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**Datasheet for the decision  
of 18 April 2012**

**Case Number:** T 0148/10 - 3.2.06

**Application Number:** 06012175.3

**Publication Number:** 1733962

**IPC:** B62M23/02, B62M7/12, B62L1/00

**Language of the proceedings:** EN

**Title of invention:**  
Bicycle wheel driving device

**Applicant:**  
SHIMANO INC.

**Relevant legal provisions:**  
EPC 1973 Art. 56  
EPC 1973 R. 67  
RPBA Art. 13(1)

**Keyword:**  
Main request - inventive step (no)  
Auxiliary requests 1 to 3 (not admitted)



Case Number: T0148/10 - 3.2.06

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.06**  
**of 18 April 2012**

**Appellant:** SHIMANO INC.  
(Applicant) 3-77 Oimatsu-cho  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted 27 October 2009  
refusing European patent application No.  
06012175.3 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman:** M. Harrison  
**Members:** T. Rosenblatt  
W. Sekretaruk

## Summary of Facts and Submissions

- I. The appeal lies from the decision of the examining division refusing European patent application No. 06012175.3.
- II. The documents relevant to the appeal proceedings from the first instance proceedings are:

D1: EP-A-0 706 909,  
D9: EP-A-0 688 713,  
D10: EP-A-1 122 094,  
D11: EP-A-1 488 992,  
D12: EP-A-0 482 559.

The appellant (applicant) also submitted the following documents with the grounds of appeal on 23 December 2009:

D14: [www.wer-weiss-was.de/theme126/article2270231.html](http://www.wer-weiss-was.de/theme126/article2270231.html)  
D15: Article "Rollerbrake (R)" from WikiPedalia.com  
D16: [www.mtb-news.de/forum/archive/index.php/t-205001.html](http://www.mtb-news.de/forum/archive/index.php/t-205001.html)  
D17: "How does a Roller Brake work?" on [www.shimano.com](http://www.shimano.com)  
D18: "Around the world 2: Sage & Cooper..." on [www.bakfiets-en-meer.nl](http://www.bakfiets-en-meer.nl)  
D19: "Wahl eines Elektromotors: Beugen sie Überhitzung und Überdimensionierung vor" on [www.specamotor.de](http://www.specamotor.de)

- III. In a communication following the summons to oral proceedings, the Board of Appeal expressed its preliminary view that the decision of the examining division on lack of inventive step appeared to be correct so that neither the first auxiliary request nor the broader main request corresponding in substance to claim 1 as originally filed, both submitted with the

statement of the grounds of appeal (23 December 2009), appeared allowable. With respect to the further auxiliary requests submitted with the grounds of appeal, the Board *inter alia* expressed doubts as to whether the requirements of Articles 84, 123(2) and 56 EPC were met.

IV. Oral proceedings were held on 18 April 2012. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request, filed 23 December 2009 or on the basis of one of the auxiliary requests 1-3, filed during the oral proceedings of 18 April 2012, and that the appeal fee be reimbursed.

V. The independent claims of the main and auxiliary requests have the following wording:

Claim 1 of the main request:

*"A bicycle wheel driving device (20) comprising:  
a hub axle (22);  
a hub shell (24) rotatably arranged around the hub axle, has a hub flange (24a) on an outside circumference thereof, and has a housing space (24b) inside; and  
a motor (26) disposed inside the hub shell (24) and configured to rotate the hub shell with respect to the hub axle; characterized in that  
a roller brake device (28) is at least partially arranged within the hub shell and extending outside of the hub shell (24)."*

Claim 1 of auxiliary request 1:

*"A bicycle wheel driving device comprising:*

*a hub axle;*  
*a hub shell rotatably arranged around the hub axle, has*  
*a hub flange on an outside circumference thereof, and*  
*has a housing space inside; and*  
*a motor disposed inside the hub shell and configured to*  
*rotate the hub shell with respect to the hub axle; and*  
*a roller brake device at least partially arranged*  
*within the hub shell and extending outside of the hub*  
*shell,*  
*wherein the roller brake device comprises*  
*a stationary bracket configured to be fastened to a*  
*bicycle; and*  
*a cylindrical brake drum arranged to rotate integrally*  
*with the hub shell and having a braking surface on an*  
*internal circumferential surface thereof,*  
*wherein the roller brake device comprises a plurality*  
*of brake shoes arranged to be non-rotatable with*  
*respect to the stationary bracket, the brake shoes*  
*having a contact surface arranged to selectively*  
*contact the braking surface to apply braking action*  
*against the brake drum,*  
*wherein the roller brake device comprises a brake*  
*operating unit having a plurality of rollers arranged*  
*with spaces therebetween in a circumferential*  
*direction,*  
*wherein the roller brake device comprises a cam*  
*mechanism configured to press the rollers in a radially*  
*outward direction when turned to press the brake shoes*  
*against the brake drum."*

