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**Datasheet for the decision
of 22 June 2012**

Case Number: T 0881/09 - 3.2.01

Application Number: 02014182.6

Publication Number: 1288117

IPC: B62L 1/00

Language of the proceedings: EN

Title of invention:
Bicycle disc brake hub

Patentee:
SHIMANO INC.

Opponent:
SRAM Deutschland GmbH

Headword:
-

Relevant legal provisions:

EPC Art. 112a(2)(c)
EPC R. 106
RPBA Art. 12(4)

Relevant legal provisions (EPC 1973):

EPC Art. 54(1), 56

Keyword:

"Novelty (main request: yes)"
"Inventive step (main request, second auxiliary request: no;
third auxiliary request: yes)"
"First auxiliary request filed with the grounds of appeal (not
admitted)"
"Objection in respect of a procedural defect under Rule 106
(dismissed)"

Decisions cited:

G 0009/91, T 0002/83, T 0229/85, T 0552/89, T 1705/07,
T 0356/08, T 0848/09

Catchword:

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Case Number: T 0881/09 - 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 22 June 2012

Appellant I:
(Patent Proprietor)

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Appellant II:
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Decision under appeal:

Interlocutory decision of the Opposition
Division of the European Patent Office posted
16 April 2009 concerning maintenance of
European patent No. 1288117 in amended form.

Composition of the Board:

Chairman: G. Pricolo
Members: W. Marx
S. Hoffmann

Summary of Facts and Submissions

I. Appellant I (patent proprietor) lodged an appeal against the interlocutory decision of the Opposition Division posted 16 April 2009 maintaining European patent No. 1 288 117 in amended form, and simultaneously paid the appeal fee.

Appellant II (opponent) likewise lodged an appeal against the interlocutory decision of the Opposition Division and paid the appeal fee.

The statements setting out the grounds of appeal were duly received at the European Patent Office.

II. The Opposition Division held that the patent as granted satisfied the requirements of Article 83 EPC 1973 and that the subject-matter of claim 1 as granted was new but not inventive. However, the first auxiliary request filed during oral proceedings met the requirements of the European Patent Convention.

III. The documents cited during the proceedings before the Opposition Division and the Board of Appeal included the following:

E1: FR 2 752 773
E2: EP 0 955 233 A
E8: US 5 503 600
E14: US 4 201 120

IV. In the oral proceedings before the Board of Appeal, held on 22 June 2012, appellant I requested that the decision under appeal be set aside and that the patent be maintained as granted (main request) or in the alternative on the basis of claim 1 filed with letter dated 21 August 2009 as first auxiliary request (first

auxiliary request) or in the form allowed by the opposition division (second auxiliary request) or according to the third auxiliary request on the basis of the following documents filed during the oral proceedings:

- claims 1 to 12;
- description, columns 1 to 11; and
- figures 1 to 25 as granted.

Appellant II requested that the decision under appeal be set aside and that the European patent be revoked.

V. Claim 1 according to the main request reads as follows:

"A bicycle disc brake hub with a removably attachable disc brake rotor, comprising:

a hub axle (31) having a center axis (0) extending in an axial direction between a first axle end (31a) and a second axle end (31b);

a hub shell (32) having first and second hub shell ends (32a, 32b) with said hub axle (31) rotatably coupled to said hub shell (32);

a brake rotor attachment portion (34) disposed at said first hub shell end (32a), said brake rotor attachment portion (34) having an external surface with an external splined section (34c) and an annular internal surface with internal threads (34d);

a locking ring (29) having a center tubular section (29d) with external threads (29e) and an abutment flange (29c) extending outwardly from said center tubular section (29d) to form an axially facing retaining surface, said external threads (29e) of said center tubular section (29d) adapted to mate with said internal

threads (34d) of said brake rotor attachment portion (34);

characterized by

a rotor mounting boss (28) connectable to said disc brake rotor (23), said rotor mounting boss (28) having internal splines (28c) adapted to mate with said external splined section (34c) of said brake rotor attachment portion (34), and

said locking ring (29) retaining said rotor mounting boss (28) on said external splined section (34c) of said brake rotor attachment portion (34) when said external threads (29e) of said center tubular section (29d) are engaged with said internal threads (34d) of said brake rotor attachment portion (34)."

First auxiliary request

Compared to claim 1 of the main request, claim 1 of the first auxiliary request has been amended by specifying the features relating to the locking ring in more detail, so that the corresponding part of claim 1 reads as follows (for ease of comprehension, the Board has indicated additions compared to claim 1 of the main request in bold):

"...

a locking ring (29), **which is a disc shaped member,** having a center tubular section (29d) with external threads (29e) and an abutment flange (29c) extending outwardly from said center tubular section (29d) to form an axially facing retaining surface, said external threads (29e) of said center tubular section (29d) adapted to mate with said internal threads (34d) of said brake rotor attachment portion (34);
characterized by

a rotor mounting boss (28) connectable to said disc brake rotor (23), said rotor mounting boss (28) having internal splines (28c) adapted to mate with said external splined section (34c) of said brake rotor attachment portion (34), and

said locking ring (29) retaining said rotor mounting boss (28) on said external splined section (34c) of said brake rotor attachment portion (34) when said external threads (29e) of said center tubular section (29d) are engaged with said internal threads (34d) of said brake rotor attachment portion (34) **and the locking ring (29) has a center opening (29a) with a plurality of internal splines (29b).**"

Second auxiliary request

Claim 1 of the second auxiliary request differs from that of the main request by the addition, at the end of the claim, of the following feature:

"...

wherein said rotor mounting boss (28) has at least one axially extending protrusion (28e)."

