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D E C I S I O N
of 7 March 2003

Case Number: T 1192/01 - 3.2.4

Application Number: 95925183.6

Publication Number: 0785347

IPC: F02B 33/12

Language of the proceedings: EN

Title of invention:
Two-stroke internal combustion engine

Applicant:
Skripov, Jury Nikolaevich

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step - (yes) after amendment"

Decisions cited:

-

Catchword:

-



Case Number: T 1192/01 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 7 March 2003

Appellant: Skripov, Jury Nikolaevich
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Moscow 107589 (RU)

Representative: Röhl, Wolf Horst, Dipl.-Phys., Dr
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 18 May 2001
refusing European patent application
No. 95 925 183.6 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: C. A. J. Andries
Members: T. Kriner
C. Holtz

Summary of Facts and Submissions

I. The Appellant (Applicant) lodged an appeal on 17 July 2001, against the decision of the Examining Division, dispatched on 18 May 2001, refusing European patent application No. 95 925 183.6. The fee for the appeal was paid simultaneously and the statement setting out the grounds of appeal was received on 15 September 2001.

II. The Examining Division held that the application did not meet the requirements of Article 52(1) EPC in conjunction with Article 56 EPC in view of document:

D1: US-A-4 185 597.

In addition to D1 the following documents have been cited in the international search report, in the supplementary search report and in the description of the present application:

D2: US-A-4 332 229

D3: GB-A-2 149 006

D4: DE-A-4 216 565

D5: GB-A-104 695

D6: GB-A-1 467 394

D7: SU-A-1 697 594

D8: SU-A-576 973 (corresponding to DE-A-2 308 127).

III. The appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the following documents:

Claims: Numbers 1 to 8 filed with letter of 28 February 2003.

Description: Pages 1 to 3, 3a, 3b, 6, 7, 9 to 11 filed with letter of 17 February 2003, with the amendments of page 3b as agreed by the Appellant during the consultation by telephone on 6 March 2003.
Pages 4, 5, 8 filed with letter of 28 February 2003.

Drawings: Figures 1 to 9 as originally filed.

IV. The independent claim 1 reads as follows:

"A two-cycle internal combustion engine comprising a cylinder (1) and a main piston (2), the cylinder having a port (3) in which an intake valve (4) is placed for feeding a gas from an intake manifold (5) into a first intake chamber (6) which is positioned under the main piston (2), is isolated from a crank chamber (7) and communicates with a combustion chamber (8) positioned above the main piston (2) by means of a by-pass manifold (9) for feeding the gas from the first intake chamber (6) into the combustion chamber (8), an intake valve (11) placed at the outlet from the first intake chamber (6) and communicating the first intake chamber (6) with the input (10) of the by-pass manifold (9),

an additional piston (15) arranged in the cylinder (1) between the crank chamber (7) and the main piston

(2) and rigidly connected to the main piston (2),
a second intake chamber (17) which is positioned between the first intake chamber (6) and the additional piston (15), is isolated from the first intake chamber (6) by means of a partition (20), communicates with the intake manifold (5) by means of a valve (18) mounted in a port (19) at the inlet to the second intake chamber (17) and facing with its inlet side the intake manifold (5), and communicates with the by-pass manifold (9) by means of a valve (21) placed at the outlet from the second intake chamber (17) and facing with its inlet side the second intake chamber (17), and

a window (12) for discharging exhaust gases from the combustion chamber (8),

characterized in that

the gas is a fuel-air mixture,

said window is placed on the wall of the cylinder (1), and

the by-pass manifold (9) comprises two channels (48, 49),

one channel (48) communicating with the first intake chamber (6) by means of the intake valve (11) placed at the outlet from the first intake chamber (6), and with the combustion chamber by means of a valve (23) placed at the inlet (24) into the combustion chamber (8) and facing the by-pass manifold (9) with its inlet side,

and the other channel (49) communicating with the second intake chamber (17) by means of the valve (21) placed at the outlet from the second intake chamber (17), and communicating with the combustion chamber (8) by means of a valve (50) placed at the inlet (24) into the combustion chamber (8) and facing the by-pass manifold (9) with its inlet side."

V. In support of its request, the appellant relied

essentially on the following submissions:

The most relevant state of the art was represented by D1 which disclosed a combustion engine as defined in the preamble of claim 1. Starting from this document, the object underlying the present invention was to provide a combustion engine which had a simplified construction and an increased service life and which allowed a more efficient provision of a fuel-air mixture. This object was achieved by feeding a fuel-air mixture from the inlet manifold to the combustion chamber, by placing the window for discharging the exhaust gases on the wall of the cylinder and by the provision of a by-pass manifold having two channels as described in the characterising portion of claim 1. As a result of these measures an output valve was no longer required and the fuel-air ratio could be controlled in a better way.

