

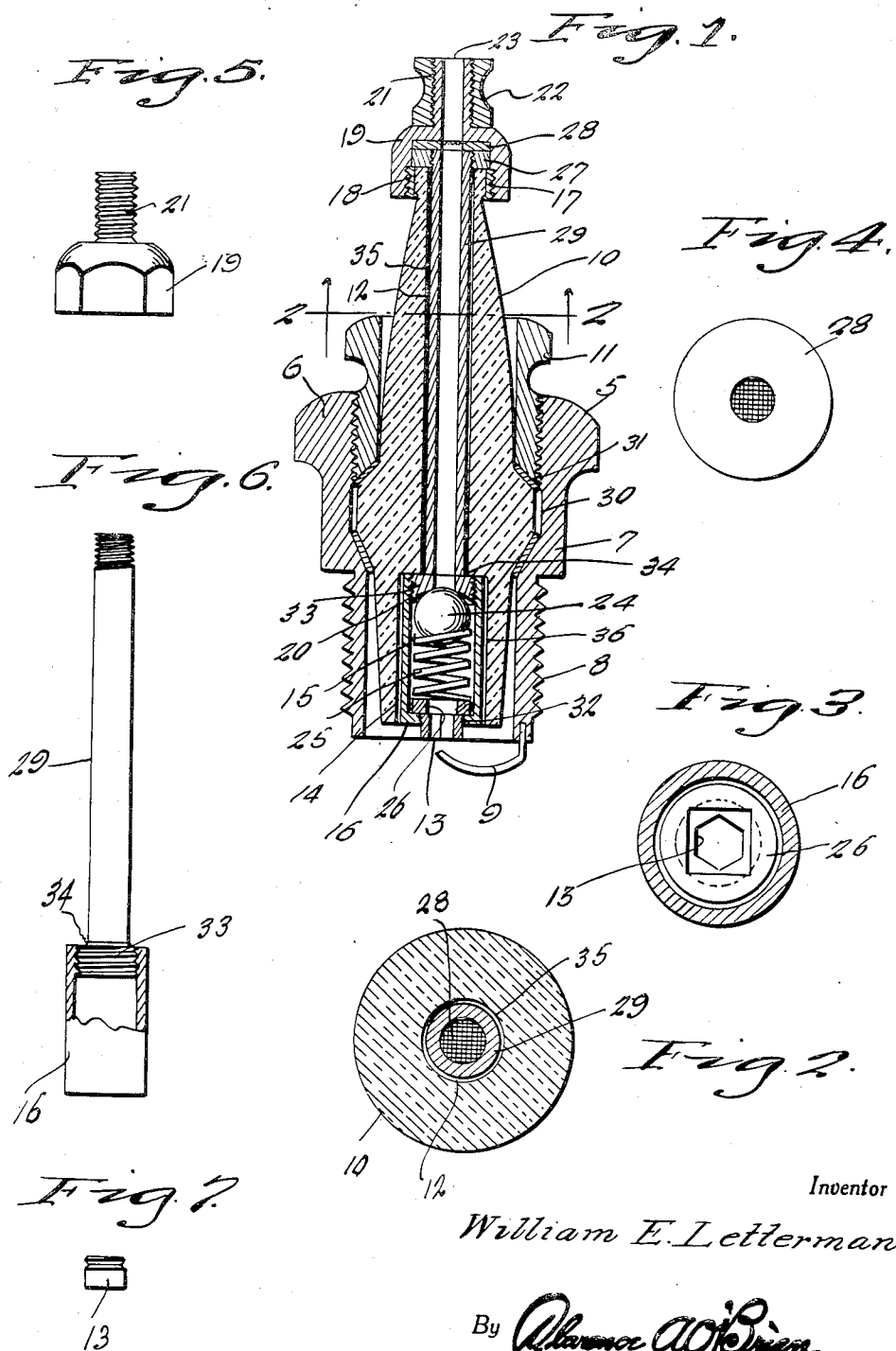
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SPARK PLUG

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SPARK PLUG

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My invention relates to improvements in spark plugs, and particularly to a spark plug having a valved conduit for admitting air therethrough into the interior of the combustion chamber of an internal combustion engine upon which it may be mounted.

It is an important object of my invention to provide a spark plug of the type described having air passing means controlled by check valve means operable to admit air upon the intake stroke of the piston of the engine whereby a stream of air is impinged upon the sparking points of the plug so as to clean them and prevent the formation of carbon thereon and the fouling thereof.

It is also an important object of my invention to provide a spark plug as described above whereby air is introduced into the combustion chamber so as to scavenge the combustion chamber of oil accumulations and carbon, and by this means in conjunction with the cleaning of the sparking points, to increase the efficiency and economy of operation of the engine.

It is also an important object of my invention to provide a spark plug construction as described above whereby the sparking points thereof are kept clean and cool by the impinged stream of air, thereby prolonging the useful life of the spark plug and its greatest efficiency, resulting in continual perfect combustion in the engine.

Other objects and advantages of my invention will be apparent from a reading of the following description in connection with the drawing, wherein for purposes of illustration I have shown a preferred embodiment of the invention.

In the drawing:—

Figure 1 is a transverse vertical sectional view through an embodiment of the invention.

Figure 2 is a transverse horizontal sectional view therethrough, taken approximately on the line 2—2 of Figure 1.

Figure 3 is a horizontal sectional view through the lower part of Figure 1 showing the check valve assembly within its tubular cage.

Figure 4 is a plan view of the screened washer.

Figure 5 is a side elevational view of the cap.

Figure 6 is a side elevational view of the center electrode.

Figure 7 is a side elevational view of the tubular spark point.

