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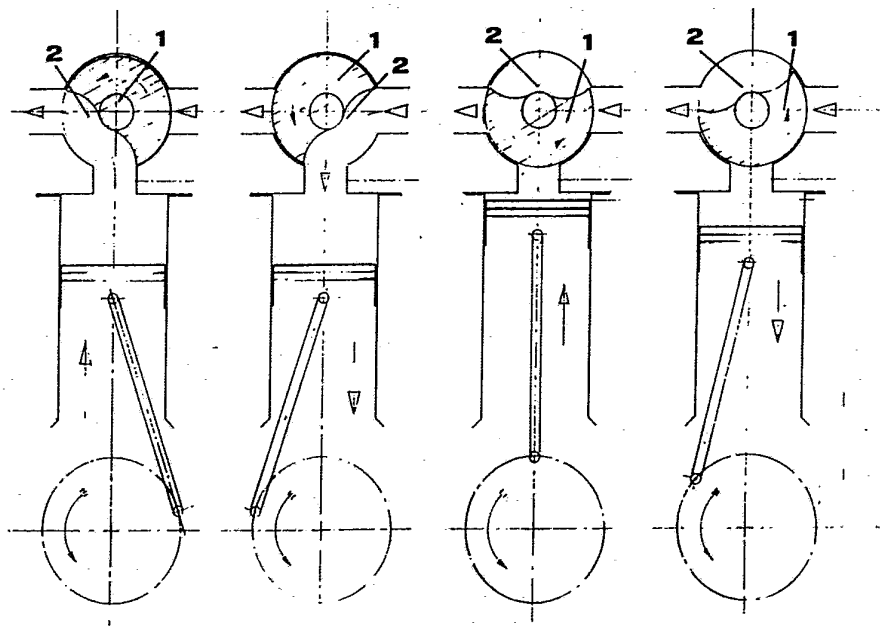
(54) Title: A ROTOR DEVICE WITH PITS FOR THE FEEDING AND DISCHARGE OF ENDOTHERMIC FOUR-STROKE ENGINES



(57) Abstract

The device according to the present invention is provided for the feeding and discharge of four-stroke engines, in replacement of the valve system, having a rotor (1) operated by the driving shaft and provided with one or more pits for each cylinder, shaped in such a way as to allow to obtain the following outlines: (1) a communication between the suction duct and the burst chamber; (2) an isolation between the suction duct, the burst chamber and the discharge; (3) a communication between the burst chamber and the discharge.

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"A ROTOR DEVICE WITH PITS FOR THE FEEDING AND DISCHARGE OF ENDOTHERMIC FOUR-STROKE ENGINES"

The present invention concerns a device consisting of a rotor with one or more pits for each cylinder, for the feeding and discharge of endothermic four-stroke engines.

It is already well known that the feeding and discharge system of the four-stroke engines is usually obtained by interception valves. Said valves have an alternate motion, are operated for their opening and recalled in closed position by springs (there are also systems with valves being operated for opening and closing, called desmodronic).

The main inconveniences of such system are:

a) - a strong resistance to the motion of the fluids when the valves are not completely open;

b) - a non-linear motion of the fluids;

c) - the difficulty of controlling the valves at a high engine revolution number (for those valves with spring recall);

d) - the mechanical complexity, especially for those desmodronic valves;

.../...

e) - relevant damages to the engine in case of out-of-phase of the system, due to the breaking of the operating element.

The inconveniences a) and b) cause an imperfect filling-up of the burst chamber and an incomplete discharge of the exhaust gases; the system conventionally used for reducing said effects consists in crossing the opening and closing of the valves with the consequence, however, of determining a leaking of mixture in the stroke-engines and a reduction of the final compression in the Diesel engines.

The aim of the device according to the present invention consists of:

- improving the motion of the fluids;
- improving the filing-up of the burst chamber;
- increasing the percentage of discharged exhaust gases;
- reducing the mechanical complexity and the sensibility of the system for increasing the number of the engine's revolutions;
- eliminate the damages in case of rupture of the operating element.

The aim set forth is reached by means of the device according to the present invention, shown in the attached drawing in which the four phases are shown in a scheme:

A = discharge

.../...

B = suction

C = compression

D = expansion.

Relating now to the figure, the device mainly consists of a rotor 1 provided with a pit 2 for each cylinder, shaped in such a way as to obtain the following outlines:

1 - a communication between suction duct and burst chambers;

2 - an isolation between suction duct and burst chambers;

3 - a communication between burst chambers and discharge.

The rotor 1 is moved by the driving shaft by means of a transmission element (chain, toothed bet, a fall of gears, etc.), with an appropriate reduction relation of the revolution number.

In possible variants, on said rotor 1 a plurality of pits 2 may be provided for each cylinder, so as to allow an adjustment of the advances and delays on the suction and on the discharge.

The device according to the present invention may be applied to all four-stroke and Diesel engines.

In the stroke engines, said device may be applied with any feeding system with a carburetor with single injector, with multiple injectors and also with suction or compression engines.

.../...

In the Diesel engines the application of the device according to the present innvention is immediate in the direct injection engines, and with a particular project of the body of the rotor the application of said device is provided also on pre-chamber engines.

CLAIMS

1. A device for feeding and discharge of endothermic four-stroke engines, characterized in the replacing of the valve system by a rotor (1) operated by the driving shaft, and provided with a pit for each cylinder, shaped in such a way as to obtain the following outlines:

   1 - a communication between the suction duct, the burst chamber and the discharge;

   2 - an isolation of the suction duct from the burst chamber and the discharge;

   3 - a communication between the burst chamber and the discharge.

