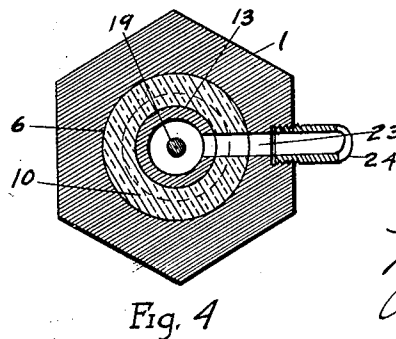
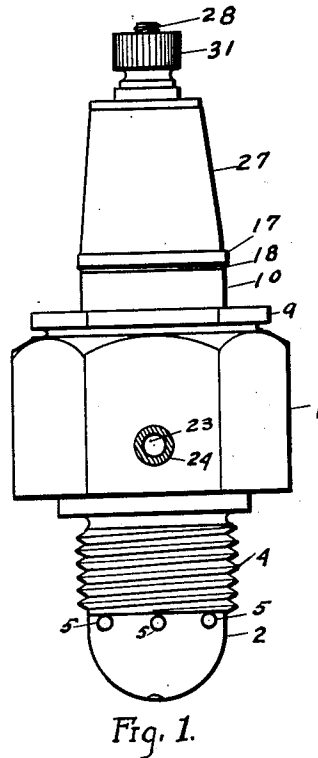
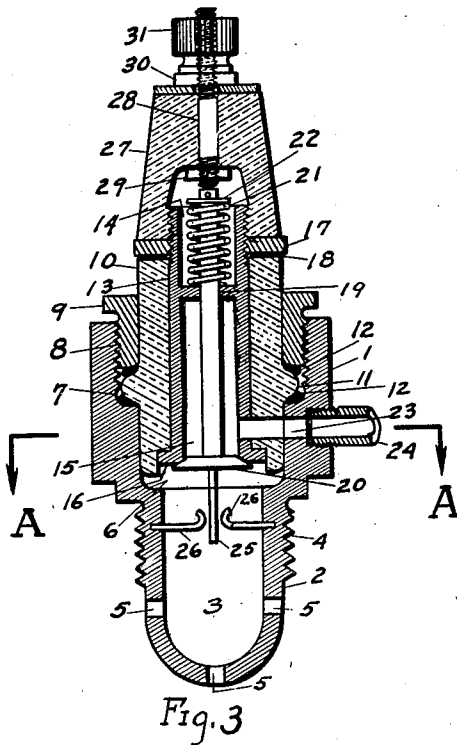
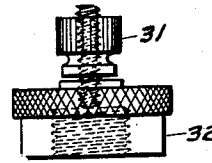
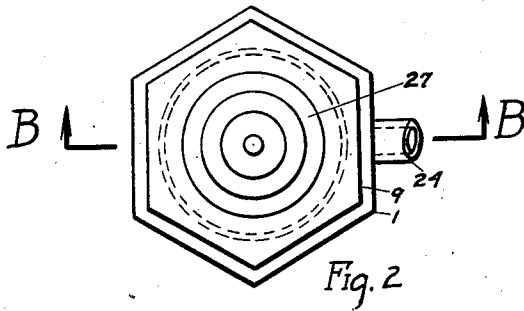


Aug. 17, 1926.

