Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 29 April 2020

Case Number: T 0433/18 - 3.2.04

Application Number: 06745359.7

Publication Number: 1888920

IPC: F04C29/12, F04C2/344

Language of the proceedings: EN

Title of invention:
VACUUM PUMP FOR VEHICLE MOTORS AND A ONE-WAY VALVE FOR SAID VACUUM PUMP

Patent Proprietor:
O.M.P. Officine Mazzocco Pagnoni S.r.l.

Opponent:
Pierburg Pump Technology GmbH

Headword:

Relevant legal provisions:
EPC Art. 100(b), 83

Keyword:
Grounds for opposition - insufficiency of disclosure (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 0433/18 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 29 April 2020

Appellant: (Opponent)	Pierburg Pump Technology GmbH Alfred-Pierburg-Str. 1 41460 Neuss (DE)
Representative:	terpatent Patentanwälte ter Smitten Eberlein-Van Hoof Rütten Daubert Partnerschaftsgesellschaft mbB Burgunderstraße 29 40549 Düsseldorf (DE)
Respondent: (Patent Proprietor)	O.M.P. Officine Mazzocco Pagnoni S.r.l. Via Marzabotto, 71/73 40050 Funo (Bologna) (IT)
Representative:	Porta & Consulenti Associati S.p.A. Via Vittoria Colonna, 4 20149 Milano (IT)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 3 January 2018 rejecting the opposition filed against European patent No. 1888920 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	A. de Vries
Members:	S. Oechsner de Coninck
	W. Van der Eijk

Summary of Facts and Submissions

I. By its decision dated 3 January 2018 the opposition division rejected the opposition against the European patent No. 1 888 920. On 13 February 2018 the appellant-opponent filed an appeal and paid the appeal fee simultaneously. The statement setting out the grounds of appeal was filed on 3 May 2018.

II. The opposition division held that the grounds for opposition mentioned in Article 100 (a) together with Articles 54 and 56 and Article 100 (b) EPC did not prejudice the maintenance of the granted patent having in particular regard to the following documents:

D1: EP 1 766 239 B1
D2: DE 41 07 720 A1
D4: DE 40 19 854 B4
D5: DE 196 14 329 A1

III. The appellant (opponent) requests that the decision under appeal be set aside, and that the European patent be revoked. Oral proceedings are not requested.

IV. The respondent (patent proprietor) requests dismissal of the appeal, alternatively to maintain the patent on the basis of an auxiliary request filed on 27 September 2018.

V. Oral proceedings set for 7 October 2020 were cancelled upon issue of this decision.

VI. The independent claim 1 according to the main request (as granted) is as follows:

"Vacuum pump (1) for vehicle motors, comprising:
a stator (2);
a chamber (3) defined within said stator (2);
at least one vane (4) rotatably mounted inside said chamber (3) and which can be operated to generate a depression;
wherein said stator (2) comprises:
at least one air inlet opening;
at least one oil inlet opening;
a first discharge opening (30);
a first one-way valve (35) operating on said first discharge opening (30);
at least one second discharge opening (50) separate from said first discharge opening (30);
at least one second one-way valve (55) operating on said at least one second discharge opening (50);
wherein said at least one second discharge opening (50) is dimensioned to discharge the corresponding oil flow rate introduced into said chamber (3) at each rotation of said vane (4); characterised in that
said at least one second discharge opening (50) has a size such that it is completely occupied by the oil flow rate discharged at each rotation of said vane (4)."

VII. The appellant argues as follows:
- The patent does not disclose how the skilled person can determine a size of the second discharge opening such that it is completely occupied by the oil flow rate. The patent does not disclose any practical example of how such sizing can be performed for a second discharge opening. Without any guidance in that respect, the skilled person cannot realise the claimed discharge opening without undue burden.
- Since the features concerning the discharge opening do not imply any clear structural limitation, they can

be disregarded. Therefore any vacuum pump having two discharge ports with an associated valve as in D1,D2,D4 or D5 falls under the scope of claim 1.

VIII. The respondent argues as follows:
- The skilled person is able to provide the required dimension for the second discharge port using normal skills based on knowledge of the operational range of a particular vacuum pump from basic design calculations.
- The appellant does not argue that D1,D2,D4 or D5 discloses all the features of claim 1, but merely submits that the functional limitations of claim 1 should be disregarded.