Third auxiliary request

Claim 1 of the third auxiliary request has been amended, compared to claim 1 of the second auxiliary request, by adding at the end of the claim the following feature:

"...

wherein said brake rotor (23) has an inner mounting portion (23c) with at least one notch (23e) that mates with said at least one axially extending protrusion (28e) to prevent relative rotation between said rotor mounting boss (28) and said brake rotor (23)."

VI. Appellant I (patent proprietor) argued as follows:

As correctly held by the Opposition Division, the term "connectable" had to be understood as meaning that the disc brake rotor and the rotor mounting boss were formed as separate pieces, because only separate components could become connected to each other and be connectable. Therefore, the subject-matter of granted claim 1 differed from document E1 in the feature that "the rotor mounting boss is connectable to the brake disc rotor".

Moreover, E1 did not show a locking ring as claimed, since the locking ring 12 known from E1 had only a small radial extension and therefore provided low guidance in radial direction, contrary to the locking ring according to the contested patent. Based on this difference, the problem to be solved was to improve the guidance in radial direction. Furthermore, only with hindsight could the axial thickening of the brake disc in E1 be interpreted as a rotor mounting boss.

According to the claimed invention, a radial extending retaining surface of the locking ring 29 retained the rotor mounting boss 28 on the brake rotor attachment portion 34 comprising an annular abutment flange 34b. Since the retaining surface of locking ring 29 abutted on the brake disc, the brake disc was clamped in axial direction without play. The prior art did not prompt such a precise alignment of the braking device, in particular because E1 (page 3, paragraph 2 and 3; also claim 3) and E2 (column 2, lines 56 to 58; also claim 1) showed a brake disc that was fixed floatingly. Admittedly, E1 also showed an embodiment where the brake

rotor was fixed to the hub without axial play, but the combination of E1 and E2 would lead to an axially floating arrangement. However, the patent in suit did not provide any indication of such an arrangement, in particular since the terms "abutment flange", "retaining surface" and the expression "retaining said rotor mounting boss" used in claim 1 made clear that the rotor mounting boss was axially fixed on the hub and no axial play was permitted.

As regards document E1, the starting point for the invention described in said document was a prior-art braking device showing a brake rotor and a rotor mounting boss formed as separate parts (page 1, lines 13 to 17), and E1 tried to solve the problem of complexity and cost by directly coupling the hub to the brake disc rotor without any mounting boss in between. Hence E1 rejected the two-piece concept and taught the use of a single-piece concept instead, whereas E2 proposed using a two-piece concept in which the disc brake rotor and the rotor mounting boss were made of two separate pieces. Since the teachings of both documents stood in heavy discrepancy to each other, in view of their incompatibilities a combination of these documents was not obvious (see T 552/89, section 2.2; Guidelines for Examination in the EPO, C-IV, 11.8 i)) but rather artificial and could only be the result of an ex post facto analysis (Guidelines for Examination in the EPO, C-IV, 11.9.2). Moreover, the departure of claim 1 from the one-piece solution proposed in E1 had to be regarded as an indication of an inventive step (see T 229/85, section 7.). E1 suggested a direct coupling between the hub and the brake disc and left no room for a two-piece concept.

The new interpretation of the prior art which document E1 referred to, presented by appellant II in his submissions of 25 May 2010, claiming that the plate supporting the brake disc was part of the hub (see E1, page 1, lines 13 to 15) and therefore referring to a one-piece brake disc, amounted to a complete change of its point of view, done for strategic reasons, and therefore should not be considered in the proceedings.

Besides, axial travel of the disc holding star in E2 required a certain tolerance between the splined mating parts, resulting in a small gap which allowed a certain tilting relative to the pivot axle of the hub, which would lead to a malfunction. Therefore, E2 did not constitute an enabling disclosure that could render the subject-matter of claim 1 obvious.

Confronted with the problem of reducing weight, E2 did not provide any motivation to modify the brake disc of E1. In fact, E2 was silent about the reasons for making the disc from steel and the disc holding star from aluminium alloy. A brake disc made of steel with a high friction coefficient as shown in E2 did not, depending on constructional features, necessarily have a higher weight than aluminium. Moreover, E2 taught the provision of additional "lightening holes" in the brake disc made of steel (and not to choose aluminium) in order to achieve a reduction in weight. Besides, the rotor according to E1, the material of which was not mentioned, was already lightweight due to the small size of the rotor mounting boss portion.

In fact, starting from E1 as closest prior art, the problem to be solved was to provide a brake disc that could be easily and reliably installed on the disc brake hub even after extensive use, as stated in paragraph [0006] of the patent in suit. In particular, the central opening of quadratic shape of the brake disc rotor in E1 did not allow for a reliable mounting of the brake disc. Moreover, changing from the one-piece concept of the brake disc rotor shown in E1 to a two-piece concept provided a higher degree of freedom when designing the brake disc rotor. However, as pointed out above, on the one hand the combination of E1 and E2 would lead to a floating arrangement of the disc brake rotor, contrary to the teaching of the contested patent (with claim 1 requiring a clamped disc), on the other hand the disc brake rotor of E1 was already of lightweight design and E2 did not address the issue of weight when mentioning the disc holding star made of aluminium.

