

Internal distribution code:

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

**Datasheet for the decision
of 28 November 2016**

Case Number: T 0075/12 - 3.2.06

Application Number: 06004880.8

Publication Number: 1700781

IPC: B62M9/10, F16H55/30

Language of the proceedings: EN

Title of invention:

Bicycle sprocket

Patent Proprietor:

SHIMANO INC.

Opponent:

SRAM Deutschland GmbH

Headword:

Relevant legal provisions:

EPC Art. 100(a), 54, 56
RPBA Art. 13(1)

Keyword:

Novelty - (yes)

Inventive step - (yes)

Late-filed argument - admitted (no)

Decisions cited:

Catchword:



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 0075/12 - 3.2.06

D E C I S I O N
of Technical Board of Appeal 3.2.06
of 28 November 2016

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

Representative: Thum, Bernhard
Wuesthoff & Wuesthoff
Patentanwälte PartG mbB
Schweigerstraße 2
81541 München (DE)

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

Representative: Grosse Schumacher Knauer von Hirschhausen
Patent- und Rechtsanwälte
Nymphenburger Strasse 14
80335 München (DE)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 28 November 2011 rejecting the opposition filed against European patent No. 1700781 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	M. Harrison
Members:	T. Rosenblatt
	E. Kossonakou

Summary of Facts and Submissions

I. The opposition division rejected the opposition filed against European patent No 1 700 781. The patent was granted with the following independent claims.

"1. A bicycle sprocket (71) comprising:
a metallic sprocket ring part (90, 190, 290) including a ring element (92, 192, 292) with a plurality of sprocket teeth (92a, 192a, 292a) located on an outer periphery of the ring element (92, 192, 292), a plurality of connecting elements (94) located on an inner periphery of the ring element (92, 192, 292) and a plurality of internal fastening elements (93, 193, 293) located on radial inner ends of the connecting elements (94), respectively; **characterised by**
a synthetic resin fastening part (91, 191, 291) non-movably formed on both axial faces of the sprocket ring part (90, 190, 290) at a location radially inwardly of the sprocket teeth (92a, 192a, 292a) so as to cover at least a portion of the inner periphery of the ring element (92, 192, 292), the connecting elements (94), and the internal fastening elements (93, 193, 293).

11. A bicycle sprocket (71) comprising:
a metallic sprocket ring part (90, 190, 290) including a ring element (92, 192, 292) with a plurality of sprocket teeth (92a, 192a, 292a) located on an outer periphery of the ring element (92, 192, 292), a plurality of spike fastening structures (96) configured to fasten spike pins (98) on the ring element (92, 192, 292), and a plurality of sub-spike fastening structures (97) integrally formed with the ring element (92, 192, 292) on an inner periphery of the ring element (92, 192, 292) and configured to fasten sub-spike pins (99) at circumferentially spaced intervals along of the

inner periphery of the ring element (92, 192, 292); and **characterised by**

a synthetic resin fastening part (91, 191, 291) non-movably formed on both axial faces of the sprocket ring part (90, 190, 290) at a location radially inwardly of the sprocket teeth (92a, 192a, 292a) so as to cover at least the inner periphery of the ring element (92, 192, 292) and the sub-spike fastening structures (97)."

II. In its decision the opposition division found that the subject-matter of claims 1 and 11 was novel and involved an inventive step in view of inter alia the following prior art:

E1: EP-A-1 609 714,
E5: US-B-4 475 894,
E6: DE 202 18 755 U1
E7: EP-A-1 504 988,
E8: EP-A-1 167 174-

It also decided to not admit document

E10: GB-A-5099,

for lack of *prima facie* relevance in regard to the requirements of both novelty and inventive step.

III. The appellant (opponent) filed an appeal against the opposition division's decision to reject the opposition.

IV. The parties were summoned to oral proceedings before the Board of Appeal, which took place on 28 November 2016. During the oral proceedings the appellant stated that it did not maintain its novelty objections against claim 1 based on E5 and E10.

