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Datasheet for the decision of 22 March 2012

Case Number: T 1572/10 - 3.2.08

Application Number: 00301143.4

Publication Number: 1030073

IPC: F16D 13/74

Language of the proceedings: EN

Title of invention:
A multi-disk friction device having improved lubrication characteristics

Patent Proprietor:
BorgWarner Transmission Systems GmbH

Opponent:
Hoerbiger Antriebstechnik GmbH

Headword:
-

Relevant legal provisions (EPC 1973):
EPC Art. 100(a), 54(2), 56

Keyword:
"Novelty (yes) - after amendments"
"Inventive step (yes) - after amendments"

Decisions cited:
-

Catchword:
-

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Case Number: T 1572/10 - 3.2.08

D E C I S I O N
of the Technical Board of Appeal 3.2.08
of 22 March 2012

Appellant: (Patent Proprietor)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 19 May 2010 revoking European patent No. 1030073 pursuant to Article 101(3)(b) EPC.

Composition of the Board:

Chairman: T. Kriner
Members: M. Alvazzi Delfrate
U. Tronser

Summary of Facts and Submissions

I. By its decision posted on 19 May 2010 the opposition division revoked European patent No. 1 030 073.

II. The appellant (patent proprietor) lodged an appeal against this decision on 19 July 2010, paying the appeal fee on the same day. The statement setting out the grounds for appeal was filed on 17 September 2010.

The appellant requests that the appealed decision be set aside and the patent maintained on the basis of auxiliary request 1 submitted with the letter dated 17 September 2010 (now main request) and a duly amended description, i.e. columns 3 to 7 as filed during oral proceedings before the board of appeal, columns 1 and 2 as granted and Figures 1 to 4 as granted.

The respondent requested that the appeal be dismissed.

III. Claim 1 reads as follows:

"A multi-disk friction device (10) comprising:
a drive member (12) having a plurality of drive disks (22) supported for rotation with said drive member (12) and a driven member (14) having a plurality of driven disks (28) supported for rotation with said driven member (14), said drive and driven disks (22, 28) interleaved relative to each other such that each drive disk (22) is adjacent a driven disk (28) and movable toward and away from one another for providing selective frictional engagement therebetween and to transmit torque between said drive (12) and driven (14) members;

each of said drive and driven disks (22, 28) including a working face (34, 32) which is disposed for frictional engagement with the working face of an adjacent one of said disks, at least one of said working face (32, 34) on said adjacent one of said disks including a plurality of micro-pockets (40) formed thereon, said micro-pockets (40) acting to store lubricating agents on said working face; characterised in that
said at least one working face (32, 34) includes a friction coating (36), said plurality of micro-pockets (40) being formed on said friction coating (36), said plurality of micro-pockets (40) on at least one of said working faces of said adjacent disks are arranged in a predetermined pattern relative to one another, and said friction coating (36) being a fabric implant, or made of a paper based product."

IV. The following documents are relevant for the present decision:

E1: Extract from "Hoerbiger Information: Kupplungslamellen", pages 1-12, Sonderdruck aus Werkstatt und Betrieb (2/4/7/ 1971);
E4: DE -C- 871 857; and
E5: EP -A- 0 848 179.

V. The arguments of the appellant can be summarised as follows:

The prior art did not disclose or render obvious the provision of a friction coating being a fabric implant or made of a paper-based product and used in a multi-

disk friction device having micro-pockets in accordance with claim 1.

VI. The arguments of the respondent can be summarised essentially as follows:

Novelty

E1 disclosed a multi-disk friction device comprising a drive member having a plurality of drive disks supported for rotation with said drive member and a driven member having a plurality of driven disks supported for rotation with said driven member, said drive and driven disks interleaved relative to each other such that each drive disk was adjacent a driven disk and movable toward and away from one another for providing selective frictional engagement therebetween and to transmit torque between said drive and driven members; each of said drive and driven disks included a working face which was disposed for frictional engagement with the working face of an adjacent one of said disks. E1 further disclosed under point 1.2 on page 10 that said at least one working face included a friction coating made of a fabric implant or of a paper-based product.

Moreover, Figures 5 to 7 on page 10 showed that the friction coating could be provided with grooves arranged in a predetermined pattern relative to one another. Since the patent in suit defined neither the shape nor the dimensions of the micro-pockets, said grooves, which contained oil for lubrication and cooling, could be regarded as micro-pockets in

accordance with claim 1. Therefore, the subject-matter of claim 1 lacked novelty.

Inventive step

In the event that the subject-matter of claim 1 was considered to be novel over E1 by virtue of the micro-pockets arranged in a predetermined pattern relative to one another, it did not involve an inventive step.

Due to the lack of definition of the micro-pockets according to claim 1, the pores in the friction coating of E1 could also be regarded as micro-pockets.

