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**Datasheet for the decision  
of 13 May 2014**

**Case Number:** T 2364/10 - 3.2.06

**Application Number:** 03003696.6

**Publication Number:** 1342657

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**Language of the proceedings:** EN

**Title of invention:**

Sprocket assembly for a bicycle

**Patent Proprietor:**

SHIMANO INC.

**Opponent:**

SRAM Deutschland GmbH

**Headword:**

**Relevant legal provisions:**

RPBA Art. 13(1)  
EPC 1973 Art. 56, 84  
EPC Art. 123(2)

**Keyword:**

Amendments - added subject matter -  
main request, first auxiliary request (yes)  
Late filed requests - second and third auxiliary requests -  
admitted (yes)  
Inventive step -  
second auxiliary request (no), third auxiliary request (yes)

**Decisions cited:**

**Catchword:**



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Case Number: T 2364/10 - 3.2.06

**D E C I S I O N  
of Technical Board of Appeal 3.2.06  
of 13 May 2014**

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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
4 October 2010 concerning maintenance of the  
European Patent No. 1342657 in amended form.**

**Composition of the Board:**

**Chairman** M. Harrison  
**Members:** M. Hannam  
W. Sekretaruk

## Summary of Facts and Submissions

I. An appeal was filed by the appellant (opponent) against the interlocutory decision of the opposition division which found that European patent No. 1 342 657 in an amended form met the requirements of the EPC. In support of its request to revoke the patent, the appellant submitted arguments relating to objections under Articles 56 and 123(2) EPC. The following documents were cited in support of its request:

E1	EP-A-0 834 450
E10	GB-A-1 202 886
E11	US-A-4 121 474

II. The respondent (proprietor) submitted arguments in support of a main request to dismiss the appeal, auxiliarily requesting that the patent be maintained according to an auxiliary request 1.

III. The Board issued a summons to oral proceedings including a communication containing its provisional opinion, in which it indicated *inter alia* that the subject-matter of claim 9 of the main request appeared not to meet the requirement of Article 123(2) EPC. It furthermore indicated that the subject-matter of claims 1 and 13 of the main request involved an inventive step over the appellant's objections in this respect.

IV. Oral proceedings were held before the Board on 13 May 2014, during which the appellant filed further auxiliary requests 2 and 3.

The appellant requested that the decision under appeal be set aside and that the European patent No. 1 342 657 be revoked. The respondent requested that the appeal be

dismissed or the European patent be maintained on the basis of auxiliary request 1, filed 20 May 2011, or on the basis of one of the auxiliary requests 2 or 3, both filed 13 May 2014.

V. Claim 9 of the main request reads as follows:

"A sprocket assembly comprising:  
a tubular member (150);  
a sprocket (34I') comprising:  
a sprocket portion (700) having a plurality of radially extending teeth (704); and  
a coupling portion (708) extending from a side of the sprocket portion (700) and having a coupling structure (716) disposed on an outer peripheral surface (720) thereof,  
wherein the coupling structure (716) comprises a plurality of splines,  
characterized in that  
the tubular member (150) has an unsplined outer peripheral surface (188) and  
the coupling portion (708) has an unsplined inner peripheral surface (758) that fits around the unsplined outer peripheral surface (188) of the tubular member (150),  
wherein the tubular member (150) supports the sprocket (34I')."

Claim 9 of auxiliary request 1 reads as per claim 9 of the main request with the insertion of the following feature directly after the first recitation of 'unsplined outer peripheral surface (188)':

", the coupling portion (708) has a tubular shape, the sprocket portion (700) and the coupling portion (708) are formed as one piece".

Claim 15 of auxiliary request 2 reads:

"An apparatus for supporting a plurality of sprockets as defined by any of the previous claims, comprising: a first tubular member (130) having a first end portion (135) and a second end portion (137), wherein the first tubular member (130) has a first outer peripheral surface (185) suitable for supporting a first plurality of sprockets;

a separate second tubular member (150) having a first end portion (154) and a second end portion (158), wherein the second tubular member (150) has a second outer peripheral surface (188) suitable for supporting a second plurality of sprockets;

wherein the first end portion (154) of the second tubular member (150) is coupled to the second end portion (137) of the first tubular member (130) wherein an outer peripheral surface (162) of the first end portion (154) of the second tubular member (150) has a threaded portion (162) that screws into a threaded portion of an inner peripheral surface (166) of the second end portion (137) of the first tubular member (130)."