In claim 1 of auxiliary request 2 the following features are added at the end of claim 1 of auxiliary request 1:

*"wherein the brake drum includes an engaging part that is provided on an external circumferential surface*

*thereof and configured to non-rotatably engage the hub shell,  
wherein the engaging part comprises a screw thread oriented in such a direction such that engagement between the brake drum and the hub shell tightens the engaging part when the bicycle wheel is braked while rotating in a direction corresponding to forward movement of the bicycle."*

In claim 1 of auxiliary request 3, compared to claim 1 of auxiliary 2, the introductory portion is amended such that its subject-matter is directed to "A bicycle having a bicycle wheel driving device, said bicycle wheel driving device comprising: a hub axle;...", with the remaining features being unchanged.

VI. The arguments of the appellant, as far as relevant for the present decision, may be summarised as follows:

- a) The subject-matter of claim 1 of the main request was inventive. The difference of claim 1 with respect to the bicycle wheel driving device known from D1 was that the hub of the device comprised a roller brake instead of a drum brake. The objective technical problem to be solved was in accordance with paragraphs [0005] and [0006] of the patent application that of providing an alternative braking device giving improved braking capacity. The solution was not obvious because, the skilled person would not have installed a roller brake, known to be a thermally critical element on a bicycle hub equipped with a further equally thermally critical motor. Evidence for this existing technical prejudice was to be found in D14 to D19. Documents D9, D10, D11 and D12 all related to different problems, underlining the

existing thermal problems, none of which disclosed or dealt with an improved braking capacity, so that the skilled person did not find any hint in them to combine the roller brakes disclosed therein with the device of D1. The skilled person could have combined them, but there was no hint or indication that would have incited him to do so when considering the case of a device known already to be sensitive to bad thermal issues.

- b) The auxiliary requests submitted during the oral proceedings were based on combinations of originally filed claims and specified in more detail the mechanism of the roller brake (auxiliary request 1), in which in particular the cam mechanism which was not known from the prior art, contributed to the reduction of excessive thermal heat by allowing a periodically alternating brake-release function ("Stotterbremse"). The features added to claim 1 in auxiliary requests 2 and 3 related to a screw threaded engagement of the drum brake and the hub shell. Such an engagement was not suggested in the prior art and contributed to improving the management of the thermal load on the wheel hub. The term "non-rotatably" in claim 1 should be understood in line with the description, paragraph [0037], as meaning that the hub shell and drum brake rotated integrally with each other.
  
- c) Reimbursement of the appeal fee was requested because of the conduct of the first instance proceedings by the first examiner. Although the search report and the accompanying written opinion did not indicate any prior art and corresponding objections against the patentability of several of

the dependent claims, the examiner had clearly, throughout the procedure, the firm intention of refusing the application and thus had repeatedly introduced new and irrelevant prior art in order to form unsound inventive step objections.

## **Reasons for the Decision**

### *Main request*

1. The subject-matter of claim 1 of the main request does not involve an inventive step (Article 56 EPC 1973).
- 1.1 The closest prior art to the subject-matter of claim 1 may be regarded as that represented by the bicycle wheel driving device disclosed in D1. The device shown in Figure 4 thereof discloses all features of the preamble of claim 1. It comprises also a brake which is at least partially arranged within the hub shell and extending outside of the hub shell. This was not disputed by the appellant.

According to D1, col. 10, lines 14-21, the brake is advantageously of the drum type, in which brake shoes are arranged inside an annular brake drum on a supporting axle. The mechanism of its actuation is not disclosed.
- 1.2 The only difference between the subject-matter of claim 1 and the device known from D1 is that the hub brake is a roller brake. This was also not disputed by the appellant.
- 1.3 A roller brake is generally known as a specific type of drum brake with a particular roller mechanism by which the brake shoes are pressed against the surrounding



annular brake drum. There are no further particular technical effects achieved by a roller brake in general, neither in normal bicycle hubs nor in hubs equipped with a motor drive, nor were any alleged.

