Internal distribution code:

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

Datasheet for the decision of 15 May 2012

Case Number: T 1722/08 - 3.2.06

Application Number: 97310089.4

Publication Number: 849155

IPC: B62M9/10, F16G13/06, F16H55/30

Language of the proceedings: EN

Title of invention:
Multiple sprocket assembly for a bicycle

Patent Proprietor:
SHIMANO INC.

Opponent:
SRAM Deutschland GmbH

Relevant legal provisions:
EPC 1973 Art. 54, 56
EPC Art. 123(2), 114(2)
RPBA Art. 13

Keyword:
Novelty (main request) - no
Admissibility of amendments (first and second auxiliary request) - no
Inventive step (third and fourth auxiliary request) - no
Admission into the proceedings (fifth auxiliary request) - no

Europäisches Patentamt
European Patent Office
Office européen des brevets

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 1722/08 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 15 May 2012

Appellant: (Patent Proprietor)	SHIMANO INC. 3-77 Oimatsu-cho Sakai-ku, Sakai City Osaka 590-8577 (JP)
Representative:	Murnane, Graham John Murgitroyd & Company 165-169 Scotland Street Glasgow G5 8PL (GB)
Respondent: (Opponent)	SRAM Deutschland GmbH Romstr. 1 97424 Schweinfurt (DE)
Representative:	Thum, Bernhard Wuesthoff & Wuesthoff Patent- und Rechtsanwälte Schweigerstrasse 2 81541 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted 15 July 2008 revoking European patent No. 849155 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman: M. Harrison
Members: G. Kadner
W. Sekretaruk

Summary of Facts and Submissions

I. The mention of grant of European patent No. 0 849 155, on the basis of European patent application No. 97310089.4 filed on 15 December 1997 as a divisional application and claiming a US priority from 20 December 1996, was published on 22 September 2004.

Claims 1, 3 and 5 of the patent as granted read as follows:

"1. A sprocket cluster (100) for a bicycle comprising: a plurality of sprockets (F1 - F14) coaxially mounted together in an axially fixed position relative to each other,
characterised in that a free space defining a spacing is disposed between a root circle portion (R) of the smaller diameter sprocket (F2 - F14) of each pair of adjacent sprockets and an axially aligned portion of the larger diameter sprocket (F1 - F13) of each pair of adjacent sprockets, and
wherein said spacing between each pair of adjacent sprockets is less than or equal to a thickness of at least one of the plurality of sprockets (F1 - F14).

3. The sprocket cluster according to claim 1 or 2 wherein said spacing between each pair of adjacent sprockets is less than or equal to approximately 2.0 millimetres.

5. The sprocket cluster according to any preceding claim wherein said plurality of sprockets comprises at least ten sprockets coaxially mounted together and forming a first free side sprocket surface (140) facing laterally outwardly and a second free side sprocket surface (144) facing laterally inwardly, and wherein a

spacing between the first free side sprocket surface (140) and the second free side sprocket surface (144) is less or equal to approximately 50 millimetres."

II. Notice of opposition, in which revocation of the patent on the grounds of Articles 100(a) and 100(b) EPC 1973 was requested, was filed against the granted patent.

By way of its decision posted on 15 July 2008, the opposition division revoked the patent. The opposition division held that the subject-matter of claim 1 of the main request (patent as granted) was not novel, and that claim 1 according to the first and second auxiliary requests respectively did not meet the requirement of clarity.

III. Notice of appeal was filed against this decision by the appellant (patentee) on 4 September 2008, and the appeal fee was paid on the same day. The grounds of appeal were filed on 24 November 2008.

IV. In a communication accompanying the summons to oral proceedings the Board expressed its preliminary view that although the subject-matter claimed met the requirement of Article 83 EPC, the opposition division's conclusion of lack of novelty appeared correct. The first and second auxiliary requests appeared to give rise to problems in respect of Articles 84 and 123(2) EPC, presence of an inventive step in the claimed subject-matter of the third auxiliary request was questionable and the fourth auxiliary request did not comply with Article 13 of the Rules of Procedure of the Boards of Appeal (RPBA).

V. Oral proceedings were held before the Board on 15 May 2012 during which the appellant filed a fifth auxiliary request.

The following prior art documents were discussed:

E8: US-A-5 362 278
E9: US-A-4 121 474

The appellant (patent proprietor) requested that the decision under appeal be set aside and the European patent be maintained as granted (main request), or on the basis of auxiliary request 1 of 20 March 2008, or on the basis of auxiliary request 2 of 24 November 2008, or on the basis of auxiliary request 3 of 8 October 2009, or on the basis of auxiliary request 4 of 12 April 2012, or on the basis of auxiliary request 5 of 15 May 2012.

