

BESCHWERDEKAMMERN
DES EUROPÄISCHEN
PATENTAMTS

BOARDS OF APPEAL
OF THE EUROPEAN
PATENT OFFICE

CHAMBRES DE RECOURS
DE L'OFFICE EUROPEEN
DES BREVETS

A		B		C	<input checked="" type="checkbox"/>
---	--	---	--	---	-------------------------------------

File Number: T 696/89 - 3.2.4
Application No.: 82 302 528.3
Publication No.: 0.066 407
Title of invention: Reciprocating exhauster

Classification: F04B 37/10

DECISION
of 16 September 1992

Proprietor of the patent: WABCO AUTOMOTIVE U.K. LIMITED

Opponent: PIERBURG GMBH

Headword:

EPC Article 56

Keyword: "Inventive step (yes)"



Case Number : T 696/89 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 16 September 1992

Appellant :
(Opponent)

PIERBURG GMBH
Postfach 10 10 52
W - 4040 Neuss 1 (DE)

Representative :

Livsey, Gilbert Charlesworth Norris
HYDE, HEIDE & O'DONNELL
10-12 Priest's Bridge
London SW15 5JE (GB)

Respondent :
(Proprietor of the patent)

WABCO AUTOMOTIVE U.K. LIMITED
90 Newbold Road
Rugby, Warwickshire CV21 2NL (GB)

Representative :

Chettle, Adrian John
Withers & Rogers
60 Holly Walk
Leamington Spa, Warwickshire CV32 4JE (GB)

Decision under appeal :

Interlocutory decision of the Opposition Division
of the European Patent Office dispatched on
14 September 1989 concerning maintenance of
European patent No. 0 066 407 in amended form.

Composition of the Board :

Chairman : C.A.J. Andries
Members : H.A. Berger
M.V.E. Lewenton

Summary of Facts and Submissions

- I. European patent No. 0 066 407 comprising five claims, was granted on 26 June 1985 in response to European patent application No. 82 302 528.3 filed on 18 May 1982.
- II. The patent was opposed by the Appellant on the grounds that its subject-matter lacked novelty or inventive step with respect to the state of the art and that the subject-matter was not sufficiently disclosed (Article 100(a), (b) EPC).

The Opponent relied in particular on the following state of the art documents:

D1 = "Hydrostatics and Mechanics" by AEE Mc Kenzie 1934,
Edition of 1953, pages 71 and 72;

D4 = DE-C- 281 977

D5 = GB-A- 169 201

D6 = GB-A-2 003 990

D7 = GB-A-2 040 361.

- III. By interlocutory decision dispatched on 14 September 1989 the Opposition Division maintained the European patent in an amended form on the basis of four claims filed with the letter of 1 December 1987.
- IV. On 30 October 1989 the Appellant (Opponent) lodged an appeal against the decision, paying the appeal fee simultaneously. The Statement of Grounds was received on 9 January 1990. The appeal was based on documents D1, D4, D5, D6 and D7 intending to prove that the subject-matter of the European patent was not patentable within the terms of Articles 52 to 57 EPC.

The Appellant filed with his letter of 6 August 1992 a copy of the patent specification GB-B-2 040 361, published on 13 April 1983, which shows in Figure 2 a corrected version of the valve 12 in the piston between the upper and lower chambers.

In his written statements the Appellant stresses that according to the wording of Claim 1 the inlet of the inlet chamber may or may not be provided with a non-return valve and that by the word "main pumping chamber" in Claim 1 a second pumping chamber is included.

The closest prior art is in the Appellant's opinion described in documents D6 and D7.

The Appellant further argues that the technical problem to be solved has never been clearly set out by the Respondent and in this respect draws attention, besides other Board of appeal decisions, mainly to the decision T 26/81. In the Appellant's view the problem might be the obtaining of greater efficiency, and/or suitability for fitment to an engine casing, and/or simpler/cheaper construction, compactness, a reduction in the need for close control tolerances.

