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**Datasheet for the decision
of 16 November 2020**

Case Number: T 0371/19 - 3.2.04

Application Number: 10158810.1

Publication Number: 2375073

IPC: F04C15/00, F04C14/22

Language of the proceedings: EN

Title of invention:

Sealing for the control chamber of a variable displacement
lubricant pump

Applicant:

Pierburg Pump Technology GmbH

Headword:

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - (yes) - could-would approach

Decisions cited:

Catchword:



Beschwerdekammern
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Chambres de recours

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Case Number: T 0371/19 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 16 November 2020

Appellant: Pierburg Pump Technology GmbH
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Representative: ter Smitten, Hans
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 19 September
2018 refusing European patent application No.
10158810.1 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman C. Kujat
Members: S. Oechsner de Coninck
C. Heath

Summary of Facts and Submissions

- I. The appeal lies from the decision of the examining division of the European Patent Office, posted on 19 September 2018 concerning refusal of the European Patent Application No. 10.158810.1 pursuant to Article 97(2) EPC.
- II. The applicant as appellant lodged an appeal against this decision, which was received on 7 November 2018, and simultaneously paid the appeal fee. The statement setting out the grounds of appeal was received on 25 January 2019.
- III. The examining division held that the subject-matter of claim 1 of the sole and main request filed with telefax on 10 October 2012 did not involve an inventive step. It concluded that the application and the invention to which it related, did not meet the requirements of the EPC, having regard to the following pieces of evidence:
- D1: US 2007/224 067 A1
D2: US 2008/308 062 A1
D3: WO 2006/045 190 A1
D4: US 4 531 893 A
D5: US 2008/099 270 A1
D6: US 5 518 380 A
D7: WO 01/06 095 A2
- IV. The appellant requests that the decision is set aside and that a patent is granted based on the main request filed with filed with letter of 20 October 2020.

V. Independent claim 1 according to that request reads as follows (the addition with regard to the request underlying the impugned decision underlined by the board):

"Variable displacement lubricant pump (10) with a housing (12), a shiftable control ring (14) inside the housing (12), and a seal (16) sealing a control chamber (20, 22) defined by the housing (12) and the control ring (14), whereby the seal (16) comprises a stiff bar (17) and an elastomeric stripe (18) fixed to the stiff bar (17), the stiff bar (17) is sliding at the housing (12), the elastomeric stripe (18) of the seal (16) is attached to the control ring (14), the stiff bar (17) is a metal bar, and the elastomeric stripe (18) is fixed and co-molded to the sliding stiff bar (17)."

VI. The appellant argued as follows:
The subject matter of independent claim 1 involves an inventive step. Therefore, the refusal of the application by the examining division should be set aside, and a patent should be granted based on the request filed with letter of 20 October 2020.

Reasons for the Decision

1. The appeal is admissible.

2. *Background*

The invention concerns a variable displacement lubricant pump with a seal sealing a control chamber defined by the pump housing and a control ring of the variable displacement pump. The seal comprises a stiff metal bar and an elastomeric stripe fixed and co-moulded to the the stiff bar, wherein the elastomeric stripe is attached to the control ring such that the stiff bar is sliding at the housing. The contact between the stiff metal bar and the metal housing of the lubricant pump provides a good sealing property and a good long time durability. Further, the co-moulding of the elastomeric part and the stiff part provides a one-piece seal which is fluid-tight and strong enough to withstand the wear of the relative motion (application, page 2, lines 25 to 28 and page 3, lines 1-3).

3. *Amendments*

Independent claim 1 filed with the statement setting out the grounds for appeal differs from claim 1 underlying the impugned decision by the insertion of "is fixed" in the last feature. The amendments in said claim were not objected to by the examining division, and the Board is also satisfied that it does not contain any unallowable amendment. In particular, claim 1 is based on original claims 1, 3 and 6, with the further feature "is fixed" taken from page 2, line 5 of the original description. The amendments therefore meet the requirements of Article 123(2) EPC.

4. *Inventive step*

4.1 Apart from the insertion of "is fixed", present claim 1 is identical with claim 1 underlying the impugned decision. Therefore, the finding that the subject-matter of claim 1 does not involve an inventive step in the impugned decision is also presumed to hold for claim 1 in appeal. The applicant as appellant disputes this finding.

4.2 It is common ground that document D1 forms a suitable starting point for assessing inventive step. Likewise, it is undisputed that D1 discloses a variable displacement lubricant pump with a housing (10), a shiftable control ring (12) inside the housing, and a seal (24, 25) sealing a control chamber (22, 23) defined by the housing and the control ring, whereby the seal comprises a stiff bar (24, 25) and a resilient stripe (29, 30), the stiff bar is sliding at the housing, and the stripe of the seal is attached to the control ring (reference numerals refer to the lubricant pump shown in figure 1).

4.3 It is also undisputed that the distinguishing features over D1 are that the stiff bar is a metal bar, and that an elastomeric stripe is fixed and co-moulded to the sliding stiff bar.

In a first step, the Board must formulate the objective technical problem. According to the application, the contact between the stiff metal bar and the metal housing of the lubricant pump provides a good sealing property and a good long time durability (page 2, lines 25 to 28). Further, the co-moulding of the elastomeric part and the stiff part provides a one-piece seal which

is fluid-tight and strong enough to withstand the wear of the relative motion (page 3, lines 1-3). The objective technical problem underlying these features may therefore be regarded as improving the seal contact interface (impugned decision, page 3, third paragraph), or as improving the lifetime sealing quality (statement setting out the grounds, page 3, third full paragraph).