The respondent (opponent)requested that the appeal be dismissed.

Claim 1 of the first auxiliary request was amended by an insertion (underlined) into its last feature: "... wherein said spacing between each pair of adjacent sprockets is less than or equal to a thickness of the outer peripheral portion of at least one of the plurality of sprockets (F1 - F14)."

Claim 1 of the second auxiliary is based on that of the first auxiliary request and was further amended by the addition of "each sprocket having an outer peripheral portion of constant thickness inside and outside the root circle portion of the sprocket" to the pre-characterising clause and the replacement of "characterised in that" by "wherein".

Claim 1 of the third auxiliary request is a combination of the features of granted claims 1 and 3.

Claim 1 of the fourth auxiliary request includes the features of granted claims 1, 3 and 5, the word "approximately" in the expressions "approximately 2.0 millimetres" and "approximately 50 millimetres" in the last line of each of granted claims 3 and 5 however having been removed.

Claim 1 of the fifth auxiliary request as filed during the oral proceedings is based on that of the fourth auxiliary request and was further amended by the replacement of "... between a root circle portion (R) of the smaller diameter sprocket ..." by "... between the root circle of the smaller diameter sprocket ...".

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

The subject-matter of granted claim 1 was novel when compared with the disclosure of E9. Contrary to the patent, the sprockets in E9 did not have a uniform thickness. From the claims, the description and the Figures of the patent as a whole, the skilled person would clearly understand when comparing claim 1 with E9 that the meaning in claim 1 of "a thickness", see e.g. col. 3, line 33, was the thickness of the sprocket in the area of engagement, which corresponded to the uniform thickness of the sprocket in the patent over its diameter, which was greater than the spacing between the sprockets in the root circle portion.

The amendments made to the claim 1 of the first and second auxiliary requests respectively were clearly

disclosed in the description. According to paragraph [0011] the term in brackets "at least the outer peripheral portion thereof ..." was a more specific definition of where the thickness of the sprocket compared to the spacing between the sprockets was to be measured.

The sprocket cluster according to claim 1 of the third auxiliary request or at least that of the fourth auxiliary request should be allowed since it was novel and inventive. Document E8 as closest prior art did not disclose or suggest that between each of the pairs of sprockets in the cluster there was a spacing which was less or equal to the thickness of at least one of the plurality of sprockets. Figure 11 in connection with Figures 3c and 3d showed that a spacing between the sprockets existed only in region 10b of the larger sprockets, but not in the location of the root circle due to the presence of spacers. The dimensions of the spacing being 2 millimetres or less or the whole width of the sprocket cluster being 50 millimetres or less were also not disclosed in E8.

The amendment made to claim 1 of the fifth auxiliary request was originally disclosed, corresponding to the description col. 3, lines 43 to 48, and should be admitted into proceedings because the objection leading to the need for that amendment was not known earlier. The object underlying the newly claimed subject-matter was only modified in that the sprocket cluster having an increased number of sprockets was simpler in construction and could be used with an adapted narrow chain.

VII. The respondent argued that all the features of a sprocket cluster according to claim 1 as granted were

known from E9. In particular, since the patent indicated that the thickness of each sprocket might not be uniform, the thickness of each sprocket could be measured anywhere, whereby a spacing between each pair of sprockets at a root circle portion was less than that particular thickness of one of the sprockets.

The amendments made to claim 1 of the first and second auxiliary requests respectively and their introduction in a generalized form were not admissible since they had been taken from the description of a specific embodiment (paragraph [0011]) thus leading to an inadmissible intermediate generalization.

The subject-matter of the claims of the third and fourth auxiliary requests did not involve an inventive step. The object underlying the subject-matter claimed was known from E8 as closest prior art. The skilled person would apply the teachings disclosed there and arrive at a sprocket cluster having an increased number of sprockets without an inventive step being involved. A sprocket cluster having that increased number of sprockets was disclosed in E8 as well as a spacing between each pair of sprockets. Since the skilled person was aware of the usual dimensions of a sprocket for reasons of strength, and the well-known available space at the rear wheel of a bicycle, he would arrive at the claimed solution without inventive step.

The fifth auxiliary request should not be admitted into the proceedings because it was late filed and the appellant had already had the opportunity to react to the respondent's arguments in respect of the definition of a root circle portion. Therefore the newly introduced wording "the root circle" would not change the conclusion of lack of inventive step provided that

the original problem to be solved remained unchanged. Otherwise, if the appellant were trying to change the object of the invention underlying the subject-matter claimed, this would give rise to new and complex problems contrary to the provisions on admittance under Article 13 RPBA.