Moreover, E4 rendered it obvious to arrange the micro-pockets in a predetermined pattern. This document taught the formation of a pattern of depressions in the disks of a multi-disk friction device in order to store lubricant. The nature of the friction coating was not essential for the effect of the micro-pockets, which was provided also in the case of a fabric- or paper-based product. Moreover, the technique used to form the depressions in E4, i.e. embossing, was also used to form the grooves in E1. Hence, it was obvious to transpose the teaching of E4 to E1 and provide the friction coatings disclosed in the latter document with micro-pockets arranged in a predetermined pattern. Therefore, the subject-matter of claim 1 did not involve an inventive step in view of the combination of E1 and E4.

A similar argumentation applied starting from document E5, since here too E4 rendered the provision of micro-pockets arranged in a predetermined pattern

obvious. Hence, the subject-matter of claim 1 did not involve an inventive step in view of the combination of E5 and E4 either.

Additionally, starting from E4 it was obvious to adopt a friction coating as disclosed in E1 in order to improve the torque transmission. As the depressions shown in E4 could be realised in the metal disc or in the friction coating, the subject-matter of claim 1 did not involve an inventive step in view of the combination of E4 and E1 either.

Reasons for the Decision

1. The appeal is admissible.

2. Novelty

2.1 E1 discloses a multi-disk friction device (see Figures 1 and 2 on page 3) comprising a drive member having a plurality of drive disks supported for rotation with said drive member and a driven member having a plurality of driven disks supported for rotation with said driven member, said drive and driven disks interleaved relative to each other such that each drive disk is adjacent a driven disk and movable toward and away from one another for providing selective frictional engagement therebetween and to transmit torque between said drive and driven members; each of said drive and driven disks includes a working face which is disposed for frictional engagement with the working face of an adjacent one of said disks, wherein at least one working face includes a friction coating,

for instance a fabric implant or paper-based product (see points 1.1 and 1.2 at pages 9 and 10).

2.2 As shown by Figures 5 to 7 on page 10, the friction coating can be provided with grooves arranged in a predetermined pattern relative to one another. However, contrary to the respondent's opinion, said grooves cannot be regarded as micro-pockets in accordance with claim 1. Independently of its specific shape and dimensions, a pocket or a micro-pocket must form a compartment providing separate storage space. This is also reflected in claim 1, which explicitly states that the micro-pockets act to store lubricating agents on said working face. By contrast, the grooves shown in Figures 5 to 7 of E1 are radially open and, as a consequence, cannot act to store lubricating agents. Therefore, they cannot be regarded as micro-pockets in accordance with claim 1.

As to the pores of the coating of E1, even if they are regarded as micro-pockets that act to store lubricating agents on said working face, they are not arranged in a predetermined pattern relative to one another.

Therefore, the subject-matter of claim 1 is novel.

3. Inventive step

3.1 Starting from E1, which represents the most relevant prior art, the object to be achieved by the claimed invention is to provide a device with an increased service-life (see paragraph [0011] of the A-publication). This object is achieved in that at least one working face of the disks includes a

plurality of micro-pockets formed thereon, said micro-pockets acting to store lubricating agents on said working face, being formed on the friction coating and arranged in a predetermined pattern relative to one another.

It is true that E4 teaches the provision of a working face of a disk in a multi-disk friction device with a plurality of micro-pockets formed thereon, wherein said micro-pockets act to store lubricating agents on said working face and are arranged in a predetermined pattern relative to one another. However, this document refers to a friction device comprising metallic friction discs (see the claim). It neither discloses nor suggests the provision of micro-pockets in a fabric- or paper-based friction coating, let alone for the purpose of increasing the service-life of the multi-disk friction device. Moreover, the frictional behaviour of a device wherein, as in the case of E4, metallic disks are in direct contact with each other is considerably different from that of a device comprising a friction coating which is a fabric implant or made of a paper-based product (see E1 page 9, point 1.). Hence, transposing the teaching of E4 to paper- or fabric-coated discs as known from E1 could have been done only with hindsight. Therefore, the subject-matter of claim 1 was not rendered obvious by the combination of E1 and E4.

3.2 For the same reasons, E4 does not render it obvious to provide the friction facings made of resin-coated paper of the multi-disk friction device disclosed in E5 (see Figure 1 and claim 4) with a plurality of micro-pockets according to claim 1.

3.3 The objection starting from E4 as closest prior art is even less relevant. Although it could be considered to be obvious to adopt a fabric- or paper-based friction coating as disclosed in E1 to improve the torque transmission of the device described in E4, neither of those documents teaches that said friction coating should be provided with micro-pockets in accordance with present claim 1.

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

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 the first instance with the order to maintain the patent on the basis of

   – claims 1 to 6 according to auxiliary request 1 submitted with the letter dated 17 September 2010 (now main request);

   – description columns 1 and 2 as granted, and columns 3 to 7 as filed during oral proceedings before the board of appeal;

   – Figures 1 to 4 as granted.

The Registrar: The Chairman:

V. Commare T. Kriner