1.4 According to the appellant the problem to be solved in the underlying application is to provide an alternative brake having improved braking capacity. The Board however does not agree that this is an objective problem starting from D1, since the second condition in this statement of the problem, namely that of providing an "improved braking capacity", is not something which is solved by the features defined in claim 1 since the only novel feature compared to D1 is a (generally defined) roller brake. The braking capacity of a roller brake, when compared to a generic hub or drum brake, depends on many factors and there is no evidence on file, either in the application as filed, or in the documents considered during the first instance proceedings, or indeed in those submitted with the statement of the grounds of appeal, that roller brakes, generally, provide an improved braking capacity compared to other hub brakes. Although the application contains in paragraph [0035] an indication on how the braking capacity may specifically be improved while producing less heat, such features are not defined in the claim.

1.5 Therefore the Board concludes that an objective technical problem to be solved is merely to provide an alternative brake for the bicycle wheel driving device.

1.6 Roller brakes for bicycle hubs were generally known to the skilled person at the time of filing of the present application. This was not disputed by the appellant. Among the numerous patent documents on file (D9, D10,

D11, D12) dealing with particular developments in such brakes, D11 distinguishes in paragraph [0002] between rim and hub braking devices and states that the latter "include drum brakes, band brakes, roller brakes and the like". The skilled person faced with the objective technical problem to provide an alternative braking device for a bicycle wheel driving device, and being aware that a roller brake is a well known type of a hub or drum brake would thus have considered its use in a device as known from D1 obvious unless, for example, a technical prejudice, as alleged by the appellant in the present case, against the combination of the roller brake device and the motor on a bicycle wheel hub existed.

- 1.7 The arguments and evidence submitted by the appellant in respect of the alleged prejudice are however unconvincing. The application as filed does not mention the existence of a technical prejudice of a combination of a roller brake and a motor on a bicycle wheel hub nor does it contain any particular considerations related to the assembly of a roller brake and motor on the hub in view of dealing with excessive heat. Furthermore, none of the submitted documents D14 to D19 specifically addresses the combination of roller brake and motor-equipped hub. D19 only concerns motor design considerations for handling overheating and wrong dimensioning, without addressing the application to bicycle hubs, let alone combinations with roller brakes. Almost all of the statements made in D14 to D18 are drafted after the priority date of the present application and hence are not prior art. Moreover, they reflect essentially personal views of a very small number of users collected on internet forums and blogs. These documents can therefore not be considered as evidence of an existing technical prejudice

demonstrated by reference to suitable technical literature (see e.g. Case Law of the Boards of Appeal, 2006, I.D.9.2). Moreover, they cannot even be considered as showing that roller brakes are thermally critical because the statements made in them are not even consistent on this point. For example, in D18, in response no. 6 "henry Says [sic]" (20 August 2009): "*The IM70 [a particular roller brake model of the appellant] though has about as much heat absorbing and more dissipating capacity than any bicycle drum brake I know of...*", which means that in the author's view roller brakes may even be considered as less thermally critical than other drum brakes.

1.8 Consequently, the Board is unable to conclude from the appellant's evidence and arguments that the alleged technical prejudice existed. Since the Board cannot see any other reason which would have run counter to the replacement of the conventionally known drum brake by a generally known roller brake in the bicycle wheel hub driving device of D1, the Board considers this an obvious solution to the objective technical problem. The subject-matter of claim 1 hence does not involve an inventive step.

1.9 The appellant's argument that no specific hint or indication could be found in the prior art leading the skilled person to the combination does not run counter to the Board's finding on obviousness. Following the objective technical problem formulated by the Board, the skilled person would seek an alternative to the known drum brake. Roller brakes are generally known as such alternatives, as is evident already from e.g. D11. The skilled person requires no inventive skill to make a selection from known alternatives. The question whether or not there are thermal issues to be taken

into account in his selection does not affect the present case, since claim 1 does not contain any feature reflecting such considerations. It is additionally noted, that in particular the portion in which the brake is to be installed is already to the outside of the hub in D1, so that heat is dissipated in the very same way as intended in the present application. Moreover, the person skilled in the art is able to consider advantages and disadvantages of his selection and he would weight them against each other, which would lead him in some cases even to the choice of a technically non-optimal solution if indicated by other, for example economical, constraints. Nevertheless such a selection remains obvious.