Claim 1 of auxiliary request 3 reads:

"A sprocket comprising:

a sprocket portion (200) having a plurality of radially extending teeth (204);

a first coupling portion (208) extending from a first side (212) of the sprocket portion (200) and having a first coupling structure (216) disposed on an inner peripheral surface (220) thereof; and

a second coupling portion (224) extending from an opposite second side (228) of the sprocket portion (200) and having a second coupling structure (232) disposed on an outer peripheral surface (236) thereof,

characterized in that the first coupling structure (216) comprises a plurality of splines and the second coupling structure (232) comprises a plurality of splines."

Claim 9 of auxiliary request 3 reads:

"A sprocket comprising:

a sprocket portion (500) having a plurality of radially extending teeth (504);

a first coupling portion (508) extending from a first side of the sprocket portion (500) and having a first coupling structure (516) disposed on an inner peripheral surface (536) thereof; and

a second coupling structure (524) disposed on an inner peripheral surface (536) of the sprocket portion (500), characterized in that

the first coupling structure (516) comprises a first plurality of splines and the second coupling structure (524) comprises a second plurality of splines."

VI. The appellant's arguments may be summarised as follows:

Regarding the main request, claim 9 represented an inadmissible intermediate generalisation of the embodiment disclosed in Figs. 7 - 10 and paragraphs [0031] - [0037], particularly since it was a sprocket assembly, rather than simply a sprocket, which was claimed. Claim 9 of auxiliary request 1 met with similar objections under Article 123(2) EPC since there was no originally filed disclosure of just tubular member 150 and sprocket 34I' without the further structurally and functionally related features of the specific embodiment disclosing the sprocket assembly.

Both auxiliary request 2 and auxiliary request 3 were not to be admitted under Article 13(1) RPBA since they

were filed during oral proceedings and changed the focus of the claims completely by complete removal of independent claims which had been discussed in detail, thus giving rise to the need to discuss issues which had not needed to be addressed previously.

Regarding claim 15 of auxiliary request 2, the arguments to the (then) claim 19 filed with the grounds of appeal included a general introductory portion which applied to all claims in the opposed patent. The soldered joint between the bodies 8 in E10 would be exchanged for a screwed connection by the skilled person looking to find an alternative connecting arrangement, thus depriving the subject-matter of claim 15 of an inventive step (Article 56 EPC). Such an alternative was even disclosed in E10 itself, albeit exemplified for a connection of two other elements.

The subject-matter of claim 1 of auxiliary request 3 lacked an inventive step starting from E1 in combination with the general knowledge of the skilled person. Col.1, lines 32-40 of E1 discussed the problem of chain transfer between sprockets which could be overcome with splined couplings between the sprockets and their support. The bolted fixing of E1 failed to achieve this accurate relative circumferential location between adjacent sprockets. If a change to a splined coupling were made, a glued or press-fitted sprocket would also fulfil the axial location need. A glued or welded fitting disclosed in Figs. 7 and 8 of E1 failed to achieve the required accurate circumferential location, such that the skilled person would also provide these with a splined coupling. This would also provide a higher torque transfer possibility which was a solution known to the skilled person.



The subject-matter of claim 9 of auxiliary request 3 also lacked an inventive step when starting from E11, particularly the sprocket 10 disclosed in Fig. 2, and combining this with the teaching of E1 to provide the sprocket with splines. Col.5, lines 48-51 suggested a combination of bonded or welded sprockets and splines.

VII. The respondent's arguments may be summarised as follows:

The subject-matter of claim 9 of the main request met the requirement of Article 123(2) EPC. Paragraphs [0031] - [0033] of the patent clearly disclosed the claimed features since the required functionality of the sprocket did not require any further features. An applicant should have the right to define the invention so as to differentiate it from the state of the art and thus select features from an embodiment in order to achieve this. In the present case, claim 9 was concerned with the support of sprocket 34I' by tubular member 150 and so the relationship between sprockets 34I' and 34H' was functionally irrelevant. It was furthermore unclear how the claimed subject-matter represented an intermediate generalisation.

