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A. E. EASTMAN

SPARK PLUG STRUCTURE

Filed Dec. 6, 1921

Fig. 1.

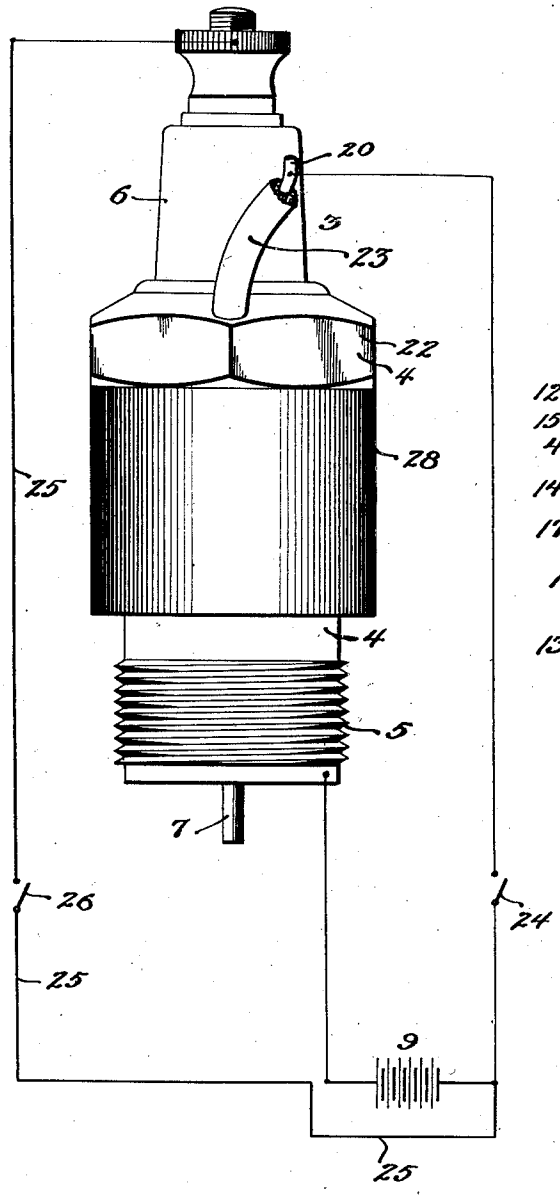
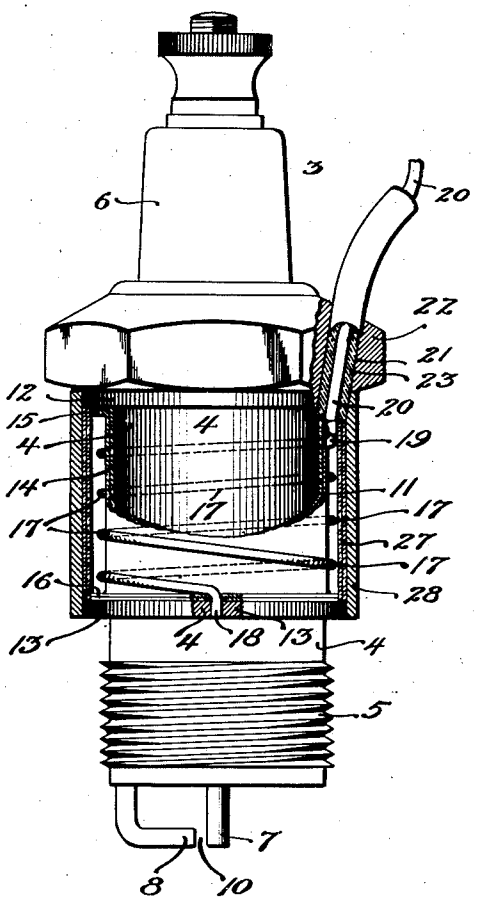


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

ADAM E. EASTMAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WALLACE A. COLE, OF PHILADELPHIA, PENNSYLVANIA.

SPARK-PLUG STRUCTURE.

Application filed December 6, 1921. Serial No. 520,221.

To all whom it may concern:

Be it known that I, ADAM E. EASTMAN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Spark-Plug Structures, of which the following is a specification.

