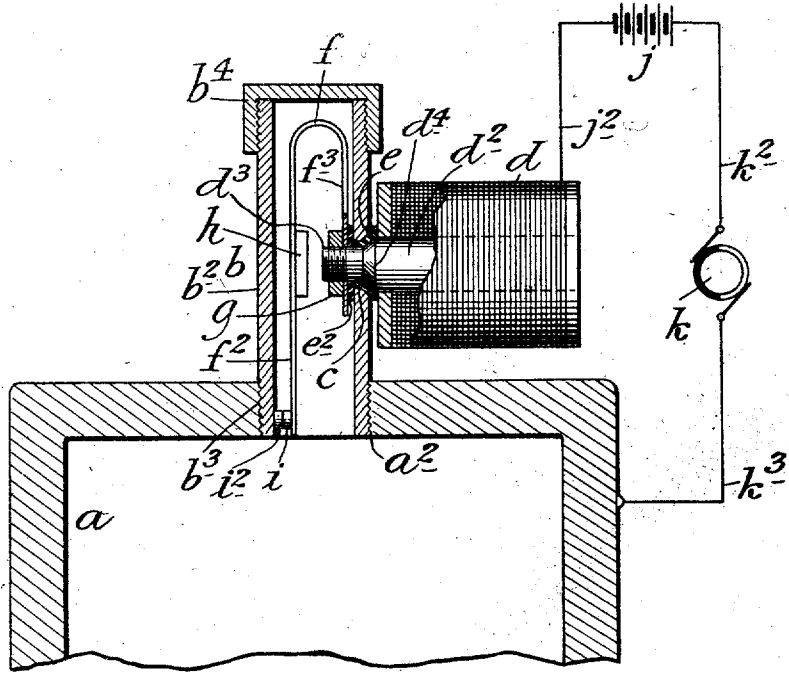


W. H. HORNER.
SPARKING PLUG FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED NOV. 30, 1909.

963,564.

Patented July 5, 1910.



WITNESSES:

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WILLIAM H. HORNER, OF WILLIAMS BRIDGE, NEW YORK.

SPARKING-PLUG FOR INTERNAL-COMBUSTION ENGINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM H. HORNER, a citizen of the United States, and residing at Williams Bridge, in the county of New York and State of New York, have invented certain new and useful Improvements in Sparking-Plugs for Internal-Combustion Engines, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to electric sparking plugs or devices for use in connection with internal combustion engines, and one of the objects thereof is to provide a device of this class which will not become clogged or fouled with carbon and which will be self-cleaning at the contacts; a further object being to provide a device of the class specified the moving parts of which are entirely within the plug; and with these and other objects in view the invention consists in a device of the class specified, constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification of which the accompanying drawing forms a part, said drawing being a sectional view of a part of a cylinder of an internal combustion engine and showing also my improved sparking device or plug also in section.

In the drawing forming part of this specification I have shown at *a* a part of a cylinder of an internal combustion engine, and in the practice of my invention I provide a sparking plug or device *b* which comprises a tube *b*¹, one end of which is screw threaded as shown at *b*³ and adapted to be screwed into an aperture or opening *a*² in the cylinder *a*, and the tube *b*² is of standard dimensions as is also the threaded aperture *a*² of the cylinder *a*.

The outer end of the tube *b*² is closed, in the form of construction shown, by means of a threaded cap *b*⁴, and in practice I form in one side of the tube *b*² and centrally thereof an opening or aperture *c* the outer walls of which are counter-sunk, and connect with said tube an electromagnet *d* having a core *d*² provided with a reduced screw threaded extension *d*³ which is passed through the opening or aperture *c* and said core is also provided with a beveled shoulder *d*⁴, and between the adjacent end of the magnet, the shoulder *d*⁴, and the reduced and threaded extension *d*³ of the core

of the magnet, and the side of the tube *b*² is placed an insulating packing *e*.