The Appellant points out that the drawings of document D7 are stated to be diagrammatic and that the skilled man would know how to obtain pumping efficiency and would understand that dead space needs to be minimised. When the pump disclosed in document D7 is in series mode, the pump equates with all the features of Claim 1 of the disputed patent, save for the location of the return spring in the inlet chamber. Document D6 however shows a return spring in the exhaust chamber. No surprising effect can be seen in placing the spring in the inlet chamber of the pump disclosed in document D7. Furthermore, single chamber

operation clearly is discussed in document D6. Therefore, in the Appellant's opinion the subject-matter of Claim 1 does not involve an inventive step.

V. Oral proceedings took place on 16 September 1992. Nobody was present on behalf of the Appellant. In his letter of 20 August 1992 the Appellant informed the Board that he did not wish to be present at the oral proceedings. The oral proceedings therefore were held without him (Rule 71(2) EPC).

VI. The Respondent (Patentee) filed new Claims 1 and 2 and an amended description during the oral proceedings.

The amended description comprises the following documents:

Column 1 to column 4, line 4, of the European patent specification No. 0 066 407 with amendments made in columns 1 to 3;

pages 2 and 2a to replace the part of the description in column 1, line 30, beginning with the word "valve", to line 55, ending with the word "chamber".

Claim 1 reads as follows:

"A reciprocating exhauster for mounting on the engine casing of a motor vehicle to be driven by the engine and comprising a pump member (C) working in a cylinder body (G) so as to define on opposite sides thereof an inlet chamber having an inlet (S) for connection to a vacuum reservoir and an exhaust chamber having an outlet fitted with an exhaust valve (K) on the side of the exhaust chamber remote from the pump member, and a valve (B) arranged to permit fluid to flow from the inlet chamber

to the exhaust chamber, the pump member (C) being driven in one direction by a push rod (A) against the action of a return spring (H) disposed in one of the chambers of the cylinder body, which spring (H) drives the pump member (C) in the return direction, the push rod (A) passing through the other chamber without the spring and the pump member (C) and the cylinder body (G) being so shaped that the clearance volume of said chamber without the spring is minimised and said chamber constitutes the main pumping chamber whereas the chamber with the spring comprises a large clearance volume chamber, characterised in that the main pumping chamber is the exhaust chamber, the exhaust valve (K) and the side of the exhaust chamber remote from the pump member are adapted for direct discharge into the interior of the engine casing, and the valve (B) arranged to permit fluid flow from the inlet chamber to the exhaust chamber is a flap valve."

The Respondent contests the arguments of the Appellant and is of the opinion that the subject-matter as now defined in Claim 1 involves an inventive step, since neither document D6 nor document D7, taken individually or in combination, suggests to the person skilled in the art to design a reciprocating exhauster for mounting on an engine casing of a motor vehicle according to Claim 1 which overcomes the disadvantages of the prior art assemblies mentioned in the description of the patent in suit. The Respondent points out that the inventive exhauster differs from known exhausters among other things by the valve between the inlet and outlet chambers of the cylinder body being a flap valve in the invention. In the opinion of the Respondent a flap valve has a negligible self closing spring effect. A spring effect however would be necessary in the exhausters of documents D6 and D7.

VII. The Appellant requests that the decision under appeal be set aside and that the European patent No. 0 066 407 be revoked.

The Respondent requests that the decision be set aside and that the patent be maintained on the basis of the documents specified in above paragraph VI and the drawings, Figures 1 to 5 of the European patent specification No. 0 066 407.

Reasons for the Decision

1. Admissibility of the Appeal

The Appeal is in accordance with Articles 106 to 108 and Rule 64 EPC and is admissible.

2. Amendments

2.1 The amendments made to Claim 1 during the oral proceedings relate only to features which were already part of the claims examined in the interlocutory decision of the Opposition Division and to further clarifications.

