



(11) Publication number : **0 589 603 A3**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **93307213.4**

(51) Int. Cl.⁵ : **F02P 3/08, F02P 9/00,
F02P 7/03, F02P 11/00**

(22) Date of filing : **14.09.93**

(30) Priority : **22.09.92 US 949319**
22.12.92 US 994865

(43) Date of publication of application :
30.03.94 Bulletin 94/13

(84) Designated Contracting States :
DE FR GB IT

(88) Date of deferred publication of search report :
15.02.95 Bulletin 95/07

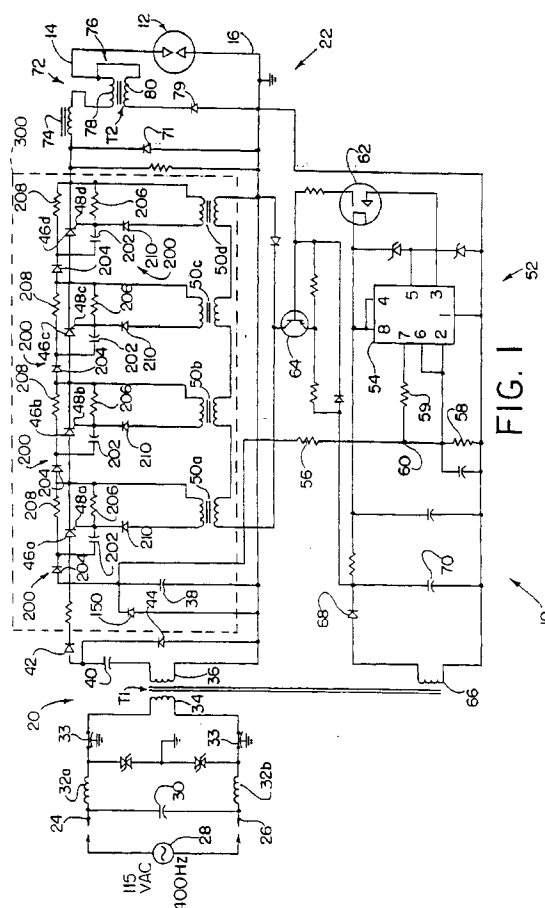
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(54) **Exciter circuits and methods with protective measures for solid state switches.**

(57) An exciter for an internal combustion engine igniter plug (12) comprises a continuous AC charging circuit (20) and a discharge circuit (22). The discharge circuit (22) is connectable to the plug (12) and the charging circuit (20) includes a transformer (T1) having a primary winding connectable to an AC power source (28) and a secondary winding connected to the discharge circuit. The discharge circuit includes a storage capacitor (38) connected to the transformer secondary winding such that current induced in the secondary charges the capacitor (38) at a generally constant rate. A switching device (46) is connected in series between the capacitor (38) and the plug (12). A trigger circuit (52) triggers the switching device (46) in response to charge on the capacitor (38). The charging circuit (20) and trigger circuit (52) operate to maintain a generally constant spark rate. A current multiplier (76) is also provided to substantially increase the peak currents delivered to the plug (12). A clamping diode (150) is also provided in parallel with the storage capacitor (38) to prevent reverse currents and voltages due to resonance between the capacitor (38) and stray inductance.





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EUROPEAN SEARCH REPORT

Application Number
EP 93 30 7213

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.5)
X	US-A-5 032 969 (EGGERS ET AL)	1-3,10,11	F02P3/08 F02P9/00 F02P7/03 F02P11/00
A	* column 7, line 26 - line 59; figures * ---	13	
X	GB-A-1 108 636 (THE GAS COUNCIL)	1-3,11	
A	* page 1, line 46 - line 52; figure 1 * ---	13	
A	US-A-5 049 786 (GOTISAR ET AL)	1,3,10,11	
	* abstract; figures 5,7,10 * ---		
A	US-A-4 506 650 (SHIMOJO ET AL)	4,12,14	
	* abstract; figures 3B,11 * ---		
A	EP-A-0 481 609 (LUCAS INDUSTRIES PUBLIC LIMITED COMPANY) ---		
A	US-A-5 030 883 (BONAVIA) -----		
The present search report has been drawn up for all claims.			TECHNICAL FIELDS SEARCHED (Int.Cl.5) F02P F23Q
Place of search		Date of completion of the search	Examiner
THE HAGUE		19 September 1994	MICHELS J.
CATEGORY OF CITED DOCUMENTS 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 I : 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			

EPO FORM 1503 03.92 (P04C01)



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ All claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claims:
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet -B-

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees has been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims.
- namely claims: 1-13, 14



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LACK OF UNITY OF INVENTION - A POSTERIORI -

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims 1-13: Exciter circuit and method for charging and discharging at constant rate
 Claim 14 : Exciter with current multiplier
2. Claim 15 : Exciter with multiple series-connected switch devices
3. Claims 16-20: Exciter and method for preventing reverse currents between storage capacitor and stray inductance