Reasons for the Decision

1. The appeal is admissible.

2. Main request (Article 54 EPC 1973)

2.1 E9 discloses a sprocket cluster for a bicycle comprising a plurality of sprockets (e.g. sprockets 30 and 33 - see e.g. Figure 5) coaxially mounted together in an axially fixed position relative to each other. A free space defining a spacing is disposed between a root circle portion of the smaller diameter sprocket of each pair of adjacent sprockets and an axially aligned portion of the larger diameter sprocket of each pair of adjacent sprockets. This spacing between each pair of adjacent sprockets is less than a thickness of a plurality of sprockets 30, 33 in the cluster (see e.g. Figure 5 and col. 7, lines 14 to 36).

2.2 In its decision the opposition division concluded, and the Board finds this correct, that since the thickness is not restricted to a particular location of the sprocket, the definition of claim 1 can be applied with respect to the prior art at any point of a sprocket having a nonuniform thickness.

2.3 The appellant's argument that the skilled person would understand from the patent as a whole that the

sprockets have a generally uniform thickness also in the area of chain engagement which was the only location of importance, and that the thickness should thus be measured at that location, is not convincing. The wording of the claim is clear in itself and there is no reason for interpreting the terminology "a thickness" in a specific sense so as to be limited to a particular part of the sprocket, not least since the patent itself states that the thickness of the sprockets in the sprocket cluster may be nonuniform (col. 4, lines 30 to 31). Therefore, since all features of claim 1 are known from E9, the subject-matter of claim 1 lacks novelty.

3. First auxiliary request, second auxiliary request
Article 123(2) EPC

3.1 Claim 1 of each of the first and second auxiliary requests respectively was amended by an insertion (underlined) into its last feature: "... wherein said spacing between each pair of adjacent sprockets is less than or equal to a thickness of the outer peripheral portion of at least one of the plurality of sprockets (F1 - F14)."

3.2 The inserted wording is based on the disclosure in paragraph [0011] of the patent specification (col. 3, line 35) corresponding to the published application (page 4, line 2) relating to a particular embodiment of a sprocket cluster having a total width of less than or equal to 47 millimetres wherein some, if not all, of the sprockets F1 - F14 have a thickness less than or equal to approximately 2 millimetres (at least the outer peripheral portions thereof, if not the entire sprocket). It follows that the insertion is only disclosed in a specific configuration of a sprocket

cluster together with a particular form of the sprockets. The isolation of the selected feature out of the specific context in which it is disclosed results in this case in an inadmissible intermediate generalisation of the original disclosure having been made, with the consequence that subject-matter is claimed which was not originally disclosed. Such an amendment contravenes Article 123(2) EPC.

3.3 Although the appellant argued that the passage of the description in question gave a definition of where thickness is to be measured, rather than being related to a specific embodiment, the Board also finds this argument unconvincing since the terminology "at least at the outer peripheral portions thereof" is not given as a definition at all, but instead is related to where a specific thickness of 2 mm in a specific embodiment as also shown in the Figures is to be measured. Indeed, paragraph [0011] where this wording appears, starts with the wording "In this embodiment…". Thus, the Board can find no support for the appellant's argument that this passage provides a definition of where thickness is to be measured for the purposes of interpreting the claim.

4. Third auxiliary request (Article 56 EPC 1973)

Claim 1 includes the features of granted claims 1 and dependent claim 3. No objection was raised by the respondent under Article 123(2) EPC in relation to the content of the application as filed in this regard, nor did the Board itself find any reason why the requirement of Article 123(2) EPC would not be met.

4.1 Inventive step

The closest prior art may be taken as E8, which discloses a sprocket cluster 10 for a bicycle, comprising a plurality of sprockets 12 coaxially mounted together in an axially fixed position relative to each other, wherein a free space defining a spacing is disposed between a root circle portion of the smaller diameter sprocket of each pair of adjacent sprockets and an axially aligned portion of the larger diameter sprocket of each pair of adjacent sprockets, and wherein the spacing between each pair of adjacent sprockets is less than or equal to a thickness of at least one of the plurality of sprockets 12 (see e.g. Figures 3c, 3d and 11; col. 15, lines 11 to 28).

4.2 The difference of claim 1 with regard to the disclosure in D8 lies only in that the spacing between each pair of adjacent sprockets is less than or equal to approximately 2.0 millimetres.

The technical problem underlying the claimed invention is to increase the number of sprockets in a sprocket cluster without increasing the total width of the cluster (see patent col. 1, lines 26 to 31). The object underlying D8 (see e.g. col. 1, lines 32 to 43) and also the solution thereto (see above 4.1) is the same as that of the patent in suit. Therefore the objective problem can be seen only to lie in the provision of an appropriate sprocket cluster arrangement which still solves the same underlying problem.