The internal splines according to claim 1 of the first auxiliary request served as an interface for an assembly tool. Said auxiliary request had been filed in reaction to the decision of the Opposition Division to maintain the patent based on an auxiliary request that only covered one embodiment of the contested patent. This fallback position was not satisfactory for the patent proprietor, who should be given an opportunity to obtain a broader and more appropriate protection in reaction to said decision, based on a limitation that still covered the two embodiments described in the contested patent. Holding the first auxiliary request inadmissible would raise the question of respecting the right to be heard as a principle of procedural law. Moreover, the first auxiliary request had been filed at the earliest

possible point in time, with the statement of grounds of appeal. The amendment submitted in claim 1 was not complex and had been originally disclosed. In particular, it was not associated with the feature regarding the abutment flange 34b (which was not relevant in the context of the tool interface of the locking ring), and therefore did not amount to an intermediate generalisation. Moreover, in the discussion concerning the combination of E2 and E1 the kind of tool interface already played a role, and the opponent had had enough time to find additional prior art.

Claim 1 of the second auxiliary request further differed from E1 in the feature that the rotor mounting boss had at least one axial extending protrusion so that the disc brake rotor could be mounted easily to the rotor mounting boss without rivets or bolts, thus solving the problem of optimising the mounting of the rotor to the rotor mounting boss. Claim 1 thus defined the fixing element on the rotor mounting boss for achieving a connection of form fit on the rotor mounting boss, leaving open the question of what was the corresponding element on the brake rotor. The skilled person could not find any indication in document E1 which showed a disc brake rotor without any separate rotor mounting boss. The teaching of document E2, showing bolts that had to be fitted by special fastening means, led away from the inventive solution which made it possible to simplify the connection between the rotor mounting boss and the separate disc brake rotor. Moreover, the contested patent clearly distinguished between axially extending protrusions, i.e. elements made in one piece with the base section of the rotor mounting boss (this was clear from the wording of the claim according to which the

rotor mounting boss "has" at least one protrusion), and fasteners or bolts representing separate parts. The axially protruding disc-shaped rim of the disc holding star in E2, i.e. the annular collar at the upper edge of the disc holding star 4 in Figure 5 of E2, could not be considered as an axially extending protrusion in the sense of claim 1 since it was not capable of providing a non-rotatable coupling of the rotor mounting boss and the disc brake rotor, and since it could not be clearly seen in this figure whether this collar indeed protruded above the ends of the five arms of the disc holding star in axial direction. Nor could the locally axially protruding portions of the rotor mounting boss, which were adjacent to locally recessed areas in the spokes of the disc holding star, as possibly shown in Figure 5 of E2, be regarded as an "axially extending protrusion", because this expression required the protrusion to extend axially beyond all other parts of the rotor mounting boss.

A combination of document E8 that concerned a derailleur gear assembly, i.e. a completely different part of the bicycle, with a disc brake hub according to the present invention was artificial. The newly presented document E14 related to a crank shaft and a chain gear and would not be considered by the skilled person when finding a solution in regard to a brake disc hub, connecting in a form-fit way a separate rotor mounting boss and a separate brake disc rotor. Furthermore, E14 was late-filed and lacked immediate relevance. It should therefore not be admitted into the proceedings.

The third auxiliary request was based on the features of granted claims 1 to 3. As pointed out for the second

auxiliary request, the bolts shown in E2 were not protrusions within the meaning of claim 1, and documents E8 and E14 would not be considered by the skilled person. Moreover, a connection by bolt means could not be regarded as an axially extending protrusion interacting with a notch, in particular since bolts were usually mounted in holes which could not be regarded as notches.

VII. Appellant II (opponent) argued as follows:

Claim 1 of the main request specified that the rotor mounting boss was connectable to the disc brake rotor. Since the term "connectable" did not necessarily imply components that were originally separate, the objection of lack of novelty in view of E1 was maintained.

The radial extending surface of locking ring 29 according to the patent in suit was defined only in relation to the rotor mounting boss 28, not necessarily abutting on the brake disc. When fixing the brake rotor with axial play, the locking ring was abutting against the hub and not against the brake rotor. Moreover, E1 definitely showed a clamped arrangement of the brake disc, but also mentioned with respect to the second embodiment a floatingly fixed brake disc, i.e. the disc brake system known from E2 could be combined with E1.

E1 was considered to represent the closest prior art, requiring the minimum of structural modifications and aiming at the same objective as the claimed invention. Acknowledging that the problem formulated by the Opposition Division ("optimising separately the brake disc rotor and the mounting portion of said rotor") already pointed to the solution, the problem could be

formulated as how to optimise the brake disc of E1 (reducing weight and maintaining the braking properties and durability of a disc made of steel) or, in other words, to provide a more flexible design for the brake disc. The skilled person would have found in E2 a two-piece solution for the brake disc, also prompting him to use different materials for separate optimisation of the rotor mounting boss and the disc brake rotor. The objective, addressed in the introductory portion of E1, of reducing the axial dimensions of a bicycle brake disc could not be considered as a partial problem to be solved when applying the problem-solution approach, so decision T 552/89 cited by appellant I was irrelevant. Therefore, the skilled person would have readily combined the compatible teachings of E1 and E2, in line with decision T 229/85 (i.e. when formulating the problem to be solved without containing pointers to the solution) and the Guidelines for Examination.

