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Datasheet for the decision of 16 October 2020

Case Number: T 2984/19 - 3.2.08

Application Number: 15803195.5

Publication Number: 3152466

IPC: F16H57/04, F16D23/06

Language of the proceedings: EN

Title of invention:
ARRANGEMENT IN A GEARBOX

Applicant:
Scania CV AB

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - amended claims (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 2984/19 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 16 October 2020

Appellant: (Applicant)	Scania CV AB 151 87 Södertälje (SE)
Representative:	Scania CV AB Patents, GP 117kv 151 87 Södertälje (SE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 9 July 2019 refusing European patent application No. 15803195.5 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	C. Herberhold
Members:	M. Foulger
	Y. Podbielski

Summary of Facts and Submissions

I. With the decision posted on 9 July 2019, the examining division refused European patent application No. 15803195.

II. They found that the subject-matter of claim 1 of the then valid main request lacked an inventive step in view of US 5,009,116 (D1).

III. With the statement setting out the grounds of appeal the appellant (applicant) requested that the decision under appeal be set aside and a patent be granted on the basis of the main request, or in the alternative on the basis of one of auxiliary requests 1 - 4.

IV. In response to the Board's communication pursuant to Rule 100(2) EPC, the appellant withdrew its then valid main request and auxiliary request 1 (see letter dated 29 September 2020).

V. Thus, the appellant requests that a patent be granted on the basis of the main request or in the alternative the first or second auxiliary request, referred to as the second, third and fourth auxiliary requests respectively in the statement setting out the grounds of appeal.

VI. Claim 1 of the currently valid main request reads:

"A gearbox comprising an arrangement, wherein the arrangement comprises a first shaft (4), a second shaft (3, 11), at least one gear set, which comprises a primary cogwheel (5-7) arranged on the first shaft (4) and a secondary cogwheel (12-14) arranged on the second

shaft (3, 11), wherein the primary cogwheel (5-7) and the secondary cogwheel (12-14) have teeth engaging (30-32) with each other, and wherein the arrangement comprises a first component (29a-d), which is arranged at a first side of the gear mesh (30-32) between the primary cogwheel (5-7) and the secondary cogwheel (12-14), said first component (29a-d) is comprised in a unit (19, 20), which is adapted to provide a rotational locking of the secondary cogwheel (12-14) on the second shaft (3, 11), characterised in that said first component (29a-d) comprises a recess ($29a_2$-d_2) in a radial side wall in relation to said shafts (3, 4, 11), which recess has its opening arranged in connection with the gear mesh (30-32) so that gearbox oil may be led between the first side of the gear mesh (30-32) and the recess ($29a_2$-d_2)."

VII. The following documents are referred to in this decision:

D1: US 5,009,115 A
D2: US 2007/0199786 A1
D3: EP 1 517 064 A2

VIII. The appellant argued essentially the following:

The subject-matter of claim 1 involved an inventive step.

D1 could not be considered as closest prior art because of the feature in the preamble whereby said first component comprising a recess was comprised in a unit, which was adapted to provide a rotational locking of the secondary cogwheel on the second shaft. Conversely, in D1 the clutch arrangement 132d comprising the recess formed by the dent in the housing 134d was not arranged

to provide any rotational locking of the cogwheel 202 to the shaft 48, but rather to provide a direct connection between the input shaft and the output shaft.

With respect to conventional gearboxes as described in the background section of the application, the problem to be solved was to provide an arrangement ensuring the lubrication and cooling of a gear mesh between the cogwheels of a gear set.

This was solved by the first component comprising a recess in a radial side wall in relation to said shafts, which recess has its opening arranged in connection with the gear mesh so that gearbox oil may be led between the first side of the gear mesh and the recess.

None of the cited documents taught such an arrangement, thus the skilled person would not have arrived at the subject-matter of claim 1 without the exercise of inventive activity.