2.2 The Board is of the opinion that the amendments made are admissible with regard to Article 123(2) EPC.

2.2.1 Claim 1

The positioning of the exhaust valve on the side of the exhaust chamber remote from the pump is disclosed in the original description page 5, last lines of the second paragraph and in original Figures 1, 4 and 5. This feature was the feature of Claim 2 of the documents on which the

interlocutory decision of the Opposition Division was based.

The positioning of the push rod and the return spring is disclosed in the original Claim 2 and in the original Figures 1, 4 and 5 as well as in Claim 2 of the published patent specification No. 0 066 407.

The main pumping chamber is already mentioned in the original description page 7, line 2 and the high, i.e. large, clearance volume inlet chamber is described in the original description, page 5, second paragraph. It was attempted to express these features in Claim 1 discussed in the interlocutory decision by the wording "in that the exhaust chamber only is formed with minimum clearance volume".

It is derivable from the original Claim 5 and the original Figures 1, 4 and 5 that the exhaust valve and the side of the exhaust chamber remote from the pump member are adapted for direct discharge into the interior of the engine casing. This feature furthermore is part of Claim 4 discussed in the interlocutory decision.

The flap valve is shown in original Figures 1, 2, 4 and 5 and described in the original description on page 6, second paragraph, and restricts the protection conferred by Claim 1 discussed in the interlocutory decision.

2.2.2 Claim 2 comprises the features of the original Claim 4 on which the granted Claim 4 was based.

2.2.3 The amendments to the description only relate to the state of the art known from document D7 and to the amended claims.

2.3 Claim 1 comprises all the features of granted Claim 1 (see the published patent specification EP-0 066 407) and additional features including the features of the granted Claim 2 which restrict the protection conferred in granted Claim 1 so that Article 123(3) EPC is not violated.

3. Closest prior art and novelty

3.1 The Board shares the opinion of the Respondent that document D6 describes the closest prior art, since this document discloses an exhauster with a minimised clearance volume chamber and a large clearance volume chamber. The basic idea of the exhauster of document D7 on the other hand is the possibility to change from a parallel operation mode to a series operation mode and therefore both chambers need low clearance volumes. Document D7 therefore discloses an exhauster having a different concept.

The pre-characterising portion of Claim 1 of the patent in suit therefore is derived from the vehicle engine mounted vacuum pump disclosed in document D6.

3.2 The essential differences between the subject-matter of Claim 1 and the exhauster known from document D6 are the positioning of the main pumping chamber, which is the low clearance volume chamber, at the exhaust side of the pump and the exhaust valve and the side of the exhaust chamber remote from the pump member being adapted for direct discharge into the interior of the engine casing.

Document D5 which describes vacuum pumps particularly for use with condenser systems and document D7 as mentioned above in paragraph 3.1, both disclose exhausters in which the two pumping chambers need about the same high volumetric efficiencies and therefore both chambers need

low clearance volumes. No piston return spring is provided in these pumping chambers. Document D4 discloses an exhauster with two pistons. Only the second piston comprises a valve which allows air to flow from an inlet chamber into an outlet chamber. Document D1 describes, in general, exhausters with one or two pumping chambers. A spring in the inlet chamber is not present either in the exhauster of document D4 or in the exhauster of document D1.

The other prior art documents cited during the opposition proceedings are less relevant than the documents discussed above.

The subject-matter of Claim 1 therefore is novel within the meaning of Article 54 EPC.

4. Technical problem to be solved and solution

4.1 In the exhauster known from the closest prior art, described in document D6, the chamber with the low clearance volume is positioned adjacent to the pump actuating device i.e. piston rod and cam, whereas the exhaust chamber is positioned on the side of the piston member remote from that actuating device. The exhaust chamber comprises an actuating spring and is the chamber with the high clearance volume. The purpose of this exhaust chamber is to suppress the noise generated.

The advantages of the reciprocating exhauster of the patent in suit over the exhauster known from document D6 therefore are that the exhausted air can be discharged directly into the engine crankcase and that the exhauster can be constructed more compactly.