M. J. DIKEMAN
IGNITION FLASH PLUG
Filed Sept. 8, 1924

1,596,240

2 Sheets-Sheet 1



INVENTOR

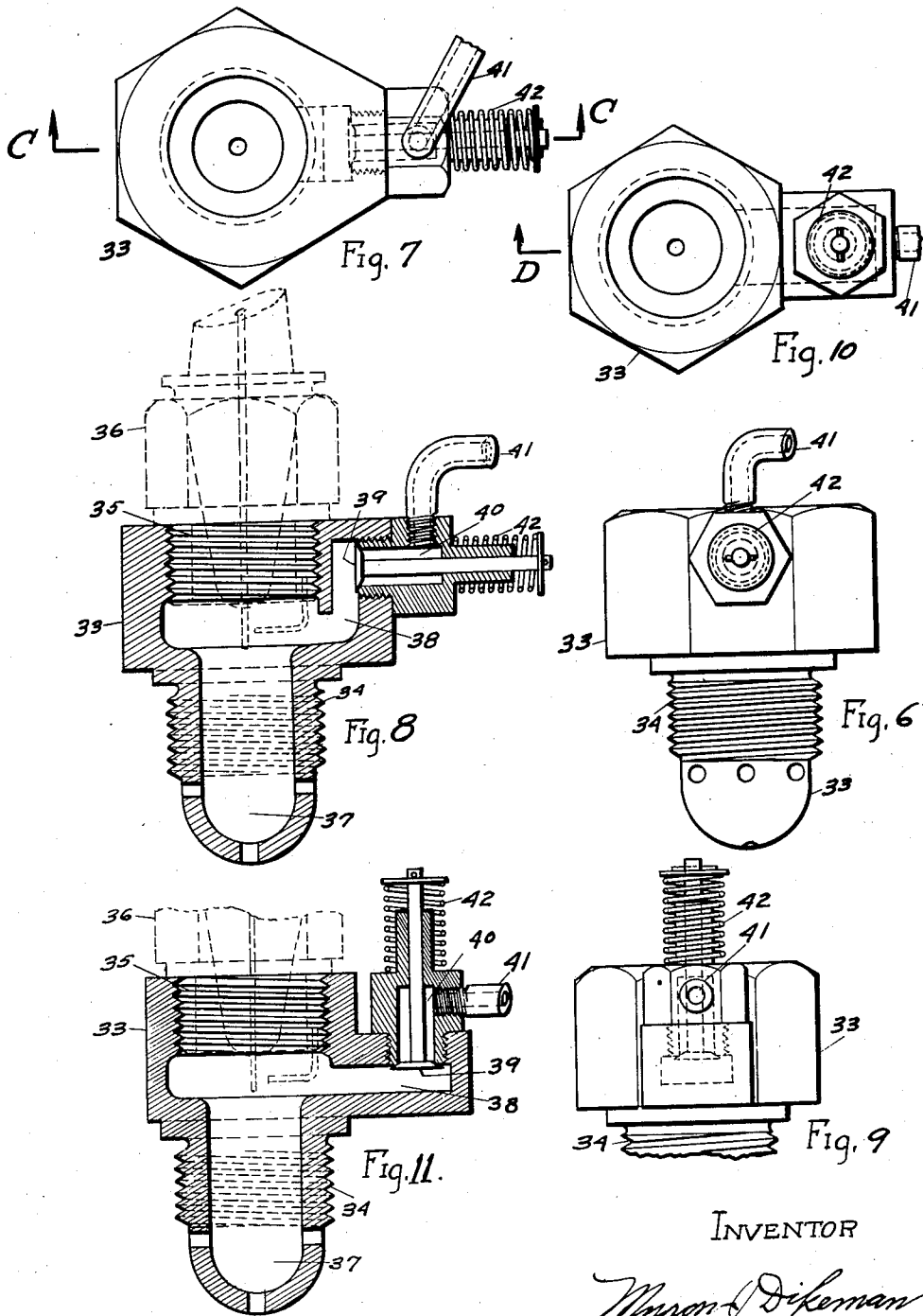
Myron J. Dikeman

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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE.

MYRON J. DIKEMAN, OF DETROIT, MICHIGAN.

IGNITION FLASH PLUG.

Application filed September 8, 1924. Serial No. 736,523.

The object of my invention is to provide an ignition flash plug adapted for igniting the power gas in gas engines, by the use of a flame from the plug instead of a spark as is now in common practice and use, thereby igniting the entire contents of the engine cylinder, instead of one point only as is the case with the ordinary electric spark.

Another object is to produce an ignition flash plug that can be filled with gas independently of the engine cylinders, so designed that it will produce an internal explosion within the plug prior to the explosion within the engine cylinder, and producing a flame for igniting the gas in the engine cylinders.

A further object is to provide an ignition flash plug that will operate automatically under the action of the engine cylinder vacuum, for filling and discharging the combustion chamber therein.

These several objects are attained by the construction and arrangement of parts more fully hereinafter set forth.

Similar parts on all drawings are marked by similar numerals.

Fig. 1 is a side view of the flash ignition plug assembled, showing the gas intake pipe, and the flash ports.

Fig. 2 is a top view of the assembled plug.

Fig. 3 is a sectional view of the plug taken on the line —BB— of Fig. 2, showing the general arrangements of parts.

Fig. 4 is a sectional view —AA— of Fig. 3, through the gas inlet channel and chamber, showing the insulating from the main casing.

Fig. 5 is an alternate terminal cap which may be substituted in place of the insulated cap shown in the assembled drawing, where direct contact is desired for the ignition points.

Fig. 6 shows a modified form of the flash plug having the gas chamber and operating valve installed in the outside of the casing, and inserting the ordinary spark plug within the casing opening for igniting the gas in the combustion chamber. The principle and operating are the same as the former plug.