- V. The appellant requested that the decision under appeal be set aside and the patent be revoked.
- VI. The respondent (patent proprietor) requested dismissal of the appeal.
- VII. The arguments of the appellant may be summarised as follows:

The subject-matter of claim 1 lacked novelty in view of E1, in particular in view of the embodiment shown in Figure 5 and additionally in view of the embodiment shown in Figure 8. The embodiment of Figure 5 of E1 corresponded exactly to the embodiment shown in Figure 11 of the patent which constituted an embodiment of the invention and thus fell under the scope of claim 1. Since according to that embodiment and as stated in paragraph 66 of the patent, the ring element, the connecting elements and the internal fastening elements could be formed separately, the expressions "located on an inner periphery" and "located on radial inner ends" in claim 1 could be given their broadest meaning according to which the respective elements could be separated by a larger distance.

The subject-matter of claim 1 was obvious, starting from the sprocket shown in Figure 4 of E5 as closest prior art in combination with the teaching of E6. Also, since according to paragraph 5 of the patent E6 disclosed the features of the preamble of claim 1, which could consequently also be considered as closest prior art, the features in the characterising portion were obvious in view of E5 or E7. Starting from E7 as closest prior art, the subject-matter of claim 1 was obvious in combination with E6.

E10 should be admitted into the proceedings. The opposition division incorrectly exercised its discretion when assessing the relevance of E10 in regard to inventive step. The subject-matter of claim 1 was obvious in view of a combination of E10 with for example E5 or E7.

The subject-matter of claim 11 was obvious when considering either of E5 or E7 as closest prior art in combination with E8 or when considering E8 as closest prior art in combination with either of E5 or E7.

VIII. The respondent's arguments may be summarised as follows.

The features in the preamble of claim 1 were necessarily all integrally formed as implied by the wording "located on" in claim 1. The sprocket shown in Figure 11 of the patent concerned a different embodiment and did not fall under claim 1; rather it constituted an embodiment of independent claim 11.

E1 failed to disclose connecting elements according to the preamble of claim 1.

The decision of the opposition division not to admit E10 into the proceedings should be followed. The content of E10 was not *prima facie* relevant for novelty or inventive step.

E5 failed to disclose internal fastening elements and connecting elements according to the preamble of claim 1, as well as the corresponding features of the characterising portion. The bushes 23 in Figure 4 of E5 were not located on radial inner ends of some

connecting element. The only embodiment of a bicycle sprocket disclosed in E6 comprised a gap between the inner carbon fibre wheel and the outer metal sprocket ring to allow for relative movement between the two components. The skilled person was prevented thus to combine this teaching with the sprocket known from E5. Moreover there was no motivation in E6 to provide connecting elements and to further embed them into the synthetic resin. Claim 1 was not obvious from E5 and E6, irrespective of which document was chosen as closest prior art. The same reasoning applied when considering the combination of documents E6 and E7.

Concerning claim 11, neither E5 nor E7 disclosed fastening structures for spike pins or sub-spike pins. E8 disclosed such fastening structures but located on the lateral sides of the metal sprocket ring, rather than on its inner periphery. There was no indication to cover fastening members for sub-spike pins with synthetic resin.

Reasons for the Decision

Interpretation of the claims

1. When examining whether the subject-matter of claim 1 meets the requirements of Article 54 and 56 EPC, the following considerations are taken into account.
 - 1.1 For the examination of whether these requirements are met, a comparison has to be made between the disclosure in the prior art and in particular the embodiments therein and the subject-matter defined by the actual

wording of the claim in the patent, rather than via a comparison of a figure of the patent in suit.

1.2 If the wording of a claim is clear by itself, which is undisputed at least in regard to claim 1, there is no reason to give the claim an interpretation divergent from its literal meaning on the ground that, for example, an embodiment disclosed in the description as being in accordance with the invention seemingly does not fall within the claimed subject-matter. Such inconsistency, if it existed at all, would merely be a question of whether the claims were supported by the description. This is a requirement of Article 84 EPC, which is however not a ground of opposition. The same is true in regard to statements made in the description concerning features of the claim allegedly known from the prior art.

1.3 As regards the features in the preamble of claim 1, it is not defined that the respective elements (ring element, connecting elements and internal fastening elements) have to be integrally formed. Also, the expression "including" in relation to the elements of the metallic sprocket ring part does not mean that the list of defined elements is necessarily exhaustive.

The expression "a metallic sprocket ring part including" of claim 1 does however limit the claim's subject-matter to sprockets in which *inter alia* the ring element, the teeth and the connecting elements are all necessarily metallic, since these elements (at least) form the sprocket ring part.

