



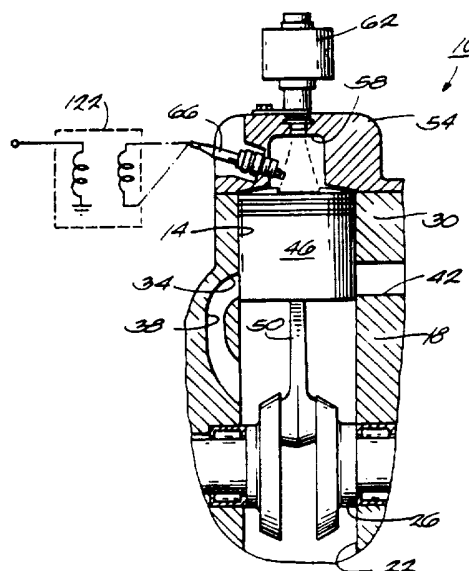
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<p>(21) International Application Number: PCT/US97/10636 (22) International Filing Date: 20 June 1997 (20.06.97) (30) Priority Data: 60/020,032 21 June 1996 (21.06.96) US (71) Applicant (for all designated States except US): FICHT GMBH & CO. KG [DE/DE]; Spannleitenberg 1, D-85614 Kirchseeon (DE). (72) Inventors; and (75) Inventors/Applicants (for US only): HELLMICH, Wolfram [DE/DE]; Westermeyerstrasse 31, D-81829 München (DE). CRAFT, Todd, D. [US/US]; 3608 125th Street, Kenosha, WI 53142 (US). BINVERSIE, Gregory, J. [US/US]; 162 Prairieview Avenue, Grayslake, IL 60030 (US). BYLSMA, Philip, J. [US/US]; 3380 Burlawn Parkway, Brookfield, WI 53005 (US). (74) Agents: SANDLER, Ronald, A. et al.; Jones, Day, Reavis & Pogue, 77 West Wacker Drive, Chicago, IL 60601-1692 (US).</p>	<p>(81) Designated States: AL, AM, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GE, GH, HU, IL, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, RU, SG, SI, SK, SL, TR, TT, UA, US, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p> <p>(88) Date of publication of the international search report: 19 March 1998 (19.03.98)</p>	

(54) Title: IMPROVED TIME DELAY IGNITION CIRCUIT FOR AN INTERNAL COMBUSTION ENGINE

(57) Abstract

An internal combustion engine assembly including an internal combustion engine (10) including an engine block (30) having at least one cylinder (14), a piston (46) mounted within the cylinder (14) for reciprocal movement in the cylinder (14), a fuel injector (62) for injecting fuel into the cylinder (14), the fuel injector (62) initiating a fuel injection event at a predetermined time and a circuit for generating a spark in the cylinder a predetermined amount of time after the injection event to cause combustion of fuel in the cylinder (14).



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/10636

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : F02B 5/02; F02P 9/00
US CL : 123/305,335

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 123/295,305,335,416,417,418,478,480

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 3,892,207 A (WEISE ET AL) 01 July 1975, see Figures 1 and 2.	1,2,16,17 and 20 ----- 21-32
X --- Y	US 4,111,178 A (CASEY) 05 September 1978, see Figure 1.	1,2,16,17 and 20 ----- 21-32
Y	US 4,336,778 A (HOWARD) 29 June 1982, see Figures 2 and 3.	21-32
A	US 5,078,107 A (MORIKAWA) 07 January 1992, see column 5, line 63 through column 7, line 37.	1-32

Further documents are listed in the continuation of Box C. See patent family annex.

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International application No.
PCT/US97/10636

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,009,208 A (FIORENZA, II) 23 April 1991, see column 5, line 34 through column 6, line 49.	20-32