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**Datasheet for the decision
of 19 October 2017**

Case Number: T 1146/16 - 3.2.04

Application Number: 11724056.4

Publication Number: 2558724

IPC: F04C2/18

Language of the proceedings: EN

Title of invention:

GEAR PUMP WITH CONTINUOUS VARIABLE OUTPUT FLOW RATE

Applicant:

FIGURA, Pavol

Headword:

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - (yes)

Decisions cited:

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

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Case Number: T 1146/16 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 19 October 2017

Appellant: FIGURA, Pavol
(Applicant) Mateja Bela 4661/12
92101 Piestany (SK)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted on 21 December 2015 refusing European patent application No. 11724056.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman E. Frank
Members: S. Oechsner de Coninck
C. Heath

Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal, received on 4 February 2016 against the decision of the examining division, dispatched 21 December 2015 refusing the application N° 11724056.4. The appeal fee was paid the same day and the statement setting out the grounds of appeal was submitted on 27 April 2016.

The examining division held that the main request did not meet the requirements of Rule 137(5) EPC and the main and auxiliary requests did not meet the requirements of Article 56(1) EPC.

II. In a communication following the summons to oral proceedings, the Board gave its provisional opinion and inter alia stated that the auxiliary request as filed with the grounds of appeal was allowable.

III. The applicant submitted comments in a letter of 27 July 2017. In his last submission of 13 September 2017, the applicant requests to continue the proceedings in writing without oral proceedings on the basis of the auxiliary request.

IV. Cancellation of oral proceedings were dispatched on 15 September 2017.

V. The appellant requests that the decision under appeal be set aside, and that a patent be granted on the basis of claims 1 to 14 according to the main request (former auxiliary request filed on 27 April 2016 with the grounds of appeal).

VI. The wording of the independent claim 1 reads as follows:

"Gear pump with continuous variable output flow rate, where at least one first gear (3) is mounted on a first shaft (1), at least one second gear (4) is mounted on a second shaft (2), the first gear (3) and the second gear (4) are arranged axially movably against each other, the first gear (3) is sealed at one end by a first sealing (7) of the first gear (3) and at the other end by a second sealing (9) of the first gear (3), whereas sealings (7, 9) of the first gear (3) are arranged on the first shaft (1), the second gear (4) is sealed at one end by a first sealing (10) of the second gear (4) and at the other end by a second sealing (8) of the second gear (4), whereas sealings (10, 8) of the second gear (4) are arranged on the second shaft (2), characterized in that, the first gear (3) comprises a first ring (5) with flow passages (50), fitted on the first gear (3) tightly co-axially movably, the second gear (4) comprises a second ring (6) with flow passages (50), fitted on the second gear (4) tightly co-axially movably, whereas the first ring (5) is movable with the second gear (4) and the second ring (6) is movable with the first gear (3)."

VII. The applicant argues as follows:

- The subject-matter of claim 1 differs from D1 not only in that the sealing plates do not contain flow passages, but also in that the sealing plate 48 is located in a groove and cannot move axially.
- The correct technical effect associated with the distinguishing technical features is to balance the pressure separately in each inter-teeth space and the objective technical problem deriving therefrom is to provide a gear pump in which the output flow rate can be continuously increased or decreased.

- D2 teaches to attain uniform equalisation of pressure in the entire space of the motor via oil channels in the cage and when combined with D1 would not therefore lead to the pressure equalisation in each inter-teeth space as obtained by the flow passages of claim 1.

Reasons for the Decision

1. The appeal is admissible.

2. Amendments

The present application 11724056.4 was filed as an international application PCT/SK2011/0009 in the Slovak language. A translation into English of this international application was provided to the EPO, as prescribed by Article 14(2) EPC, that also provides that such translation may be brought into conformity with the application as filed throughout the proceedings.

The correction pursuant Art 14(2) EPC requested by the applicant adds the term "movably" in the characterising portion of claim 1 that was omitted from the translation of the expression from the Slovak language into English upon filing the application at the international bureau.

As visible in the originally filed figures 1,10, and 13, which are identical in the the translated application and the one in the Slovak language, the sealing rings 5 and 6 that mate the teeth of the gears indeed slide over the external surface of these gears 3,4, and are therefore axially movable on the teeth of these gears. This is also clearly derivable from e.g. page 8, lines 3-9 of the translated application as filed.

From the above the Board thus concludes that the requested correction pursuant Art 70(2) EPC, does not result in an unallowable extension under Art 123(2) EPC.

3. Novelty

The impugned decision did not question novelty, and the Board is also satisfied that none of the available cited documents discloses all the features of claim 1.

