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**Datasheet for the decision
of 29 May 2012**

Case Number: T 1646/08 - 3.2.06

Application Number: 04001371.6

Publication Number: 1413509

IPC: B62M11/16, B62M11/18

Language of the proceedings: EN

Title of invention:
Bicycle hub transmission

Patent Proprietor:
SHIMANO INC.

Opponent:
SRAM Deutschland GmbH

Relevant legal provisions:
EPC 1973 Art. 56, 83, 100(b), 114(2)
EPC Art. 123(2)
RPBA Art. 13(1)

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



Case Number: T1646/08 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 29 May 2012

Appellant: SRAM Deutschland GmbH
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted 15
July 2008 concerning maintenance of the European
Patent No. 1413509 in amended form.**

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. 1 413 509, on the basis of European patent application No. 04001371.6 filed on 9 March 2001 as a divisional application and claiming a US priority from 10 March 2000, was published on 28 December 2005.
- 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 interlocutory decision posted on 15 July 2008, the opposition division found that the European patent in an amended form met the requirements of the EPC. The opposition division held that the patent provided an enabling disclosure for a skilled person to carry out the invention, that the requirement of Article 123(2) EPC was met and that the subject-matter claimed was novel and inventive.

- III. Notice of appeal was filed against this decision by the appellant (opponent) on 22 August 2008, and the appeal fee was paid on the same day. The grounds of appeal were filed on 19 November 2008.

Claim 1 as found allowable by the opposition division reads as follows (with numbering of features M1 to M9 according to the decision under appeal):

"(M1) A bicycle hub transmission (14) comprising
(M2) an axle (36) and a driver (70) rotatably supported on the axle (36),
(M3) a hub shell (74) rotatably supported on the axle (36),
(M4) a power transmitting mechanism (82) disposed

between the driver (70) and the hub shell (74) for communicating rotational power from the driver (70) to the hub shell (74) through a plurality of power transmission paths,

(M5) said power transmitting mechanism (82) including a first planet gear carrier (550), a first ring gear (551), a first sun gear (160), a clutch ring (562) engagable with said driver (70) and said first planet gear carrier (550), and

(M6) a coaster brake (86) for stopping rotation of the hub shell (74) relative to the axle (36),

(M7) wherein the clutch ring (562) is adapted to disengage from the first planet carrier (550) when the driver (70) is rotated in reverse, such that the reverse rotational power of the driver (70) is communicated along a path for activating the coaster brake (86),

(M71) wherein the first planet gear carrier (550) includes clutch engaging splines (554) for engaging planet gear carrier splines (558) formed on the clutch ring (562), and wherein the clutch engaging splines (554) and the planet gear carrier splines (558) are tapered,

(M8) a first plurality of pawls (590) disposed on the driver (70) and arranged to drive the first ring gear (551) in reverse rotational direction, when the driver (70) is rotated in reverse,

characterized in that

(M9) the first ring gear (551) includes an inner peripheral portion (586) for engaging a second plurality of circumferentially disposed pawls (587), which are mounted on a corresponding plurality of circumferentially disposed pawl pins (588) fixed to the driver (70), to form a one-way clutch for forward drive between the driver (70) and the first ring gear (551)."

IV. In a communication accompanying the summons to oral proceedings the Board expressed its preliminary view that the isolation of features added to claim 1 out of the context of a specific embodiment might have lead to an inadmissible intermediate generalisation. The subject-matter claimed appeared to be sufficiently disclosed in order for it to be carried out by a skilled person having knowledge in this field; novelty was not contested and inventive step would be a matter of discussion. The auxiliary requests appeared to give rise to objections in respect of Article 123(2) EPC.

V. With letter dated 25 April 2012 the respondent (patent proprietor) filed five new auxiliary requests.

VI. Oral proceedings were held before the Board on 29 May 2012 during which the following prior art documents were discussed:

E9: DE-A-38 19 065

E4: US-A-4 240 533

The appellant (opponent) requested that the decision under appeal be set aside and that the European patent No. 1 413 509 be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed, or the European patent be maintained on the basis of one of the auxiliary requests 1 to 5, all submitted on 25 April 2012.

Claim 1 of each of the first and second auxiliary requests is based on claim 1 of the main request. Further, the same amendments have been made to claim 1 of these requests as have been made to the respective

claims of the fourth and fifth auxiliary requests (see below).

The third auxiliary request is based on the main request, feature M9 being supplemented by the insertion: "(...fixed to the driver) wherein the pawls 587 are biased radially outwardly by a pawl spring 589 (to form a one-way clutch ...)".