The teaching of E2 was not incompatible with E1 for different reasons: E1 did not explicitly teach the rejection of a two-piece solution and explicitly mentioned that the brake disc could be fixed floatingly (see claims 2 and 3). An axially floating mounting of the brake disc did not affect the design of the brake disc, e.g. modifying the design of the brake disc from a one-piece to a two-piece design did not influence the axial dimensions, so that E1 and E2 could be readily combined. Besides, the subject-matter of claim 1 defined an axial abutment flange of the locking ring to form an axially facing retaining surface (retaining the rotor mounting boss), but did not specify an axial clamping of the brake disc (which was mentioned only in relation to preferred embodiments in the patent in suit). Therefore,

the subject-matter of claim 1 included a brake disc mounted with axial play, which also required a limitation of said axial play. Since the disc brake rotor rotated while braking, no relevant tilting would occur between the splined mating parts.

Moreover, the prior art cited in E1 related to a brake disc attached by screwing to a flange ("platine") of the hub so that technically it made sense that the flange formed part of the bicycle hub, thereby suggesting a one-piece brake disc. At any rate, E1 neither deviated from a known two-piece design of the disc brake nor taught the resolution of problems of such kind of design. The issue addressed in E1 was to avoid the drawbacks of a screw connection, and E1 proposed a form-fit coupling between brake disc and hub and a locking ring retaining the brake disc, either with axial play or without. Although the embodiments in E1 showed a one-piece brake disc, the question of having a brake disc of one-piece or two-piece design was not a relevant issue in E1, in particular since claim 1 in E1 did not claim a one-piece solution.

Furthermore, the brake disc of E1 already showed different sections fulfilling different functions, namely a rotor mounting boss of increased axial thickness for form-fit mounting on the hub, formed one-piece with an outer ring comprising the friction surfaces. In line with said different functions, and in particular in view of the teaching of E2, it was obvious for the skilled person to provide, for additional benefit, the rotor mounting boss and the disc brake rotor as separate parts.

With regard to the auxiliary requests, when the objective problem was made up of individual problems, the skilled person could be expected - in accordance with decision T 552/89 - to take account of solutions proposed in different secondary documents in the same or neighbouring fields, in particular when such individual solutions were merely aggregated together.

As to the first auxiliary request, the focus of the discussion had changed compared to the first-instance proceedings, which made it necessary to cite additional prior art, in particular relating to an alleged prior use. Moreover, it had to be discussed whether the changes amounted to an intermediate generalisation. Therefore, the aspect of procedural economy should be respected, since discussion of the new subject-matter might require remittal to the first instance, or would deprive the parties of having two instances. Accordingly, the first auxiliary request should not be admitted into the appeal proceedings.

Claim 1 of the second auxiliary request additionally specified that the rotor mounting boss had "at least one axially extending protrusion". Without further details (e.g. as defined in granted claim 3), said additional feature referred to a protrusion of any shape or function, not providing a specific technical effect and not contributing to solving a technical problem. In particular, said additional feature did not relate to the mounting of the disc brake rotor and its mounting portion, so the problem defined for the main request still applied. Since an axially extending protrusion also comprised any protrusion extending only locally in axial direction, the protruding areas adjacent to the

recessed areas formed in the spokes of the disc holding star in E2, as clearly shown in Fig. 5, were to be regarded as axially extending protrusions within the meaning of claim 1. The skilled person, when adopting the two-piece design of E2, would also obviously adopt the shape of the disc holding star shown in Figure 5 of E2, thereby arriving at the subject-matter of claim 1 according to the second auxiliary request.

Furthermore, document E8 related to the non-rotatable mounting of disc-like components on a bicycle hub comprising axially extending ears so that the solution according to claim 1 of the second auxiliary request was not inventive in view of E8. Document E14 filed with the grounds of appeal, showing a chain gear sandwiched between two fixing plates on a crank shaft, was considered highly relevant. Due to protrusions formed in the fixing plates and extending into bores of the chain gear, relative rotation between the chain gear and the fixing plates corresponding to a rotor mounting boss was prevented. E14 suggested an alternative solution to the connection via bolts, as known from E1 in combination with E2, that provided a safe non-rotatable coupling and therefore was applicable also for a brake rotor.

Starting from document E1 as closest prior art, the additional feature of claim 1 of the third auxiliary request based on claims 2 and 3 as granted provided a rotationally fixed connection between the disc brake rotor and the rotor mounting boss by form fit. Documents E2, E8 and E14 suggested a solution to the partial problem (see decision T 552/89) of providing a safe, rotationally fixed connection between those parts.