Reasons for the Decision

1. The appeal is admissible.

2. Background
The patent concerns a vacuum pump for vehicle motors, in particular for the servo brake system of the vehicle motor (paragraph [0001]). It is sought to overcome problems identified in the prior art solutions, due to the fact that the air and oil discharge have very different characteristics (paragraph [0009]).
Starting from the consideration that in vacuum pumps the discharge opening and the one-way valve are dimensioned so as to ensure that the air is evacuated very rapidly (paragraph [0010]), the objective technical problem appears two-fold: ensuring sufficient oil evacuation at low motor operation regimes of the vehicle: the oil exits from the pumping chamber in an intermittent manner and at high pressures, causing high fatigue stress on the blade valve (paragraph [0011]). At high motor operation

regimes on the other hand, oil is discharged continuously and the blade valve is continuously in an open state, which could allow undesirable back-flow of air from the exterior into the vacuum pump chamber (paragraph [0012]).

The claimed solution to these problems provides a physical and functional separation between the air discharge and the oil discharge (paragraph [0016]). This is broadly realised by a second one-way valve closing a second discharge opening that is dimensioned according to the final two features of claim 1 to discharge the corresponding oil flow rate introduced into said chamber at each rotation of said vane, and that has a size such that it is completely occupied by the oil flow rate discharged at each rotation of said vane. Thus the second discharge opening is effectively dimensioned so as to discharge only oil during operation.

3. Sufficiency - Article 100 b) EPC

3.1 The appellant challenges these functional limitations defined in claim 1 on the grounds of sufficiency, and more particularly disputes the possibility for the skilled person to realise without undue burden a second discharge opening dimensioned to discharge the corresponding oil flow rate introduced into said chamber at each rotation of said vane, and with a size such that it is completely occupied by the oil flow rate discharged at each rotation of said vane.

3.2 It is well established by the case law of the Boards of Appeal that sufficiency of disclosure within the meaning of Article 100(b) EPC must be assessed on the basis of the patent as a whole, including the

description and the figures (Case Law of the Boards of Appeal, 9th edition 2019 (CLBA), II.C.3.1). Moreover, the disclosure is aimed at the skilled person, who may use their common general knowledge to supplement the information contained in the patent (CLBA II.C.4.1).

3.3 Using the above standard for sufficiency the Board has no doubt that the skilled person reading the whole content of the patent, where necessary supplemented by common knowledge in the design of vane vacuum pumps such as used in vehicles, would know how to dimension the discharge opening to meet the requirements of the two final features of claim 1.

3.4 The patent discloses in paragraph [0016] how the core idea of effecting physical and functional separation between air discharge and oil discharge should be realised in a vacuum pump. To that effect the first discharge opening with associated one way valve is dimensioned according to the amount of air to be discharged, while the other discharge opening and one way valve is dimensioned according to the oil flow rate to be discharged. This oil flow rate to be discharged is further specified in parentheses as that "introduced into the vacuum pump chamber at each rotation" (paragraph [0016], lines 50-51). The size of the discharge opening to be provided according to claim 1 is expressed in paragraphs [0021] and [0032] to be such that it is completely occupied by the oil flow rate discharged at each vane rotation. Thus the entire oil flow rate that enters the pumping chamber at each rotation should then be fully exhausted at each rotation through the discharge port. For a given vacuum pump, the oil flow rate varies between a maximum value and a minimum value depending on the regime of the engine that drives it as already mentioned above in

relation to paragraphs [0010] and [0011] of the patent. These represent boundary operating conditions for that pump.

3.5 In the Board's view sizing a discharge opening as a function of known boundary operating conditions for a given vacuum pump is routine design practice and belongs to the skilled person's standard activity, as argued by the respondent in their reply, paragraphs [0031] to [0049]. Thus, the skilled person, a technician specialised in the design of vacuum pumps, should normally know the peak operating conditions, when the pump operates at high speeds and high vacuum conditions, as well as the idle operating conditions where the pump driven by the vehicle motor operates at a lower suction condition. These boundary operating conditions concerning the amount of air processed by the vacuum pump as a function of its speed also correspond to an associated oil flow rate fed to the vacuum pump and entering the pumping chamber through the (at least one) oil inlet opening in such conditions.