Claim 1 of the fourth auxiliary request is based on that of the third auxiliary request, the features of granted claim 2 being added:

"... further comprising a shift assist mechanism (90) for controlling a selection of the plurality of power transmission paths and for using the rotational power of the driver (70) to assist a change of the power transmission path in the power transmitting mechanism (82)".

Claim 1 of the fifth auxiliary request is based on that of the fourth auxiliary request, further features taken from the description (paragraph [0040]) being added:

"... wherein when resistance to the operation of a shift control sleeve (288) for shifting arises, third pawls (820) mounted on a pawl support (728) rotate radially outwardly and engage shift assist teeth (854) on the driver (70), such that the pawl support (728) rotates together with the driver (70) and provides an assisting force to rotate a shift sleeve (720), a shift key member guide (704) and said shift control sleeve (288) to complete the shifting operation."

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

The amendments introduced by way of feature M9 of claim 1 according to the main request and each of the first and second auxiliary requests did not comply with the requirement of Article 123(2) EPC. They had been taken from the description of a specific embodiment (paragraph [0027]), but some features had been omitted out of the context of their disclosure. No other possibility than the function of a one-way clutch formed by pawls biased radially outwardly by a pawl spring was disclosed. Therefore an inadmissible intermediate generalisation had occurred.

Since the enabling disclosure of the patent in suit was not very detailed, a well-founded knowledge of the skilled person was required for carrying out the claimed teachings. This person was well aware of the problem of so-called "brake-lock".

When dealing with the problem underlying the patent in suit, the suggestion was given to the skilled person when considering E9 (see e.g. col. 5, lines 45 to 52) to look for an alternative solution; this was obviously found in E4. Applying the means of separating the power path to the coaster brake disclosed in the bicycle hub according to E9 led the skilled person by means of his general knowledge to the claimed invention. In particular, the use of the two tapered co-acting surfaces was obvious to the skilled person since merely taking one slanting surface from E4 and applying this to E9 would mean that the cylindrical planetary carrier shaft (E9, ref. 29) would have to act against a slanted surface, which would generate wear of this surface and should obviously be avoided; the skilled person would never use such a construction with only one slanted surface and would thus use the complete solution from

E4. Therefore the subject-matter claimed lacked an inventive step.

The fourth and fifth auxiliary requests should not be admitted into the proceedings since they had been filed at a very late stage and caused new and complex problems which had not been the subject of the proceedings to date. Moreover, the added features as such were already disclosed in the prior art documents.

VIII. The respondent argued with respect to the amendments made to the claims according to the main, first and second auxiliary requests that an inessential feature which was implicitly and necessarily included in the amended claim could be omitted without a violation of Article 123(2) EPC, since it was only important that a one-way clutch was defined and not how the pawls were constructed to act therein. The Figures anyway did not disclose the feature of a pawl spring and, even if these were required, it was obvious to the skilled person that the pawls forming a one-way clutch would only work together with a pawl spring such that this functional feature could anyway be regarded as inherently present in the claim.

If in view of the third auxiliary request a problem would arise from the wording not exactly reflecting the expression as disclosed in the description, the respondent would be prepared to use the literal wording. The now claimed bicycle hub was undisputedly novel and involved an inventive step. If the skilled person starting from E9 would have applied features from E4 indicated by the problem to be solved, he would try to keep the changes to any structural elements requiring adaptation to be as few as possible. Therefore he would at best change the dogs ("Innenmitnehmernasen 30")

disclosed in E9 to tapered surfaces 812 as shown in E4 (Figures 5, 6, 7) without changing the co-acting planetary carrier shafts 29 and would thus not arrive at the claimed solution.

The fourth and fifth auxiliary requests should be admitted into the proceedings since the original problem to be solved, concerning a reliable function of the coaster brake, was still valid and merely supplemented by the general problem of improving the shift operation. The combination of features included in each claim 1 were subject-matter which was both new and involved an inventive step since the solutions provided by the subject-matter of these claims could not be found - as usual - by the combination of only two prior art documents.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request, first and second auxiliary requests (Article 123(2) EPC)*

Feature M9 was taken from the description (paragraph [0027]), whereby however the feature "pawls 587 are biased radially outwardly by a pawl spring 589 and thus function ..." was omitted. As already stated in its communication, the Board (in accordance with established case law) concludes that isolating features of a specific embodiment out of the (functional) context in which these features are disclosed leads to an inadmissible intermediate generalisation. Claim 1 thus includes subject-matter which was not originally

disclosed in that configuration thus contravening Article 123(2) EPC.