E2 showed bolts corresponding to axially extending protrusions and mating with notches of an inner mounting portion of a brake rotor. The skilled person would also adopt said arrangement when applying the two-piece design of E2. E8 related to a neighbouring technical field, showing form-fitting mechanical connections of disc-like components to a bicycle hub, in particular ears of gear support arms mating with complementary notches of gear wheels. E14 disclosed a chain gear rotationally fixed to a crank shaft, i.e. also belonging to a related technical field. To prevent relative rotation, the chain gear was sandwiched between two plates showing projections which extended into bores provided in the chain gear. It would be obvious for the skilled person to apply the solution known from E8 or E14 to mount a brake rotor in fixed rotational relationship to a bicycle hub.

Document E14 had been filed in due time with the statement of grounds of appeal and was clearly highly relevant for the assessment of the patentability of claim 1 of the third auxiliary request.

VIII. During the oral proceedings, appellant I filed an objection under Rule 106 EPC in writing. It reads as follows:

"Hiermit rügen wir die Nichtzulassung des mit der Beschwerdebegründung eingereichten Hilfsantrags 1 durch die beabsichtigte Entscheidung der Beschwerdekammer gemäß Regel 106 EPÜ 2000 als Verletzung des rechtlichen Gehörs und somit als Verfahrensmangel entsprechend Artikel 112a (2) lit c. (Verstoß gegen Artikel 113 (1) EPÜ 2000"

Reasons for the Decision

1. The appeals are admissible.
2. *Main request - novelty (Article 54(1) EPC 1973)*

In the Board's judgement, the term "connectable" describing the arrangement of the rotor mounting boss and the disc brake rotor in claim 1 implies that the rotor mounting boss and the disc brake rotor are, before assembly, two separate pieces which are "connectable" at a later stage of the manufacture of the bicycle disc brake hub, i.e. during assembly thereof. Therefore, contrary to the opinion of appellant II, the rotor mounting boss according to E1 which is formed integrally with the disc brake rotor cannot anticipate the novelty of the subject-matter of claim 1.

3. *Main request - inventive step (Article 56 EPC 1973)*

- 3.1 The Board concurs with the parties and the decision under appeal that document E1 is to be considered as closest prior art for the assessment of inventive step. E1 discloses a bicycle disc brake hub with a removably attachable disc brake rotor comprising a hub axle and a hub shell and a brake rotor attachment portion as recited in the preamble of claim 1; this has not been disputed by the parties. E1 further shows (see Figure 1) a locking ring (12) having a center tubular section with external threads, said external threads of said center tubular section adapted to mate with the internal threads of the brake rotor attachment portion (page 2, lines 21 to 23), and an abutment flange extending outwardly from said center tubular section to form an

axially facing retaining surface (page 2, lines 34 to 36). The Board cannot follow the view of appellant I that E1 does not show a locking ring as claimed, due to the small radial extension of the abutment flange providing only low guidance in radial direction. The locking ring 12 disclosed in E1 (see Figure 1) clearly shows an extension from the center tubular section in radial direction forming an axially facing retaining surface for the brake disc rotor, and it does not matter that the radial extension is rather small since claim 1 according to the main request does not specify the degree of radial extension of the abutment flange of the locking ring. As a consequence, all features of the preamble of claim 1 are known from E1.

- 3.2 A rotor mounting boss just describes a part designed for mounting the rotor, irrespective of whether it is formed in one piece with the rotor or not. Therefore, the Board takes the view that E1 also shows a rotor mounting boss (Figure 1: central part of disc brake rotor 8) having internal splines adapted to mate with the external splined section of the brake rotor attachment portion (see page 2, lines 16 to 33: the brake rotor attachment portion of the hub and the rotor mounting boss are of complementary shape and may be realised by means of splines). Moreover, the locking ring disclosed in E1 performs the function as defined in the characterising portion of claim 1, i.e. retaining the rotor mounting boss on the external splined section of the brake rotor attachment portion when the external threads of the center tubular section are engaged with the internal threads of the brake rotor attachment portion.

3.3 However, the rotor mounting boss known from E1 is **integrally** formed with the disc brake rotor, in contrast to the rotor mounting boss as defined in claim 1 which is "connectable" to said disc brake rotor and thus forms a separate part. By changing the design of the disc brake rotor from a one-piece design as described in E1 to a design comprising two pieces with the rotor mounting boss forming a separate part, the disc brake rotor can be designed with more flexibility.

According to the established case law (e.g. T 229/85 as cited by applicant I), a formulation of the problem to be solved which already contains pointers to the solution - e.g. as defined by the Opposition Division ("optimising separately the disc brake rotor and the mounting portion") or as proposed by the appellants ("reducing weight", "easy and reliable installation even after extensive use") - must be avoided. The Board finds that the objective problem to be solved associated with the sole difference as mentioned above must be formulated more generally as the optimisation of the design of the disc brake rotor.