1.4 In regard to the meaning of the expressions "connecting element" and "internal fastening element", there appears to be no reason not to give these elements

their broadest technically sensible meaning without being limited to particular embodiments disclosed in the description.

- 1.5 The conjunction "and", as used in the characterising portion of claim 1, can only be understood to define a cumulative requirement rather than different options, regarding the parts which are covered by the synthetic resin fastening part.

- 1.6 Finally, considering claim 1 as a whole the (metallic) connecting elements and the synthetic resin fastening part have to be considered as distinct features, the latter covering at least a portion of the first.

- 1.7 The appellant argued that if, according to the Board's interpretation, the components of the sprocket wheel defined in the preamble of claim 1 were not required to be integrally formed, the respective components could be separated by a larger distance between them. The Board does not accept this argument. The expressions "located on an inner periphery" or "located on radial inner ends", used in the claim's preamble, imply a direct contact between the respective pair of components. Otherwise, following the appellant's interpretation, the claim would encompass arrangements in which components placed at, for example, the position of the ring element's central axis, such as the axial bolt fastening the crank shaft to the crank arms, which in the mounted state were also connected via a number of further components, would have to be considered as being "located on the internal periphery" of the ring element. This would be contrary to the normal meaning of that expression and thus highly contrived rather than being technically sensible.

The Board does also not accept that such an interpretation would be justified in view of the embodiment of Figure 11 of the patent in suit. Figure 11 relates to a third embodiment of the invention (see column 8, lines 17-25). It is described in detail in paragraphs 66 and 69 of the patent. The beginning of paragraph 66 discloses that, in contrast to the previous embodiments in which the internal fastening elements were formed integrally [via the connecting elements] with the ring element, the internal fastening element can be formed separately from the ring member. According to Figure 11 the internal fastening element, constituted by a cylindrical member 100, is mounted to the (metallic) ring element 292 via a synthetic resin fastening part 291. From that Figure and the corresponding passages of the description, it cannot be derived that the (circumferential) ridges 100b of the "cylindrical member 100 that correspond to the internal fastening elements" (see column 16, line 44/45) correspond to connecting elements of claim 1. Interpreting the circumferential ridge 100b or its upper part pointing radially outwardly to the inner periphery of the ring element, as a connecting member, as suggested by the appellant, is simply not supported by the description. Moreover, considering only a limited upper portion of the circumferential ridge 100b as a connecting element would not comply with the very wording of claim 1 which states that the internal fastening elements, rather than merely a portion thereof, are located at the radial inner ends.

Also the fact that claim 1 comprises reference numerals which are used in the patent only in relation to the embodiment of Figure 11 does not change this finding. Notwithstanding the fact that Rule 43(7) EPC explicitly excludes such a limiting interpretation (as also argued

by the respondent), the single reference numeral 94 used in claim 1 for the feature "connecting elements" is found only in those figures which actually show connecting elements. In contrast, the reference numeral 100b designating the circumferential ridge in Figure 11 is not used in claim 1. The Board thus cannot find any indication in the patent which would support an interpretation of the ridge 100b as being an embodiment of a connecting element according to claim 1.

In fact, as also pointed out by the respondent, the embodiment of Figure 11 comprises the features defined in independent claim 11 and is thus an embodiment of that invention.

Article 100(a) in combination with 54 EPC

2. The only objection maintained by the appellant against the subject-matter of claim 1 is based on E1. During the oral proceedings before the Board, the appellant withdrew its other objections based on E5 and E10.
3. E1 is a European patent application published in the priority interval of the patent in suit. It has not been argued by the appellant that the subject-matter of claim 1 was not disclosed in the Japanese application from which the patent in suit claims priority and the Board also could not see that this would be the case. Therefore E1 constitutes prior art within the meaning of Article 54(3) EPC.

The appellant argued nevertheless that the priority was not valid since the patent's priority application was not the first application within the meaning of Article 87(4) EPC. However, this does not need to be considered

further since the subject-matter of claim 1 is new with regard to E1, as explained below.

4. The argument of the appellant is in essence based on the similarity of the sprocket wheel disclosed in Figure 5 of E1 and the embodiment disclosed in Figure 11 of the patent as far as claim 1 is concerned, assuming that the embodiment of Figure 11 is covered by claim 1. The latter assumption is however not justified as explained above.

