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**Datasheet for the decision
of 24 September 2013**

Case Number: T 0467/10 - 3.2.06

Application Number: 03103356.6

Publication Number: 1398103

IPC: B23D31/00

Language of the proceedings: EN

Title of invention:

Device and method for machining connecting rods

Patent Proprietor:

MAPE S.p.A

Opponent:

Mauser-Werke Oberndorf Maschinenbau GmbH

Headword:

Relevant legal provisions:

EPC Art. 114(2), 100(a), 54, 56

RPBA Art. 12, 13

Keyword:

Late submitted material - evidence admitted (no)

Grounds for opposition - lack of patentability (no)

Decisions cited:

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 0467/10 - 3.2.06

D E C I S I O N
of Technical Board of Appeal 3.2.06
of 24 September 2013

Appellant: Mauser-Werke Oberndorf Maschinenbau GmbH
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 10 December
2009 rejecting the opposition filed against
European patent No. 1398103 pursuant to Article
101(2) EPC.**

Composition of the Board:

Chairman: M. Harrison
Members: T. Rosenblatt
R. Menapace

Summary of Facts and Submissions

- I. With letter received by the European Patent Office on 22 February 2010, the appellant (opponent) filed an appeal against the decision of the opposition division, dated 10 December 2009, rejecting the opposition against European patent No. 1 398 103, and paid the appeal fee on the same date. The grounds of appeal were submitted on 20 April 2010.
- II. The appellant referred *inter alia* to the following documents:
- D7: C. Luchner, "*Bruchtrennen von Kurbelgehäusen*";
E2: DE 198 41 027 C1;
E3: EP 1 036 622 B1;
E7: DE 197 33 387 C2;
E8: K. Häffner, *Diplomarbeit "FEM-Berechnungen am Pkw-Pleuel"*, and to
"Lasocrack": evidence relating to a machining centre named "LASOCRACK", comprising announcements of exhibitions in 1999 and 2000, a CD-Rom containing a video relating to the exhibition in 1999 and a product brochure (annexes 2 to 5 to the grounds of appeal), together with the offer to hear as a witness Mr. Siegfried Gruhler.
- III. In preparation for the oral proceedings to be held, the Board informed the parties of its preliminary opinion on the case. The Board considered that the evidence filed as "Lasocrack" with the grounds of appeal should be disregarded under Article 114(2) EPC and that the subject-matter of claims 1 and 8 did not appear to be obvious in view of E2, E7 and E8.

- IV. Oral proceedings were held before the Board on 24 September 2013 in the absence of the respondent (proprietor) as notified in advance to the Board.
- V. The appellant requested remittal of the case to the opposition for taking of evidence as to the alleged prior use "Lasocrack". The appellant further requested that the decision under appeal be set aside and that the European patent No. 1 398 103 be revoked.
- VI. The respondent did not submit any request.
- VII. The independent claims of the patent read as follows:
- "1. A device for machining steel connecting rods (15), each comprising a rod (2), and a big end (3) in turn comprising a first portion (6) connected integrally to the rod (2), a second portion (7) connected to said first portion (6), an eye (4), and an inner annular surface (5) defining the eye (4); the device (16) comprising a first traction member (23) which is inserted inside the eye (4) and has a first thrust surface (24) mating with said annular surface (5) at the first portion (6) and substantially in the form of a cylindrical sector having a respective radius of curvature, a second traction member (28) which is inserted inside the eye (4) and has a second thrust surface (29) mating with said annular surface (5) at the second portion (7) and substantially in the form of a cylindrical sector having a respective radius of curvature, and actuating means (30) for parting said first and said second traction member (23; 28) so as to break the second portion (7) away from the first portion (6); the device (16) comprising a supporting surface (22) for supporting the rod (2) and a seat (26) for housing the second portion (7); the first and the*

second traction members (23, 28) being fixed to the supporting surface (22) and the seat (26), respectively; the device (16) being characterized in that the radius of curvature of the first thrust surface (24) is smaller than the radius of curvature of the second thrust surface (29).