It follows from the description of the patent in suit (cf. column 2, lines 12 to 31) and from the submissions of the Respondent during the oral proceedings that the technical problem to be solved by the invention is to provide a reciprocating exhauster which is able to discharge exhausted air directly into the engine crankcase, and which allows a very compact construction.

- 4.2 The problem is solved by the subject-matter of Claim 1. With the main pumping chamber being the exhaust chamber and the exhaust valve and the side of the exhaust chamber remote from the pump member being adapted for direct discharge into the interior of the engine casing, it is possible to connect the exhauster onto the engine casing so that it exhausts air directly into the engine casing without the necessity of a long connection pipe or a noise reducing chamber. Furthermore, the push rod passing through the exhaust chamber can directly extend into the engine casing onto the actuating device therein.
- 4.3 Therefore, the above reasons are fully in line with the Technical Board decision T 26/81 cited by the Appellant which states that the invention should be disclosed in such terms that the technical problem and its solution can be understood.

5. Inventive step

- 5.1 According to the wording of Claim 1 it is not of importance for the examination of the claim whether a non-return valve is provided or is not provided in the inlet of the inlet chamber. Therefore, prior art documents showing an exhauster with a non-return valve in the inlet to the inlet chamber can be as pertinent as those without such a non-return valve.

The Board further wishes to emphasise that for a person skilled in the art the meaning of the expression "main pumping chamber" is unequivocally clear and furthermore clearly defined in Claim 1, namely it is that pumping chamber which guarantees that the desired vacuum can be obtained, and which will normally be the chamber with the lowest clearance volume.

- 5.2 The most relevant state of the art known from document D6 discloses a reciprocating exhauster in which the spring chamber is the exhaust chamber. This spring chamber mainly is provided for sound suppressing purposes. Even when the skilled man takes into account the technical content of document D7 he does not arrive at the subject-matter of Claim 1. Indeed, document D7 discloses an exhauster with two pumping chambers in a cylinder. These chambers operate first in parallel and later in series. Since the intention of this known device is to provide a vacuum pump which, without excessive power consumption, rapidly builds up adequate suction in the vacuum tank it is obvious for a person skilled in the art to provide both chambers with a low clearance volume in order to attain the necessary efficiency during parallel operation. The piston return spring of this known vacuum pump is located outside the pumping chambers. The provision of the return spring inside one of the pumping chambers would lead to a large clearance volume in this spring chamber which would consequently diminish the effectiveness of the pump during the parallel pumping mode and would therefore be in contradiction to the basic idea of this known exhauster. With the knowledge of document D7 it would be obvious to provide two pumping chambers with low clearance volumes and to position the spring outside the pumping chambers. Even if, stimulated by document D7, the skilled man were to recognise that an additional noise suppressing chamber is not necessary if the exhauster of document D6 expels

the air from the pumping chamber directly into the crank case then it would be more likely for him to keep the low clearance volume chamber as the inlet chamber and to expel the air of this chamber directly into the crank case.

There is no basis, either in document D6 or in document D7 or in any one of the other documents D1, D4 or D5 cited during the present appeal which could lead to an exhauster with the inlet chamber being the large clearance volume chamber comprising the return spring therein and the outlet chamber being the main pumping chamber with minimised clearance volume. Document D4 describes a vacuum pump with two pistons (G, L) in which the second piston (L) with a valve therein defines an inlet (B) and an outlet chamber. This inlet chamber is a preliminary vacuum chamber (B). The main vacuum chamber is provided in the cylinder portion with the first piston (G). No piston return spring is shown or described in document D4. According to the description of this document the second piston (L) is close to the end wall of the inlet chamber at its one end position (page 2, lines 66 to 72). Therefore, an inlet chamber with a large clearance volume and with a spring therein cannot be derived from this document D4. Document D5 describes a vacuum pump with two pumping chambers. This pump which is particularly for use with condenser systems must be capable of maintaining a high vacuum. Both pumping chambers therefore are low clearance volume chambers. Document D1 which discloses the basic idea of a single chamber and a double chamber vacuum pump does not give any details with respect to the clearance volume of the inlet chamber and of the outlet chamber.