The respondent's argument that the omitted features are not essential once a one-way clutch has been defined, and thus do not need to be defined in the claim, is unconvincing since the only direct and unambiguous disclosure which is given to a skilled person in the application as filed is a one-way clutch in which the pawls are radially outwardly biased by springs. It is irrelevant whether a skilled person might or might not be able to arrive at other types of one-way clutches in the context disclosed. Also, it should be noted that other types of one-way clutch do exist, and whilst no such possibilities are disclosed in the application as filed these are inadmissibly included within the scope of claim 1.

3. *Third auxiliary request*

3.1 Admission into the proceedings (Article 13(1) RPBA)

The objection under Article 123(2) EPC with respect to claim 1 as found allowable by the opposition division (see point 2 above) was first raised in the Board's communication together with the summons to oral proceedings. Therefore, to give the respondent a fair chance to pursue its case in appeal, an amended claim dealing with this objection was admitted into the proceedings.

Although the amended claim does not exactly copy the particular wording in regards to the terminology "thus function as (a one way clutch)" of the feature taken from paragraph [0027], but instead uses the term "to form (a one way clutch)", no specific objection in this

regard was argued as being present by the appellant and the Board also found no reason to raise such an objection. In regard to inventive step considerations (see below), any difference which might possibly be present was anyway unimportant for the consideration of inventive step.

3.2 Enabling disclosure (Article 83, 100(b) EPC 1973)

The opposition division concluded that the subject-matter of claim 1 could be carried out by a skilled person. The Board shares this opinion, however, the actual disclosure in respect of the first 587 and second pawls 590 (paragraph [0027]) is rather limited such that the skilled person has to interpret the construction on the basis of his general knowledge. Therefore he would e.g. consider pawls disposed on a pawl pin as claimed being equivalent to the function of pawls 55, 56 received within recesses or pockets 51 to 53 as shown in E9, Fig. 6, when compared with Fig. 3 of that document wherein the pawls are mounted on pawl pins. Since the effect of both constructions is nearly the same, it is merely a question of available space and design as to which form of pawls the skilled person would use in his particular design.

3.3 Inventive step (Article 56 EPC 1973)

3.3.1 E9 discloses a bicycle hub transmission 11 comprising an axle 13 and a driver 12 rotatably supported on the axle 13, a hub shell 11 rotatably supported on the axle 13, a power transmitting mechanism 16 to 20 disposed between the driver 12 and the hub shell 11 for communicating rotational power from the driver 12 to the hub shell 11 through a plurality of power transmission paths. The power transmitting mechanism includes a first planet

gear carrier ("Steg 18"), a first ring gear 19 and a first sun gear 16. A clutch ring ("Wählhülse 14") is engagable with the driver 12 and the first planet gear carrier 18 and a coaster brake 22, 23 for stopping rotation of the hub shell 11 relative to the axle 13. The clutch ring 14 is adapted to disengage from the first planet carrier 18 when the driver 12 is rotated in reverse, such that the reverse rotational power of the driver 12 is communicated along a path for activating the coaster brake 22, 23. The first planet gear carrier 18 includes clutch engaging studs 29 (which are the planetary gear carrier shafts - see col. 5, lines 33 and 34) for engaging planet gear carrier dogs 30 formed on the clutch ring 14 (Fig. 1; col. 3, line 62 to col. 4, line 40).

A first plurality of pawls 56 is disposed on the driver 12 within pockets 52, 54 and arranged to drive the first ring gear 19 in reverse rotational direction when the driver 12 is rotated in reverse. The first ring gear 19 includes an inner peripheral portion for engaging a second plurality of circumferentially disposed pawls 55, which are mounted within corresponding pockets 51, 53 of the driver 12 and are biased radially outwardly by a pawl spring 59 and thus form a one-way clutch for forward drive between the driver 12 and the first ring gear 19 (Fig. 6; col. 6, lines 8 to 29).

3.3.2 The subject-matter of claim 1 differs from this known bicycle hub transmission in that the rotational power between the first planet gear carrier and the clutch ring is effected by clutch engaging splines for engaging planet gear carrier splines, the splines being tapered, and that the first plurality of pawls and the second plurality of pawls are mounted on a plurality of

circumferentially disposed pawl pins fixed to the driver.

This is also not a matter of dispute between the parties.

3.3.3 The object underlying the claimed invention in the patent in suit is to provide a bicycle hub transmission with a coaster brake, where braking action introduced by reverse pedalling is reliably communicated along a path through the hub transmission regardless of the gear speed currently engaged (see page 2, paragraph [0005]).