3.4 When looking at document E2 also belonging to the technical field of bicycle disc brakes, the skilled person will recognise a brake disc rotor made of two parts, a disc holding star 4 comprising an internal splined section 6 engaging an external splined section 7 on the hub and a disc 1 providing the friction surface. E2 describes (see paragraph [0024]) that disc 1 is preferably made of steel with a high friction coefficient, whereas disc holding star 4 is preferably made of tempered aluminium alloy. The skilled person would immediately recognise that the two-piece design of

the disc brake rotor proposed in E2 permits optimisation of the braking disc in two respects: the material of the braking area can be chosen to provide a high friction coefficient and thereby best braking performance, whereas the mounting area of more complex design can be made of material like aluminium alloy which is easy to process and can be tempered (i.e. hardened) afterwards to provide the required stability. Even though not explicitly disclosed in E2, this is clear for a skilled person as it is generally known to use the different materials steel and aluminium to provide optimised design of mechanical components, having regard to the intended performance of the parts of said components. Document E1 already teaches the skilled person to use complementary splined sections in order to mount the disc brake rotor on the hub, but E1 is silent about the material of the disc brake rotor. However, relying on a one-piece design of the disc brake rotor as disclosed in E1 necessitates compromising on the selected material of the brake disc with respect to friction properties and workability. Since the two-piece design proposed in E2 provides more flexibility in designing the respective areas of the disc brake rotor according to their respective functions, the skilled person confronted with the problem stated above would consider replacing the single-piece brake disc rotor of E1 by the two-piece brake disc rotor of E2, thereby arriving in an obvious manner at the claimed subject-matter by combining E1 with E2.

- 3.5 The question whether the selection of materials of the disc brake rotor according to E2 leads to a reduction in weight can be left open, in particular since E1 already shows - although without mentioning any specific

material - a lightweight construction. Moreover, weight issues are addressed in E2 only in connection with constructional features ("lightening holes") that are also used in E1 (see Figure 2), but not in relation to the selected materials.

3.6 The Board cannot follow the argument of appellant I that a combination of E1 and E2 would lead to an axially floating arrangement, contrary to the claimed invention which requires the rotor mounting boss to be axially fixed on the hub without axial play. First of all, the first embodiment described in document E1 (see page 2, lines 21 to 23) relates to a brake rotor clamped in axial direction without axial play, and there is no reason why the skilled person should deviate from this teaching when modifying the disc brake rotor. Moreover, even assuming that the combination of E1 and E2 would lead to a floating arrangement, the wording used in claim 1 of the main request does not exclude such kind of arrangement. The expressions "abutment flange ... to form an axially facing retaining surface" and "locking ring ... retaining said rotor mounting boss" used in claim 1 do not necessarily mean that the rotor mounting boss is clamped in axial direction, in particular since the rotor mounting boss might be "retained" also after performing a certain axial movement.

3.7 Furthermore, the Board agrees with appellant II that the teaching of E2 is not incompatible with E1. The starting point described in E1 (page 1, lines 13 to 17) does not clearly relate to a two-piece brake disc, so the argument of appellant II that E1 rejected a two-piece concept and taught the use of a single-piece concept cannot be followed. For this reason the criterion

mentioned by appellant I which might indicate an inventive step, as proposed in decision T 229/85, or which would prevent the skilled person from obviously combining documents (see T 552/89 or the Guidelines for Examination in the EPO) does not apply in the present case.

3.8 Since the new interpretation of the starting point described in E1 by appellant II is not considered as an amendment to its case after having filed its grounds of appeal but as a reaction to the arguments of appellant I with regard to the discrepancy between documents E1 and E2, the Board did not see any reason to exercise its discretion not to admit said argumentation.

3.9 The argument presented by appellant I that E2 did not show an enabling disclosure that could render the subject-matter of claim 1 obvious is not convincing, because due to the rotation of the disc brake rotor while braking no relevant tilting occurs between the splined mating parts.

3.10 Hence, the subject-matter of claim 1 of the main request does not involve an inventive step within the meaning of Article 56 EPC 1973.

4. *Non-admittance of the first auxiliary request in appeal proceedings (Article 12(4) RPBA)*

4.1 Claim 1 according to the first auxiliary request has been amended in particular by adding a feature taken from the description ("internal splines") relating to the mounting of the locking ring. Said aspect is not mentioned in the contested patent as being essential to

define the invention. Furthermore, in the first-instance proceedings the patent proprietor filed first and second auxiliary requests in reaction to the summons for oral proceedings, corresponding respectively to the second and third auxiliary requests filed with the statement of grounds of appeal, and which specified in more detail how to prevent relative axial rotation between the rotor mounting boss and the disc brake rotor. The amended subject-matter according to the first auxiliary request filed with the statement of grounds of appeal, specifying the design of the locking ring and not relating to the engagement of the rotor mounting boss and the disc brake rotor, therefore amounts to the introduction of a so-called "fresh case". This will be further developed below. The appellant did not argue that he could not have filed the first auxiliary request during the first-instance proceedings (and indeed no objective reasons that could have prevented him from doing so are identifiable by the Board). Accordingly, the admission of the first auxiliary request is a matter of discretion under Article 12(4) RPBA (Rules of Procedure of the Boards of Appeal, OJ EPO 2007, 536).

- 4.2 Appellant I argued that the decision of the Opposition Division to maintain the patent on the basis of an auxiliary request was not satisfactory as it only covered one embodiment of the contested patent as granted. Therefore, the appellant should be given the opportunity to seek appropriate protection in reaction to the decision of the Opposition Division, by introducing limitations that would still cover the two embodiments described in the contested patent.