Reasons for the Decision

1. Closest prior art

The claim relates to a gearbox in which a first component is comprised in a unit, which is adapted to provide a rotational locking of the secondary cogwheel (12-14) on the second shaft. Such arrangements are generally known, as is recognised in the application, see description, p. 1, paragraphs 2 and 3.

In the impugned decision with reference to D1, the housing 134d (see Figure 2a) was identified as the

first component. This is secured to the output shaft 48 such that selective engagement of the clutch 132d, by fluid pressure in a passage 200, will enforce a direct drive connection between the input shaft 46 and the output shaft 48 (D1, col. 7, l. 29 - 35). Thus, this is not part of a unit for locking the secondary cogwheel on the second shaft as is claimed, but rather a clutch arrangement for connecting two shafts. In order to arrive at the subject-matter of claim 1, the skilled person would have to make considerable structural modifications to the gearbox of D1 and, hence, D1 is not regarded as the closest prior art.

D2 does however disclose an arrangement according to the preamble of claim 1:

a gearbox, wherein the gearbox comprises a first shaft **(10)**, a second shaft **(see paragraph [0040]: "the third gear 18 and the fourth gear 20 are in constant mesh with non-shown gears on an output shaft arranged in parallel to the input shaft 10 respectively")**, at least one gear set, which comprises a primary cogwheel **(18, 20)** arranged on the first shaft and a secondary cogwheel arranged on the second shaft, wherein the primary cogwheel and the secondary cogwheel have teeth engaging with each other **(see paragraph [0040])**, and wherein the arrangement comprises a first component **(carrying splines 18a, 20a - see paragraph [0041])**, which is arranged at a first side of the gear mesh between the primary cogwheel and the secondary cogwheel **(see fig. 1), (the locking process including a synchronisation of rotational speeds is described in paragraphs [0059] - [0066]).**

Thus, D2 is the closest prior art. D3 also discloses

such a gearbox (see e.g. Figure 1).

2. D2 and D3 do not disclose that the first component comprises a recess in a radial side wall in relation to the shafts, which recess has its opening arranged in connection with the gear mesh so that gearbox oil may be led between the first side of the gear mesh and the recess. The term "recess", both generally and in the sense of the application, has the meaning of "a space set back in a wall" (see OED online at https://www.oed.com, entry "recess", retrieved 10 October 2020) and is synonymous with "alcove". Consequently, this implies that the recess is confined on all sides except in the plane of the wall. Thus, in the sense of the application, the recess is set back from the radial side wall of the first component. This is illustrated in Fig. 2 of the application. By contrast, the stepped arrangements shown in D2 and D3 are not bounded on their radially outward sides and cannot thus be regarded as recesses.

3. Problem to be solved

According to the application, p. 2, l. 15 - 17 the "objective of the present invention is to provide an arrangement ensuring a required lubrication and cooling of a gear mesh between the cogwheels of a gear set, which is arranged in a gearbox". The problem to be solved is therefore to improve the lubrication distribution, particularly in arrangements as shown in D2, Fig. 2 in which the synchronising ring carrying the splines 18a may interfere with oil flow from the gearwheel 18.

4. Solution

The invention achieves this object through the provision of the recess which gives a route for the oil to flow through the meshed gears. This also allows the radially extending wall of the synchronising ring to be placed closer to the cogwheel without impeding oil flow.

5. None of the documents in the proceedings render the solution obvious nor does it seem to be an obvious modification for the skilled person. In D1, the dent in item 134d is not described at all but appears to be there to provide an end stop for the piston 136d. Thus, D1 does not provide any teaching regarding oil flows that would incite the skilled person to modify the arrangement of D2.

6. Hence, the subject-matter of claim 1 involves an inventive step.

Order

For these reasons it is decided that:

The decision under appeal is set aside. The case is remitted to the examining division with the order to grant a patent based on the following documents and a description to be adapted:

Claims 1 - 10 filed on 14 October 2019 as second auxiliary request,
Figures 1/3 - 3/3 as published.

The Registrar: The Chairman:

D. Magliano C. Herberhold

Decision electronically authenticated