(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 525 945 B1**

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **08.11.95** (51) Int. Cl.[6]: **F02P 7/02**

(21) Application number: **92304727.8**

(22) Date of filing: **26.05.92**

(54) **Improvements in rotating spark distributors for a spark-fired ic engine.**

(30) Priority: **02.08.91 ID 291**

(43) Date of publication of application:
03.02.93 Bulletin 93/05

(45) Publication of the grant of the patent:
08.11.95 Bulletin 95/45

(84) Designated Contracting States:
AT DE FR GB IT NL

(56) References cited:
CH-A- 211 175

PATENT ABSTRACTS OF JAPAN vol. 8, no. 116 (M-299)(1533) 30 May 1984 & JP-A-59023074

PATENT ABSTRACTS OF JAPAN vol. 13, no. 317 (E-789) 19 July 1989 & JP-A-01086417

WERKSTOFFKUNDE FÜR DIE ELEKTROTECHNIK UND ELEKTRONIK, Dr L. Hahn, Chem. Ing. Irene Munke u.a., 4. unveränderte Auflage, Berlin 1986, Seiten 73-4; 154-9

(73) Proprietor: **Sadikin, Lukas**
Jln. Kalibaru Barat No. 36
Jakarta Pusat (ID)

(72) Inventor: **Sadikin, Lukas**
Jln. Kalibaru Barat No. 36
Jakarta Pusat (ID)

(74) Representative: **Newby, John Ross**
J.Y. & G.W. Johnson
Furnival House
14/18 High Holborn
London WC1V 6DE (GB)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

EP 0 525 945 B1

Description

This invention relates to an improvement in a rotor arm of a distributor of a spark-fired internal combustion (IC) engine which is intended to increase the horsepower of the engine and at the same time to economise on the fuel consumption of the engine.

A distributor rotor functions to distribute electrical current to spark plugs of an IC engine causing them to ignite fuel vapour in the cylinders of the engine and put the engine in motion. The rotor is usually made of a plastics core and a conducting plate (usually a brass plate) secured thereto. Generally, the thickness of the conducting plate is less than 1.7 millimetres and its design has changed little over many years.

The rotor arm rotates within a ring of stationary contacts (usually one for each cylinder of the engine) whereby current at high voltage fed to the axis of the rotor arm can spark across between the outer tip of the conducting plate and each stationary contact in turn as the rotor arm turns during operation of the engine.

The German language textbook "Werkstoffkunde für die Electrotechnik und Elektronik" (VEB Technik Berlin, 1986) discloses that either brass or a number of different bronze alloys (such as Cu-Sn, Cu-Ag, Cu-Al, Cu-Be, Cu-Mn and Cu-Ni) may in general be used as the material for electrical contacts, but there is no specific suggestion that these materials are suited for distributor rotor arms. The amount of copper in the bronze alloys is stated to be over 60%.

With the widespread use of spark-fired IC engines in motor vehicles, any improvement in power output and/or fuel economy of the engines is widely sought. This invention promises improved performance of a spark-fired IC engine by means of a simple but unobvious modification of the distributor rotor, a cheap, readily-changeable spare part of such engines.

The invention provides a rotor arm distributor for a spark-fired internal combustion engine, the rotor arm comprising a conducting plate on a core support, characterised in that the conducting plate is provided with a tin layer on the tip portion thereof.

The conducting plate may be of brass, and the layer of tin may have a thickness of between 1mm and 2mm, preferably about 1.5mm. Preferably, an increased edge area of the tip of the conducting plate of the rotor arm is provided, such that the area of the conducting plate available for current transmission when the rotor arm revolves within the ring of stationary metal contacts in the distributor cap is increased, thus allowing a stronger electrical current to be conducted to the spark plugs.

A rotor arm improved in accordance with this invention has been found to produce a more powerful spark at the plug and thus better combustion and cleaner engine running with a consequent increase in engine horsepower, between 5% to 10% improvement in fuel combustion and reduced air pollution from the engine exhaust gases.