As regards auxiliary request 1, originally filed claim 21 was directed simply to a sprocket, which sprocket was now claimed in the assembly according to Fig. 7 such that the requirement of Article 123(2) EPC was clearly met in claim 9.

Regarding the admittance of auxiliary requests 2 and 3 under Article 13(1) RPBA, relative to the main request these requests were a simplification by way of deletion of one or more independent claims present in the main request. These requests in no way increased the

complexity of the case in that the claims remaining were already present in the main request.

Regarding claim 15 of auxiliary request 2, the soldered joint in E10 prohibited an easy disconnection of the two bodies 8, such that the claims defined an invention which presented a clear advantage as regards assembly and disassembly. The arrangement of E10 was clearly suitable for supporting a plurality of sprockets, yet provided no hint to suggest a screwed rather than a soldered joint. It was furthermore evident that the alternative screwed connection would be less capable of withstanding the torque experienced by a coupling in a sprocket supporting apparatus, such that an inventive step had to be recognised.

The subject-matter of claim 1 of auxiliary request 3 involved an inventive step over E1 in combination with the skilled person since no hint was to be found in E1 suggesting the replacement of bolt 182 with a spline. Exact positioning of sprocket 130E relative to sprocket 130D was already possible without the need for a splined coupling. Also, replacement of the bolt with a splined coupling would require an additional means of axial location of the splined sprocket to be provided. The skilled person would not consider a bonded or welded coupling as requiring an additional spline for cost and complexity reasons.

The subject-matter of claim 9 of auxiliary request 3 involved an inventive step essentially for the same reasons as those presented for claim 1 of this request.

## Reasons for the Decision

1. Main request
- 1.1 The subject-matter of claim 9 fails to meet the requirement of Article 123(2) EPC.
- 1.2 Claim 9 is directed to a sprocket assembly, which is disclosed in the originally filed application (corresponding directly to the A-publication of the application) firstly in claim 63 and secondly in relation to the embodiment of Figs. 7 - 10.
- 1.3 Of these two disclosures, claim 63 is directed to a sprocket assembly comprising both a first and second tubular member. With the subject-matter of claim 9 of the present request comprising just a single tubular member, claim 63 alone is unable to provide a basis for this claimed subject-matter.
- 1.4 Regarding the second originally filed disclosure of a sprocket assembly in the embodiment of Figs. 7 - 10, the related description passages relating to this embodiment are from paragraph [0031] to [0037] of the patent specification (which correspond exactly to equivalent paragraphs in the originally filed application). The single embodiment of the sprocket assembly described in these paragraphs comprises a number of further features disclosed in combination with those included in claim 9. These further features include at least sprocket 34H' and the locknut 460, each of which is clearly included in the sprocket assembly as disclosed in Figs. 7 - 10 and the related description paragraphs.

A very clear structural and functional relationship exists between sprocket 34I', included in claim 9, and sprocket 34H' not included in claim 9, since these sprockets are rotatably coupled together by way of splines (see [0037]). Lacking the presence of sprocket 34H', the sprocket 34I' included in claim 9 is simply rotatably supported on tubular member 150, lacking any rotational drive capability. It thus follows that sprocket 34I' is functionally and structurally disclosed only in combination with sprocket 34H'.

A similarly clear functional relationship exists between sprocket 34I' and the locknut 460 since, without the locknut, sprocket 34I' would be axially unrestrained and would thus not remain, for example, engaged with sprocket 34H'. Thus also here, sprocket 34I' is disclosed functionally and structurally only in combination with the locknut 460.

Lacking at least these two features of the Fig. 7 embodiment (sprocket 34H' and locknut 460), the subject-matter of claim 9 is found to present an undisclosed combination of features of the application as originally filed, contrary to the requirement of Article 123(2) EPC.