2. A device according to claim 1, characterized in that on said rotor (1) a plurality of pits (2) for each cylinder are provided so as to allow ad adjustment of the advance and delay on the suction and the discharge.

3. A device according to the precedent claims, characterized in that said rotor (1) is operated by the driving shaft by means of a transmission element, with an appropriate reduction relation of the revolution number.

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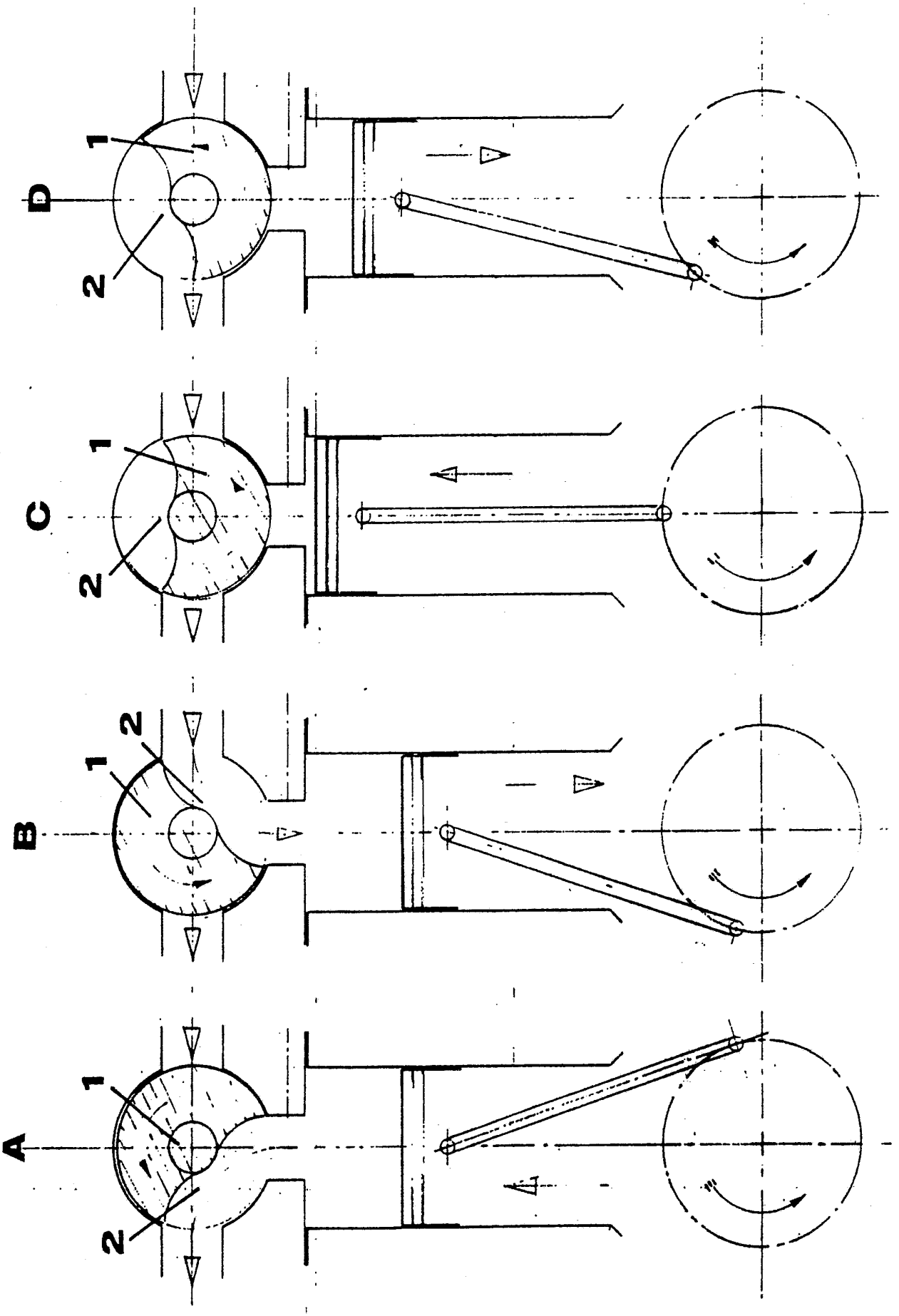
D
1
2
C
1
2
B
1
2
A
1
2

INTERNATIONAL SEARCH REPORT

International Application No PCT/IT 89/00083

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: F 01 L 7/02

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
IPC5	F 01 L

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category *	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
X	FR, B1, 2184209 (MARGUERITE G.M.G.) 21 December 1973, see the whole document	1-3
A	FR, B1, 2144168 (NEGRE GUY) 9 February 1973, see the whole document	1-3
A	FR, A1, 2085418 (NEGRE GUY) 24 December 1971, see the whole document	1-3
A	DE, C, 192230 (CHRISTIAN LORENZEN) 27 November 1907, see the whole document	1-3

* Special categories of cited documents: [10]

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
8th August 1990	28. 08. 90
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	H. Ballesteros

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. PCT/IT 89/00083

SA 33378

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on 27/06/90
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-B1- 2184209	21/12/73	DE-A- 2323949	06/12/73
FR-B1- 2144168	09/02/73	NONE	
FR-A1- 2085418	24/12/71	NONE	
DE-C- 192230	27/11/07	NONE	

For more details about this annex : see Official Journal of the European patent Office, No. 12/82

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