Fig. 7 is a top view of Fig. 6.

Fig. 8 is a sectional view —CC— of Fig. 7, showing the general construction and arrangements of the working parts.

Fig. 9 is a modified form of Fig. 6, with the gas chamber and operating valve in a vertical position instead of horizontal.

Fig. 10 is a top view of Fig. 9.

Fig. 11 is a sectional view —DD— of Fig. 10, showing the general construction and arrangement of parts.

I will now describe more fully the detailed construction of my flash plug, referring to the drawings and the marks thereon.

The general construction of my device comprises a threaded metallic casing for screwing into the opening in an engine cylinder head, and provided with an internal combustion chamber therein, which projects through and beyond the inner surface of the engine cylinder head, and communicates therewith through small ports in the sides of the combustion chamber walls. Adjacent to the combustion chamber is a gas supply chamber, which is closed and regulated by an intervening check valve, said chamber being connected to a gas supply tank by suitable pipes and valves, and in the ordinary operation on gas engines it may be conveniently connected to the gas intake manifold of the engine, receiving gas from the same supply as the engine cylinders. A light regulating spring is attached to the check valve for keeping it closed on the valve seat, except as opened under the vacuum of the engine cylinder when taking charge of gas. Within the combustion chamber are electric spark points, properly insulated from each other, for igniting the gas in the combustion chamber, causing a flame to be shot from all port openings, and into the cylinders of the engine, igniting the entire cylinder gas at the same instant.

The casing —1— is made of metal and similar in shape to a machine nut with an extended hollow cylindrical body —2— projecting from one end thereof, forming an internal combustion chamber —3—. The cylindrical projection —2— is closed at the outer end thereof, and is provided with external threads —4— for engaging threaded

opening in the wall of the engine cylinder head, projecting the closed end of the combustion chamber inside the engine cylinder. Small ports —5— pass through the chamber walls providing a passage from the combustion chamber into the engine cylinder. The open end of the casing is provided with a cylindrical opening —6—, having a supporting shoulder —7— turned therein and enlarging the outer end of the casing opening. The enlarged portion of the casing —1— carrying internal threads —8— for receiving the threaded bushing nut —9— therein. Within the cylindrical portion of the casing —1— is inserted an insulating cylinder —10—, of porcelain, or any suitable material for insulating, and having an external collar —11— projecting therefrom for engaging the shoulder —7— of the casing —1—, and the bushing nut —9— screwed therein. Washer gaskets —12— are placed between the insulator collar —11— and the casing and bushing nut —9— for making an air tight joint therein. Within the insulating cylinder —10— is inserted a metallic valve sleeve —13—, having a spring recess —14— in one end thereof and a gas supply chamber —15— in the other end. The valve sleeve being provided with a projecting collar —16— at the chamber end thereof for engaging the end of the insulating cylinder, the other end of the valve sleeve being threaded to receive the lock nut —17—, for clamping and retaining the sleeve within the insulator cylinder —10—. Between the lock nut —17— and the insulator —10— is a washer gasket —18— for making the joint air tight. Inside the valve sleeve —13— is movably mounted the valve stem —19— and valve —20—. The valve —20— being seated over the opening of the gas supply chamber —15—, forming an air tight joint and separating the chamber —15— from the combustion chamber —3—. At the opposite end of the valve stem —19— is mounted a coil compression spring —21— with supporting washer —22—, for holding the valve closed against the valve seat. Opening into the gas supply chamber —15— is a gas inlet passage —23— and inlet pipe —24— leading from a gas supply tank, or other source of gas supply, preferably the intake pipe be attached to the gas intake manifold of the gas engine. From the outer face of the valve —20— is projected a metallic ignition point —25—, same being thoroughly insulated from the casing —1— by the insulating cylinder —10—. Projecting from the walls of the casing —1—, within the combustion chamber, are several metallic ignition points —26—, and grounded therein, and so arranged as to leave small gaps between the ends thereof and the valve ignition point —25— for passing an electric spark when an electric current is connected to the terminal ignition points, for igniting gas in the combustion chamber —3— when under pressure of the engine cylinders. The combustion and explosion within the combustion chamber —3— causes a flame to shoot from the small ports —5—, for igniting the gas in the engine cylinder. At the threaded end of the valve sleeve —13— is mounted a hollow terminal cap —27—, made of insulating material suitable for that purpose, and carries a terminal bolt —28— secured thereto by nuts —29— and —30—. On the outer end of the terminal bolt —28— is an adjustable nut —31— for making an electrical wire connection thereto. The terminal bolt —28— is adjustable endwise within the cap —27—, to provide a small gap between the end thereof and the adjacent end of the valve stem —19—, providing a second spark gap in the ignition circuit for increasing the intensity of the spark within the combustion chamber —3—. If desired, the entire cap —27— may be replaced by the metallic cap —32—, shown in Fig. 5, making a direct connection of the electric circuit with the valve terminal —25—.