- 1.5 The respondent's argument that the claimed sprocket 34I' was functionally independent of sprocket 34H' particularly in view of the claim being directed to the support of the sprocket 34I' on the tubular member, is not accepted. Whilst the claim is indeed directed to the support of sprocket 34I' on the tubular member 150, this does not dictate which features are required to meet the requirement of Article 123(2) EPC. Rather, it is a question of whether the claimed subject-matter is disclosed in a clear and unambiguous manner in the

originally filed application. In this respect, paragraphs [0031] to [0037] disclose a single embodiment of a sprocket assembly, which assembly discloses a plurality of elements in combination as a single disclosure. The extraction of individual features from this single disclosure for inclusion in a claim can only be seen as allowable within the requirement of Article 123(2) EPC if the extracted features have a structural and functional independence from those features of the embodiment not included in the claim. As found in point 1.4 above, sprocket 34I' does not exhibit this independence from at least sprocket 34H' and locknut 460.

- 1.6 As regards the respondent's contention that an inadmissible intermediate generalisation was not presented by the subject-matter of claim 9, the Board disagrees.
- 1.6.1 In this regard, the terminology 'inadmissible intermediate generalisation' is to be understood to refer to an undisclosed combination of selected features lying between an original broad disclosure (in this case, the claims and embodiment directed solely to a sprocket) and a more limited specific disclosure (in this case, the specific embodiment of Figs. 7 - 10 as described in paragraphs [0031] to [0037]). Such an objection to an intermediate generalisation underlies the requirement for an amendment to be directly and unambiguously derivable, using common general knowledge, and seen objectively and relative to the date of filing, from the whole of the application as filed.
- 1.6.2 In the present case, the sprocket 34I' of the sprocket assembly is indeed disclosed in combination with a

plurality of further technical features from paragraphs [0031] to [0037], such that extraction of the sprocket 34I' alone from the paragraphs and insertion into the claim to a sprocket assembly presents the skilled person with new information in the form of a new combination of features, which is not directly and unambiguously derivable from the application as originally filed, thus contravening the requirement of Article 123(2) EPC.

- 1.7 The main request is thus not allowable.
2. Auxiliary request 1
  - 2.1 The subject-matter of claim 9 fails to meet the requirement of Article 123(2) EPC.
  - 2.2 As found above for claim 9 of the main request, the same finding applies to claim 9 of the current request which has been amended solely to further include the feature that 'the coupling portion (708) has a tubular shape, the sprocket portion (700) and the coupling portion (708) are formed as one piece'. The insertion into claim 9 of this additional feature fails to address the finding that sprocket 34I' in the sprocket assembly is disclosed solely in a structural and functional combination with at least sprocket 34H' and locknut 460.
  - 2.3 The respondent's argument that a basis for claim 9 existed through the sprocket originally filed in claim 21 now being claimed in the assembly of Fig. 7 is not accepted. Claim 9 is directed to a sprocket assembly rather than simply a sprocket as in originally filed claim 21. A sprocket assembly, as indeed accepted by the respondent, is only originally disclosed in the

embodiment of Figs. 7 - 10 and the associated passages of the description. Whilst the sprocket of claim 21 as originally filed is undoubtedly included in the sprocket assembly of the Fig. 7 embodiment, this does not, contrary to the opinion of the respondent, provide a direct and unambiguous disclosure for the subject-matter of claim 9, in which only selected features of this embodiment are extracted for inclusion in the claim with the sprocket of originally filed claim 21.

2.4 The subject-matter of claim 9 thus fails to meet the requirement of Article 123(2) EPC, such that auxiliary request 1 is not allowable.

3. Auxiliary request 2

3.1 The Board exercised its discretion to admit the request into the proceedings (Article 13(1) RPBA).

3.1.1 The set of claims comprised in this request corresponded to those included in the main request save for the deletion of claim 9, found above to be unallowable, and the claims dependent thereon. As such the present request was a simplification, by way of a deletion of a part, of the main request. Despite having been filed during oral proceedings, at a very late stage in the appeal procedure, and thus representing a change of case to be considered under Article 13(1) RPBA, this new request introduced no new subject-matter and was thus of no greater complexity than the main request already considered by the parties.

3.1.2 The appellant's contention that the amendment changed the focus of the claims completely, was not found convincing. The set of claims of this request were all present in the main request and as such were already a

focus of attention for the parties. A decision had been issued also regarding these claims by the opposition division. Deletion of one of the previously present independent claims, and the claims dependent thereon, did not materially change the focus already attributed, by way of being present in the main request, to the claims remaining in the present request.