5. In the sprocket wheel of Figure 5 of E1 a tubular metallic member 92, provided with an annular flange section 92b, serves as a (metallic) internal fastening member. The tubular member 92 with its annular flange section 92b is mounted in the sprocket wheel by means of a fastening part 91 made of a synthetic resin in a similar manner to the cylindrical member 100 in Figure 11 of the patent, that is without a (metallic) connecting member located on an inner periphery of the corresponding (metallic) sprocket ring part 90. For similar reasons as given in regard to the circumferential ridge 100b in Figure 11 of the patent, the corresponding flange section 92b of the tubular member 92 cannot be considered as a connecting member located on an inner periphery of the ring member according to claim 1. No other feature in Figure 5 of E1 can be identified with such metallic connecting element as defined in claim 1.

For this reason the subject-matter of claim 1 is new in view of E1 (Article 54(3) EPC).

6. In the oral proceedings before the Board of Appeal, the appellant raised for the first time a novelty objection

against claim 1 based on the embodiment illustrated in Figure 8 of E1.

7. The Board considers this new objection to be an amendment to the appellant's case. According to Article 13(1) of the Rules of Procedure of the Boards of Appeal, RPBA, any amendment to a party's case may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of *inter alia* the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy.

In order to be in line with the requirement of procedural economy, a new objection should be *prima facie* relevant in the sense that it is immediately recognisable that it will likely change the outcome of the appeal.

8. The novelty objection based on Figure 8 of E1 is however not *prima facie* relevant. In this embodiment the inner periphery 90e of the sprocket ring part has a serrated surface 90f. It constitutes an alternative embodiment to the series of holes circumferentially formed through the sprocket ring part and which serve to firmly anchor the synthetic resin fastening part 91 to the sprocket ring part 90'. The appellant considered the large bottom portions of the individual teeth on the surface 90f to constitute connecting elements and their respective tips to constitute internal fastening elements. Fastening of the synthetic resin part 91 to the sprocket ring part 90 is however achieved by the entire serrated structure, including the base portions of the individual teeth 90f and not only by their tips. With such a far-fetched interpretation, a distinction

between connecting elements and fastening elements, as defined in claim 1, would be deprived of any sense.

The Board thus exercised its discretion under Article 13(1) RPBA not to admit this objection into the proceedings, as it was at least *prima facie* highly unlikely to prejudice the maintenance of the patent

9. Novelty of the subject-matter of independent claim 11 has never been disputed. The Board also sees no reason to find differently.

10. It follows that in view of the prior art on file, the ground of opposition under Article 100(a) in combination with 54 EPC does not prejudice the maintenance of the patent.

Article 100(a) in combination with 56 EPC - claim 1

11. For examining whether the subject-matter of claims 1 (and 11) involves an inventive step, the problem-solution approach will be used.

12. Concerning the subject-matter of claim 1, the appellant argued that its subject-matter was obvious to the skilled person starting from either E5, E6 or E7 in combination with the teaching of some of the respective other documents.
 - 12.1 E5 discloses (in Figure 4 in combination with Figure 2) a bicycle sprocket composed of a metallic ring element 3 including a plurality of sprocket teeth 5. The ring element is embedded into an outer annular connector portion 6 of a plastic injection molded member (cf. col. 2, lines 33-38). The ring element 3 comprises through holes 25 which are penetrated by the plastic

material so as to securely fix the two components to each other. The plastic member has five support arms 4 in which bushes 23 are mounted for fastening a plate member and the crank. As pointed out by the respondent, the material of the bushes 23 is not disclosed in E5. The appellant did not contest that metallic connecting elements as defined in the preamble of claim 1 were also not disclosed. As a consequence, also the feature in the characterising portion according to which the synthetic resin fastening part was required to cover at least a portion of the (metallic) connecting elements (these being equated with bushes 23 by the appellant), is not disclosed in E5, contrary to what the appellant argued.

- 12.2 E6 discloses a bicycle sprocket comprising a ring element 20 made of an aluminium alloy provided on its outer periphery with a plurality of sprocket teeth 50. At its inner periphery an inner wheel 30 made of a carbon fibre material (penultimate paragraph on page 2 according to the page numbering apparent under the dotted application number) is attached to it by rivets ("*Verschlussteil* 40"). Rivets 40 are received in roughly semi-circular recesses formed in the inner contour or periphery of the ring element 20 and on corresponding positions on the outer periphery of the inner wheel 30. Between the inner carbon fibre wheel 30 and the outer Al-alloy ring 20 a narrow gap is required to accommodate for the different thermal expansion coefficients of both materials (2nd paragraph on page 3 according to the above mentioned page numbering). The inner wheel 30 has five radially inward extending portions provided with holes, as can be seen in the three-dimensional Figures 1 and 2. It is undisputed that E6 does not disclose at least the features in the characterising portion of claim 1.