8. A method of machining steel connecting rods (15), each comprising a rod (2), and a big end (3) in turn comprising a first portion (6) connected integrally to the rod (2), a second portion (7) connected to said first portion (6), an eye (4), and an inner annular surface (5) defining the eye (4); the method comprising a traction step wherein relative withdrawal motion is imparted to a first thrust surface (24) substantially in the form of a cylindrical sector and which mates with said annular surface (5) at the first portion (6), and to a second thrust surface (29) substantially in the form of a cylindrical sector and which mates with said annular surface (5) at the second portion (7), so as to break the second portion (7) away from the first portion (6); the method being characterized in that said first and said second thrust surface (24; 29) each have a respective radius of curvature; the radius of curvature of the first thrust surface (24) being smaller than the radius of curvature of the second thrust surface (29)."

VIII. The arguments of the appellant as far as relevant to the present decision may be summarised as follows:

- "Lasocrack" did not constitute new evidence; rather it was new material concerning the machining centre of E2, intended to strengthen the arguments on file. It was however more relevant than E2 since, in addition to the features

disclosed therein, the machine on display to the public during the in-house exhibitions employed traction members known from E8 having the features of the characterising portion of claims 1 and 8. It was only possible to file "Lasocrack" in the appeal proceedings because it had emerged as a result of enquiries with the appellant regarding the doubt expressed by the opposition division in regard to the public availability of E8. The request to remit the case to the opposition division for hearing the offered witness concerning the "Lasocrack" prior use was thus justified because it was a highly relevant piece of prior art.

- E3 also did not represent new evidence. Instead, it confirmed the general knowledge of the skilled person that the breaking behaviour could be positively influenced if the weaker portion of the rod's big end would be faced by a thrust surface of bigger radius. It was only cited in reaction to the Board's preliminary opinion, which had addressed claim 8 only in passing when referring to claim 1. The Board had thus not considered it separately as was however the case in the grounds of appeal. It was novelty prejudicial for the subject-matter of claim 8 as was evident in particular from paragraph [0006] and the sole Figure.

- E7 represented the closest prior art for considering inventive step. It disclosed three different configurations of the traction members, convex, conical and oval, which however did not avoid plastic deformation in particular in the cap of the connecting rods made of non-ductile

material and therefore did not yield optimum breaking behaviour. The problem to be solved was to improve the breaking-apart of the connecting rod eye. E8 disclosed in particular the modification of the shape of the cap-side traction member so as to apply the traction force only to limited regions adjacent the breaking plane by a particular roof-like shape. This shape had an effective average diameter smaller than that of the rod-side traction member. Therefore the traction members of E8 corresponded to the features defined in the characterising portion of claim 1. Moreover, following page 53 of E8, item 8.7, the skilled person would obviously consider replacing the roof-like shape by a known alternative oval shape. The oval shaped member would then have a bigger radius of curvature compared to the rod-side traction member (as defined by the features of claim 1), because the rod-side traction member would be kept cylindrical when changing the cap-side traction member to oval. E7 itself already suggested (see e.g. paragraph [0019]) the use of traction member halves having different shapes, among which the selection of a smaller radius on the rod-side was obvious at least in view of the teaching of E8.

IX. The respondent did not submit any argument in respect of the submissions of the appellant and the Board's preliminary opinion.