The Board recognises that the auxiliary requests as filed during the first-instance proceedings restrict the claimed subject-matter to the first embodiment described in the granted patent, as it excludes the second embodiment described in Figures 24 and 25. However, the main request in the first-instance proceedings was still concerned with both embodiments, and the patent proprietor already at that stage had the opportunity to define further auxiliary requests that provided appropriate protection in case the main request failed. By filing two auxiliary requests in the first-instance proceedings which concerned only one embodiment of the contested patent, the patent proprietor defined a clear direction on how auxiliary requests could develop in case of refusal of the main request and thereby set the framework for discussion during the opposition proceedings.

The fact alone that the first auxiliary request was filed already with the statement of grounds of appeal at the earliest possible point in time during appeal proceedings does not justify admitting it into the appeal proceedings.

- 4.3 According to the established case law, appeal proceedings are not about bringing an entirely fresh case; rather, the decision of the Board of Appeal will in principle be taken on the basis of the subject of the dispute in the first-instance proceedings. The appeal proceedings are thus largely determined by the factual and legal scope of the preceding opposition proceedings and the parties have only limited scope to amend the subject of the dispute in second-instance proceedings (cf. T 1705/07, point 8.4 of the Reasons). It is not the

purpose of the appeal to conduct the case anew and, therefore, the issues to be dealt with in appeal proceedings are determined by the dispute underlying the opposition proceedings (see e.g. T 356/08, point 2.1.1 of the Reasons).

4.4 The first auxiliary request, presented for the first time in appeal proceedings, is concerned with a new aspect of the claimed subject-matter taken from the description, namely a plurality of internal splines of the locking ring, which is neither explicitly nor implicitly described as being related to the interacting constructional features of the brake rotor attachment portion, the locking ring, the rotor mounting boss and the disc brake rotor as defined in claim 1 of the main request and the auxiliary requests discussed in first-instance proceedings. Therefore, the Board finds that the subject-matter of claim 1 according to the first auxiliary request deviates from the matter at issue in the first-instance proceedings.

4.5 Moreover, the new feature of internal splines of the locking ring, taken from the description and not from any granted claim, relates to an entirely different technical problem compared to that previously discussed during first-instance proceedings, namely how to mount the locking ring, and probably has not been searched, as is proven by the fact that appellant II in reaction submitted further documents in appeal proceedings intended to prove a prior use of said new feature.

Thus, if the Board were to admit this request, it would be to the disadvantage of the opponent (appellant II) because either that request would be dealt with only by

the Board as the department of second instance, meaning a loss of one instance, or the Board would remit the case to the department of first instance, which would prolong the proceedings and would be incompatible with the principle of procedural economy. If the patent proprietor (appellant I) had wished to change the scope of the invention in this way, this should have been done during the opposition proceedings, since the main purpose of opposition appeal proceedings is to give the losing party the opportunity to challenge the impugned decision (cf. G 9/91, OJ EPO 1993, 408, point 18 of the reasons) rather than to consider issues not put before the Opposition Division (cf. T 848/09, point 3.3 of the reasons, not published). In line with this objective, Article 12(4) RPBA allows the Board to hold inadmissible requests which could have been presented in the first-instance proceedings.

4.6 For these reasons, the Board has decided to exercise its power under Article 12(4) RPBA not to admit the first auxiliary request into the appeal proceedings.

5. *Right to be heard*

5.1 In reaction to the Board's announcement not to admit the first auxiliary request into the appeal proceedings, appellant I complained that its right to be heard (Article 113(1) EPC) had been infringed, which was a procedural violation under Article 112a(2)(c) EPC.

However, already in the annex to the summons for oral proceedings the Board had raised its concerns about whether to admit the first auxiliary request into the appeal proceedings, having regard to Article 12(4) RPBA.

Accordingly, appellant I was informed that the admissibility of the first auxiliary request was a matter of discretion for the Board; he was also informed of reasons speaking against the admissibility. Moreover, the question of admissibility of the first auxiliary request was thoroughly discussed during the oral proceedings with the parties and the Board did not restrict them in submitting arguments. Therefore, the Board could not recognise that a fundamental violation of Article 113(1) EPC had occurred (see Article 112a(2)(c) EPC).

For these reasons, the objection in respect of the alleged procedural defect raised under Rule 106 EPC by appellant I was dismissed by the Board during the oral proceedings.

6. *Second auxiliary request - inventive step (Article 56 EPC 1973)*
- 6.1 Claim 1 of the second auxiliary request results from a combination of claims 1 and 2 as granted and comprises, compared to claim 1 of the main request discussed above, the additional feature that the rotor mounting boss has at least one axially extending protrusion. Claim 1 does not specify further structural details or the shape of said protrusion, and also leaves open its function. By leaving open what the respective element on the brake rotor is, claim 1 of the second auxiliary request does not define a connection of form fit as alleged by appellant I.
- 6.2 Following the argumentation of appellant I that the wording "the rotor mounting boss **has** ... one axially

extending protrusion" means that said protrusion forms part of the rotor mounting boss, the disc holding star 4 shown in E2 (see Figure 5), which corresponds to the claimed rotor mounting boss, has a non-flat shape comprising recessed areas in the spokes of the disc holding star and, adjacent thereto, locally protruding areas. Due to the general wording of claim 1 according to the second auxiliary request, the additional feature of at least one axially extending protrusion cannot provide a limitation over the rotor mounting boss disclosed by E2, which already shows locally protruding areas.