An alternate, or modified form of my invention is illustrated in Figs. 6, 7, 8, 9, 10 and 11, showing the same invention, but with the gas chamber and valve at the side, and an ordinary spark plug inserted within the casing for igniting the gas within the combustion chamber. Figs. 6, 7, and 8 show the gas valve and chamber in a horizontal position, and Figs. 9, 10 and 11 show the gas valve and chamber in a vertical position. Both operating exactly the same. The casing —33— being similar to the type heretofore described in Fig. 3, also provided with an external thread —34— on the combustion chamber wall for engaging the threaded opening in the engine cylinder head. The opposite end of the casing being provided with an internal thread —35— for receiving and retaining a standard spark plug —36— of the ordinary type, projecting the ignition points of said spark plug into the opening of the combustion chamber —37—. At one side of the casing —33— is an intake gas passage —38— leading directly into the combustion chamber, and is provided with an intake gas check valve —39— and a connecting gas supply chamber —40—. The check valve —39— separating and closing the supply chamber —40— from the passage —38—. A gas supply pipe —41— opening into the gas chamber —40—. A coil spring —42— is mounted on and attached to the check valve holding same in a closed position, keeping the two chambers separated at all times except when charging under direct action of the engine cylinder vacuum. The plug operates the same as the previously described

form, except the valve and gas chamber are arranged at one side to allow the use of a standard spark plug therein.

In operating my device it can be easily seen that when it is attached to the cylinder head of an engine, as heretofore described, the vacuum caused by the operating engine cylinders will also create a like vacuum within the combustion chamber of the flash plug, opening the check valve and filling the combustion chamber with gas from the gas supply chamber and supply pipe attached thereto, and the compression stroke of the engine cylinder likewise compressing the gas within the combustion chamber of the plug. The compressed gas in the combustion chamber is then ignited by the electric spark points positioned therein, through the action of an electric current passed through the plug circuit, causing a flame to be shot out of each of the port openings, into the cylinder gas within the engine cylinder, thus igniting the gas therein by a hot flame throughout the cylinder, instead of at one point by a small spark as is the case with the ordinary spark plug.

I do not wish to be confined to the exact construction and arrangement of parts herein shown and described, as it is obvious that my invention is subject to various modifications and arrangements of the mechanical details, without departing from the spirit of my invention.

Having fully described my ignition flash plug, what I claim as my invention and desire to secure by Letters Patent is;

1. An ignition flash plug comprising an inclosed combustion chamber having a series of small side port openings around the end thereof, means for attaching same within an opening in a gas engine cylinder head and projecting the inclosed chamber and ports inside cylinder of the engine, a gas supply chamber adjacent to the said combustion chamber and opening therein, a check valve for closing the gas supply chamber and separating it from the inclosed combustion chamber, means for operating said check valve, means for flowing gas within the gas supply chamber, and means for igniting the gas within the combustion chamber.

2. An ignition flash plug comprising an inclosed metallic combustion chamber having a series of small side port openings around the lower end thereof for projecting through the opening of a gas engine cylinder head, means for attaching same thereto, said ports to open within the engine cylinder, a supply gas chamber adjacent to the inclosed combustion chamber and opening therein, a disc check valve with attached stem fitted into said opening for separating the combustion chamber and the gas supply chamber, a spring mounted on

said valve stem for holding the said check valve in a closed position, an inlet gas passage leading into the gas supply chamber, a gas supply pipe attached thereto, ignition points mounted within the said combustion chamber and means for insulating said ignition points from each other.

3. An ignition flash plug comprising a metallic casing having an inclosed tubular combustion chamber projecting therefrom, said tubular combustion chamber provided for screwing same within the opening of a gas engine cylinder head projecting the end thereof within the engine cylinder, a series of small side ports opening from the inclosed combustion chamber into the engine cylinder, a metallic valve sleeve mounted within the casing and insulated therefrom, a gas supply chamber formed within the end of the valve sleeve and adjacent to the inclosed combustion chamber, and opening therein, a check valve with attached stem fitted into said opening for closing the gas supply chamber for separating same from the combustion chamber, a compression coil spring mounted on the valve stem for holding the check valve in a closed position for separating the two chambers, a gas supply channel and pipe leading into the gas supply chamber, ignition points mounted within the combustion chamber and means for insulating said ignition points from each other.

