

Internal distribution code:

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

**Datasheet for the decision
of 27 August 2013**

Case Number: T 1813/10 - 3.2.06

Application Number: 02005875.6

Publication Number: 1344714

IPC: B62M11/16

Language of the proceedings: EN

Title of invention:

Hub transmission for a bicycle

Patent Proprietor:

SHIMANO INC.

Opponent:

SRAM Deutschland GmbH

Relevant legal provisions:

EPC Art. 54, 56, 84, 123(2), 123(3)

Keyword:

Novelty - (no) main request
Amendments - allowable (yes)
Novelty - (yes) fourth aux. request
Inventive step - (yes) fourth aux. request



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 1813/10 - 3.2.06

**D E C I S I O N
of Technical Board of Appeal 3.2.06
of 27 August 2013**

Appellant: SRAM Deutschland GmbH
(Opponent) Romstr. 1
97424 Schweinfurt (DE)

Representative: Prechtel, Jörg
Weickmann & Weickmann
Patentanwälte
Postfach 86 08 20
81635 München (DE)

Respondent: SHIMANO INC.
(Patent Proprietor) 3-77 Oimatsu-cho
Sakai-ku,
Sakai City
Osaka 590-8577 (JP)

Representative: Wallinger, Michael
Wallinger Ricker Schlotter Tostmann
Patent- und Rechtsanwälte
Zweibrückenstrasse 5-7
80331 München (DE)

Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
29 June 2010 concerning maintenance of the
European Patent No. 1344714 in amended form.**

Composition of the Board:

Chairman: M. Harrison
Members: G. Kadner
K. Garnett

Summary of Facts and Submissions

- I. The mention of grant of European patent No. 1 344 714, on the basis of European patent application No. 02005875.6 filed on 14 March 2002, was published on 6 February 2008.
- II. Notice of opposition, in which revocation of the patent on the ground of Article 100(a) EPC was requested, was filed against the granted patent.

By way of its decision posted on 29 June 2010, the opposition division found that account being taken of the amendments made by the patent proprietor during the opposition proceedings, the patent and the invention to which it related met the requirements of the Convention. The prior art cited was:

E1: DE-A-37 32 977
E2: US-A-1 490 644
E3: DE-C-251 410
E4: DE-C-808 417
E5: EP-B-1 028 275

- III. Notice of appeal was filed against this decision by the appellant (opponent) on 30 August 2010, and the appeal fee was paid on the same day. With its grounds of appeal dated 14 October 2010, the appellant pursued its request for revocation of the patent.
- IV. With its reply to the appeal the respondent (patentee) filed an amended main request based on the claims as found allowable by the opposition division, together with a first auxiliary request.

- V. In response to a further submission of the appellant dated 3 May 2012, the respondent filed a second auxiliary request with its letter of 28 November 2012.
- VI. In a communication accompanying the summons to oral proceedings the Board expressed its preliminary view that the subject-matter of claim 1 of the main request seemed to lack novelty, and that the first and second auxiliary requests seemed to contravene Article 123(2) EPC.
- VII. With its letter dated 17 July 2013 the respondent filed third and fourth auxiliary requests.
- VIII. Oral proceedings were held before the Board on 27 August 2013, during which the respondent withdrew its first to third auxiliary requests and filed an amended fourth auxiliary request, as well as:
- E6: GB-C-541 332 (referred to as E4a in the minutes of oral proceedings before the Board)
- IX. The appellant (opponent) requested that the decision under appeal be set aside and the patent be revoked.
- The respondent (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained on the basis of the main request filed with letter dated 23 February 2011, alternatively on the basis of the fourth auxiliary request filed during the oral proceedings.
- X. Claim 1 according to the main request reads as follows (sections numbered by the Board):

"(1) A hub transmission for a bicycle comprising:
(2) a hub axle (1);
(3) a drive member (2) and a hub body (3) rotatably supported on said hub axle (1);
(4) at least one planetary gear mechanism (4, 5) for transmitting rotational force from the drive member (2) to the hub body (3) through multiple rotational force transmission paths, said at least one planetary gear mechanism comprising at least one planetary gear (11, 12) mounted on a planetary carrier pin (40) in a planetary gear carrier (4a); and
(5) a change speed control mechanism (7, 8) comprising at least one clutch (17, 18, 19) for selecting one of the rotational force transmission paths; wherein
(6) the planetary gear comprises at least one larger diameter gear section (11) and at least one smaller diameter gear section (12), each defining different gear ratios, and the carrier pin (40) comprises at least one larger diameter pin section (9) and at least one smaller diameter pin section (10), and
(7) the larger diameter pin section (9) of the carrier pin (40) supports the larger diameter gear section (11) of the planetary gear over more than 50% of the axial width (w1) of the larger diameter gear section (11)."