- 12.3 E7 discloses a bicycle sprocket very similar to the one of E1 with the difference that the tubular member 92 is missing. In all other aspects relevant to the subject-matter of claim 1 the sprocket of E7 is however of the same construction, consisting of an outer metal sprocket ring part 90 provided with teeth 90a and an inner synthetic resin fastening part 91, comprising arch elements 91c ("connecting elements") which at their radial inner ends comprise fastening flanges 91d and fastening holes 91e ("internal fastening elements"). The resin fastening part is non-movably fixed to the metal sprocket ring part by a similar construction to that in E5, namely by a series of holes 90d circumferentially formed in the metal ring part 90 and penetrated by the resin material of the fastening part 91. Connecting elements and internal fastening elements are thus not made of metal, so that neither these features of the preamble of claim 1 nor their covering by the resin part according to the characterising portion of claim 1 is disclosed in E7.
- 12.4 All documents are equally appropriate to be considered as suitable starting points for the problem-solution approach.
13. Starting from E5 as the closest prior art to the subject-matter of claim 1, the Board can accept the problem formulated by the appellant based on the distinguishing features as being an objective one, which was formulated as providing a bicycle sprocket with increased stiffness in particular in the regions of the arms 4 of plastic member 6.
- 13.1 The Board however does not accept the argument of the appellant made in the oral proceedings that the skilled

person would just select the ring element 20 of E6, this means in isolation from the inner carbon fibre wheel 30, and mount it in place of the metallic sprocket ring 3 of Figure 4 of E5. E6 does not contain any teaching leading the skilled person to believe that the ring element 20 on its own would provide a stiffer sprocket when mounted to a sprocket according to E5. The structure of the bicycle sprocket of E6 requires a gap between its two components. The structure of the ring 20 comprising the circumferentially spaced semi-circular recesses on its inner periphery is apparently chosen so as to allow the rivets 40 to secure the inner carbon fibre wheel 30 on the ring 20 while allowing for slight movement between these two components so as to accommodate their different thermal expansion coefficients. This teaching is already incompatible with the fixed, i.e. non-movable connection of the respective components of E5, as pointed out also by the respondent. Nothing in E6, except for impermissible use of hindsight, points the skilled person to consider that particularly the portions of the sprocket ring 20 located between the semi-circular recesses could provide increased stiffness compared to the ring 3 used in the sprocket of Figure 4 of E5.

- 13.2 The argument of the appellant submitted in the written part of the procedure, based on the consideration that the rivets 40 of E6 constituted connecting elements within the meaning of claim 1, is also not persuasive. As argued by the respondent, there is no motivation for the skilled person to provide these connecting elements in the form of rivets 40 also in a sprocket according to E5 and to further embed them even into the synthetic resin. The appellant did not respond to this argument. Indeed the rivets of E6 serve the purpose of securing the two components 20 and 30 while maintaining the gap

for allowing relative movement between them. As explained before, the two corresponding components of the sprocket of E5 are secured gap-less and non-movably by a different construction (see above point 12.1). There is no indication, unless by the impermissible use of hindsight, which would guide the skilled person to keep the now purposeless rivets 40 in a sprocket of E5 when replacing the metallic sprocket ring 3 by the metallic ring element 20 of E6, and further even embedding the rivets into the synthetic resin.