A similar problem is disclosed in E9; the provision of a bicycle hub transmission with a coaster brake wherein the braking action is constant under all circumstances irrespective of the speed currently engaged (col. 2, lines 35 to 51). Therefore, when considering the subject-matter of claim 1, the objective problem to be solved, when starting from E9 as the closest prior art, can be seen as being the creation of an alternative solution for achieving a constant braking effect regardless of the speed currently engaged.

3.3.4 A solution to this problem is already proposed in E9 wherein, before braking action is effected, the power connection between the studs 29 and the dogs 30 is decoupled, or the brake is activated before the power in reverse rotation is transmitted from the clutch ring 14 to the planet gear carrier. According to the description in E9, means for achieving both alternatives are within the general knowledge of the skilled person (col. 5, lines 45 to 52).

3.3.5 E4 discloses a bicycle hub transmission with a coaster brake designed for providing a constant braking effect

(col. 1, lines 58 to 61). In Figures 5 to 8 a solution to the problem is shown in which the decoupling of the clutch 100 from the planet gear carrier 6 is effected by splines in the form of cam means 81, 82 having tapered faces 812, 822 providing a similar effect to the "splines" 554, 558 of the patent. By the instruction of E9 in col. 5, lines 45 to 52, the skilled person is thus motivated to apply the solution of E4 to that of E9 thus arriving at a bicycle hub transmission in which the rotational power between the first planet gear carrier and the clutch ring is effected by clutch engaging splines for engaging planet gear carrier splines, whereby the splines are tapered.

3.3.6 The further difference in the feature that the first plurality of pawls and the second plurality of pawls are mounted on a plurality of circumferentially disposed pawl pins fixed to the driver, does not support the presence of an inventive step. As assessed above (item 3.2) the skilled person would e.g. consider pawls disposed on a pawl pin as claimed being equivalent with pawls received within pockets, both biased radially outwardly by a pawl spring.

3.3.7 The respondent's argument that the skilled person, trying to apply the solution known from E4 to the bicycle hub transmission according to E9 would only change the dogs 30 having an axially extending surface to a tapered form and keep the shafts 29 as shown as forming the surfaces against which the dogs should be applied, is not convincing. E4 discloses co-acting splines 81, 82 each having a tapered surface 812, 822. If an axial movement between these surfaces under force is intended, the skilled person would always use parallel sliding surfaces because a sharp edge of a stud or similar would self-evidently cause high wear and

would obviously not work well. Therefore E4 can only be considered as providing a teaching only of a complete solution having two tapered surfaces.

Since the splines 82 in E4 are formed on an extension 62 of the planet gear carrier, the skilled person would use a similar arrangement and provide a respective extension to the planet gear carrier of E9 thus keeping a seat for the planet gear axle as shown in E4 (see Fig. 8, without a reference number). Any necessary adaptations of dimensions lie within the general knowledge of the skilled person in this technical field.

The subject-matter of claim 1 therefore does not involve an inventive step.

4. *Fourth auxiliary request (Article 13(1) RPBA)*

4.1 According to Article 114(2) EPC 1973 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.

- 4.2 The features of granted claim 2 which have been added into claim 1 of this request relate to a shift assist mechanism.

The respondent argued that, by way of the additional features, the original problem to be solved concerning brake operation in hub gearing was merely supplemented, since although a further problem was solved in that the shift operation was improved, these two problems could be viewed as a single problem of generally improving gear changing.

- 4.3 The Board concludes that by the amendment, the original technical problem to be solved was however not merely supplemented, but a different problem was solved by the added features which was entirely independent from the problem of brake operation. 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 at a very late stage of proceedings, the Board exercised its discretion not to admit the fourth auxiliary request into the proceedings.

5. *Fifth auxiliary request (Article 13(1) RBPA)*

In its communication the Board had already stated that no basis for the additional amendment of claim 1 of the then third auxiliary request was found in the claims. Nor was it explained by the respondent where and in which context these features were originally disclosed. It was apparent that the features had been taken from the patent specification (paragraph [0040]) but, as also noted in the Board's communication, had seemingly been isolated out of the context in which they were disclosed (Article 123(2) EPC). Moreover, as with the amendments

to the fourth auxiliary request, the additional features introduced by way of the amendment related to a new and not previously discussed object of improving the shift operation. At least for the same reasons as those given for the fourth auxiliary request, the fifth auxiliary request was also not admitted into the proceedings.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The European patent is revoked.

The Registrar:

The Chairman:



M. Patin

M. Harrison

Decision electronically authenticated