Since there was no suggestion for the characterising features of claim 1, the subject-matter of this claim was not only new, but also based on an inventive step.

Reasons for the decision

1. The appeal is admissible
2. *Amendments*

The subject-matter of claim 1 is disclosed in Figure 8 and in the corresponding description on page 9, lines 20 to 27 of the originally filed application.

The features of dependent claims 2 to 8 are disclosed in the originally filed claims 2, 3, 4, 8, 9, 12 and 6 in

conjunction with the originally filed claim 13. In addition to some formal corrections, the description has only been adapted to the amended wording of the claims.

All amendments meet the requirements of Article 123(2) EPC.

3. *Novelty*

3.1 D1 which represents the most relevant state of the art discloses (in particular in its Figure 1 and in the corresponding description) a combustion engine as defined in the preamble of claim 1, namely a two-cycle internal combustion engine comprising a cylinder (10, 11) and a main piston (30), the cylinder having a port (40 or 50) in which an intake valve (44 or 54) is placed for feeding a gas from an intake manifold (implicitly disclosed in D1) into a first intake chamber (24) which is positioned under the main piston, is isolated from a crank chamber and communicates with a combustion chamber (12) positioned above the main piston by means of a by-pass manifold (120) for feeding the gas from the first intake chamber into the combustion chamber, an intake valve (102 or 106) placed at the outlet from the first intake chamber and communicating the first intake chamber with the input (100 or 104) of the by-pass manifold, an additional piston (60) arranged in the cylinder between the crank chamber and the main piston and rigidly connected to the main piston (by the connecting rod 38), a second intake chamber (70) which is positioned between the first intake chamber and the additional piston, is isolated from the first intake chamber by means of a partition (90), communicates with the intake manifold by means of a valve (76, 82, or 88) mounted in a port (72, 78 or 84) at the inlet to the

second intake chamber and facing with its inlet side the intake manifold, and communicates with the by-pass manifold by means of a valve (112 or 116) placed at the outlet (110 or 114) from the second intake chamber and facing with its inlet side the second intake chamber, and a window (opening of the exhaust manifold closed by the exhaust valve 18) for discharging exhaust gases from the combustion chamber.

However, the gas fed from the intake manifold to the combustion chamber is not a fuel-air mixture (since the carburettor 130 is arranged at the downstream end of the by-pass manifold), the window is not placed on the wall of the cylinder (but on the wall of the cylinder head), and the by-pass manifold does not comprise two channels (but only a single channel).

Consequently, D1 does not disclose any of the characterising features of claim 1.

3.2 All further available documents (D2 to D8) disclose less relevant features of claim 1 than D1. Moreover, none of these documents discloses a by-pass manifold comprising two channels.

3.3 In view of the assessments above, the subject-matter of claim 1 is novel.

4. *Inventive step*

4.1 It is correct that when starting from D1, the object to be achieved by the present invention may be regarded as to provide a combustion engine according to the preamble of claim 1 which has a simplified construction and an increased service life and which allows a more efficient

provision of a fuel-air mixture.

4.2 In accordance with the characterising portion of claim 1 this object is achieved by the following features:

- (a) the gas is a fuel-air mixture;
- (b) the window is placed on the wall of the cylinder;
and
- (c) the by-pass manifold comprises two channels, one channel communicating with the first intake chamber by means of the intake valve placed at the outlet from the first intake chamber, and with the combustion chamber by means of a valve placed at the inlet into the combustion chamber and facing the by-pass manifold with its inlet side, and the other channel communicating with the second intake chamber by means of the valve placed at the outlet from the second intake chamber, and communicating with the combustion chamber by means of a valve placed at the inlet into the combustion chamber and facing the by-pass manifold with its inlet side.

4.3 Each of the features a and b, i.e. the feeding of a fuel-air mixture from an intake manifold via a by-pass manifold into the combustion chamber of a two-cycle internal combustion engine, and the arrangement of a window for discharging exhaust gases from such an engine on the wall of a cylinder, is well known in the state of the art (feature a: see for example D4 or D6; feature b: see for example D2, D6 or D7).

However, there is no suggestion for the provision of a by-pass manifold having two channels, let alone of the

type described in feature c.

- 4.4 Consequently, the subject-matter of claim 1 also involves an inventive step.

Claim 1 together with dependent claims 2 to 8, the amended description and drawings, therefore form a suitable basis for the grant of a patent.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent in the following version:

Claims: Numbers 1 to 8 filed with letter of 28 February 2003.

Description: Pages 1 to 3, 3a, 3b, 6, 7, 9 to 11 filed with letter of 17 February 2003, with the amendments of page 3b as agreed by the Appellant during the consultation by telephone on 6 March 2003.
Pages 4, 5, 8 filed with letter of 28 February 2003.

Drawings: Figures 1 to 9 as originally filed.

The Registrar:

The Chairman:

G. Magouliotis

C. Andries