14. The Board concludes that starting from E5 as the closest prior art, the subject-matter of claim 1 is not rendered obvious by the teaching of E6.
15. The same conclusions are reached when starting from E7 as the closest prior art. In fact, the structure of the bicycle sprocket disclosed in E7 corresponds - in regard to the features defined in claim 1 - to the construction of the sprocket of E5 (see above 12.1 and 12.3). In view of the resulting same distinguishing features and objective problem, the same considerations as set out before apply equally.
16. Starting from the bicycle sprocket of E6 as the closest prior art, the appellant raised objections based on different ways of identifying the elements shown in E6 with the features defined in claim 1 and based on combinations with either of E5 or E7.
 - 16.1 On the one hand, the appellant based its argument on paragraph 5 of the patent in suit arguing that accordingly the features of the preamble of claim 1 were known from E6. Following this approach the rivets 40 allegedly constituted connecting elements within the meaning of claim 1. On the other hand the appellant

identified the semi-circular recesses on the inner periphery of the ring element 20, receiving the rivets 40, as constituting internal fastening elements located on radial inner ends of connecting elements, which connecting elements in turn would be formed by those portions of the ring element 20 which extended radially inward on both sides of each of the rivet-receiving recesses.

- 16.2 Irrespective of how exactly the features of the sprocket wheel disclosed in E6 are identified with the features according to claim 1 and irrespective of the technical effect that the distinguishing features could then be seen to achieve, the outcome of the objection cannot be different as the conclusions reached when starting from E5 or E7 as the closest prior art and combining this with the teaching of E6. As stated above (point 13.1), the composite construction of the sprocket wheels of E5 or E7 is incompatible with that of E6. An indication in E5 or E7 which would have led the skilled person to consider that the fixed, non-movable connection between the two relevant components in E5 could be dispensed with or that it could replace in some way the gap foreseen in E6 to accommodate different thermal expansion coefficients could not be found.
- 16.3 The Board concludes that starting from E6 as the closest prior art, the subject-matter of claim 1 is not rendered obvious by the teaching of E5 or E7.
17. In summary, the subject-matter of claim 1 is considered to involve an inventive step.

Admittance of E10

18. E10 was filed by the appellant in the opposition proceedings in reply to the opposition division's preliminary opinion sent in preparation for oral proceedings.
19. As stated in the Board's communication containing its preliminary opinion on the case, the opposition division exercised its discretion under Article 114(2) EPC to disregard the late filed document (E10) by correctly applying the relevant criteria. The division examined the procedural conditions under which the document had been filed and its *prima facie* relevance for novelty and inventive step on the basis of the objections raised by the opponent. The reasoning for its decision given in points 3.2.6 to 3.2.11 does not show any sign of an inappropriate exercise of its discretionary power.
20. In the oral proceedings before the Board, the appellant argued for the first time, after having withdrawn its novelty objection based on E10, that the division did not correctly exercise its discretion in that the content of E10 and therewith its relevance for the requirements of inventive step was incorrectly assessed. The Board does not accept this argument.

In points 3.2.7 and 3.2.8 of the impugned decision, the opposition division identified the features of claim 1 which are not disclosed in E10. In point 3.2.11 the division held that E10 related to a bicycle sprocket providing elasticity and, being disclosed in 1897, did not give consideration to the weight of the sprocket. The Board agrees with this assessment of the content of E10. The sprocket disclosed in E10 indeed employs a

rubber element between the toothed gear wheel and the hub components to allow for circumferential backward and forward movement between the gear wheel and the hub as well as variation to the left and right side from its true perpendicular alignment. This implies a much higher elasticity of the rubber component compared to that of the resin part according to the patent in suit which aims for a stiff and lightweight (modern) bicycle sprocket, see paragraph 10 of the patent. Accordingly, a skilled person would thus not have considered E10 when looking for a solution for a stiff and lightweight sprocket. The division's conclusion that E10 was not *prima facie* relevant for the question of inventive step was thus based on a correct assessment of this document.

The appellant furthermore argued that E10 was the only document which disclosed metal connecting elements integrally formed and thus located on an inner periphery of the ring element so that it was highly relevant in view of the combinations with E5, E6 and E7, which did not show integral internal fastening elements of this type. This argument must fail for a similar reason as noted already above: E10 relates to a completely different type of sprocket with a required high degree of flexibility compared to the sprockets considered in the patent and in the remaining prior art cited by the appellant, so that it is not immediately apparent that the skilled person would consider to combine the respective teachings.

21. The Board thus has no reason to overturn the discretionary decision of the opposition division to not admit E10 into the proceedings, which is hereby confirmed.