XI. Claim 1 of the fourth auxiliary request is based on claim 1 of the main request amended as follows:

In section (5) concerning the term "... clutch (17, 18, 19) for selecting ...", the reference numerals "17" and "19" were deleted.

In section (6) concerning the term "... gear ratios, and the carrier pin (40) ...", the word "and" was replaced by "characterised in that", and at the end of that section the word "and" was deleted.

At the end of section (7) the following text was added:

"and

(8) the smaller diameter pin section (10) of the carrier pin (40) supports the smaller diameter gear section (12) of the planetary gear over more than 50% of the axial width (w2) of the smaller diameter gear section (12)."

XII. The arguments of the appellant can be summarized as follows:

The subject-matter of claim 1 of the main request was not novel when compared to the disclosure of E4. The hub transmission shown in the Figure disclosed all the features of claim 1 and comprised a one-piece carrier pin having a larger diameter pin section and a smaller pin section. The larger diameter pin section supported the planetary gear over its whole axial width, i.e. more than 50% of its larger diameter gear section.

E6 which disclosed a carrier pin of constant diameter, should not be admitted into the proceedings since it was filed at a very late stage of proceedings and, although cited in E4, did not disclose a hub transmission identical to that of E4 but only a hub transmission of the known type ("bekannter Art"). The design of the carrier pin of E4 was clear und unambiguous to the skilled person in accordance with the common rules of drawing representation. No indication was present that the smaller pin section could be a shifted view of the spring-biased pin 19 since there was a space between the smaller end of the pin and the groove 21.

Claim 9 of the fourth auxiliary request failed to fulfil the requirements of Article 84 EPC when considered in combination with claim 1. Claim 9 either repeated what was in claim 1 and the claims were therefore not concise, or it lacked clarity because it was not clear what different feature was being defined. The subject-matter of claim 1 according to the fourth auxiliary request lacked novelty when compared to E1. If "the planetary gear" according to section (6) of the claim was regarded as an "at least one" planetary gear in accordance with the features of section (4) of the claim, E1 showed one larger and one smaller diameter gear section. The carrier pin 11 shown there also had a larger and a smaller diameter pin section.

The hub transmission according to claim 1 of the fourth auxiliary request lacked an inventive step with regard to E2. A general object in the construction of hub transmissions for bicycles was to increase the gear ratio which depended on the diameter difference of the planetary gears. The skilled person, starting from a hub as shown in Fig. 21, would recognize that the increased diameter difference of the planetary gears in Fig. 1 was achieved by reducing the diameter of the carrier pin of the smaller planetary gear. The application of that teaching to the carrier pin of Fig. 21 would lead to a stepped carrier pin such that the claimed solution was arrived at without the involvement of an inventive step.

XIII. The respondent argued that the carrier pin had to be regarded in a functional way related to "carrying" a gear, such that the pin (portion) carrying the planetary gear had a constant thickness whereas the smaller section of the pin was only intended for mounting it to the planetary gear carrier and not for

carrying. As could be derived from E6 which document was cited in E4 as representing a known device of a hub transmission, the carrier pin there was of a cylindrical form. E4 therefore did not disclose anything more in respect of the hub transmission since its object was directed to the integration of a generator into the hub transmission. Document E6 as cited in E4 should be admitted into the proceedings since this document was already within the proceedings from the beginning of the opposition proceedings by virtue of its citation in E4.

The disclosure of a smaller pin section of the carrier pin according to D4 was not clear and unambiguous. What was shown in the upper part of the hub could likewise be the view of a shifted section of the spring-biased pin 19 of the lower part of the hub, i.e. a partial view on to pin 19, the remainder being hidden by the carrier pin.

Claim 9 of the fourth auxiliary request, against which the appellant had raised an objection to lack of clarity or conciseness within the meaning of Article 84 EPC, was clear and concisely formulated; it specified two gear sections and two pin sections of different diameters whereas claim 1 merely required at least one large one and at least one small one of each.

The subject-matter of claim 1 according to the fourth auxiliary request was novel and involved an inventive step. E1 disclosed clearly two separate planet gears having different diameters whereas claim 1 defined that "the planetary gear" comprised "at least one larger diameter gear section and at least one smaller diameter gear section". It was thus evident that this was directed to a one-piece planetary gear.

