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**Datasheet for the decision  
of 14 July 2016**

**Case Number:** T 2591/12 - 3.2.06

**Application Number:** 03725951.2

**Publication Number:** 1532352

**IPC:** F01M13/04, B04B5/08, B04B9/04,  
B01D45/14

**Language of the proceedings:** EN

**Title of invention:**

A METHOD OF CLEANING CRANKCASE GAS AND A GAS CLEANING SEPARATOR

**Patent Proprietor:**

Alfa Laval Corporate AB

**Opponent:**

MAHLE International GmbH

**Headword:**

**Relevant legal provisions:**

EPC Art. 100(a), 100(b)

**Keyword:**

Sufficiency of disclosure - (yes)  
Inventive step - (no)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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European Patent Office  
D-80298 MUNICH  
GERMANY  
Tel. +49 (0) 89 2399-0  
Fax +49 (0) 89 2399-4465

Case Number: T 2591/12 - 3.2.06

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.06**  
**of 14 July 2016**

**Appellant:** Alfa Laval Corporate AB  
(Patent Proprietor) Rudeboksvägen 3  
221 00 Lund (SE)

**Representative:** Alfa Laval Attorneys  
Alfa Laval Corporate AB  
Patent Department  
P.O. Box 73  
221 00 Lund (SE)

**Respondent:** MAHLE International GmbH  
(Opponent) Pragstrasse 26-46  
70376 Stuttgart (DE)

**Decision under appeal:** **Interlocutory decision of the Opposition**  
**Division of the European Patent Office posted on**  
**23 October 2012 concerning maintenance of the**  
**European Patent No. 1532352 in amended form.**

**Composition of the Board:**

**Chairman** M. Harrison  
**Members:** M. Hannam  
W. Ungler

## Summary of Facts and Submissions

I. An appeal was filed by the appellant (proprietor) against the interlocutory decision of the opposition division in which it found that European patent No. 1 532 352 in an amended form met the requirements of the EPC.

The appellant requested that the interlocutory decision be set aside and the patent be maintained as granted, alternatively that it be maintained according to one of auxiliary requests 1 to 4.

II. The respondent (opponent) requested that the appeal be dismissed.

III. The following documents are relevant for the present decision:

D1 WO-A-01/03846

D2 WO-A-01/36103

IV. The Board issued a summons to oral proceedings with a subsequent communication containing its provisional opinion, in which it indicated *inter alia* that the objections under Article 100(b) EPC were not prejudicial to the maintenance of the patent and that the subject-matter of claim 1 of the main request appeared to lack an inventive step when starting from D2 and taking into account the technical teaching of *inter alia* D1.

V. With letter of 8 March 2016 the respondent indicated that it would not attend the scheduled oral proceedings.

VI. Oral proceedings were held before the Board on 14 July 2016. The final request of the appellant was that the decision under appeal be set aside and the patent be maintained on the basis of the main request filed with the statement of grounds of appeal.

In accordance with its written submissions, the respondent requested that the appeal be dismissed.

VII. Claim 1 of the main request reads as follows:  
"A method of cleaning crankcase gas produced by an internal combustion engine from particles, solid and/or liquid, suspended therein, the crankcase gas being caused to flow through a non-rotatable housing (1) and to rotate therein about a rotational axis (R) by means of a centrifugal rotor (2), which for its operation is journalled in the housing (1) at two bearing places axially spaced from each other, characterized by causing the centrifugal rotor (2) to rotate by using part of it within the housing (1) also as a rotor (19) of an electrical motor, which motor also has a stator (18), said stator (18) being kept non-rotating within the housing (1) and charged with an electric current for rotation of the centrifugal rotor (2), while the centrifugal rotor (2), including the part thereof being used as rotor of the electrical motor, is kept journalled during its rotation only at said two bearing places."

VIII. The appellant's arguments may be summarised as follows: As regards the objections under Article 100(b) EPC, claim 1 referred to 'bearing places' rather than 'bearings' such that a single bearing place could have more than one bearing. The skilled person was thus able to carry out the invention according to the main

request.

The subject-matter of claim 1 involved an inventive step when starting from D2 and taking into account the technical teaching of D1. The objective technical problem to be solved when starting from D2 was to simplify the alignment of the centrifugal rotor and the motor. The solution to this problem in the patent was through providing just two bearing places and positioning the motor in the separator housing, thus reducing distances for alignment. D1 concerned a significantly different separation device to both that claimed and that disclosed in D2, such that the skilled person would not look to D1 for a solution to the posed problem. D1 disclosed three bearing places and thus failed to provide a hint to just two bearing places. It was also directed to filtering of oil which would impose significant forces on the bearings, particularly due to the fluid viscosity and boundary effects between the rotating filter 306 and the stationary housing 304 (see Fig. 14); bearing misalignment would represent a relatively small additional energy loss. In contrast, D2, similarly to the present invention, disclosed a gas separator which would impose comparatively small loads on its bearings; any bearing misalignment would thus represent a significant loss factor. Thus, even if D1 were considered by the skilled person, he would realise that the bearing design was so different that it could not be used in the gas separator of D2. Furthermore, as regards the functioning of D1, its design was completely unsuited to separating of particles from a gas stream which would be a further disincentive for the skilled person to combine its technical teaching with D2.