Article 100(a) in combination with 56 EPC - claim 11

22. Concerning the subject-matter of claim 11, again the appellant raised several objections, starting from either of E5, E7 or E8 as closest prior art and combining the respective document with some other of these three documents. None of these objections is however successful for the following reasons.
23. Starting from E5 as closest prior art, the appellant recognised that spike fastening structures and sub-spike fastening structures configured to fasten respective spike pins and sub-spike pins were not disclosed. These features would allow for softer gear changes, which can be considered as an objective problem.
- 23.1 The Board can accept that some of the holes 25 shown in Figure 4 of E5, formed in the outer metal sprocket ring and filled by the synthetic resin of the resin part 1 for securing it to the metal sprocket ring 3, could in principle be used to install spike pins. However, this consideration can only arise from hindsight because E5 does not even mention spike pins, let alone to install them in some of the already present holes 25 filled by the resin.
- 23.2 E8 discloses a sprocket assembly comprising spikes and sub-spikes in order to facilitate shifting the chain from the larger to a smaller sprocket. It does however not suggest to use resin filled holes as fastening structures for the respective (sub-) spike pins 10 and 11. E8 does not even teach a sprocket wheel comprising a synthetic resin part. The fact that pins 10 and 11 inserted in dedicated holes in the bigger sprocket S1 are shown in Figure 6b of E8 does not constitute a hint

to use holes like those referred to above in the sprocket of E5 for pin fastening.

23.3 Moreover, E8 does also not suggest to add holes radially inward from the holes 25 on the metal sprocket ring 3 of E5 so as to provide for sub-spike fastening structures formed integrally with the ring on its inner periphery. Rather the structures for fastening the sub-spike pins in E8 are, as also argued by the respondent, disclosed as being located on the lateral face 7 of the sprocket S1, see col. 4, lines 24-31 of E8. None of the Figures of E8, including Figure 6b, allows an inner periphery of the sprocket wheel to be identified, let alone its position relative to the location of the pins 10 and 11.

23.4 Even if the skilled person were to decide to provide spike and sub-spike pins as known from E8 on the bicycle sprocket of E5 in order to solve the problem mentioned above, further modification of the features disclosed in E5 and E8 would be necessary in order to arrive at the subject-matter according to claim 11 (for example, providing the fastening structures on an inner periphery instead of a lateral side of the metal gear). There is however no teaching available to the skilled person from E5 or E8 to make such further modifications.

23.5 The Board thus concludes that the subject-matter of claim 11 is not rendered obvious when considering the disclosure in E5 and E8.

24. Starting from a sprocket wheel as shown in Figure 4 of E7 as the closest prior art, the Board cannot reach a different conclusion. Like E5, E7 discloses small holes 90d for securing an inner resin part 91 to a metal

sprocket ring 90. It does however not disclose any fastening structures for sub-spike or spike pins.

The structure and function of features corresponding to the small circles depicted on the metal sprocket ring 90, for example at and close to the 6h-clock position and around the 3h-clock and 11h-clock positions, is nowhere described in E7. For its argument that these circles corresponded to spike pins or holes for fastening them, the appellant could not provide any basis and the Board also cannot find any. Figure 3 of E7, to which the appellant also referred in this context, does not disclose any pin which interacted with the chain when it was removed (intentionally or by accident) from one of the sprockets.

Consequently, based on the same distinguishing features and on the same problem formulated as in regard to the above considered objection starting from E5 as the closest prior art, the solution according to claim 1 cannot be considered to be obvious in view of a combination of E7 and E8 for equivalent reasons as given previously.

25. Finally, also the objections based on E8 as the closest prior art, combined with the teaching of either E5 or E7, does not lead to a different result. Similarly, the respective combinations of features known from these documents would again require further modifications of the resulting bicycle sprocket in order to arrive at the subject-matter of claim 11, as was also found by the opposition division in the impugned decision under items 3.12.8 to 3.12.15 and 3.13. In its appeal grounds the appellant just repeated its objection already dealt with by the opposition division without refuting the division's considerations in regard to the necessity of

further (non-obvious) modifications (as also pointed out by the respondent in its reply to the appeal grounds). Subsequent to that, the appellant did not provide any additional comments in this regard. The Board therefore cannot see any reason to deviate from the conclusions drawn by the opposition division. The subject-matter of claim 11 is thus not obvious in view of a combination of E8, considered as the closest prior with the teaching of either E5 or E7.

26. It follows that in view of the prior art cited by the appellant, the ground of opposition under Article 100(a) in combination with 56 EPC does not prejudice the maintenance of the patent.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



M. H. A. Patin

M. Harrison

Decision electronically authenticated