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**Datasheet for the decision
of 28 January 2011**

Case Number: T 0685/10 - 3.2.04

Application Number: 06120247.9

Publication Number: 1752644

IPC: F02F 1/42

Language of the proceedings: EN

Title of invention:
Multiple intake valve engine

Applicant:
Isuzu Motors Limited

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Added subject-matter (yes) (all requests)"
"Intermediate generalization"

Decisions cited:
T 1067/97, T 0714/00, T 0025/03

Catchword:
-



Case Number: T 0685/10 - 3.2.04

D E C I S I O N
of the Technical Board of Appeal 3.2.04
of 28 January 2011

Appellant:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 21 October 2009
refusing European patent application
No. 06120247.9 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: A. de Vries
Members: M. Poock
C. Heath

Summary of Facts and Submissions

I. The Appellant lodged an appeal, received 22 December 2009, against the decision of the Examining Division posted 21 October 2009, refusing the European patent application No. 06120247.9 and simultaneously paid the required fee. The grounds of appeal were received 22 February 2010.

In its decision the Examining Division held that the application did not meet the requirements of Articles 52(1) and 54 EPC for lack of novelty.

II. In a communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal the Board expressed its preliminary opinion that, inter alia, amendments to claim 1 were unallowable under Article 123(2) EPC.

III. Oral proceedings were duly held before the Board on 28 January 2011.

IV. The Appellant requests that the decision under appeal be set aside and that a patent be granted on the basis of a main request, or alternatively, on the basis of one of auxiliary requests 1 to 6 all filed with letter of 28 December 2010.

V. The wording of claim 1 of the requests is as follows :

Main Request

" A multiple intake valve engine having a cylinder head including:

a first intake port (1) having a first inlet (4), a first outlet (7) and a downwardly curved middle section (15) between the first inlet (4) and outlet (7), and a second intake port (2) having a second outlet (8), characterized in that the first outlet (7) is formed below a straight line (B) passing through an uppermost point of the first inlet (4) and touching a lowermost corner point (18) defined by the curved middle section (15); the second intake port (2) is provided downstream of the first intake port (1) with respect to a swirl (S) generated in a respective cylinder (3) of the engine, and that the first intake port (1) has an inlet section (14) extending slightly upward from the first inlet (4) to the middle section."

Auxiliary Request 1

Claim 1 is as in the main request but adds at the end the following wording:

"the first intake port (1) includes a pre-outlet part (16) immediately before the outlet (7) extending downstream from the middle section (15), the middle section (15) is U-shaped, a rear half of the middle section (15) and the pre-outlet part (16) are inclined as close to horizontal as possible, allowing as much swirl-component to be obtained as possible, and that a charge is injected in the orientation of the pre-outlet part (16)."

Auxiliary Request 2

Claim 1 is as in the main request but adds at the end the following wording:

"the first intake port (1) includes a pre-outlet part (16) immediately before the outlet (7) extending downstream from the middle section (15), the middle section (15) is protruded in a U-shape moving away from the second intake port (2) and then moving back toward the second intake port (2), an umbrella portion (17) smoothly links the pre-outlet part (16) and the outlet (7), and that a charge is injected in the orientation of the pre-outlet part (16)."

Auxiliary Request 3

"A multiple intake valve engine having a cylinder head including:

a first intake port (I) having a first inlet (4), a first outlet (7) and a middle section (15) between the first inlet (4) and outlet (7) extending downstream from an inlet section (14), and

a second intake port (2) having a second outlet (8), wherein in a mounting position of the engine the cylinder is vertically oriented and the intake ports (1, 2) are arranged on top of the cylinder, characterized in that in the mounting position the first outlet (7) is formed below a line (B) passing through an inlet (4) upper end and touching an bottom corner wall (18) of the middle section (15);

the second intake port (2) is provided downstream of the first intake port (1) with respect to a swirl (S) generated in a respective cylinder (3) of the engine, and

that the inlet section (14) has a straight shape in plan view and extends slightly upward from the first

inlet (4) to the middle section (15) when the engine is oriented in the mounting position."