*Auxiliary requests 1 to 3*

2. Auxiliary requests 1 to 3 were not admitted into the proceedings.
- 2.1 According to Article 13(1) of the Rules of Procedure of the Boards of Appeal any amendment to a party's case after it has filed its grounds of appeal may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of 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 request filed at a late stage of the procedure should be *prima facie* allowable in the sense that it overcomes the objections raised against previous requests and does not introduce new objections.
- 2.2 Claim 1 of the first auxiliary request filed during the oral proceedings is based on a combination of original

claims 1, 2, 3, 5 and 6. It corresponds in substance to claim 1 of auxiliary request 1 underlying the preliminary opinion issued by the Board in preparation for the oral proceedings. Although it overcomes the objections under Article 123(2) EPC raised by the Board in its written communication, it is *prima facie* not suitable to overcome the objection of lack of inventive step raised with respect to the former auxiliary request or the present main request. The features added to claim 1 of the first auxiliary request compared to claim 1 of the main request appear to be nothing more than the commonly known features constituting the internal operation mechanism of a roller brake and are for example disclosed in each of the appellant-applicant's earlier applications corresponding to documents D9 (Figures 4-6), D10 (Fig. 7), D11 (Fig. 20, 21) and D12 (Fig. 10, 11). Since the description of the present application does not appear to support any particular further technical effect attributable to them, in particular nothing appears to suggest a periodically alternating brake-release-function ("Stotterbremse") with respect to the feature taken from original claim 3 ("selectively contact the braking surface to apply braking action against the brake drum") as argued by the appellant, or an impact on the heat issues as also argued by the appellant, it is not apparent that these added features could change the finding on inventive step arrived at with respect to the subject-matter of claim 1 of the main request.

- 2.3 The independent claims (claim 1) of auxiliary requests 2 and 3 are based essentially on a combination of originally filed claims 1, 2, 3, 5, 6, 7 and 9. Both independent claims define *inter alia* that (underlining added by the Board)

*"the brake drum includes an engaging part that is provided on an external circumferential surface thereof and configured to non-rotatably engage the hub shell wherein the engaging part comprises a screw thread oriented in such a direction such that engagement between the brake drum and the hub shell tightens the engaging part when the bicycle wheel is braked while rotating in a direction corresponding to forward movement of the bicycle."*

The Board considers this wording to lack clarity (Article 84 EPC 1973) since "non-rotatably" and "screw thread" are mutually exclusive features of engaging parts. The passage in paragraph [0037] referred to by the appellant as support to construe the term "non-rotatably" in the sense of allowing for an integral rotation of hub shell and brake drum does not contain any reference to a "non-rotatable" engagement between the hub shell and the brake drum, as it is disclosed in the context of the other described embodiment using a non-rotatable meshing engagement by serrations, splines and the like (cf. column 6, lines 28-35).

Further, in light of the appellant-applicant's prior art roller brake disclosed in Figure 10 of D12, showing threaded engagements between drum and hub shell, it would further appear that the amendments are also not suitable to overcome the objection on inventive step made in regard to the subject-matter of claim 1 of the main request. There appears to be no basis in the application, nor would it appear to belong to the common general knowledge of the skilled person, that the claimed engagement between brake drum and hub shell has any particular effect on managing thermal issues, as argued by the appellant, so that admittance of such a request into proceedings would have entailed a

discussion on complex matters which would have redirected the proceedings in an entirely new direction.

2.4 Since none of the amended independent claims of the auxiliary requests 1 to 3 submitted during the oral proceedings is *prima facie* allowable in the aforementioned sense (see in detail pt. 2.1), these requests were not admitted into the proceedings.

3. Reimbursement of appeal fee

Since the Board finds the appeal to be unallowable, already the first condition set out in Rule 67 EPC 1973 is not satisfied, so that the reimbursement of the appeal fee cannot be ordered.

## Order

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



M. Patin

M. Harrison

Decision electronically authenticated