

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

To:

see form PCT/ISA/220

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2007/004501

International filing date (day/month/year)
21.02.2007

Priority date (day/month/year)
21.02.2006

International Patent Classification (IPC) or both national classification and IPC
INV. F01L15/04 F01L1/28 F01L1/44 F01L5/04

Applicant
STURMAN DIGITAL SYSTEMS, LLC

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- 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
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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this opinion

see form
PCT/ISA/210

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2007/004501

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed
 - a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - a sequence listing
 - table(s) related to the sequence listing
 - b. format of material:
 - on paper
 - in electronic form
 - c. time of filing/furnishing:
 - contained in the international application as filed.
 - filed together with the international application in electronic form.
 - furnished subsequently to this Authority for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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)	Yes: Claims	<u>2-5,9-10,12-13,15-17</u>
	No: Claims	<u>1,6,7,8,11,14,18</u>
Inventive step (IS)	Yes: Claims	<u>2-5,9-10,12-13,15-17</u>
	No: Claims	<u>1,6,7,8,11,14,18</u>
Industrial applicability (IA)	Yes: Claims	<u>1-18</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The following documents (D) are referred to in this communication; the numbering will be adhered to in the rest of the procedure:

- D1: GB-A-2 361 031 (TEIXEIRA TOMAS [GB]) 10 October 2001 (2001-10-10)
- D2: GB-A-2 267 124 (DIXON HARRY LESLIE JAMES [GB]) 24 November 1993 (1993-11-24)
- D3: GB 204 183 A (GEORGE RICHARD INSHAW) 27 September 1923 (1923-09-27)
- D4: US-A-2 323 251 (NOAH SMITH THOMAS) 29 June 1943 (1943-06-29)
- D5: ES-A1-2 176 079 (PASCUAL CABELLO ANTONIO [ES]) 16 November 2002 (2002-11-16)
- D6: WO 92/14040 A (MARSZALKIEWICZ PIOTR [PL]) 20 August 1992 (1992-08-20)
- D7: GB-A-2 223 800 (T & N TECHNOLOGY LTD [GB]) 18 April 1990 (1990-04-18)
- D8: GB 250 095 A (EUGENIO TOSI) 8 April 1926 (1926-04-08)
- D9: DE 697 779 C (DEUTSCHE WERKE KIEL AG) 23 October 1940 (1940-10-23)

V.1 Independent claim 1

D1, (page 2, lines 1-6, and figures) discloses:

"A piston engine comprising;

- *at least one intake valve and at least one exhaust valve per piston engine cylinder; and*
- *a flow control valve system for controllably coupling the at least one intake valve to an intake manifold or to an exhaust manifold, and for controllably coupling the at least one exhaust valve to an exhaust manifold or an intake manifold;*
- *the at least one intake valve and at least one exhaust valve per piston engine cylinder being actuated by camless actuators."*

Therefore the subject-matter of claim 1 is not new according to article 33(2) PCT.

Ad notum 1: According to the wording of claim 1 it is enough that the intake valve is coupled to the intake manifold OR the exhaust manifold (the intake manifold being common practice) AND that the exhaust valve is coupled to the intake

manifold OR the exhaust manifold (exhaust manifold being common practice here). Therefore ANY camless engine would take away novelty from the present claim 1. However the meaning of the claim is interpreted as if the valves were each switchably coupleable between function as intake valve and exhaust valve. The applicant is advised to adjust the wording to avoid misinterpretations.

Ad notum 2: With the above in mind it seems superfluous to name the valves "intake valves" and "exhaust valves", and they will in the following be referred to as simply "valves". It will be seen that the use of one, two or more than two "valves" will not affect the function in the sense of the present invention.

Ad notum 3: Also **D2** discloses all features of claim 1. **D3-D9** disclose various cam-driven switch-over valve arrangements, and care should be exercised upon filing of amended claims, since camless valve actuators in a combustion engine is commonly known to the skilled person.

V.2 Independent claim 11

The examiner fails to see any difference in the subject matter defined by claim 1 and claim 11, thus they are in unity, and therefore what is said concerning the novelty of claim 1 equally yields for claim 11.

V.3 Dependent claims 6, 7 and 8

Dependent claims 6, 7 and 8 do not appear to contain any additional features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT with respect to novelty, since they merely relate to details known from the prior art.

V.4 Dependent claims 2, 3, 4, 5, 9, 10, 12 and 13

The above mentioned claims seem to fulfil all requirement of the PCT regarding novelty, inventive step and industrial applicability.

V.5 Claims 14-18

The form used in claims 14-18 is not allowable under PCT since it is left to interpretation wherein the "improvement" lies. The text of these claims does actually not claim any

protection. Further the subject matter of the claims seems to be merely repetitions of subject matter of earlier claims and should thus for reasons of conciseness (Article 6 PCT) be omitted. Claims 14 and 18 are considered not novel, for comments relating to claims 15-17, see above.

Re Item VII

Certain defects in the international application

VII.1 Prior art

The description does not cite a document reflecting the closest background art (Rule 5.1a)ii) PCT).

VII.2 Reference signs

The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2 b) PCT).

VII.3 Two-part form

Independent claims 1 and 11 are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (**D1**) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).