IX. The respondent's arguments may be summarised as follows:

The ground for opposition under Article 100(b) EPC prejudiced maintenance of the patent according to the main request. Claim 1 stated that the centrifugal rotor was journalled at only two bearing places whilst para. [0028] suggested that a separate 'support' of the rotor is possible taking-up only axial forces (i.e. 3 bearing places existed for the rotor). This contradiction resulted in the skilled person not being able to carry out the invention.

The subject-matter of claim 1 lacked an inventive step. Starting from D2, claim 1 differentiated itself from this in that the motor was within the housing and the rotor was journalled at just two bearing places. D1 disclosed a rotor assembly journalled at just two bearing places with the motor located within the housing. Through a combination of D2 and D1 the skilled person would thus reach the claimed subject-matter.

## **Reasons for the Decision**

Main request

1. Article 100(b) EPC

The objection under Article 100(b) EPC is not prejudicial to the maintenance of the patent.

1.1 In its preliminary opinion, the Board indicated that the ground for opposition under Article 100(b) EPC was not prejudicial to maintenance of the patent, particularly since the expression 'journalled' could be

understood to imply a support providing force perpendicularly to the rotational axis. It thus follows that the reference in para. [0028] of the patent to a support taking up axial forces, as also indicated in this paragraph, is not seen as one of the bearing places defined in claim 1. The respondent offered no counter-arguments to the preliminary opinion such that the Board also sees no reason to alter its view. It thus follows that, contrary to the opinion of the respondent, the claimed two bearing places in conjunction with para. [0028] of the patent, do not hinder the skilled person from carrying out the invention.

2. Article 100(a) EPC

The ground for opposition under Article 100(a) EPC relating to Article 56 EPC prejudices maintenance of the patent according to the main request.

- 2.1 D2, which is accepted by both parties and the Board as the document presenting the most promising starting point for considering inventive step, discloses:  
A method of cleaning crankcase gas produced by an internal combustion engine from particles, solid and/or liquid, suspended therein (see page 1, lines 4 to 8), the crankcase gas being caused to flow through a non-rotatable housing (1; see Fig. 1) and to rotate therein about a rotational axis (R) by means of a centrifugal rotor (8), which for its operation is journalled in the housing (1) at two bearing places (11, 13) axially spaced from each other (see Fig. 1), causing the centrifugal rotor (8) to rotate due to the motor stator (9) being charged with an electric current for rotation of the centrifugal rotor (8).



2.1.1 As also undisputed by the parties, the subject-matter of claim 1 differs from the method known from D2 in that:

- the centrifugal rotor, including the part thereof being used as rotor of the electrical motor, is kept journalled during its rotation only at two bearing places; and
- part of the centrifugal rotor within the housing is also used as a rotor of the electrical motor, which motor also has a stator, said stator being kept non-rotating within the housing.

2.1.2 As regards the objective technical problem to be solved based on these differentiating features, the appellant argued, and indeed this is well-accepted from a technical point of view, that more than two bearing places for a rotating assembly is more difficult to align accurately than just two bearing places. As a consequence, restricting the apparatus to two bearing places with improved alignment results in reduced vibration and a more efficient use of drive energy. The objective technical problem may thus be seen as how to reduce alignment problems for the motor and centrifugal rotor.

2.1.3 In seeking a solution to this problem, the skilled person would look at D1 which discloses a vertically oriented, motor-driven separation device (see Fig. 14 and page 10, lines 13 to 14) with the motor arranged inside the device housing. From this it would be immediately evident to a skilled person that the arrangement of the motor and rotating filter assembly with just two bearing places removes any requirement for alignment of the shaft with a further bearing positioned in a motor, and thus provides a solution to the objective technical problem. It would thus be

obvious for the skilled person, starting from D2 and wishing to reduce alignment problems, to modify the known method of D2 with the bearing, separator and motor arrangement of D1, thus solving the objective problem and arriving at the subject-matter of claim 1 without exercising an inventive step (Article 56 EPC).

2.2 As regards the appellant's contention that D1 was in an unrelated technical field and so would not be considered for combination with D2, this is not persuasive. It is noted that the devices of both D1 and D2 exhibit a very similar set of structural features including: a motor and a rotating separating device on a common vertical rotational axis; a housing containing the fluid to be cleaned; rotating cleaning media; bearings supporting the rotational assembly; a fluid inlet and a fluid outlet. The skilled person in the art of filtering devices would thus immediately recognise that the devices of the respective documents would share a number of design criteria which might provide him with suggestions for modification of one or the other device. It is also noted that the fields of application for the two devices have internal combustion engines in common, which also provides a further link between the documents which the skilled person would appreciate. Furthermore, although not decisive, the patent classification subclass B04B is common to both documents, relating to machines for centrifugal separation processes. As a consequence the skilled person would see a clear relationship between the technical fields of D1 and D2 and would not hesitate to consider D1 when wishing to modify the separator known from D2.