3.1.3 Auxiliary request 2 was thus admitted into the proceedings.

3.2 The subject-matter of claim 15 is however found not to involve an inventive step (Article 56 EPC 1973) in view of the disclosure of E10 in combination with the general knowledge of the skilled person.

3.2.1 E10 discloses the following features of claim 15 (the reference signs in parentheses referring to E10):  
An apparatus for supporting a plurality of sprockets (see Figure, showing 5 sprockets), comprising:  
a first tubular member (8 - hereafter referenced 8<sub>R</sub> - to the right of the copper fuse 21) having a first end portion and a second end portion, wherein the first tubular member (8<sub>R</sub>) has a first outer peripheral surface (see Figure) suitable for supporting a first plurality of sprockets (e.g. sprocket 11, but peripheral surface is suitable for supporting further sprockets);  
a separate second tubular member (8 - hereafter referenced 8<sub>L</sub> - to the left of the copper fuse 21) having a first end portion and a second end portion, wherein the second tubular member (8<sub>L</sub>) has a second outer peripheral surface (see Figure) suitable for supporting a second plurality of sprockets (e.g. 12, 13);  
wherein the first end portion (to the right in the Figure) of the second tubular member (8<sub>L</sub>) is coupled to



the second end portion (to the left in the Figure) of the first tubular member (8<sub>R</sub>).

E10 fails to disclose the following feature of claim 15:

'wherein an outer peripheral surface of the first end portion of the second tubular member has a threaded portion that screws into a threaded portion of an inner peripheral surface of the second end portion of the first tubular member.' In E10 this threaded coupling is instead achieved by a copper fused joint.

The objective technical problem to be solved in view of this characterising feature over E10 of claim 15 may be seen as to provide an alternative coupling arrangement.

In the technical field of bicycle gear assemblies, screwed connections between components are frequently to be found e.g. the Figure of E10 shows a myriad of screwed connections between sprockets and their axial supports as well as between other gear assembly components. It would thus be an obvious step for the skilled person to consider the provision of a screwed coupling between the bodies 8<sub>R</sub> and 8<sub>L</sub> as an alternative to the copper fused joint in order to solve the technical problem and arrive at the subject-matter of claim 15 without involving an inventive step (Article 56 EPC 1973).

- 3.2.2 The Board concurs with the respondent insofar as the copper fused joint prohibiting an easy disconnection of the two bodies 8 of E10. However, this restriction in no way hinders the skilled person in seeking a solution to the problem of providing an alternative coupling arrangement to the copper fused joint, a perfectly workable alternative being a commonly used and well

known screwed coupling.

3.2.3 Regarding the respondent's argument that E10 would lead the skilled person only to the substitution of a screwed connection with a fused joint, rather than vice-versa, this is not accepted. Whilst indeed page 1, lines 86 - 88 of E10 explicitly mentions the former possibility, the Board holds that the skilled person would not thereby be restricted in its thinking of possible alternatives to the copper fused joint when faced with the objective technical problem. The skilled person is well aware of the applicability of screwed connections in bicycle gear assemblies and would thus consider such a connection as an alternative to the copper fused joint disclosed in E10 without having to exercise inventive activity.

3.2.4 Regarding the respondent's further argument that the alternative screwed connection in E10 would be less capable of withstanding the torque experienced by a sprocket than the copper fused joint, this argument is based on an interpretation of claim 15 which is not present. The claimed apparatus is simply suitable for supporting a plurality of sprockets, providing no requirement for a torque transfer capability of the apparatus. To act as an appropriate starting point in reaching the subject-matter of claim 15, the apparatus of E10 has simply to be suitable for supporting a plurality of sprockets which, merely by viewing the Figure of E10 depicting 5 sprockets supported on the apparatus, it clearly is. It thus follows that substituting a screwed connection for the copper fused joint of E10 would lead the skilled person to the subject-matter of claim 15 without exercising an inventive step (Article 56 EPC 1973).

3.3 Auxiliary request 2 is thus not allowable.

4. Auxiliary request 3

4.1 This request represented a further change of case by the respondent for which admittance required the Board to positively exercise its discretion in accordance with Article 13(1) RPBA. For the reasons given below, the Board exercised its discretion to admit the request into the proceedings.