4. An ignition flash plug adapted for igniting gas engines, comprising a metallic casing having a hollow cylindrical combustion chamber with closed end projecting therefrom, a series of small side port openings through the inclosed end of the said combustion chamber, external threads on the cylindrical chamber for engaging the threaded opening in the gas engine cylinder head, said threads being so positioned on the chamber as to project the inclosed end and side ports inside the engine cylinder walls, a metallic valve sleeve mounted within the casing and extending to the opening of the combustion chamber, said valve sleeve being inclosed by an insulating cylinder, means for retaining said valve sleeve therein, a threaded bushing nut for holding the insulating cylinder within the casing, a gas supply chamber within the end of the valve sleeve and adjacent to the combustion chamber, and opening into said combustion chamber, a check valve fitted into said opening between said chambers for closing the passage between the gas supply chamber and the combustion chamber, a valve stem attached to the check valve and movably mounted within the valve sleeve for allowing the opening and closing of the valve, a coil spring mounted on the outer end of the valve stem for holding the valve closed, a gas inlet passage leading into the gas sup-

ply chamber, a gas supply pipe attached thereto, an ignition point projecting from the valve face into the combustion chamber, multiple ignition points projecting from the walls of the combustion chamber and so positioned as to leave a small gap between the ends thereof and the valve ignition point, and connections for attaching said ignition points into an electric circuit.

5. An ignition flash plug adapted for ignition of gas engines, comprising a metallic casing having a hollow cylindrical combustion chamber with inclosed end projecting therefrom, a series of small side ports through the side walls of the inclosed end of the chamber, external threads on the cylindrical combustion chamber for engaging the threaded opening in the engine cylinder head for projecting the closed end and side ports inside the engine cylinder, a metallic valve sleeve mounted within the casing and extending to the opening of the combustion chamber, an insulating cylinder inclosing the valve sleeve, a lock nut for retaining said valve sleeve within the insulating cylinder, a bushing nut for retaining the insulating cylinder within the casing, a disc check valve and stem movably mounted within the valve sleeve, a coil spring attached to said valve stem for holding same in a closed position, a gas supply chamber within the end of the said valve sleeve, and opening into the combustion chamber, said gas supply chamber being separated from the combustion chamber by the check valve, a gas inlet pipe leading into said gas supply chamber, insulated ignition points mounted within the combustion chamber, one of said ignition points being mounted on the check valve, an insulated terminal cap attached to the outer end of the valve sleeve, a separate metallic terminal bar mounted therein, so arranged and spaced as to leave a small spark gap between the end thereof and the movable valve stem, and means for making an electrical connection thereto.

6. An ignition flash plug socket comprising a hollow metallic casing having an inclosed cylindrical combustion chamber projecting from one end thereof, said combus-

tion chamber having a series of small side ports through the closed end thereof, external threads on the cylindrical portion of the combustion chamber for engaging the threads of a gas engine cylinder opening, for projecting the said combustion chamber and side ports within the engine walls, an internal threaded section in the open end of the casing for receiving and retaining a standard spark plug therein, said spark plug projecting its ignition points within the inclosed combustion chamber, a gas supply chamber adjacent to the combustion chamber and opening therein, a check valve between the gas supply chamber and the combustion chamber for keeping the two chambers separated, means for operating said valve, and a gas inlet pipe leading into said gas supply chamber.

7. An ignition flash plug socket comprising a hollow metallic casing having an inclosed cylindrical combustion chamber projecting from one end thereof, said combustion chamber having a series of small side ports through the closed end thereof, external threads on the cylindrical portion of the combustion chamber for engaging the threaded opening in the engine cylinder head for projecting the inclosed end of said combustion chamber and side ports therein within the engine cylinder, an internal threaded section at the open end of the casing for receiving and retaining any ordinary standard spark plug therein, of a type that will project its ignition points within the combustion chamber, a side passage adjacent to the combustion chamber and leading therein, a gas supply chamber adjacent to the combustion chamber and opening into said side passage, a movable check valve separating the gas supply chamber and the combustion chamber passage, a valve stem attached to the valve, a spring mounted on said valve stem for operating and closing said check valve, and a gas inlet pipe opening into the gas supply chamber.

In witness whereof I sign these specifications.

MYRON J. DIKEMAN.