One object of my invention is to provide means effective to heat internal combustion engine spark plugs for the purpose of facilitating the starting of the engine.

Another object is to embody heating means in connection with a spark plug so that it can be made in a commercial manner.

These objects, and other advantageous ends which will be described hereinafter, I attain in the following manner, reference being had to the accompanying drawing in which—

Figure 1 is an elevational view of an internal combustion engine spark plug; the electrical connections being illustrated diagrammatically,

Figure 2 is an elevational view showing said spark plug with certain of the parts in section to show the electrical resistance heating coil which forms a part of my invention.

Referring to the drawing, 3 represents a spark plug including a metallic body portion 4; said body portion having a screw threaded part 5 of the usual form adapted to be screwed into an engine cylinder. The body portion 4 has the usual insulated central electrode 7 extending therethrough; the latter having a sparking portion adjacent the sparking portion 8; the latter depending from and being in electrical connection with the body portion 4 so that when the part 5 is screwed into the metallic engine cylinder and the engine cylinder is electrically grounded with one pole of any suitable electric generator, such for example as the generator diagrammatically illustrated at 9, sparks will be produced across the gap 10 when the other pole of the generator is in electrical connection with the central electrode.

The elements above specifically mentioned and designated do not in themselves form a part of my present invention but are merely illustrated and described in order to more readily comprehend my invention which will now be described.

The part 11 of the body portion is preferably turned in cylindrical form having upper and lower flanges 12 and 13 and around this part 11 I provide an insulating shell 14 preferably of mica; this shell having flanges 15 and 16 to serve as insulating facings for the opposed surfaces of the flanges. Around this shell 14 I wind a coil 17 which may be made of German silver, nickel silver or other material which, when electric current is passed therethrough, will become heated to a high degree.

With the system of electric wiring as illustrated, I ground one end 18 of the coil in the flange 13 and connect the other end 19 of the coil with an electric conduit 20; said electric conduit extending through a port hole 21 in the head 22 of the body portion 4; said conduit 20 being insulated from the body portion by any suitable insulation, such for example as the insulation 23.

I have illustrated diagrammatically in Figure 1, the conduit 20 in electrical connection with the generator 9; said connection including a switch 24; said generator also being in electric connection with the body portion 4; there being an independent connection 25 between the generator and the central insulating electrode 6; said latter connection including a switch 26.

In the use of my invention, considering that the engine is at rest and comparatively cool, before the current is passed through the plug, the switch 24 is closed and an electric circuit is completed through the coil 17 and said coil becomes hot and the heat generated is absorbed by the body portion 4 and all the parts in connection with the body portion 4 become heated and this heat effects the heating of a zone surrounding the electrode sparking portions and causes the gases to be heated so that when current is passed through the plug to create the spark, the gas within the cylinder by being thus heated will readily explode and facilitate the starting of the engine. I preferably surround the coil 17 with an outer shell 27 of mica and force a sleeve 28 upward so as to surround the flanges 12 and 13 and also to surround the outer shell 27 of mica so as to protect the parts.

It will be further noted that by the use of my invention any moisture or condensation immediately adjacent the sparking portion of the spark gap will be evaporated when the plug is heated so that when the

current is passed through the plug, the parts will be in such condition as to effect a ready explosion of the gases and not be interfered with by any moisture or other condensation.

In the actual use of the invention as above described I have, due to the heating of the plug, been able to quickly start the engine and the arrangement is such as to economize in electricity since there is practically no chance of running down any batteries such as is common occurrence when attempting to start an engine when cold or when the gases immediately adjacent the spark plug are cold.

While I have described my invention as taking a particular form, it will be understood that the various parts of my invention may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

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

1. The combination of a spark plug; a metallic body portion; an electric resistance heating coil having a part surrounding a part of the spark plug adjacent said body portion; and a sleeve forming a protective cover for said coil and being secured to said spark plug; substantially as described.

2. A spark plug including a metallic body, an electric resistance heating coil having a part surrounding a part of the plug adjacent the body; an insulating shell surrounding the coil, and a sleeve forming a protective cover for the coil and insulating shell, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ADAM E. EASTMAN.

Witnesses:
ELIZABETH GARBE,
CHAS. E. POTTS.