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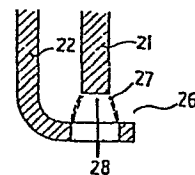
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(54)

A spark plug with a ring-shaped ground electrode.

(57)

Spark plug comprising a center electrode (21) and a
ground electrode (22) having a discharging surface designed
into a hollow round frame.**F I G . 3****EP 0 167 687 A1**

A SPARK PLUG WITH A RING-SHAPED GROUND ELECTRODE

This invention relates to a spark plug, particularly, a spark plug with a ring-shaped ground electrode.

In the conventional spark plug (as shown in Fig. 1 and 2), the portion of the ground electrode 9 under the center electrode 8 is a rectangular piece; between the two electrodes, there is a spark gap 10. Upon sparking, a rectangle-shaped discharge 11 will take place. After a period of time, the discharging surface of the ground electrode will be coated with carbonized deposits, and this is particularly true to the two-stroke engine. Usually, the electrodes near the spark gap are coated with some granular carbonized deposits, which may result in engine failure or engine unable to start; all these troubles would put the user to inconvenience.

In view of the aforesaid drawbacks of the conventional spark plug, the inventor has, through repeated studies and experiences and personal interest in the art, developed the present invention.

The prime object of the present invention is to provide a spark plug with a ring-shaped ground electrode to generate a slope type of discharging spark. Since the ground electrode forms a round frame over the center electrode, there will, upon explosion taking place, be a high speed air stream to pass through the gap between the electrodes to clean the carbonized deposits off out of the round frame, i.e., something like a washing effect to prevent from generating granular carbonized deposits.

Therefore, the prime feature of the present invention is the round frame on the ground electrode; the round frame has a gap, and the inner diameter of the round frame is longer than that of the center electrode so as to generate a slope type of discharging spark.

An embodiment of the invention is described by way of example with reference to drawings attached as follows:

Fig. 1 illustrates a partial sectional view of a conventional spark plug.

5 Fig. 2 is a bottom view of the spark plug shown in Fig. 1.

Fig. 3 is a partial side and sectional view of the spark plug with a ring-shaped ground electrode in the present invention.

Fig. 4 is a bottom view of the spark plug shown in Fig. 3.

Fig. 5 is a bottom view of another embodiment of the spark plug
10 with a ring-shaped ground electrode in the present invention.

Fig. 6 is a bottom view of a still another embodiment of the spark plug with a ring-shaped ground electrode in the present invention.

Referring to Fig. 1 and 2, there is shown a conventional spark plug, which mainly comprises a center electrode 8 and a ground electrode
15 9. The center electrode 8 is surrounded with insulator 2 with filling stuffs 3 therein. The top is provided with a terminal 1; outside the insulator 2, there is mounted a ground electrode 9, which extends under the tip of the center electrode 8 with a given spark gap 10. The bottom end of the center electrode 8 is a flat and smooth surface 12 without
20 any crossed threads. Upon a spark taking place in the spark gap, there will be a rectangle-shaped discharge 11. Since the ground electrode 9 is a solid piece, a carbonized deposit as a result of sparking is usually deposited on the discharging surface of the ground electrode 9; that deposits may cause abnormal ignition.

25 Referring to Fig. 3 and 4, there is shown the ring-shaped ground electrode and the center electrode of the present invention, in which the bottom end of the center electrode 21 is provided with crossed threads 23, while the end of the ground electrode 22 is designed into a round frame 24 with a gap 25 to open a portion of the round frame that

is opposite to the ground electrode 22. The inner diameter of the round frame 24 is longer than that of the center electrode 21. There is a spark gap 26 between the center electrode 21 and the ground electrode 22. In ignition, the spark in the spark gap 26 becomes a slope type of spark 27. During explosion, there is a high speed air stream to flow through the spark gap 26. In that moment, the carbonized deposits caused by the sparks will flow, together with the air stream of explosion, out of the round frame 24 without being deposited on the discharge surface of the ground electrode; in other words, a washing effect is provided in the spark plug. The gap 25 is used for preventing the temperature of the ground electrode 22 from being into focus to form a blockade to temperature circulation so as to have the high temperature of the ground electrode transmitted to a radiator promptly.

Referring to Fig. 5, there is shown another embodiment of the present invention, which includes a center electrode 31 and a ground electrode 33 with crossed threads 32, but the inner periphery of the round frame of ground electrode 33 is provided with a number saw teeth 34.

Referring to Fig. 6, there is shown a still another embodiment of the present invention, which includes a center electrode 41 with crossed threads 42 on top, and a ground electrode 43 furnished with several salient lugs 44 along the inner periphery of the round frame.

According to the aforesaid descriptions, the improved portion of a spark plug in the present invention is merely limited to the ground electrode, but that limited improvement will surely solve the carbonized deposit problem to an expected extent, i.e., it is deemed as being an advanced and practical spark plug without doubt. Since there has been no similar product being found in some relative information and in the markets both domestically and abroad, its novelty may

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conform with the requirements of the patent law.

