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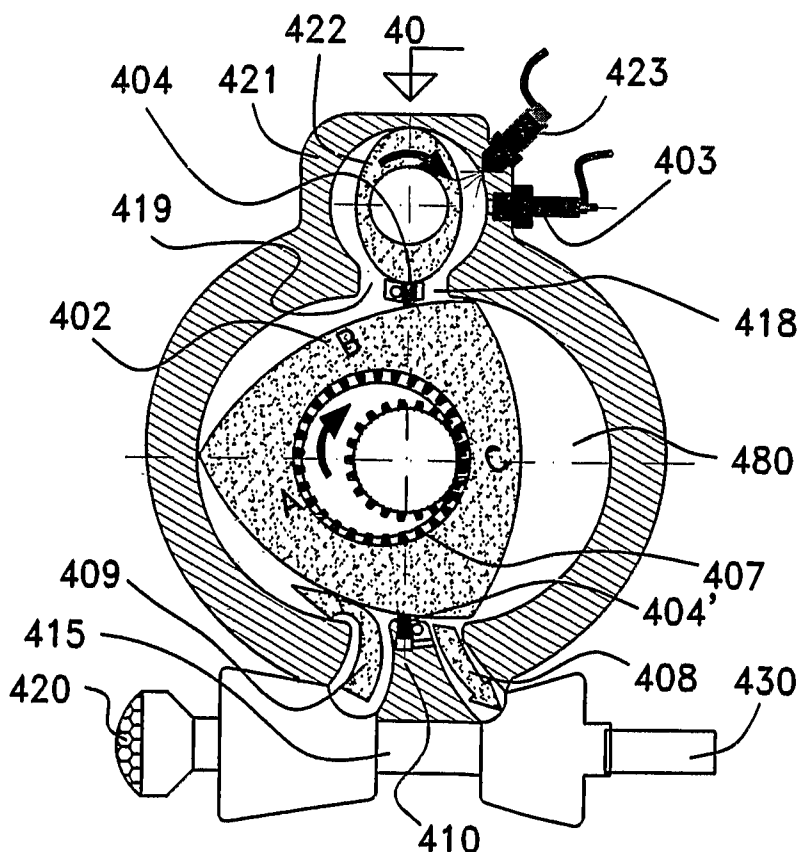
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[Continued on next page]

(54) Title: IMPROVEMENTS TO WANKEL AND SIMILAR ROTARY ENGINES



(57) Abstract: An improved rotary engine system has two stationary buffer seals located at the two ends of the minor axis of a rotor housing that divide the rotor housing into two separate volumes. A first volume is an intake and compression volume and a second volume downstream to the first volume is an expansion and exhaust volume. A rotating combustion chamber flow control device (CCFC) is synchronized with a rotor, for receiving compressed fluid from the first volume, for receiving fuel injected by a fuel injector located within a corresponding CCFC, for igniting and burning an air-fuel mixture, to allow combustion products to expand in the second volume, and for transferring the combustion products to the second volume. In one embodiment, the CCFC is synchronized with two longitudinal shafts fitted at centers of first and second housings, respectively, in each of which are located a pair of side by side rotors.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/IL06/00911

A. CLASSIFICATION OF SUBJECT MATTER

IPC: **F02B 53/00**(2006.01),**53/02**(2006.01),**75/12**(2006.01);**F01C 01/02**

USPC: 123/213.215.238.228.222:418/61.2.104

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. : 123/213, 215, 238, 228, 222: 418/61.2, 104

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.
Y	GB 1,483,096 A (BOSCH GMBH) 17 August 1977 (17.08.1977), figure 2.	1-6, 11, 13, and 17-22
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A		7 and 14-16
Y	WO 00-8606437 A1 (WHITE et al.) 06 November 1986 (06.11.1986), figure 2.	1-2, 6, 11, 13, and 17-22.
Y	US 3,858,557 A (MYERS et al.) 07 January 1975 (07.01.1975), figure 1.	3 and 4
Y	US 4,964,275 A (PAUL et al.) 23 October 1990 (23.10.1990), figure 1.	5 and 8

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

* Special categories of cited documents:

"A"	document defining the general state of the art which is not considered to be of particular relevance	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier application or patent published on or after the international filing date	"X"	document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y"	document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	"&"	document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed		

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INTERNATIONAL SEARCH REPORT

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos. 1-8.11 and 13-22

- Remark on Protest**
- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
 - ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
 - ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IL06/00911

BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In order for more than one species to be examined, the appropriate additional examination fees must be paid. The species are as follows:

Species I (depicted in Figures 4-6 and 9A);
Species II (depicted in Figures 7-8 and 12E);
Species III (depicted Figures 12A, 12 D, 12F and 13A-13I);
Species IV (depicted Figure 15A)
Species V (depicted Figure 16 A)
Species VI (depicted Figures 18A-18B, 20A-20C, 21A -21B and 22A-22B):

The claims are deemed to correspond to the species listed above in the following manner:

Species I (Claims 2-4);
Species II (Claims 9, 10 and 12);
Species III (Claims 24, 28, 32-33, 35, 40, 43);
Species IV (Claim 48, 50);
Species V (Claims 48, 45); and
Species VI (Claims 24, 40-42, 44, 47, and 56-59).

The following claim(s) are generic: Claims 1, 5-8, 11, 13-22 for Species I, II, and III; and Claims 23, 25-27, 29-31, 34, 36-39, 43, 46, 49, 51-55, and 60-62 for Species IV, V, and VI.

The international Searching Authority considers that the international application does not comply with the requirement of unity of invention (Rules 13.1, 13.2, and 13.3) for the reasons indicated below:

The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: the special technique feature of each species is their specific support structure, and the support structure of each species is exclusive to that species. In the other words, although all of the embodiments are related to the rotary engine system, each embodiment of the rotary engine system includes at least one technical feature that differentiates it from the other embodiments.