4. Inventive step

4.1 The document D1 (page 2, lines 37-78) discloses a gear pump with two gear wheels 24,26 and two sealing plates 46, 48 that are axially movable on each of the gear wheels 24,26. The gear 26 is axially movable relative to the driven gear 24 and thus provides variable delivery at constant gear wheel speeds dependent upon its position. As gear pump with variable delivery D1 can be considered as the closest prior art.

It is undisputed that the subject-matter of claim 1 differs from D1 in particular by each of the gear wheel being being provided with flow passages.

4.2 Technical problem

By providing flow passages in both rings, each one of them being axially movable with the opposite gear, the relative movement of the gears is facilitated which provides an improved volumetric variability in operation. The Board therefore agrees with the appellant that a corresponding technical problem to be solved can be formulated as quoted on page 1 of the

published application under "summary of invention", viz., to further improve variability of the output flow rate in a continuous manner.

- 4.3 D2 discloses a gear engine with variable speed and torque. An axially movable cage covering the teeth of a non translatable gear is provided with oil pressure balancing channels (see fig 1, claim 10).

At first, the Board is unconvinced that the skilled person striving to improve a gear pump with sealing rings of the type disclosed in D1, would obviously turn to a gear engine equipped with a cage as in D2. The basic considerations in terms of pressure difference between inlet and outlet, and the necessary sealing requirements differ substantially between an engine and a mainly volumetric pump with relatively smaller pressure difference. Moreover the cage 1 of the gear engine does not split the toothed gear between an active space receiving the working fluid from a inactive space behind the ring as in D1 and therefore serves a different purpose, rendering any implementation on such a ring unsuitable. For that reason the skilled person would not find it obvious to use the teaching of D2 as belonging to another category of devices.

Furthermore since the purpose of the longitudinal channels depicted in the cage is just mentioned as pressure equalising channel in claim 10 of D2, the skilled person even when considering this bare teaching would infer that they primarily serve to equalise pressure in terms of allowing the fluid trapped between the teeth to escape when the cage is translated over the corresponding gear. Therefore he would not find that teaching useful for providing a pressure

equalisation in operation. In fact another pressure equalisation is foreseen in D2 on both sides of the other gear but with another means, that is, a duct external to the housing is provided with two pressure balancing openings 9,10 on both sides of the other toothed gear 6 (see claim 8, figure 1). For that reason, the Board is convinced that even taking into account the teaching of D2, the skilled person would not find it obvious to adapt the channels of the cage to a ring according to D1, even less to both rings thereof.

4.4 The Board thus concludes that the subject-matter of claim 1 involves an inventive step having regard to the combination of the D1 and D2 (Articles 52(1) and 56 EPC).

4.5 Turning to the other available documents D3 to D7, quoted as "A" in the search report, they would not give a useful hint to improve the variability in operation of a gear pump. D3 discloses a gear pump but comprises two cup shaped axially movable sealing elements without any flow passage for pressure equalisation (Col 2, lines 32-59; fig 1,2). D4 discloses two rotor follower covers 7,8 as sealing elements instead of rings and are also without any flow passage (page 1, lines 23-31). D5 discloses a screw pump belonging to another type of apparatus with single adjustable wall 4 (page 1, lines 65-76). D6 describes a rotary gear pump for a cooling system without volume adjusting means (col 1, lines 1-4; figs 1-3). D7 also discloses an adjustable displacement gear pump with toothed complements 17, 30 also lacking flow channels ([44]-[48]). The Board is therefore satisfied that none of these teachings when combined with D1 would have lead in an obvious manner to a gear pump according to claim 1.

4.6 The dependent claims 2 to 14 define further features of the gear pump of claim 1. These claims therefore also comply with the requirements of novelty and inventive step, Article 52(1) with Articles 54(1) and 56 EPC.

5. Remittal

The Board has thus dealt with the main ground for refusing the main request raised by the examining division. However, the patent sought cannot be granted since the two-part form of the present claim 1, where considered appropriate, is not correctly drafted according to the requirements of Rule 43(1) EPC, which may prompt a further adaptation of the description pursuant Rule 42(1)(c) EPC. In view of the continuation in writing of the proceedings, the Board considers it expedient to exercise its discretion under Art 111(1) EPC to remit the case to the first instance for further prosecution, the more so as such deficiencies could rather easily be dealt with by the Examining Division by means of EPO Form 2035.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance for further prosecution on the basis of claims 1-14 of the main request (former auxiliary request filed on 27 April 2016).

The Registrar:

The Chairman:



G. Magouliotis

E. Frank

Decision electronically authenticated