4.3 It is within the knowledge of the skilled person in the field of bicycle chain drives that the available space for mounting a sprocket cluster is restricted by the construction of a bicycle to about 50 millimetres. On the other hand, it is well-known that a minimum thickness of a sprocket of about 2 millimetres is

necessary for reasons of strength and stability. In E8, Fig. 11, the cluster comprises 15 sprockets, and within the normal dimensions of the thickness of a sprocket about 20 millimetres are then available for the total 14 free spaces between these sprockets in their root circle portion. This means that the spaces have an average width of less than 1.5 millimetres. Even if the spaces between the sprockets shown in E8 (see Figures 3c and 3d) have different dimensions, it can be derived by the skilled person that the spaces between the sprockets 12a, 12b provided by spacer 15 have a smaller width than the thickness of the sprockets, and therefore are in the range of 2 millimetres or less. Consequently the sprocket cluster according to claim 1 having the particular claimed dimensions of spacing between the sprockets would be arrived at without involving an inventive step.

4.4 The appellant's arguments that E8 did not disclose a spacing in a root circle portion (Fig. 3d) or did not at all disclose a spacing (Fig. 3c) are not convincing. A root circle portion as claimed is not precisely defined, but instead can only be regarded as the area generally around the tooth space(or the tooth base). As shown in Fig. 3d, the teeth are marked with crossed full and crossed dashed lines, whereby a root circle "portion" is also present above the spacer 15. Fig. 3c shows a space between teeth 12a, 12b extending radially inwardly. The fact that this is intended as a real space and is not merely a drawing error or inaccuracy is clearly derivable from the line between securing disc 26 and sprocket 12a where no space is present. Likewise, the appellant's further argument that Figure 11 showed no space between the sprockets, and that the same was represented in Fig. 3c, is also found unconvincing since due to manufacturing tolerances it

is also entirely expected that, in the enlarged section shown in Fig. 3c, a space would indeed be present between sprockets 12b and 12c, precisely to avoid the teeth of the sprockets coming into interference contact.

5. Fourth auxiliary request (Article 56 EPC 1973)

Claim 1 includes the features of granted claims 1, 3 and 5. No objection was raised by the respondent under Article 123(2) EPC in relation to the content of the application as filed in this regard, nor did the Board itself find any reason why the requirement of Article 123(2) EPC would not be met.

5.1 Inventive step

With respect to the third auxiliary request, claim 1 of this request includes the further feature that the overall thickness of the sprocket cluster is less than or equal to 50 millimetres.

5.2 Since the consideration of the technical problem underlying claim 1 of the third auxiliary request is not altered by the introduction of the feature of granted claim 5, nor by the removal of the words "approximately", this added feature does not give rise to a different finding concerning lack of inventive step.

As discussed above (4.3) it belongs to the knowledge of the skilled person that the maximum available space for a sprocket cluster at the rear wheel of a bicycle provided by normal design considerations is about 50 millimetres. By applying that common knowledge to the sprocket cluster of claim 1 of the third auxiliary

request, the skilled person is thus lead to the subject-matter of claim 1 of the fourth auxiliary request without an inventive step being involved.

6. Fifth auxiliary request (Article 13 RBPA)

6.1 According to Article 114(2) EPC the European Patent Office may disregard facts or evidence which are not submitted in due time by the parties concerned. In Article 13(1) of the Rules of Procedure of the Boards of Appeal (RBPA) it is stated that it is within the Board's discretion to admit and consider any amendment to a party's case after it has filed its grounds of appeal or reply. The discretion shall be exercised inter alia in view of the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy. According to the established case law of the Boards of Appeal a late filed request should only be admitted into the proceedings if it overcomes all deficiencies raised up until that stage and appears at least *prima facie* allowable.

6.2 Claim 1 as filed during the oral proceedings was amended by the replacement of "... between a root circle portion (R) of the smaller diameter sprocket ..." to "... between the root circle of the smaller diameter sprocket ...".

6.3 The appellant argued that in addition to the technical problem of increasing the number of sprockets in a sprocket cluster a further problem was solved in that a very narrow conventional chain could be used. The respondent was of the opinion that it had already on 17 April 2009 addressed the lack of preciseness of the

term "root circle" used in the amended claim, which could vary dependent on the form of the teeth.

6.4 By the amendment, the original technical problem to be solved was not only supplemented, but in view of the argument concerning the use of a particular chain - which was not at all the subject of the patent – an entirely new set of circumstances arises in regard to the problem to be solved. At least for the reason that this would require the discussion of new and complex issues of the case, going in a different direction to those addressed in the written submissions, and given the fact that the appellant had been aware of arguments of the respondent concerning the lack of preciseness of the terminology relating to the root circle, the Board exercised its discretion not to admit the fifth auxiliary request into the proceedings.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Patin M. Harrison

Decision electronically authenticated