2.3 As regards the appellant's argument that D1 disclosed three bearing places and thus failed to provide a hint

to just two bearing places, this is not accepted. Fig. 14 of D1 indeed shows three bearings: two bearings 332 at the motor output shaft and a single bearing 360 at the distal end of the filter from the motor. Irrespective of the possibility of the two bearings 332 being considered as a 'single bearing place', page 10, lines 13 to 14 also indicate that these two bearings, albeit explained only in relation to a turbine embodiment, can be realised as just a single bearing. It thus follows that D1 clearly discloses just two bearing places for the rotating assembly of the separator.

2.4 The appellant's argument that the separation devices of D1 and D2 were so different that the skilled person would be unable to combine them is also not accepted. As is immediately evident from simply looking at Fig. 14 of D1, those features differentiating claim 1 from the disclosure of D2 are disclosed therein i.e. a vertically rotating assembly with just two bearing places and the drive motor enclosed within the housing. As also conceded by the appellant, the skilled person understands from basic mechanical principles that two bearing places provide easier alignment when compared to three or more bearing positions. It thus follows that, when starting from D2 and faced with the objective technical problem, the skilled person would see in Fig. 14 of D1 a clear hint as to how to modify the apparatus of D2 and reach the subject-matter of claim 1.

2.5 As part of its argument that D1 and D2 were incompatible documents, the appellant further argued that the oil filter of D1 would experience heavy bearing loads due to the viscosity of the oil whilst the bearings of D2 would be subject only to light loads

due to simply a gas being centrifuged. The Board can concur with the theory here, but no features of claim 1 identify that the components used in the claimed method are necessarily of light weight. Whilst para. [0026] of the patent specification discusses the centrifugal rotor and shaft being of lightweight material, no such limitation is included in claim 1. As a consequence, the argument that the different implicit bearing loads in D1 and D2 would lead the skilled person away from combining the two documents to arrive at the solution in claim 1 fails, since no requirement for, or limitation to, a particular bearing load is present in claim 1. The skilled person would thus not see any bearing load considerations, pending from heavy duty or light duty separation, as important when considering the possible combination of the teaching of D1 with the device of D2, particularly in view of the objective technical problem to be solved.

- 2.6 The further argument of the appellant, that alignment of the bearings in the gas cleaning apparatus of D2 would have a significant impact on the total energy consumed by the device, whereas this would not be the case in D1, such that the skilled person would see no hint to combining the documents, is not accepted. Whilst the difference in duty of the two separators of D1 and D2 is acknowledged by the Board, this would not dissuade the skilled person from considering the bearing arrangement of D1 which, even at first glance, would be seen as a solution to the posed objective technical problem when starting from D2. The potential reduction in bearing forces as a result of improved bearing alignment remains, irrespective of whether the percentage force reduction by such a measure is lower in D1 than in D2. Regarding the specific duties of the separators in D1 and D2 and as mentioned in 2.5 above,

no limitation to a particular weight of rotating assembly or bearing size is provided in claim 1 such that the appellant's contention regarding incompatibility of the two documents due to different bearing design considerations is not accepted when considering the objective problem to be solved.

2.7 The appellant's argument, that the separator of D1 was completely unsuited to separating of particles from a gas stream which would be a further disincentive for the skilled person to combine its technical teaching with D2, is also not convincing. The Board concurs with the appellant that D1 is not suited to remove particles from a gas stream. However, the missing suitability of D1 to cleaning crankcase gas is of no consequence for the skilled person wishing to solve the problem of reducing alignment problems. For this, he would simply need to consider the suitability of the bearing arrangement of D1 from which it would be immediately evident, and also appreciated from an understanding of mechanical principles, that the two bearing places disclosed would solve this problem by reducing the number of bearing places to just two.

2.8 It thus follows that, starting from the separator known from D2 and wishing to reduce alignment problems, the skilled person would modify this with the two bearing places and the motor inside the housing as disclosed in D1, thus reaching the claimed subject-matter without exercising an inventive step. It may be noted at this juncture that the appellant did not attach any particular technical problem to the relative placement of housing and motor and provided no arguments on that matter, but saw the inventive step issue when starting from D2 as restricted to the technical effect of the bearing locations.

2.9 The ground for opposition under Article 100(a) EPC thus prejudices maintenance of the patent.

2.10 The main request is therefore not allowable.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



M. H. A. Patin

M. Harrison

Decision electronically authenticated