3.6 The appellant questions the probative value of the example of calculations of opening size that complies with claim 1 presented by the respondent during oral proceedings before the opposition division and detailed in their reply. More particularly, they contest the way the volume of the discharge opening is calculated as a function of the cited values of oil flow within the pump chamber.

3.7 According to established case law the objection of lack of sufficient disclosure presupposes that there are serious doubts, substantiated by verifiable facts. The burden of proof is upon an opponent to establish on the

balance of probabilities that a skilled reader of the patent, using his common general knowledge, would be unable to carry out the invention (CLBA, 9th edition, 2019, II.C.9).

3.8 The Board has no reason to doubt that the skilled person is able to determine an oil opening size capable of evacuating the oil flow rate such that it completely occupies the discharge port, according to the respondent's illustrative numerical example. Thus, the Board considers the values given and calculations made in paragraphs [0035] to [0049] to be reasonable and realistic assumptions and to produce realistic estimates of oil discharge flow rates in such a pump in normal operating conditions. More particularly, it considers the calculations presented there to be entirely plausible and straightforward and based on basic fluid flow considerations that belong to common knowledge in the present field as well as normal operating conditions of a vehicle motor vane pump. Thus, for the discharge opening to be completely occupied by the oil flow discharged at each rotation of the vane, the volume contained with the opening (product of wall thickness and opening cross-section) should at least equal the minimum volume of oil entering the pumping chamber in one revolution of the rotor at low speed, as explained in paragraph [044] of the respondent's reply.

3.9 The appellant's main contention in this regard is that it would not be scientifically possible based on the underlying physics to derive a constant opening size without knowledge of the variation in the essential parameters temperature and viscosity. In the Board's understanding, and as pointed out by the respondent in their reply, paragraphs [0048] and [0049], the

lubricant quality and associated viscosity vary little within the operational temperature range of a vacuum pump. The exact value of these parameters or the small variation is thus not seen to be of any hindrance to the skilled person when determining the required oil opening size. Furthermore, such parameters - temperature, lubricant quality and viscosity - belong to the set of design parameters that the skilled person takes into account when dimensioning (possibly with the aid of a design computer) an oil lubrication system.

3.10 The further argument of the appellant that a discharge opening with a fixed geometry would be unable to achieve the claimed result in all operating conditions, cannot be followed. Indeed as also observed by the respondent in paragraph [0043], a discharge opening completely filled by a certain discharge volume of oil (e.g. 100mm3) would certainly be fully occupied if the discharge volume is even larger (e.g. 200mm3). In that case the larger volume of oil will be discharged during a longer opening time of the one way valve closing the second discharge port (see also paragraph [0045] of the respondent's reply).

3.11 In view of the above, the Board does not see any reason to seriously doubt that the skilled person reading the disclosure of the patent would be able to dimension a second discharge opening according to the oil flow rate as defined by claim 1. The Board thus confirms the opposition division's positive assessment of sufficiency, Article 100(b) EPC.

4. Novelty.

4.1 As also noted by the respondent, see reply at paragraph [0054], the appellant acknowledges in section 4, last paragraph of their statement of the grounds of appeal, that the cited documents D1, D2, D4 and D5 do not disclose the desired result as expressed in final two features of claim 1. The argument is that as these features do not imply any (realizable or invariable) structural limitation, they should be disregarded, and for this reason the cited prior art would then be novelty destroying.

4.2 As is evident from the above, should the Board find that these features do define clear and invariable limitations that can be carried out by the skilled person, novelty must be given, see also the reply of the respondent, paragraph [0053]. This is indeed the case, as is evident from the discussion in section 3 above, and thus the question of novelty is moot.

4.3 Hence the Board has no reason to deviate from the opposition division's positive finding of novelty with respect to D1,D2,D4 or D5.

5. In the light of the above, the Board confirms the opposition division's decision to reject the opposition, Article 101(2) EPC. Thus there is no need for the Board to consider the respondent's auxiliary request.

Order

For these reasons it is decided that:

The appeal is dismissed

The Registrar: The Chairman:

G. Magouliotis A. de Vries

Decision electronically authenticated