The prior art documents under discussion in this appeal therefore cannot lead either separately or in combination to the exhauster of Claim 1. The use of flap valves in

pumps apparently is part of the normal knowledge of the skilled man in this technical field. This feature however is not needed to support the presence of inventive step.

- 5.3 The argument of the Appellant that it is obvious for a person skilled in the art to reverse the direction of the gas flow through the vacuum pump according to document D6 cannot be accepted by the Board. Indeed each of the two working chambers (37 and 38) has its own specific purpose which depends mainly on the specific location of the chamber with respect to the other. The first chamber (37), having a clearance volume as small as possible, provides the high pumping efficiency, whereas the second chamber (38) having a much greater clearance volume than that of the first chamber provides a substantial noise reduction, which noise would otherwise be created during the period of air discharge through the outlet valves of the first chamber (page 2, lines 64 to 108). Reversing the gas flow through the two chambers would therefore not be obvious for a person skilled in the art since the chamber which was intended to reduce noise would be located upstream of the place where the noise would be created, i.e. the outlet valve of the chamber with the small clearance volume.
- 5.4 The subject-matter of Claim 1 therefore involves an inventive step within the meaning of Article 56 EPC.
6. In view of the above, the patent in suit can be maintained on the basis of the Respondent's request, i.e. the independent Claim 1, the dependent Claim 2, the amended description and the granted figures.
7. The Appellant chose not to avail himself of the opportunity to take part in the oral proceedings.

Therefore, a communication under Rule 58(4) EPC was not necessary in the present case (see Decision T 219/83, OJ EPO 1986, 211) since the oral proceedings gave the Respondent and also the Appellant, had he been present, adequate opportunity to comment therein on the current set of amended documents of the patent in suit i.e. on the proposal to maintain the patent in suit in amended form.

8. Although the Appellant was not present at the oral proceedings the Board was able to take a decision for the following reasons:
 - 8.1 As is stated in the decision T 435/89 of 10 June 1992, a party voluntarily not taking part in an oral proceedings renounces his right to be heard. Therefore the Board was able to take a final decision based on all grounds and evidence discussed in the oral proceedings without contravening Article 113(1) EPC.
 - 8.2 In the present case, no other conclusion can be drawn from decision T 484/90 of 21 October 1991 partly deviating from T 435/89 cited above. As explained in decision T 484/90 under points 6 and 7 of the reasons the party voluntarily not taking part in the oral proceedings does not renounce his right to be heard given by Article 113(1) EPC unless he has so declared explicitly. However, as is also stated in this decision, a violation of Article 113(1) EPC may be considered only if during the oral proceedings grounds and evidence are presented which were previously not known to the absent party.
 - 8.3 In the present case both the grounds on which the Appellant had opposed the patent (novelty and inventive step) and the documents representing the state of art were the same as before the oral proceedings and insofar were known to the Appellant.

Furthermore, since the amendments made to Claim 1 during the oral proceedings relate only to features which were already part of the claims examined in the interlocutory decision of the Opposition Division and to further clarifications (above section 2), it cannot be considered that the Appellant would be surprised thereby since he must have realised that it is always possible to combine already existing claims resulting in a further limitation of the scope of protection.

Therefore, according to both decisions cited above the Board could decide finally without giving the Appellant the opportunity to comment on the results of the oral proceedings.

Order

For these reasons, it is decided that:

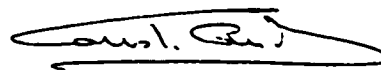
1. The decision of the Opposition Division is set aside.
2. The case is remitted to the first instance with the order to maintain the patent with the documents cited in the above sections VI and VII.

The Registrar:



N. Maslin

The Chairman:



C. Andries