Referring in detail to the drawing, wherein like numerals refer to like parts throughout the same, the numeral 5 generally designates the body portion of the spark plug construction.

This comprises the usual wrench grip 6 below

which is the cylinder head engaging annulus 7 from which depends the reduced exteriorly screw-threaded skirt 8 for projecting into the combustion chamber. On one side of the lower edge of the skirt 8 is the usual electrode 9 projecting toward the center of the opening in the skirt. A conventional type of composition insulator 10 is engaged with the body portion of the spark plug in the usual manner, and is retained and assembled by means of the annular nut 11 engaged in the opening in the upper part of wrench gripping portion 6.

All parts of the spark plug thus far described may be conventional, except for certain features of the insulator 10. The invention is particularly concerned with the construction of the insulator 10 and its electrode, and the manner in which the electrode is associated with the outer electrode 9.

The insulator 10 is provided axially throughout its length with an opening 12 in which are disposed tubular electrodes 13 and 29. In the lower part of the insulator 10 is an enlarged bore 14 in which is seated a tubular cage 16 which is open at its upper end and interiorly threaded to receive cushion 20 which is exteriorly threaded and spot welded to the lower section of tubular electrode 29 as indicated by 33 and 34 respectively. The tubular cage 16 is provided in its bottom with a threaded opening into which the lower electrode 13 is threaded as indicated at 32. This communicates the upper electrode 29 with the interior 15 of the cage 16 and the lower electrode 13. A ferrule 17 is crimped on the upper end of the insulator 10 and is exteriorly threaded to receive cap 19 which is interiorly threaded and encloses the annular nut 27 which is interiorly threaded to receive the upper electrode 29 which has its top end exteriorly threaded, and these secure the entire electrode and cage assembly in position, being 29, 16 and 13 respectively. It will be observed that the annular nut 27 engages the upper electrode 29 the lower end of which is spot-welded to cushion 20, which engages the tubular cage 16 which in turn engages the lower interchangeable electrode 13. Placed between the annular nut 27 and the interior upper portion of cap 19 is a circular disc 28 with an opening in the center thereof equivalent in size to that of the tubular electrode 29 which is covered by a fine mesh wire screen to prevent foreign particles from entering into the cylinder. Cap 19 has upwardly projecting therefrom a tubular exteriorly threaded boss which constitutes the mounting for the binding post nut 22 for clamping an igni-

tion cable to the plug in the conventional manner. The boss and cap 19, disk 28 and annular nut 27 have a communicating passage 23 therethrough. The cushion 20 is provided with a rounded recess in its underside communicating with the passage therethrough for acting as a seat for the check ball 24 which is normally seated therein by the action of a helical spring 25 acting between the ball check and the disk 26 which has a square hole punched out of the center of this circular disc to assure the passage of air to the cylinder when the helical spring 25 is depressed upon the suction stroke of the piston. The disc 26 rests on the bottom of the cage 16, the hole in the disc furnishing the communicating means between the cage interior 15 and the lower electrode 13. The tension of the spring 25 need only be sufficient to maintain the check ball 24 seated under normal conditions. The electrode 13 may be easily changed when worn.

When the plug is installed on an engine, the down stroke or intake stroke of the piston will create a suction in the tubular electrode such as will unseat the check ball 24 and draw through the top of the plug a volume of air into the combustion chamber. It will be obvious, since the terminal of the electrode 9 is placed at the opening of the lower end of the tubular electrode 13, that the incoming air will impinge upon the terminal of the electrode 9 and also create a cleaning agitation about the lower end of the electrode 13. It will be observed that the lower end of the electrode 13 projects slightly below the lower extremity of the insulator 10. The main portion of the electrode 29 is spaced from the bore of the insulator as indicated at 35 and the enlarged lower portion of the electrode 29 is spaced from the insulator as indicated at 36 to allow for expansion of these parts of the electrode due to heat when the plug is in operation.

It will be observed that the arrangement is such that when the stream of air is produced in the manner described, that air will be introduced into the combustion chamber and in its passage thereinto will clean and cool the electrodes of the spark plugs, whereby to produce the effects sought herein.

Though I have shown and described herein a preferred embodiment of the invention, it is to be definitely understood that I do not desire to limit the application of the invention thereto, and any change or changes may be made in material and structure and arrangement of parts, within the spirit of the invention and the scope of the subjoined claims.

Having thus described my invention, what I claim as new is:—

1. A spark plug including a spark plug shell, an insulator in the shell, an electrode on the shell, a tubular electrode in the insulator and having an end terminating inwardly of the insulator, a valve cage arranged in the insulator, a valve seat connecting said end of the electrode with the adjacent end of said valve cage, a spring pressed check valve in the valve cage and engaging said seat for controlling movement of air through the tubular electrode, said valve cage being located in the lower part of the insulator, and a short tubular electrode in spark gap relation to the electrode on the shell and having a detachable connection with the free end of the valve cage so as to be capable of being replaced when worn.

2. A spark plug including a spark plug shell, an insulator in the shell, an electrode on the shell, a two-part sectional tubular electrode axially disposed within the insulator one of the sectional parts of the tubular electrode being located in the lower part of the insulator and having a free end disposed in spark gap relation to the electrode on the shell, spring pressed valve means in the insulator for controlling movement of air through the tubular electrode, and including a cage having its opposite ends respectively screw threadedly engaged with the sections of the tubular electrode for connecting said sections together, a filtering screen disposed across the tubular electrode at the upper end of the insulator, and a cap screw threadedly engaged with the insulator at the upper end thereof and securing said screen in position, said cap having an air passage therethrough.

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