6.3 Appellant I conceded that the arms of the disc holding star in Figure 5 of document E2 showed axially recessed areas and at the most only local protrusions, but submitted that these did not provide the function of the protrusions according to the contested patent holding the disc brake rotor. However, the additional feature of claim 1 of the second auxiliary request is worded in general terms and does not specify the function of the axially extending protrusion, so that the subject-matter of claim 1 has to be interpreted in a broad sense. Moreover, the feature of an "axially extending protrusion" as defined in claim 1 does not require a protrusion extending beyond all other parts of the rotor mounting boss. Hence, the additional feature of an axially extending protrusion is anticipated by the disclosure of E2.

6.4 Therefore, when combining documents E1 and E2 as discussed for the main request, the skilled person would consider implementing, in the bicycle disc brake hub of E1, the disc holding star according to E2, thereby

arriving in an obvious manner at the subject-matter of claim 1 of the second auxiliary request (Article 56 EPC 1973).

7. *Third auxiliary request - inventive step (Article 56 EPC 1973)*

7.1 Claim 1 of the third auxiliary request results from a combination of claims 1 to 3 as granted. Considering that the patent was not opposed under Article 100(c) EPC and that the combination of claims 1 and 3 is present in the patent as granted, this amendment does not give rise to objections. Indeed, none were raised by appellant II, who only contested the presence of an inventive step.

7.2 In comparison to claim 1 of the second auxiliary request, claim 1 of the third auxiliary request specifies the interaction of the axially extending protrusion of the rotor mounting boss with a mating notch formed in the brake rotor in order to prevent relative rotation of the brake rotor relative to the rotor mounting boss.

The Board agrees with appellant II - and in line with decision T 552/89 to which it referred - that these additional features solve a separate partial problem, namely how to provide a safe, rotationally fixed connection between the rotor mounting boss and the brake rotor.

7.3 Appellant II argued that either the bolt connection shown in E2 corresponded to the claimed solution, or the skilled person would find an incentive to the claimed solution in documents E8 or E14. However, the Board, even taking into account document E14, the admissibility

of which was objected by appellant I in view of its late filing, cannot agree with the arguments of appellant II for the following reasons:

E2 states that the brake rotor and the rotor mounting boss are connected by bolt means, without giving further details. Even on the assumption that the bolt mentioned in E2 corresponds to an axially extending protrusion as claimed, irrespective of whether it is in one piece with the rotor mounting boss or is a separate part, the mating part co-operating with said bolt would have to be a hole or circular opening. Claim 1 according to the third auxiliary request, however, defines a notch forming an inner mounting portion of the brake rotor. For the person skilled in the art, a connection by means of protrusions and notches is different from a bolt connection. Therefore, the combination of the teaching of E1 and E2 alone does not lead to the subject-matter of claim 1. Moreover, based on the clear and consistent teaching in E2 on how to provide a connection between the rotor mounting boss and the brake rotor, there is no incentive for the skilled person to replace the bolt connection disclosed therein.

Moreover, the Board does not accept the view of appellant II that the solution proposed in claim 1 is obvious in view of the disclosure of E8 or E14. Taking into account the "could/would approach" as developed by the jurisprudence of the Boards of Appeal (T 2/83, OJ EPO 1984, 265), the Board is not convinced that the skilled person would apply the connecting means described in E8 for a gear sub-assembly, or the connecting means disclosed in E14 for a gear crank for bicycles, to the disc brake hub resulting from the

modification of the one-piece disc brake rotor of E1 according to the teaching of E2. As stated above, the combination of E1 and E2 already teaches the use of a bolt connection between rotor mounting boss and brake rotor, and there is no incentive to alter said connection.

7.4 Even if the skilled person were to consider an alternative connection means, E8 only teaches him to connect a set of gears using connecting arms showing protrusions which are inserted into respective notches of the outboard smallest and largest gear that are sandwiched between a shoulder of the wheel hub and a locking ring. It is not evident how the skilled person could apply this solution to the single brake rotor known from E2 that is only supported on one side by the disc holding star. Replacing the bolt connection known from E2 in order to arrive at the claimed solution would require the provision of notches at the brake rotor of E2 and of mating protrusions at the disc holding star of E2. However, further modifications are necessary for the assembly to work; in particular, the brake rotor requires support from the side opposite to the disc holding star, which a small-diameter locking ring according to E1 cannot provide. Therefore, the skilled person would not be tempted to apply the teaching of E8 in order to arrive at the solution claimed. As to E14, disclosing a gear crank assembly with a chain gear sandwiched between two plates showing projections which are extending into bores provided in the chain gear, a similar reasoning applies.

7.5 In view of the above, the issue of the admissibility of document E14 raised by appellant I becomes irrelevant.

8. Independent claim 1 according to the third auxiliary request, together with its dependent claims 2 to 12 and the duly revised description can, therefore, form the basis for maintaining the patent in amended form.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent on the basis of the following documents:
 - claims 1 to 12 according to the third auxiliary request filed during the oral proceedings;
 - description, columns 1 to 11 filed during the oral proceedings; and
 - figures 1 to 25 as granted.

The Registrar:

The Chairman:

A. Vottner

G. Pricolo