

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International Application No.

PCT/AU2008/XXXXXX

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Claims 4-7, 9, 13, 20-23, 26-29, 33, 34	YES
	Claims 1-3, 8, 10-12, 14-19, 24, 25, 30-32	NO
Inventive step (IS)	Claims NONE	YES
	Claims 1-34	NO
Industrial applicability (IA)	Claims 1-34	YES
	Claims NONE	NO

**2. CITATIONS AND EXPLANATIONS:****CITATIONS**

D1: US 4700103 A (YAMAGUCHI et al.) 13 October 1987  
D2: US 2004/0129683 A1 (TORII et al.) 08 July 2004  
D3: US 2003/0015951 A1 (SEGAWA et al.) 23 January 2003  
D4: US 2002/0130603 A1 (TERAMURA et al.) 19 September 2002  
D5: US 2002/0105254 A1 (HORI et al.) 08 August 2002

**NOVELTY (N)**

Claim 1: Citation D1 discloses a spark plug (figure 1) including a tubular ceramic insulator (2), a conductive shell (1) including a ground electrode (8), a center electrode (4) having an upper terminal and a lower sparking end (4a), the ground electrode extending from an anchored end (1a) to a distal end (8a), the ground electrode including a ledge (8a) having an inset planar portion (11), a sparking tip (10) located on the distal end of the ground electrode (8) having a base end attached to the inset planar surface, and the planar surface completely covers the base end of the sparking tip and extends outwardly therefrom to provide an exposed peripheral interface (see figure 5(a)). The claim does not define that the ledge is thinner than the rest of the ground electrode so in the citation the end of the ground electrode constitutes the ledge. In the citation the exposed peripheral interface is only open while the noble metal tip (10) is abutted against the bottom of the recess (11) waiting for electric resistance welding to the electrode to produce the flange (10a) which partially or fully fills the recess (11). This situation is similar to the present specification where the exposed peripheral interface may only be open until the sparking end is welded to the electrode (see figure 8 of the present specification). Therefore, D1 discloses all the features of claim 1 and therefore claim 1 is not novel and does not comply with the requirements of Article 33(2) of the PCT.

Claims 2, 3, 8: Citation D1 discloses a curving back wall surrounding the inset planar portion constituting the recess (11). Therefore, D1 discloses all the features of claims 2, 3 and 8 and therefore these claims are not novel and do not comply with the requirements of Article 33(2) of the PCT.

Claims 10-12, 14-16: Citation D1 discloses a weld bonding the sparking tip to the planar surface and back wall of the recess in the ground electrode (see columns 3 to 5). Therefore D1 discloses all the features of claims 10, 11, 12, 14, 15 and 16 and therefore these claims are not novel and do not comply with the requirements of Article 33(2) of the PCT.

Claims 17-19: Citation D1 discloses a sparking tip made of various platinum alloys (see column 3 lines 65, 66 and column 5 lines 35-42). Therefore D1 discloses all the features of claims 17-19 and therefore these claims are not novel and do not comply with the requirements of Article 33(2) of the PCT.

Claims 24, 25: Citation D1 discloses a sparking tip of cylindrical shape (column 3 line 54). Therefore D1 discloses all the features of claims 24, 25 and therefore these claims are not novel and do not comply with the requirements of Article 33(2) of the PCT.

Claims 30-32: Citation D1 discloses a sparking tip attached to the sparking end of the center electrode which can consist of a platinum alloy (see column 3 lines 53-67). Therefore D1 discloses all the features of claims 30-32 and therefore these claims are not novel and do not comply with the requirements of Article 33(2) of the PCT.

Therefore claims 1-3, 8, 10-12, 14-19, 24, 25 and 30-32 are not novel and do not comply with the requirements of Article 33(2) of the PCT.

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None of the cited documents discloses the size and shape of the wall as defined in claims 4-7 and 9; laser welding as defined in claim 13; sparking tips as defined in claims 20-23, 33 and 34; and conductive cores proximate to sparking tips as defined in claims 26-29. Therefore claims 4-7, 9, 13, 20-23, 26-29, 33, 34 are novel and meet the requirements of Article 33(2) of the PCT with regard to novelty.

**INVENTIVE STEP (IS)**

Claims 1-3, 8, 10-12, 14-19, 24, 25 and 30-32 lack novelty and are therefore considered to lack an inventive step.

Claims 4-7, 9: The size and shape of the wall beside the inset planar portion of the recess (11) of citation D1 is merely a matter of design choice and does not involve an inventive step. Therefore the matter defined in claims 4-7 and 9 does not involve an inventive step in light of citation D1, and therefore these claims do not comply with the requirements of Article 33(3) of the PCT.

Claim 13: It is well known in the spark plug manufacture art to use laser welding as a way of attaching sparking tips to ground electrodes. See for example, citation D2 at paragraphs [0009] to [0019], citation D4 at paragraphs [0034] to [0038], and citation D5 at paragraphs [0011], [0015], [0021] and [0022], all disclose methods of manufacturing spark plugs using a laser welding process to attach a sparking tip to a ground electrode. Therefore, claim 13 does not involve an inventive step over D1 in light of common general knowledge.

Claims 20-23, 33 and 34: Citation D2 at paragraphs [0050] to [0052] and figure 5, and citation D3 at paragraph [0010], disclose multi-layer sparking tips. Citation D2 discloses a sparking tip consisting of a protrusion portion (1a), a flange portion (1b) and an intermediate member (2). The protrusion and flange portions are made of a different material to the intermediate portion as disclosed in paragraphs [0050] to [0052]. Citation D3 discloses a sparking tip consisting of tip (23) and interlayer (22) each composed of different materials. It would be obvious to combine the teachings of citation D1 with either of citations D2 or D3 as they are all directed to manufacturing spark plugs using high temperature sparking tips. Either of these obvious combinations discloses all the features defined in claims 20-23, 33 and 34. Therefore the matter defined in claims 20-23, 33 and 34 does not involve an inventive step and does not comply with the requirements of Article 33(3) of the PCT.

Claims 26-29: Citation D3 at paragraphs [0027] to [0029] and figure 3, and citation D5 at paragraph [0160] and figures 28(a) and 28(b), disclose ground electrodes with thermally conductive cores located proximate the sparking tip. It would be obvious to combine the teachings of citation D1 with either of citations D3 or D5 as they are all directed to manufacturing spark plugs using high temperature sparking tips. Either of these obvious combinations discloses all the features defined in claims 26-29. Therefore the matter defined in claims 26-29 does not involve an inventive step and does not comply with the requirements of Article 33(3) of the PCT.

Therefore claims 1-34 do not involve an inventive step and do not comply with the requirements of Article 33(3) of the PCT.

**INDUSTRIAL APPLICABILITY (IA)**

The invention defined in the claims is considered to meet the requirements of Industrial Applicability under Article 33(4) of the PCT because it can be made by, or used in, industry.