The invention will now be further described, by way of example, with reference to the accompanying drawing, in which:-

Figure 1 is a view of a conventional rotor arm, and

Figure 2 is a view of a rotor arm in accordance with this invention.

The rotor arm 10 shown in Figure 1 consists of an electrically-insulating core support 11 (e.g. of ebonite) carrying an electrically-conducting radial plate 12 (e.g. of brass) having a tip 13. High voltage for firing each spark plug is led to the radially inner end of the plate 12 and passes through the plate to spark across from the tip 13 to a stationary contact (not shown) as each spark plug is energised in turn as the rotor arm 10 rotates about the axis 14. The plate 12 would typically be of 1.5 millimetres thickness at the tip.

The rotor arm 10 shown in Figure 2 differs from that shown in Figure 1 by the provision of an extension 15 to the tip 13, and by the provision of a tin layer on the tip portion. In the illustrated embodiment, the extension 15 is of tin or a tin/brass alloy which is at least as thick as the plate 12 at the tip 13 and has a radial extension of between 1 and 2 millimetres and has an extension in the circumferential direction of travel of the arm which substantially matches that of the tip 13. The ratio of tin to brass in the alloy can be about 50:50%.

In a modification, the extension 15 is of brass but has a thickness in the axial direction of the core support 11 of between 1.75 millimetres and at least 3.0 millimetres.

Claims

1. A rotor arm distributor (10) for a spark-fired internal combustion engine, the rotor arm comprising a conducting plate (12) on a core support (11), characterised in that the conducting plate (12) is provided with a tin layer on at least the tip portion (13) thereof.

2. A rotor arm as claimed in claim 1, wherein the conducting plate (12) is of brass, or of an alloy of tin and brass.

3. A rotor arm as claimed in claim 1 or claim 2, wherein the tin layer is between 1mm and 2mm thick.

4. A rotor arm as claimed in claim 3, wherein the ratio of tin to brass in the alloy is substantially 50% tin and 50% brass.

5. A rotor arm as claimed in any preceding claim, wherein the tip portion (13) of the rotor arm (10) is substantially 2mm long and has a circumferential extension which is substantially the same as that of a conventional rotor arm.

6. A rotor arm as claimed in any of claims 1 to 4, wherein the tip portion (13) of the rotor arm (10) is provided with an extension (15) having a thickness of between 1.75mm and at least 3mm in the axial direction of a core support (11) of the rotor arm (10).

7. The use of a rotor arm distributor (10) as claimed in any preceding claim in an internal combustion engine of a motor vehicle.

Patentansprüche

1. Verteilerfinger (10) für einen Verbrennungsmotor mit Fremdzündung, wobei der Verteilerfinger eine sich auf einem Kernträger (11) befindende leitende Platte (12) umfaßt, dadurch gekennzeichnet, daß die leitende Platte (12) auf zumindest ihrem Spitzenteil (13) mit einer Zinnschicht versehen ist.

2. Verteilerfinger nach Anspruch 1, bei dem die leitende Platte (12) aus Messing oder aus einer Legierung aus Zinn und Messung besteht.

3. Verteilerfinger nach Anspruch 1 oder 2, bei dem die Zinnschicht zwischen 1 mm und 2 mm dick ist.

4. Verteilerfinger nach Anspruch 3, bei dem das Verhältnis von Zinn zu Messung in der Legierung im wesentlichen 50% Zinn und 50% Messing beträgt.

5. Verteilerfinger nach einem der vorhergehenden Ansprüche, bei dem der Spitzenteil (13) des Verteilerfingers (10) im wesentlichen 2 mm lang ist und ein Umfangsausmaß aufweist, das im wesentlichen dem eines herkömmlichen Verteilerfingers entspricht.