Auxiliary Request 4

"A multiple intake valve engine having a cylinder head including:

a first intake port (1) having a first inlet (4), a first outlet (7) and a middle section (15) between the first inlet (4) and outlet (7) extending downstream from an inlet section (14), and

a second intake port (2) having a second outlet (8), wherein in a mounting position of the engine the cylinder is vertically oriented and the intake ports (1, 2) are arranged on top of the cylinder, characterized in that in the mounting position the first outlet (7) is formed below a line (B) passing through an inlet (4) upper end and touching an bottom corner wall (18) of the middle section (15);

the second intake port (2) is provided downstream of the first intake port (1) with respect to a swirl (S) generated in a respective cylinder (3) of the engine, and

that the inlet section (14) has a straight shape in plan view and extends slightly upward from the first inlet (4) to the middle section (15) when the engine is oriented in the mounting position, the first intake port (1) includes a pre-outlet part (16) immediately before the outlet (7) extending downstream from the middle section (15), the middle section (15) is protruded in a U-shape moving away from the second intake port (2) and then moving back toward the second intake port (2), an umbrella portion (17) smoothly links the pre-outlet part (16) and the outlet (7), and

that a charge is injected in the orientation of the pre-outlet part (16)."

Auxiliary Request 5

Claim 1 is as in the main request but replaces its final feature ("and the first intake ...") by the following wording :

" the first intake port (1) has an inlet section (14) that extends slightly upward from the first inlet (4) to the middle section (15) and then drops downward at the subsequent middle section (15), the outlet (7) is located at a lower height than the inlet (4), the first intake port (1) links the inlet (4) and the outlet (7), the middle section (15) is curved from the inlet side toward the outlet side, and that the inlet (4) of the first intake port (1) is located at a lower height than an inlet (5) of the second intake port (2)."

Auxiliary Request 6

Claim 1 is as in the auxiliary request 5 but adds at the end the following wording:

" the middle section (15) is protruded in a U-shape away from second intake port (2) with respect to the inlet section (14) and is moving away from the second intake (2) starting at the inlet section (14) and then moving back toward the second intake port (2), the first intake port (1) includes a pie-outlet part (16) extending downstream from the middle section (15) and an umbrella portion (17) which smoothly links the pie-outlet part (16) and the outlet (7), the inlet section (14) extends in an intake port axis (Cp) direction, the U-shape is inclined with respect to the direction

perpendicular to the direction of the axis (C_p) of the first intake port (1) so that a turning bottom of the U-shape approaches a crankshaft center (C) or a cylinder center (O_c), and that with respect to the inlet section (14) the middle section (15) is offset away from the second intake port (2), and the maximum offset length (L) thereof is between 0,5 and 0,75 of the inlet width."

VI. The Appellant argued as follows:

From his knowledge of usual intake valve shapes the skilled person will immediately be struck by the upward slant of the inlet section in figure 3 as something unusual that must contribute to the swirl. It is therefore admissible to add this feature to claim 1 (main request) which now includes all features of figure 3.

Claim 1 furthermore need not specify the exact form and shape of the first intake or its relation to the second intake as these are all implicit in the feature of the second intake being provided downstream of the first with respect to a swirl direction.

The auxiliary requests add features from parts of the description that refer to figure 3 or that detail the shape of the first intake.

Reasons for the Decision

1. The appeal is admissible.

2. *Background of the Invention*

The application is a divisional of parent application EP 1 111 224. Both concern a multiple valve intake engine with cylinder head and first and second intake ports that are configured to increase swirl in the cylinder without sacrificing charge amount. The present application picks up the idea expressed in claim 11 of the parent application as filed of the first intake being curved so that its outlet lies below a straight line passing through an uppermost corner and touching a lowermost point on the curved section. This prevents charge from escaping straight from the inlet to the outlet which would weaken swirl, paragraphs [0022], [0029].

3. *Added Subject-Matter*

- 3.1 Each of the auxiliary requests add to claim 1 detail from the description and figures and pertaining to a particular embodiment. According to established case law, see e.g. decisions T 1067/97, T 0714/00 or T 0025/03 cited in the Case Law of the Boards of Appeal, 6th edition, 2010 (or CLBA), III.A.2, it is normally not admissible under Article 123(2) EPC to extract isolated features from a set of features originally disclosed only in combination in the description. This will only be justified if there is no clearly recognizable functional or structural relationship between the features. Similarly, where features are added from figures, their structure and function must be clearly, unmistakably and fully derivable from the figures, as well as the fact that they can be isolated

from the other features shown in the figures, see the CLBA, III.A.5, and the decisions cited therein.

