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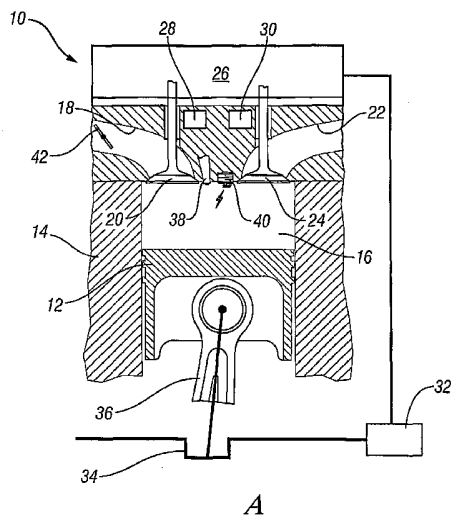
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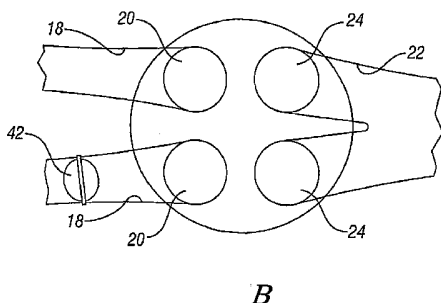
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[Continued on next page]

(54) **Title:** METHOD FOR AUTO-IGNITION COMBUSTION CONTROL



(57) **Abstract:** A method is disclosed for controlling the air-fuel ratio in a four-stroke gasoline direct-injection controlled auto-ignition combustion. The engine is operated with two sequential pairs of expansion and contraction strokes during two revolutions of the engine crank, the two revolutions defining a combustion cycle. A system is employed for variably actuating the intake and exhaust valves and adjusting the flow of air and burned gases entering the combustion chamber. Adjusting the flow affects the resulting air-fuel ratio in the combustion chamber. The valve actuating system is employable to operate the intake and exhaust valves with an exhaust re-compression or an exhaust re-breathing valve strategy. Either valve strategy affects the air-fuel ratio in the cylinder and causes a proportion of burned gases from previous combustion cycles to be retained in the cylinder to provide the necessary conditions for auto-ignition of the air-fuel mixture.





FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT,
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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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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 6,497,213 B2 (YOSHIZAWA ET AL) 24 DECEMBER 2002 (24.12.2002), SEE FIGURES 1, 4, 5, AND 8.	1, 4, 6, 8 ----- 2, 3, 5, 7
X --- Y	US 6,615,771 B2 (DINGER ET AL) 09 SEPTEMBER 2003 (09.09.2003), SEE COLUMN 4, LINE 45 - COLUMN 5, LINE 12.	1, 4, 6, 8 ----- 5
Y, P	US 2005/0000478 A1 (KUO ET AL) 06 JANUARY 2005 (06.01.2005), SEE ENTIRE DOCUMENT.	5
Y, P	US 2005/0000485 A1 (KUO ET AL) 06 JANUARY 2005 (06.01.2005), SEE ENTIRE DOCUMENT.	5
Y	US 5,918,577 A (MARTELLI ET AL) 06 JULY 1999 (06.07.1999), SEE FIGURE 4.	2, 3, 7



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