4.1.1 With identical reasoning to that presented regarding the admissibility of auxiliary request 2, the appellant objected to the present request being admitted. The Board however holds, analogously to the reasoning for auxiliary request 2, that the present request is a simplification of the main request, and a further simplification of auxiliary request 2, through deletion of part of that request. The appellant is thus presented with no new material by way of this late filed request and cannot therefore be regarded as disadvantaged by its late submission.

4.1.2 Auxiliary request 3 was thus admitted into the proceedings.

4.2 The subject-matter of claim 1 is considered to involve an inventive step (Article 56 EPC 1973) when taking account of the prior art and the arguments presented by the appellant in this regard.

4.2.1 E1 and the general knowledge of the skilled person

E1 discloses the following features of claim 1 of auxiliary request 3 (the reference signs in parentheses referring to E1):

A sprocket (130E) comprising:  
a sprocket portion having a plurality of radially extending teeth;  
a first coupling portion (184) extending from a first side (to the left of sprocket 130E in Fig. 2C) of the sprocket portion and having a first coupling structure (the shoulder of the counter-sink receiving bolt 182 in Fig. 2C) disposed on an inner peripheral surface (178) thereof; and  
a second coupling portion (193) extending from an opposite second side (to the right of sprocket 130E in Fig. 2C) of the sprocket portion and having a second coupling structure (195, 199, Fig. 3; Col.5, lines 4-5 and 7-9) disposed on an outer peripheral surface (193) thereof,  
wherein the second coupling structure (193) comprises a plurality of splines.

The subject-matter of claim 1 thus differs from the sprocket known from E1 in that the first coupling structure also comprises a plurality of splines. In E1 the first coupling structure is a bolted connection.

Based on this characterising feature, the objective technical problem may be seen as to provide an alternative fixing arrangement for the first coupling structure.

Whilst the skilled person is indeed aware of splined couplings as a possible alternative to the bolted arrangement, this would not be selected in the position of the first coupling structure since a straight substitution with a splined coupling would at least not be possible due to the spline itself having no inherent axial location. In contrast with the bolted arrangement which provides both circumferential and axial location

of the sprocket, the skilled person would have to provide a further means in addition to the spline, in order to maintain its axial location, e.g. a locknut. From the schematic layout depicted in Fig. 2C, it is not apparent where such a locknut would be positioned relative to the sprocket 130E. It is thus apparent that the skilled person would have to modify the arrangement known from E1 beyond simply providing a splined coupling in order to arrive at the subject-matter of claim 1, no convincing argument having been made as to why such a multi-stepped modification would have been obvious.

4.2.2 The appellant's suggestion, that a splined coupling was an obvious improvement over the bolted arrangement of E1, as the latter did not allow an exact circumferential location of sprocket 130E relative to sprocket 130D, is not suggested by the disclosure in E1. With reference to Fig. 2B of E1, this shows four bolt heads 182 located at what are clearly not equispaced intervals around the rotational axis of the depicted sprockets. It thus follows already that sprocket 130E cannot be secured to sprocket 130D in anything but one single circumferential position. In this respect, replacing the bolts 182 with a splined coupling would provide no benefit as regards achieving a specific circumferential location of the two sprockets relative to one another. Hence, whilst a skilled person could perform such a modification, there is no teaching for him to do so at all.

4.2.3 The appellant's argument, that the skilled person would complement the splined coupling with a glued or press-fitted sprocket in order to provide the required axial location, is unconvincing. In seeking an alternative fixing arrangement for the first coupling structure,

the skilled person would be required to carry out a two-step modification of the bolted arrangement known from E1 in order to reach a functioning alternative with splines. The necessity for a further modification beyond providing a splined coupling, in the form of having to glue the splined coupling into place, or alternatively having to provide a press-fitted tolerance between the sprocket and its support in addition to the spline, is not regarded as an obvious modification of the known bolted arrangement of E1.

