convenient point in its length with a band 3, adapted to be engaged by a wrench for the purpose of screwing it in place. Within this tubular metal plug is placed a tubular insulating-plug 4, which is centrally or at some intermediate point of its length formed with an enlarged band or zone 5, said enlarged portion being adapted to fit within the enlarged portion of the bore in the metal plug and the smaller portion of the insulating-plug being adapted to fit within the smaller inner portion of the metal plug. It is designed that these portions of the insulating-plug shall fit with reasonable closeness in the metal plug, although it is not essential that they be exact fits. Within the central bore of the insulating-plug is placed a conductor 6, herein shown as a wire. This conductor is provided upon its inner end with a washer or cap 7, which fits against the end of the insulating-plug 4. At its outer end this wire is shown as being threaded and provided with two nuts 8 and 9. The nut 8 is designed to draw the washer 7 closely up against the end of the plug and to secure it in place. I prefer to place a washer beneath the nut 8. The nut 9 is designed to coöperate with the upper surface of the nut 8 to secure a wire leading from one pole of the battery. The other wire which leads from the battery may be connected to the outer plug 1 or to any convenient portion of the engine which is in electrical connection with said plug.

Between the shoulders formed upon the insulating-plug 4 and within the metal plug 1 is placed a packing material. A method of packing which I prefer consists of a metal ring 11, combined with fibrous packing material, such as asbestos, alongside of the ring. The same style of packing is used at each end of the enlarged section 5 of the insulating-plug. The metal plug 1 is inwardly threaded at its outer end and is adapted to receive a threaded follower 13, which screws down upon the packing material provided above the band 5. I prefer that the packing material be arranged with the metal ring outwardly from the zone 5 and the fibrous material inwardly therefrom or bearing against the shoulders which terminate said band or zone.

The inner end of the insulating-block 4 is preferably beveled or coned, as shown at 14, and preferably the inner end of the bore in the metal plug is also somewhat coned, as shown at 15. The metal cap or washer 7, which forms the termination of the central conductor 6, is of such diameter that its edge is separated from the adjacent portion of the metal plug 1 a distance which is found to work well for the transmission of the igniting-spark. The coning of the end of the insulating-plug and of the metal plug forms a small chamber 16, in which the explosive mixture is forced by the compression thereof, so as to insure that the igniting-spark will pass through the explosive mixture. This chamber may be made of whatever size is found to work well and may be made by other means,

thereby coning the parts as herein described. The use of the metal rings in combination with the packing material serves a further additional purpose—namely, in properly centering the insulating-plug. This insulating-plug would preferably be made of porcelain, which material cannot be made so accurately to size as to snugly fit the bore of the plug without resorting to methods which would much increase its cost. If, however, a metal ring be inserted between the porcelain plug and the wall of the surrounding metal plug, and especially if this ring be of an easily-compressible metal—such, for instance, as copper—this ring may be made to accurately center the plug. If the space be a little smaller than the thickness of the ring, the ring may be compressed so as to permit insertion of the plug. If the space between the porcelain and the metal plug be slightly greater than the thickness of the ring, the ring may be compressed so as to fill the space. An ignition-plug of the character described has all its parts so designed and assembled that it is practically impossible for it to get out of order. It will therefore be found to be very reliable in its action. It is also so designed that it may be cheaply made, and if for any cause it should become defective in its operation it may be readily replaced by another plug.

Referring to the modification Fig. 3, this form of my invention only differs from that shown by Figs. 1 and 2 in that a mica tube 20 is inserted between the conductor 6 and the insulating-plug 4 to insure higher electrical insulation for said conductor.

It will be understood that the insulating-plug 4 will satisfactorily serve to insulate the conductor for awhile, but that in time it will gradually become broken down by contact with the oil. Therefore I have provided a mica sleeve, which is a high electrical insulator, to protect the conductor when the insulating-plug ceases to serve that purpose satisfactorily, thus providing practically perfect insulation of the conductor.

I do not desire to be understood as limiting myself to the details of construction and arrangement as herein described and illustrated, as it is manifest that variation and modification may be made in the features of construction and arrangement in the adaptation of the device to various conditions of use without departing from the spirit and scope of my invention and improvements. I therefore reserve the right to all such variation and modification as properly fall within the scope of my invention and the terms of the following claims.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. An ignition-plug for explosive-engines, comprising a tubular metal plug the interior surface thereof at the inner end being beveled, a tubular insulating-plug therein the exterior surface at the inner end thereof being beveled, a tubular insulating-sleeve fitting within said insulating-plug and a conductor within said insulating-sleeve projecting out of the inner end thereof, the inner ends of said conductor and said metal plug serving as sparking terminals, substantially as described.

2. An ignition-plug for explosive-engines, comprising a tubular metal plug the interior surface thereof at the inner end being beveled, a tubular insulating-plug therein, the exterior surface at the inner end thereof being beveled, a tubular insulating-sleeve fitting within said insulating-plug and a conductor within the insulating-sleeve projecting out of the inner end thereof and having a cap or head projecting beyond the outer circumference of the inner end of said insulating-plug, the beveled ends of said insulating-plug and said metal plug forming a gas-receiving chamber and the head or cap of said conductor and the inner end of said metal plug serving as sparking terminals, substantially as described.

3. An ignition-plug for explosion-engines, comprising a tubular metal plug the interior surface at the inner end being beveled, a tubular insulating-plug fitting therein the bore of the insulation being of the same diameter from end to end and the exterior surface at the inner end thereof being beveled, an insulating-sleeve fitting within said insulating-plug and extending from end to end thereof and an electrical conductor within the insulating-sleeve and projecting out of the inner end and having a cap or head projecting beyond the outer circumference of said insulating-plug, the beveled ends of said insulating-plug and said metal plug forming a gas-receiving chamber and the head or cap of said conductor and the inner end of said metal plug serving as sparking terminals, substantially as described.

4. An ignition-plug for explosion-engines comprising a tubular metal plug the interior surface at the inner end being beveled, a tubular insulating-plug fitting therein the bore of the insulation being of the same diameter from end to end and the exterior surface at the inner end thereof being beveled, an insulating-sleeve fitting within said insulating-plug and extending from end to end thereof, and an electrical conductor-rod within the insulating-sleeve and projecting out of the inner end and having a cap or head thereon fitting tightly against the inner end of the insulating-plug and projecting beyond the outer circumference thereof, the beveled ends of said insulating-plug and said metal plug forming a gas-receiving chamber and the head or cap of said conductor and the inner end of said metal plug serving as sparking terminals, substantially as described.

5. An ignition-plug for explosion-engines comprising a tubular metal plug adapted to be screwed in place the interior surface thereof at one end being beveled, a tubular insu-

lating-plug therein the interior surface at the inner end thereof being beveled, said metal and insulating plugs being provided with opposing shoulders adapted to receive packing material between them, means for forcing said shoulders together and holding the insulating-plug in place, and a conductor within said insulating-plug projecting out of the inner end thereof and having a cap or head thereon fitting tightly against the insulating-plug and projecting beyond the outer circumference thereof, the beveled ends of said insulating-plug and said metal plug forming a gas-receiving chamber and the outer head or cap of said conductor and the inner end of said metal plug serving as sparking terminals, substantially as described.

In testimony whereof I have signed my name in the presence of the subscribing witnesses.

WILLIAM ROCHE.

Witnesses:
J. C. PYBAS,
A. B. BLACKWOOD.