6. Verteilerfinger nach einem der Ansprüche 1 bis 4, bei dem der Spitzenteil (13) des Verteilerfingers (10) mit einer Verlängerung (15) versehen ist, deren Dicke in axialer Richtung eines Kernträgers (11) des Verteilerfingers (10) zwischen 1,75 mm und mindestens 3 mm beträgt.

7. Verwendung eines Verteilerfingers (10) nach einem der vorhergehenden Ansprüche in einem Verbrennungsmotor eines Kraftfahrzeugs.

Revendications

1. Distributeur de rotor (10) pour un moteur à combustion interne à allumage par étincelle, le rotor comprenant une plaque conductrice (12) sur un support de noyau (11), caractérisé en ce que la plaque conductrice (12) est pourvue d'une couche d'étain sur au moins sa portion de pointe (13).

2. Rotor selon la revendication 1, dans lequel la plaque conductrice (12) est en laiton, ou en un alliage d'étain et de laiton.

3. Rotor selon la revendication 1 ou 2, dans lequel la couche d'étain a une épaisseur entre 1 mm et 2 mm.

4. Rotor selon la revendication 3, dans lequel le rapport étain à laiton dans l'alliage est substantiellement de 50 % d'étain et de 50 % de laiton.

5. Rotor selon l'une quelconque des revendications précédentes, dans lequel la portion de pointe (13) du rotor (10) mesure substantiellement 2 mm de long et a une extension circonférentielle qui est substantiellement la même que celle d'un rotor conventionnel.

6. Rotor selon l'une quelconque des revendications 1 à 4, dans lequel la portion de pointe (13) du rotor (10) est pourvue d'une extension (15) ayant une épaisseur entre 1,75 mm et au moins 3 mm dans la direction axiale d'un support de noyau (11) du rotor (10).

7. Utilisation d'un distributeur de rotor (10) selon l'une quelconque des revendications précédentes dans un moteur à combustion interne d'un véhicule à moteur.

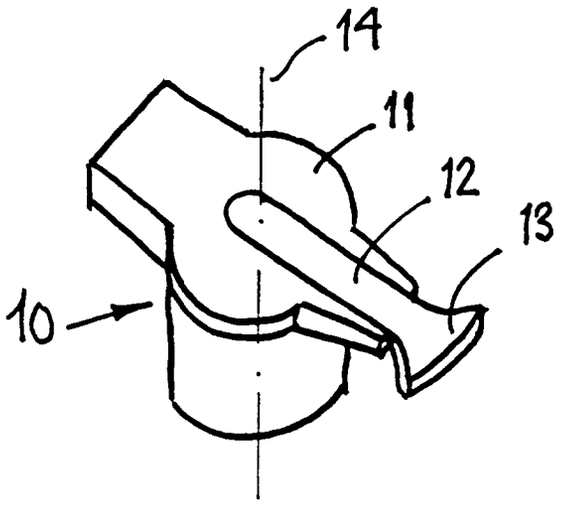


FIG. 1

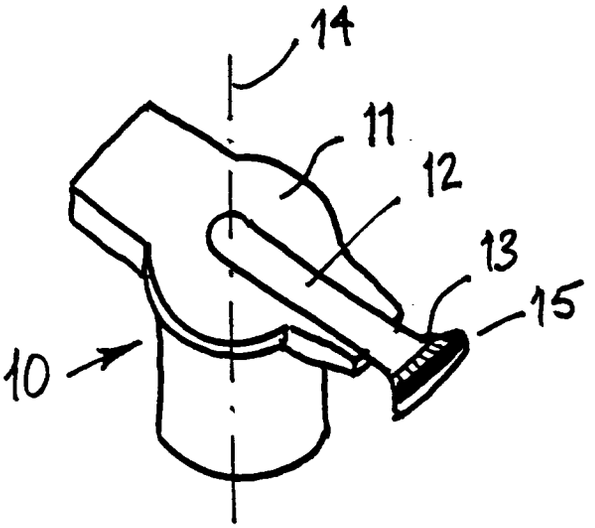


FIG. 2