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ELECTRIC IGNITION DEVICE OR SPARKING PLUG FOR INTERNAL COMBUSTION MOTORS.

APPLICATION FILED JUNE 27, 1906.

Fig. 1.

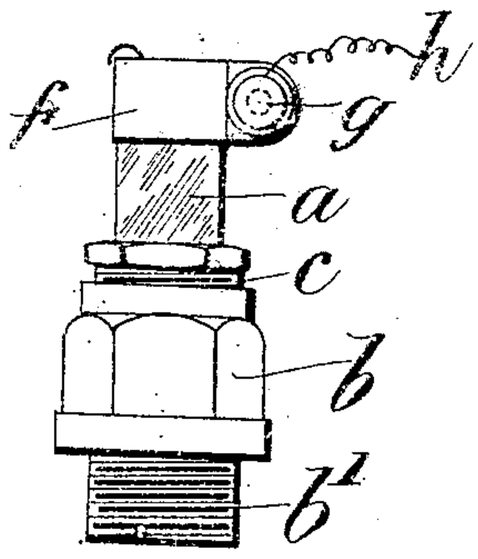


Fig. 2.

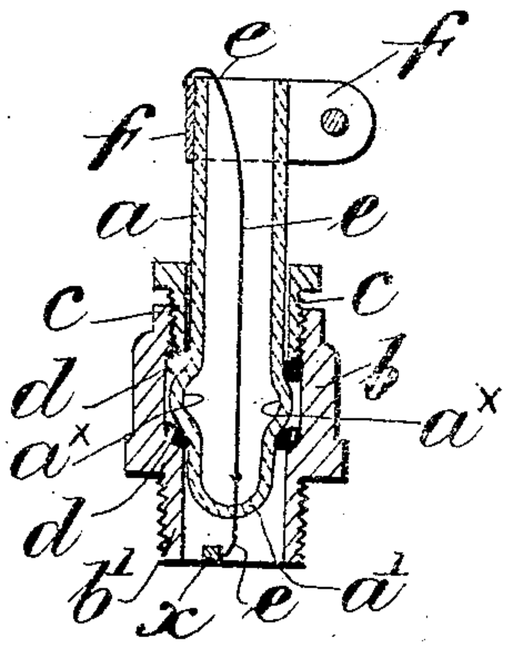


Fig. 3.

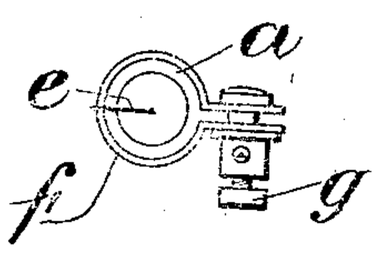
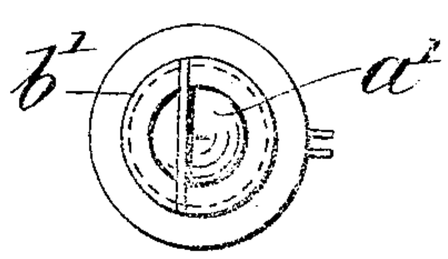


Fig. 4.



Witnesses.
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UNITED STATES PATENT OFFICE.

CHARLES ORME BASTIAN AND GEORGE CALVERT, OF LONDON, ENGLAND.

ELECTRIC IGNITION DEVICE OR SPARKING PLUG FOR INTERNAL-COMBUSTION MOTORS.

No. 897,868. Specification of Letters Patent. Patented Sept. 8, 1908.

Application filed June 27, 1906. Serial No. 323,660

To all whom it may concern:

Be it known that we, CHARLES ORME BASTIAN, electrical engineer, residing at 75 Brondesbury road, London, England, and GEORGE CALVERT, electrical engineer, residing at 27 Barretts Grove, Stoke Newington, London, England, both subjects of the King of Great Britain, have invented a new or Improved Electric Ignition Device or Sparking Plug for Internal-Combustion Motors, of which the following is a specification.

This invention is designed to produce an electrical ignition device or so-called sparking plug—for internal combustion motors—which is simple and economical to produce and which will afford or permit observation (from the exterior) both of the electric sparking produced through the medium of said plug and of the flame produced by the internal explosion or combustion within the motor caused thereby, thus serving as and combining the functions of both a sparking plug or ignition device and observation window or means for ocular observation of the phenomena occurring within the combustion chamber.