4.2.4 The appellant's further argument, that the glued or welded fitting disclosed in Figs. 7 and 8 would also be provided with a splined coupling by the skilled person, is not persuasive. In this respect the Board holds that the skilled person is aware of the desire to position sprockets in specific circumferential locations relative to one another in order to allow smooth gear changes. When fixing sprockets onto their supports by gluing or welding, the skilled person would thus ensure that their circumferential positioning was precisely achieved prior to the gluing or welding step. The appellant's argument, that this circumferential positioning would be dictated through the provision of a spline prior to gluing or welding, is technically unrealistic from a skilled person's point of view. In addition to the splines having to be precisely positioned relative to the radially extending teeth on a sprocket, such a splined coupling necessitates considerable further machining steps to be carried out at the time of manufacture of the sprocket and its support. This further machining would be avoided simply through a careful circumferential positioning of the sprocket on its support prior to gluing or welding. The appellant's suggestion, therefore, that the glued or welded sprocket fixing would also include a splined

coupling is not accepted.

4.2.5 The subject-matter of claim 1 is thus considered to involve an inventive step (Article 56 EPC 1973) even when considering E1 as a suitable prior art starting point and combining this with the general knowledge of the skilled person. The appellant stated that the further inventive step objections based on other document combinations presented in its written submissions were no longer pursued. The Board also finds these other document combinations to be less relevant than that discussed above.

4.3 The subject-matter of claim 9 also involves an inventive step when considering the prior art chosen as a starting point and the arguments presented by the appellant in regard thereto (Article 56 EPC 1973).

4.3.1 E11 and E1

E11 discloses the following features of claim 9 of auxiliary request 3 (the reference signs in parentheses referring to E11):

A sprocket (see Fig. 2; sprocket 10) comprising:

a sprocket portion (10) having a plurality of radially extending teeth (implicit);

a first coupling portion extending from a first side of the sprocket portion (to the left of sprocket 10 in Fig. 2) and having a first coupling structure (a screwed structure as visible in Fig. 2; col.5, lines 52-61) disposed on an inner peripheral surface thereof; and

a second coupling structure disposed on an inner peripheral surface (a screwed structure, see Fig. 2) of the sprocket portion.

The subject-matter of claim 9 thus differs from the sprocket known from E11 in that the first coupling structure comprises a first plurality of splines and the second coupling structure comprises a second plurality of splines.

The objective technical problem may thus be seen as to provide alternative coupling arrangements for the first and second coupling structures.

Whilst E1 does disclose a number of sprockets with splined couplings (e.g. 130F; 130A; 130B), these sprockets are all axially located by way of further mechanical features (such as lock ring 200, or neighbouring sprockets). Simply transferring the splines known from E1 onto the coupling arrangements of E11 would not provide the axial location required for a splined coupling, such that additional axial location means would be required, for which there is no indication in E1 and no clear indication of where to fit these in the sprocket arrangement of E11. The subject-matter of claim 9 thus involves an inventive step when starting from E11 and combining this with the teaching of using splines from E1.

- 4.3.2 The appellant's contention that splines in combination with a welded or bonded coupling was suggested in E1 is unconvincing. The reference to bonding or welding the sprockets into position on their support (E1: col.5, lines 48-51) is in the context of a modification to the disclosed embodiments of E1 comprising either splines or bolts as coupling means. As found in point 4.2.4 above, the use of both splines and welding or both splines and bonding is technically unrealistic given the unnecessary duplication of function of these coupling types in the context of circumferential



location of sprockets on to a support.

- 4.3.3 The appellant stated that the further inventive step objections starting from E11 in combination with other documents presented in its written submissions were no longer pursued. The Board also finds these other document combinations to be less relevant than that discussed above.
- 4.3.4 The Board thus finds that the subject-matter of claim 9 involves an inventive step (Article 56 EPC 1973) over the cited prior art when considering the arguments made in this regard by the parties.
- 4.3.5 The dependent claims were renumbered as appropriate for the two independent claims in the present request. The description was also adapted to the amended claims. No further objections were raised to the documents making up auxiliary request 3.
- 4.4 The Board thus finds auxiliary request 3 to be allowable.

## 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 European patent with the following documents:
  - claims 1-8 as granted,
  - claims 9-14, filed as auxiliary request 3 on 13 May 2014;
  - description pages 1-5, filed 13 May 2014;
  - figures as granted.

The Registrar:

The Chairman:



M. H. A. Patin

M. Harrison

Decision electronically authenticated