- 4.4 In a second step, the Board must now examine whether a skilled person would as a matter of obviousness combine the teachings of any of the documents D1 to D6 and D7 in order to arrive at a variable displacement lubricant pump in which the seal comprises a stiff metal bar and an elastomeric stripe fixed and co-moulded thereto.

In accordance with established jurisprudence, the boards of appeal apply the "could-would approach". This means asking not whether the skilled person could have carried out the invention, but whether he would have done so in the hope of solving the underlying technical problem (CLBA, I.D.5).

- 4.4.1 In the present case, document D7 discloses stationary seals 218-220 made of steel. These seals are positioned about the inside surface of a housing, and pushed against a rotor by a sponge rubber or closed cell neoprene spring (page 11, lines 6-16; figure 2). It is common ground that these materials may be considered an elastomeric stripe. Therefore it can be argued that the skilled person could have arrived at a seal comprising a stiff metal bar and an elastomeric stripe by modifying the prior art, i.e. by combining the teachings of D1 and D7.

However, the Board is not convinced that the skilled person would consider the teaching of document D7 that

relates to a completely different technical context, namely the field of naval technology. More specifically, the rotor in D7 does not belong to a lubricant pump for an engine, but to a turbine for naval applications (page 1, line 8; confirmed by the term "overboard" in the bottom right corner of figure 1). Further, unlike rotor 13 of D1, which is mechanically connected to a drive shaft, rotor 166 of D7 is driven by induced drag resulting from a working fluid jetted from a nozzle (D1, paragraphs 9 and 39; D7, page 12, lines 26-32). Furthermore, the primary purpose of the lubricant pump according to D1 is feeding oil at increased pressure to an engine, while the turbine of D7 is extracting energy from a working fluid during its expansion, thereby reducing the pressure of the working fluid (D1, paragraphs 2, 3, 26 and 28; D7: page 3, lines 17-19). Even further, the turbine of D7 does not allow for variable displacement within the meaning of the application. According to the application, control ring 14 can be shifted between a low and a high pump chamber volume position (page 4, lines 1 and 2). This principle is confirmed by the variable displacement pump of D1 (paragraphs 3 and 32). The impugned decision does not contain any reasoning as to why the examining division considered D7 to disclose a variable displacement type turbine (decision, page 4, first paragraph). The Board is not convinced that it does, since the turbine of D7 only has a constant displacement at a given operation point (see the constant volume of cavities 206-208 in figure 2). The varying volumes of suction cavities 226-228 and pressure cavities 230-232 do not alter that view, since they are required for pressurizing and expelling the working fluid to the outside, or for sucking the working fluid from the inside of the pump (page 11, lines 17-31), the stationary seals 218-220 bear against

a rotating surface and thus operate in a dynamic context different from the short path sliding contact necessary to adjust the displacement of a pump.

The Board therefore considers that the skilled person, starting from a variable displacement lubricant pump, would not look for the solution to the objective technical problem in the technical field of turbines for naval applications, i.e. in document D7.

4.4.2 Even if the skilled person were to consider D7, that document still does not disclose that the elastomeric stripe is fixed and co-moulded to the sliding stiff bar. In fact, an elastomeric stripe in the form of a sponge rubber or closed cell neoprene spring is disclosed in D7 as an alternative to a plurality of coil springs or leaf springs positioned under each stationary seal made of steel (page 11, lines 10-14). Without further details of the arrangement of these springs in D7, the Board has no reason to doubt that these springs are provided as separate entities, i.e. that they are not fixed to the stationary seals made of steel. The Board therefore does not see any motivation for the skilled person in D7 to fix the sponge rubber or closed cell neoprene spring to a stationary steel seal, let alone by co-moulding it thereto.

4.4.3 Thus, in the Board's view, the technical fields of D1 and D7 are too remote for the skilled person to contemplate combining their teachings to solve the objective technical problem as a matter of obviousness. Further, even a combination of D1 and D7 would not disclose all features of claim 1. Moreover, in the absence of any evidence to the contrary in the impugned decision, it is not apparent to the Board that co-moulding sponge rubber or closed cell neoprene to a

steel seal might be obvious *per se* in the light of common general knowledge.

- 4.5 Documents D2 to D6 are cited as alternative starting points in the impugned decision, each of these documents essentially disclosing a variable displacement lubricant pump having the same features as that of D1. A combination of any of these documents with D7 therefore does not render obvious the subject-matter of claim 1 for the reasons indicated above.
- 4.6 Summarizing the above, the Board holds that the subject-matter of claim 1 involves an inventive step, Article 56 EPC.
5. The Board is furthermore satisfied that the adapted description filed by the applicant with letters of 20 October 2020 and 27 October 2020 is in conformity with the claims and overcomes the clarity objections raised by the Board in its communication.

Order

For these reasons it is decided that:

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

Claims:

Claims 1 - 3 filed with letter of 20 October 2020,

Description:

Description pages 1 and 3 to 6 filed with letter of 20 October 2020,

Description page 2 filed with letter of 27 October 2020,

Drawings:

Drawing sheets 1/2-2/2 as originally filed.

The Registrar:

The Chairman:



G. Magouliotis

C. Kujat

Decision electronically authenticated