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Lemke et al.

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(54) **OPPOSED PISTON ENGINE**

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F01P 1/04 (2006.01)
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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,808,380	A *	6/1931	Royal	123/41.35
2,076,334	A *	4/1937	Burns	123/51 B
2,374,460	A *	4/1945	Rossmann	123/51 BB
2,834,329	A *	5/1958	Bachle et al.	123/41.35
2,978,986	A *	4/1961	Carder et al.	417/11
3,032,021	A *	5/1962	Blackburn	123/51 BA
3,071,122	A *	1/1963	Lieberherr	123/51 B
3,145,660	A *	8/1964	Bush	417/228
3,257,797	A *	6/1966	Lieberherr	60/599
4,873,822	A *	10/1989	Benaroya	60/805
6,170,443	B1 *	1/2001	Hofbauer	123/51 B
6,182,619	B1 *	2/2001	Spitzer et al.	123/51 B

FOREIGN PATENT DOCUMENTS

EP	1387058	A2 *	2/2004
FR	2844549	A1 *	3/2004

* cited by examiner

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(57) **ABSTRACT**

An opposed piston engine includes at least one cylinder with inlet and exhaust ports and opposed pistons disposed in the cylinder for reciprocating opposed motion toward and away from each other. An auxiliary system pumps liquid coolant separately to the cylinder and pistons. Another auxiliary system controls the flow of intake and exhaust gas in the engine.

21 Claims, 20 Drawing Sheets