When starting from Fig. 21 of E2 and trying to increase the difference in diameter of the planetary gears by reducing the smaller planetary gear diameter, the skilled person had the alternative of taking the construction of Fig. 1 using two separate planetary gears or, in order to mount a smaller diameter planetary gear, to reduce the diameter of the carrier pin according to Fig. 21 over its whole extension. Since the pin was welded to the frame of the planetary gear carrier, the forces acting on the planetary gears were sufficiently taken up in this case. No indication was present in E2 towards a stepped carrier pin having different diameters.

Reasons for the Decision

1. The appeal is admissible.
2. *Non-admittance of E6*

E6 was filed during the oral proceedings, i.e. at a very late stage of the appeal proceedings. The respondent argued that it should be admitted into the proceedings since it was cited in E4 and therefore already implicitly within the proceedings. According to the established case law of the Boards of Appeal, prior art filed at a late stage in appeal proceedings is only admitted into the proceedings if it is of such relevance *prima facie* that the outcome of the proceedings would be altered. In the present case E6 is not *prima facie* relevant. The hub transmission of E4 (as cited on page 2, lines 78 to 80) is of a known type as shown in British patent document 541 332 (E6), which does not mean that it is identical to that shown in E6, but merely that the transmission has the same general

structure. The carrier pin of E6 has a cylindrical cross-section over its entire width whereas that of E4 has a portion with reduced cross-section at one end. The disclosure of this reduced section in E4 is clear and unambiguous to the skilled person having general knowledge of the rules of design and drawing. The cross-sectional view on the planet carrier at the upper left side thereof would not be drawn this way if the pin 19 were being depicted (rather than the reduced diameter carrier pin), since, in the upper part of the drawing the plane of intersection is taken through the double gear and through the planet carrier at the location of the carrier pin. Nothing in E6 indicates anything to the contrary. Since E6 therefore lacks any particular relevance, the Board did not admit it into the proceedings.

3. *Main request - novelty (Article 54(2) EPC)*

3.1 E4 discloses a hub transmission for a bicycle (page 1, lines 1 to 2) comprising a hub axle, a drive member (pinion) and a hub body 1 rotatably supported on said hub axle. Within the hub body is a planetary gear mechanism contained for transmitting rotational force from the drive member (pinion) to the hub body 1 through multiple rotational force transmission paths. The planetary gear mechanism comprises one planetary gear mounted on a planetary carrier pin in a planetary gear carrier. A change speed control mechanism comprises two clutches for selecting one of the rotational force transmission paths. The planetary gear comprises one larger diameter gear section (left) and one smaller diameter gear section (right), each defining different gear ratios, and the carrier pin comprises one larger diameter pin section (supporting the planetary gear) and one smaller diameter pin

section (mounted in the planet gear carrier). The larger diameter pin section of the carrier pin supports the planetary gear over its axial width; consequently the larger diameter gear section of the planetary gear is supported over more than 50% of its axial width (see the Figure).

3.2 The respondent asserted that, even if E4 might appear accidentally novelty destroying, there was a distinguishing feature in the carrier pin definition since only the carrying portion of the pin as shown in E4 should be considered, and the carrying portion in E4 was all of a single diameter contrary to that claimed. However, the Board concludes that the carrier pin of E4 is a one-piece element having a larger diameter pin section and a smaller diameter pin section and is therefore fully encompassed by the wording of the claim. Nothing in the claim specifies or implies that only the part of the carrier pin which directly supports the gear itself should be considered, as was alleged by the respondent. Also, according to the general rules of drawing, its shape is clearly and unambiguously disclosed in the Figure of E4 when considered by the skilled person.

3.3 For these reasons the subject-matter of claim 1 lacks novelty. The main request is therefore not allowable.

4. *Fourth auxiliary request*

4.1 *Amendments, clarity (Articles 123(2), 123(3), 84 EPC)*

4.1.1 Claim 1 includes the features of granted claims 1 to 3. These amendments were not objected to by the appellant. The Board is also satisfied that amended claim 1 meets

the requirements of Articles 123(2) and 123(3) EPC and Article 84 EPC.

4.1.2 Objection was raised by the appellant against claim 9 with regard to Article 84 EPC. Claim 9 further specifies the "at least one" different diameter sections of the planetary gear and the carrier pin defined in claim 1 as specifically being "two" sections of each, thus describing a specific embodiment of the hub transmission of claim 1 and not merely repeating what is in claim 1. Maintaining claim 9 in the set of claims as a result of the amendment to claim 1 does not result in a lack of clarity or to a lack of conciseness. Nor is the amendment contrary to what is disclosed in the description, even though this latter requirement of Article 84 EPC was not contested. The Board thus concludes that the requirements of Article 84 EPC are met.