Reasons for the Decision

1. The appeal is admissible

2. Admittance of "Lasocrack" into the proceedings
- 2.1 Article 12(4) RPBA stipulates that the Boards may hold inadmissible facts, evidence or requests which could have been presented in the first instance proceedings.
- 2.2 For the first time with the grounds of appeal the appellant alleged that a machining centre with the name "LASOCRACK" constituted prior art according to Article 54(2) EPC and that its disclosure was prejudicial to the novelty of the subject-matter of claims 1 and 8. The supporting evidence "Lasocrack" was also submitted therewith for the first time.
- 2.3 "Lasocrack" introduces a new set of alleged facts and a new line of argument and does not merely strengthen or fill a gap in the appellant's argument which was already made during the opposition proceedings. The decision T 561/89 referred to by the appellant is hence of no relevance to the present case.
- 2.4 The evidence provided by the appellant is not sufficient to establish all facts in order to reach a conclusion on the public prior availability of the machining centre (nor to reach a conclusion regarding the disclosure of the features of claims 1 and 8), as already stated by the Board in its provisional opinion notified to the parties in preparation for the oral proceedings (items 2.2 and 2.3 thereof). Since, in regard to the circumstances of its public availability, no further evidence was brought forward which by itself could establish public availability, a conclusion on this point would necessarily require the taking of evidence by at least hearing the witness offered by the appellant. For this purpose the appellant specifically requested the remittal of the case to the opposition

division.

- 2.5 On the understanding that "LASOCRACK" corresponded to the machine known from E2, which was the appellant's contention, so that the argument with respect to E2 would allegedly also apply to "Lasocrack", and provided that the subject-matter of claim 1 and "LASOCRACK" differed at least in view of the disposition of the traction members relative to the connecting rod, as was agreed by the appellant, the Board concludes that the same issues which are arguable in respect of the objections based on E2 and E8 during the opposition proceedings apply equally to the matter of "Lasocrack". The Board is thus unable to see how the newly submitted evidence can be more relevant, let alone *prima facie* highly relevant in the sense set out in 2.1 above, compared to that already presented before the opposition division.
- 2.6 Considering that further consideration of "Lasocrack" would have required the taking of evidence as to the alleged public prior availability of the machining centre "LASOCRACK", notably with an inevitable uncertain outcome as to the results of such taking of evidence, and considering also that "Lasocrack" anyway did not appear to be more relevant than the evidence on file (E2, E8), let alone *prima facie* highly relevant in the above sense, the Board concluded that a remittal of the case was not justified and consequently refused the request for remittal for taking of evidence.
- 2.7 Furthermore, the evidence "Lasocrack" lies entirely in the hands of the appellant-opponent. That it was only revealed when enquiries were made with the appellant in view of concerns raised by the opposition division regarding the public availability of the diploma thesis

E8, cannot be accepted as an adequate justification of its late filing. E8 had been filed with the notice of opposition. The work for the thesis E8 was conducted at the opponent-appellant's facilities (cf. front page and "Introduction", page 3) and completed in 1994, thus five, or six years respectively before the in-house exhibitions in the years 1999 and 2000. The acknowledgement therein cites Mr. S. Gruber, who has been offered as a witness to prove that E8 was made available to the public and that the teaching of E8 was implemented in the machining centre "LASOCRACK". It is thus unconvincing that the allegedly novelty-destroying public prior presentation of "LASOCRACK", implementing allegedly the features of E8, was not known to the opponent when preparing its case for the opposition. Moreover, already together with the summons to the oral proceedings before the opposition division, the doubts on the public availability of E8 had been expressed by the opposition division (see the communication dated 18 May 2009, item III-1.1). It follows, that even if the appellant's contention were accepted that "Lasocrack" emerged only when further enquiries were made so as to reply to the question of public availability of E8, there is no apparent reason why it could not have been presented in reply to the opposition division's preliminary opinion.

2.8 The Board therefore concluded that "Lasocrack" could indeed have been presented before the opposition division and made use of its power according to Article 12(4) RPBA to hold inadmissible the evidence presented as "Lasocrack".