Now according to the present invention the electric ignition device or sparking plug (which for the sake of brevity we will hereinafter refer to as the "sparking plug") is provided with an insulator formed of a homogeneous vitreous and transparent material of high di-electric character for which purpose according to this invention glass is specially selected of a character such that while having high insulating properties it will also afford means to inspect or observe the phenomena occurring within the combustion chamber or within some part in connection with the latter and furthermore such insulator is especially formed and constructed to resist the shock pressure and heat or sudden or extreme variations of temperature arising from the internal combustion or explosions within the motor or otherwise; the glass which, according to this invention, it has been found possible and practical to use for the aforesaid purpose is Jena glass of the type known as fireproof combustion tubing such as that now found in commerce and made for example by the firm of Schott & Genossen of Jena; but we do not wish to confine ourselves to this particular glass as obviously we may employ other suitable homogeneous vitreous material of the type described and having the character of such glass and which while affording good insulation is not only transparent but is also capable of resisting shock heat and pressure and variation in temperature as aforesaid. And in order that the invention may be the more easily understood and readily carried into practice we will proceed to fully describe same with reference to the accompanying drawings in which:—

Figure 1 is a view in elevation of a sparking plug in which our present invention is incorporated and Fig. 2 is a vertical sectional view thereof. Fig. 3 is a plan *i. e.* top end view of Figs. 1 and 2; and Fig. 4 is plan view of the opposite end thereof.

Referring to Figs. 1 to 4 of the accompanying drawings:—the insulator *a* of Jena glass or the like as aforesaid is tubular advantageously with the bore of said tube and the walls thereof of the relative proportions shown in the drawings or thereabouts and shaped also at its bottom end as shown or thereabouts and same is arranged in any suitable mount as for example same may be mounted in a metal shell *b* of the form such as are at present generally in use in sparking plugs and any suitable gland *c* and packing *d* (*e. g.* of asbestos) may be employed if desired so that the glass *a* is protected as far as possible from liability to injury from its support or mount *b*; and this tubular insulator *a* of said glass or the like is closed at one end *a'* *i. e.* its inner end (or at both ends if desired) through which a wire *e* or other conductor is passed (by sealing same therethrough or otherwise—as desired) this conductor *e* forming one pole of the "sparking plug" *x* being the other pole; and said glass insulator *a* is suitably arranged in its mount or support as aforesaid for example the metal shell *b* may be provided with a screw *b'* (or other suitable means may be employed) to attach same to the cylinder (not shown) of the engine, or said sparking plug may be otherwise mounted so as to be adapted to fire the explosive charge as for example by mounting same on some part or adjunct of the engine or frame in communication with the combustion chamber of the engine; the said shell or mount *b* for said insulator forming the other or earthed pole of the plug; to which as shown the cross-bar *x* may be attached to form the second contact.

Any suitable means of attachment may be provided for connecting the central insulated wire *e* with the source of current supply for example as illustrated the said conductor

wire *e* may be connected to the split collar *f* provided with the clamping screw *g* by which latter the electric conductor *h* from any suitable source may be electrically connected and secured to the said split collar *f* which latter is fixed on the upper end of the said glass insulator *a*.

By the foregoing invention a sparking plug is provided by means of which it can be seen whether the spark is passing, whether the cylinder is charged or not or whether such charge is under compression or not, and also affording means for viewing the combustion of the charge within the cylinder and judging of its composition; this combined insulator and observation window being suitable either for testing purposes or same can be used in practice continuously.

The aforesaid inner end or portion *a'* of the insulator *a* exposed to the explosion and pressure in the cylinder is as aforesaid advantageously rounded or conoidal as illustrated being so formed to offer the requisite resistance to shock, pressure, and change of temperature; and also its joint in or with its mount *b* should be pressure-tight *i. e.* this may be effected by means of the gland *c* and packing rings *d* as aforesaid.

For the purpose of safety—or protection of the inner end *a'* of the aforesaid insulator *a*—if desired a piece of wire gauze or finely perforated metal or the like may be placed between the inner end of the insulator and the cylinder or combustion chamber; and such gauze or the like may form a portion of the electrical circuit.

Any suitable means may be provided to prevent longitudinal movement of the tubular insulator *a* with respect to its shell *b* as for example the curved annular enlargement $a^{\times}$ may be formed on the said insulator *a*—see Fig. 2.

What we claim is:—

1. In a "sparking plug" for internal combustion engines, the combination of an insulator formed from a tube of glass closed at one end, and provided with the annular enlargement $a^{\times}$, packing material on each side of said enlargement, a metal shell surrounding said insulator and having the gland *c*, and a wire sealed through the closed end of said tube and connected to said shell, substantially as described.

2. In a "sparking plug" for internal combustion engines, the combination of an insulator formed from a tube of glass closed at one end, and provided with the annular enlargement $a^{\times}$, packing material on each side of said enlargement, a metal shell surrounding said insulator and having the gland *c*, a wire sealed through the closed end of said insulator and connected to said shell, and a split collar *f* secured to the upper end of said insulator and provided with the clamping screw *g*, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

CHARLES ORME BASTIAN.
GEORGE CALVERT.

Witnesses:
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C. P. LIDDON