Within the tube *b*² is placed a U-shaped spring *f* having a longer arm *f*² and a shorter arm *f*³, and the threaded extension *b*³ of the core of the magnet *d* passes through the shorter arm of said spring, and between said spring and the side of the tube *b*² is placed an insulating packing *e*², and the insulating packings *e* and *e*² securely insulate the magnet *d*, the core *b*⁴ thereof and the spring *f* from the tube *b*². A nut *g* is screwed onto the reduced extension *d*³ of the core *d*² of the magnet *d*, and this nut securely binds the tube *b*², the magnet and the spring *f* together, and also securely presses and binds the insulating packings *e* and *e*² and this serves to prevent the escape or blow off of gases through the tube *b*² or the connection of the magnet *d* therewith. The longer arm *f*² of the spring *f* is provided centrally with an armature *h* and said arm is provided at its end or adjacent thereto with a contact device *i* and a similar contact device *i*² is connected with the inner end portion of the tube *b*² as clearly shown in the drawing. I have also shown at *j* an ordinary battery which is connected with the magnet *d* by a wire *j*² and at *k* a circuit closer or timer which is connected with the battery *j* by a wire *k*², and with the cylinder *a* by another wire *k*³, and it will be understood that the spring *f* is in electrical connection with the core *d*² of the magnet *d*.

The operation will be similar to that of other devices and will be readily understood from the foregoing description when taken in connection with the accompanying drawing and the following statement thereof. The position of the parts shown in the drawing is their normal position, and in this position of said parts the contact devices *i* and *i*² are in connection. If now the cylinder *a* is supplied with a charge of fuel, and at the proper instant the circuit closer or timer *k* revolves to a position which closes the battery circuit the current from the battery will flow through the magnet *d* and the spring *f* and through the cylinder *a*, the wire *k*³, the circuit closer or timer *k* and the wire *k*² back to the battery and this energizes the magnet *d* and draws the arm *f*² of the spring *f* inwardly and separates the contact devices *i* and *i*², and a spark is formed in the usual manner, and as the circuit closer or timer *k*

continues to turn the circuit is broken and the arm f^2 of the spring f moves back in the position shown in the drawing and this make and break of the circuit and the consequent formation of the spark are continued as long as the apparatus is in operation, and the making and breaking of the circuit and the formation of said spark are timed by the circuit closer or timer k , and this operation will be repeated for every cycle of the engine.

With my improvement there is considerable movement of the spring arm f^2 and by reason of this fact the distance between the contacts i and i^2 is greater than is ordinary in this class of devices, and by reason of this construction the said contacts will be prevented from becoming clogged with carbon and will be kept clean at all times.

By means of my improvement but one circuit wire is necessary and the tube b^2 has but one electrical connection, and by placing the magnet d at the side of said tube the power necessary for operating the arm f^2 of the spring f is much less than would be necessary, and the operation of said arm is also made more positive and direct.

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

1. A device of the class described, comprising a tubular plug, one end of which is closed and the other open and provided with a contact device, a magnet at one side of said plug and the core of which passes thereinto, said magnet and said core being insulated from said tube, a U-shaped spring placed in said tube and insulated therefrom, one arm of said spring being secured to the core of the magnet and the other arm being provided with a contact device.

2. A device of the class described, comprising a tubular plug, one end of which is closed and the other open, the open end of said plug being adapted to be secured in the cylinder of an engine and being provided with a contact device, and an electromagnet connected with one side of said plug and the core of which passes thereinto, said magnet and said core being insulated from said plug, and a U-shaped spring placed in said plug and comprising shorter and longer arms, the shorter arm being connected with the core of the magnet and the longer arm extending in the direction of the open end of said plug and being provided with a contact device.

3. A device of the class described, comprising a tubular plug, one end of which is closed and the other open, the open end of said plug being adapted to be secured in the cylinder of an engine and being provided with a contact device, and an electromagnet connected with one side of said plug and the core of which passes thereinto, said magnet and said core being insulated from said plug, and a U-shaped spring placed in said plug and comprising shorter and longer arms, the shorter arm being connected with the core of the magnet and the longer arm extending in the direction of the open end of said plug and being provided with a contact device, and being also provided with an armature.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 27th day of November 1909.

WILLIAM H. HORNER.

Witnesses:

C. E. MULREANY,
B. M. RYERSON.