4.2 *Novelty (Article 54(2) EPC)*

4.2.1 The appellant attacked the novelty of claim 1 based on E1. This document discloses a hub transmission including a carrier pin which has an excentric form with a larger diameter section and a smaller diameter section, each of which supports a separate planetary gear.

The subject-matter of claim 1 is distinguished from the hub in E1, in that "the planetary gear" defined in the claim, which has the antecedent "at least one planetary gear", comprises at least one larger diameter gear section and one smaller diameter gear section.

The appellant argued that claim 1 could be interpreted such that the "at least one planetary gear" could be

two gears, as in E1, and that the "at least one larger diameter gear section" and the "at least one smaller diameter gear section" would be the smaller and larger gear sections of the planetary gear arrangement of E1. However the Board is not convinced by this argument, because the term "the planetary gear" in the claim refers to the "at least one planetary gear", such that the claim can only logically be interpreted to mean that the "at least one planetary gear" - itself - must comprise both a larger and a smaller diameter section. This is also entirely in line with the remainder of the specification.

At least for this reason, the subject-matter of claim 1 is novel with regard to the disclosure in E1.

4.2.2 Since no further prior art was brought forward in respect of the appellant's attack of lack of novelty, the Board concludes that the hub transmission according to claim 1 meets the requirement of Article 54 EPC.

4.3 *Inventive step (Article 56 EPC)*

4.3.1 The appellant's attack on inventive step started from E2 which discloses a five speed gear hub for a bicycle. According to the description (see page 2, lines 21 to 24), Fig. 21 "illustrates in longitudinal section a slightly modified construction of five speed gear in which compound planet pinions are employed", the planet gear being supported by one single carrier pin whereas the preceding Figures (including Figure 1) deal with arrangements in which two separate planet gears are each supported by a separate carrier pin, each of which is mounted to a separate planetary gear carrier. This was not a matter of dispute between the parties.

4.3.2 Starting from the embodiment shown in Fig. 21, the technical problem underlying the invention was identified by the appellant as the modification of a hub transmission for bicycles having an increased separation between gear ratios. The skilled person was aware that this object required an increased difference in diameters between the planetary gears. This problem is solved by the combination of features defined in claim 1.

4.3.3 Accepting this to be the objective problem to be solved, the skilled person, considering the whole content of E2 and trying to increase the separation of the gear ratios of the planetary gears, receives no teaching in relation to the embodiment of Figure 21 as to how this might be achieved when starting from this as the closest prior art. If the gear diameter according to the relatively simple construction of Fig. 21 were not sufficient, there are alternatives which allow an increased difference between planetary gear diameters to be obtained. Concerning the forces to be transmitted within different parts of the gear train no information is given in E2. If the skilled person would try to reduce the diameter of the smaller section of the planetary gear so as to obtain a larger separation of ratios, he could even reduce the corresponding gear diameter without reducing the carrier pin diameter. The carrier pin is welded to the frame of the planetary gear carrier (right hand side in the Figure) and supported by a screw to plate 7 (left hand side in the Figure). Thus if a larger difference of ratios were desired, the skilled person could reduce the entire pin diameter since the reduced diameter would still be strong enough for supporting the planetary gears. The embodiments in the preceding Figures, including Figure 1, indeed show different

diameters of the carrier pins for the different planetary gears, but since these are attached to separate carriers these cannot be mounted on a single pin, nor is there any indication of combining these large and small diameter gears into a (single) planetary gear and altering the hub accordingly. Further, the carrier pins are offset and there is no teaching towards forming these as one stepped pin even with a different gear arrangement. As a consequence, no indication or hint is given in E2 towards one stepped carrier pin having different diameters for supporting a planetary gear having sections with different diameters. Therefore the claimed solution could not be arrived at by the skilled person without involving an inventive step.

No further prior art was cited by the appellant concerning an inventive step attack against claim 1 of this request.

The requirement of Article 56 EPC is therefore found to be met.

5. The dependent claims 4 to 11 were renumbered as claims 2 to 9, and the description was adapted to the amended claims. Neither the Board nor the appellant found reason to object to these.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent on the basis of:
 - (a) Claims 1 to 9 according to the fourth auxiliary request filed during the oral proceedings;
 - (b) The amended description pages numbered 2, 2a, 3 & 4 as filed during the oral proceedings;
 - (c) Figures numbered 1 to 3 as granted.

The Registrar:

The Chairman:



P. Martorana

M. Harrison

Decision electronically authenticated