The aforesaid drawings are merely served as embodiment of the present invention, but should not be construed as a limit to this invention. Any embodiment made by a person skilled in the art without
5 deviating from the concept and spirit of this invention, even with minor modification in accordance with the structure and features what are claimed in the claims of this invention, should be deemed as being within the scope of this invention.

CLAIMS

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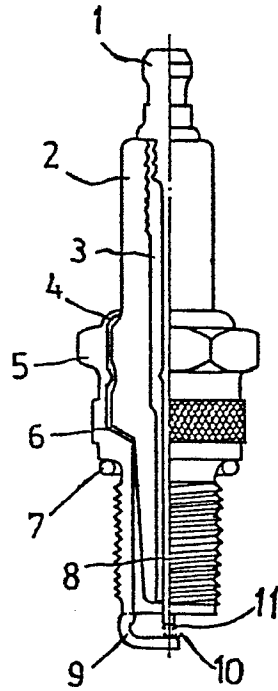
1. A spark plug with a ring-shaped ground electrode, comprising:
a center electrode, which may be referred to as the first
electrode in said spark plug;

a ground electrode, of which one end is mounted on the spark
5 plug body, and which may be referred to as the second electrode, and between said first and second electrodes there is a spark gap; and the main
feature of said spark plug is that the discharge surface of said ground
electrode is designed into a ring shape, i.e., a round frame; and upon
sparkling and explosion, a high speed air stream will blow the carbon-
10 ized deposits out of the hollow core of the round frame of said ground
electrode without being deposited on the discharge surface of the
electrodes so as to increase the ignition efficiency.

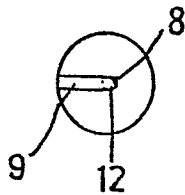
2. A spark plug with a ring-shaped ground electrode as claimed in
claim 1, wherein said round frame has a gap, by which the high temper-
15 ature generated during explosion will not focus to the ground electrode;
i.e., the heat being dissipated through a radiation board promptly.

3. A spark plug with a ring-shaped ground electrode as claimed in
claim 1, wherein the hollow core portion of said round frame of the
ground electrode may be a general circle, a saw-tooth-shaped circle, or
20 a circle with several salient lugs so as to increase the discharging
paths of the sparks between electrodes.

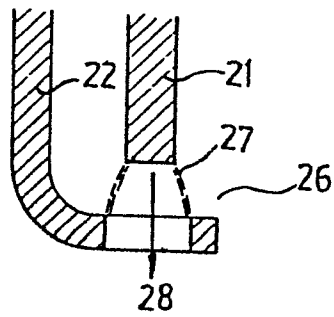
4. A spark plug with a ring-shaped ground electrode constructed
and arranged substantially as herein described with reference to any of
the figures of the drawings.



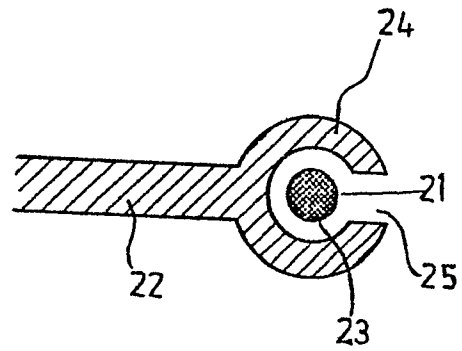
PRIOR ART
F I G . 1



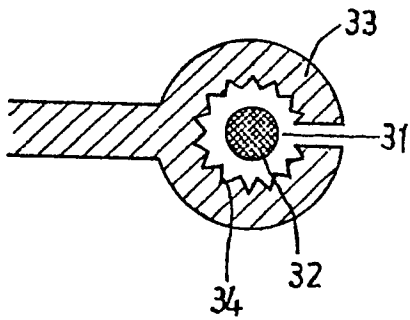
PRIOR ART
F I G . 2



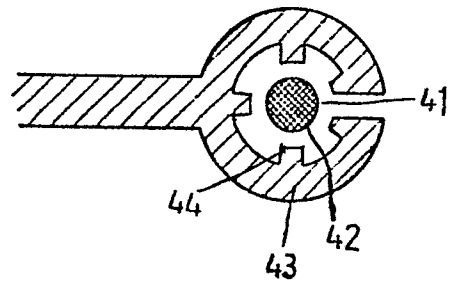
F I G . 3



F I G . 4



F I G . 5



F I G . 6



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Application number

EP 84 30 4704

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	US-A-2 487 535 (FERNANDEZ) * Column 1, lines 23-32; column 2, lines 20-25; figure 2 *	1,2,4	H 01 T 13/46 H 01 T 13/16 H 01 T 13/14 H 01 T 13/32
A	---	3	
X	FR-A-2 479 588 (GIRODIN) * Page 1, lines 27-32; figures 1,2 *	1	
X	---	1	
X	US-A-4 023 058 (LARA) * Column 1, lines 44-49; column 2, lines 39-59; figures 1,2 *	1	
A	---	3	
A	FR-E- 39 148 (BESSIERE) * Page 1, lines 34-43; figures 4,5 *	3	
A	---	3	
A	FR-A-1 124 091 (CORMIER) * Page 3, left-hand column, lines 4-18; figure 6 *	3	

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13-03-1985	Examiner BIJN E.A.
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			