3.2 The *main request* adds to claim 1 the feature of the first intake port having an upward sloping inlet section. An upward slant is indeed visible in the inlet section in figure 3 and expressly mentioned in description paragraph [0021].

Figure 3 is one of various views of the same engine intake that is a first, main embodiment, as is clear from the description of the figures 1 to 6 in columns 2 and 3. Together figures 1 to 6 provide a picture of an engine intake with two ports that are arranged in a complex 3-D configuration. This is also what emerges from corresponding description paragraphs [0013] to [0024].

The effects of this complex configuration are explained in description paragraphs [0025] to [0031]. The first intake port is thus shaped to inject charge toward an area A in the dead space between the second intake port and the cylinder wall so as to avoid interference between the charges from the two intakes, see paragraph [0025]. Moreover, see paragraph [0026], the port's internal shape avoids turbulence and separation so that the amount of injected charge is maximized. Both effects contribute to achieving the claimed invention's main aim of increasing swirl without sacrificing intake quantity, see description paragraph [0005].

The various features set out in paragraphs [0013] to [0024] together define the complex configuration that gives rise to these effects. Some features of the

configuration are given special prominence, cf. paragraphs [0018] and [0020], but for the skilled person it is clear that all the features together achieve the claimed invention's aim. The upward slant is thus set within a tight structural and functional context. Its exact role is not identified in the text, nor is it immediately apparent from the figures. However it is clear to the skilled reader that it is one feature among many that together produce the desired effects. Lifting it out of this context and adding it in isolation to claim 1 therefore represents a generalization of the specific structural and functional context in which the feature originally appears. At the same time it raises the feature to prominence and gives it a significance over the other features not included that it does not have in the original disclosure.

It is thus immaterial that the feature in question might be derivable from figure 3. Figure 3 merely illustrates one aspect of the complex shape that produces the effects described above. The figure itself already includes intimations of that complex shape - curving and narrowing - that are central in achieving the claimed invention's central aim but which are not included in claim 1 of the main request.

The Board further draws attention to paragraphs [0036] to [0038] in conjunction with figures 11 to 15, describing a further embodiment that differs from the first in only a *downward* slant of the inlet section. In paragraph [0038], first line, this embodiment is said to achieve the "same operation and effect" as the first embodiment, that of figures 1 to 6. If anything, this

passage teaches the skilled person that the slant plays a very small role if indeed any role. Giving the upward slant prominence in the definition of the invention, i.e. those core features that achieve the application's aims as described above, thus represents a new teaching, which contradicts what the skilled person infers from the original disclosure regarding this feature.

The Board concludes that adding the feature of an upward slant in isolation from its context in description and figures adds subject-matter not originally disclosed, contrary to Article 123(2) EPC.

- 3.3 The auxiliary requests add to claim 1 various further features of the first, main embodiment. The main source for all, though in different degrees, is description paragraphs [0019], [0021], [0024] and [0026]. These paragraphs are concerned with the shape and orientation of the first intake port, which is defined in increasing detail in successive versions of claim 1. Apart from the fact that, for all but auxiliary request 6, these claims include only some but not all features of the shape and orientation, none of the versions include the features of paragraphs [0018] or [0020] which are concerned with other important aspects of this embodiment, namely the shape of the second intake port and the relative placement of the two intake ports with respect to each other. These features are also part of the complex shape that produces the desired effects of the claimed invention. The relative placement, with the pre-outlet port 16 (of the first intake) oriented toward the area A between the outlet 8 of the second intake port and the cylinder inner wall 12a, is in fact highlighted in connection with swirl

increase, see paragraph [0026], though it has been omitted from all versions of claim 1.

For the same reasons as given for the main request adding some but not all features to claim 1 according to auxiliary requests 1 to 6 represents a generalization of the specific combination originally disclosed, while it also gives the features included special significance over those features that are not. On both counts this results in added subject-matter, contrary to Article 123(2) EPC.

4. None of the amended claims of the main and first to sixth auxiliary requests are allowable under Article 123(2) EPC. The Board therefore confirms the appealed decision to refuse the application.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

G. Magouliotis

A. de Vries