3. Admittance of E3 into the proceedings

- 3.1 Article 12(2) RPBA provides that the statement of grounds of appeal shall contain a party's complete case. This means that for evidence to be considered in the appeal proceedings, it is not normally sufficient that it was cited or relied upon during the proceedings before the department of first instance; rather, such evidence must normally therefore be specifically cited in the appeal grounds with its relevance explained in order to be considered.
- 3.2 E3 had been cited and briefly referred to in the notice of opposition, but was not mentioned in the notice or grounds of appeal, so that it did not form part of the appellant's case. Its reference in the reply to the Board's preliminary opinion thus constitutes an amendment to the appellant's case (cf. Article 13 RPBA).
- 3.3 Article 13(1) RPBA sets out that any amendment to a party's case after it has filed its ground of appeal or reply may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject-matter, the current state of the proceedings and the need for procedural economy. Particularly where the amendment to a party's case consists in the presentation of new facts, the procedural economy under Article 13(1) RPBA requires that the new facts - here state of the art represented by E3 - be *prima facie* highly relevant for the Board to exercise its discretion in favour of admittance.
- 3.4 The relation of the radii of curvature according to the characterising portions of claims 1 and 8 and more particularly the radius of the rod-side traction members is not mentioned in paragraph [0006] referred

to by the appellant. The only drawing of E3, also referred to by the appellant, is merely a schematic representation of the underlying invention in E3 and lacks precision. The Board notes that the thick line illustrating the curvature of the upper traction member 7 follows closely the contour of the bearing's eye along a segment that is longer than the thick lines illustrating a possible contact between the thrust surfaces (8, 9) of the second traction member (7') and that of the bearing eye. The drawing does hence not allow the reader to exclude that the radii of curvature are identical at all thrust surfaces. Since E3 does not disclose the crucial features it cannot be considered to be prejudicial to the subject-matter of independent claims 1 or 8 and, thus not *prima facie* highly relevant for deciding on the present appeal.

Moreover, E3, either alone or in combination with D7 to which the appellant also referred to, cannot be considered as confirmation of general knowledge of the skilled person, since a general teaching according to which the weaker component should be exposed to breaking forces by a member with a bigger radius of curvature is neither explicitly nor implicitly disclosed therein.

3.5 The Board therefore exercised its discretion according to Article 13(1) RPBA not to admit E3 into the proceedings.

4. Novelty

The appellant did not maintain any novelty objection based on E2 or E7. The Board is also satisfied that the subject-matter of claims 1 and 8 is novel in regard to these documents (Article 54(1) and (2) EPC) because

neither of them discloses the features in the claims' characterising portions.

5. Inventive step

5.1 As acknowledged by the appellant during the oral proceedings, the device of E7 had more features in common with the subject-matter of claim 1 than that of E2. E7 therefore constitutes the more appropriate starting point for the assessment of inventive step. The appellant also did not dispute that this was the case.

5.2 It may be left undecided for the purposes of the present decision, whether in fact all features defined in the preamble of claim 1 are disclosed in E7, in particular whether the spreading mandrels ("*Spreizbacken*") which are spread apart by use of an impacting mass or by a spreading wedge (cf. col. 4, lines 9-15) constitute "traction members" according to the claim, since the way of driving apart the respective members either by a "pulling" (i.e. traction) force or by a "pushing" force (spreading wedge of E7) is functionally unrelated to their particular shape.

5.3 According to the patent in suit, the features in the characterising portion of claim 1 reduce the inelastic deformations of the big end of the connecting rod and in particular of the end surfaces of the broken-apart cap-side and rod-side portions (paragraph [0037]). E7 is directed to the control of the breaking behaviour of connecting rods in order to achieve optimum breaking results by limiting the regions on which the breaking forces are applied to certain areas along circumferential lines of the inner surface of the rod's

big end eye (E7, [0008]). The skilled person would recognise that a reduction in plastic (i.e. inelastic) deformations at the big end during breaking is achieved.

5.4 The Board considers therefore that, starting from E7 as the closest prior art, the technical problem to be solved may be seen in providing an alternative device for breaking steel connecting rods to reduce inelastic deformations.

5.5 Neither E7 or E8 nor any other document on file discloses the features of the characterising portion. It has also not been convincingly argued by the appellant that these features would be obvious to the skilled person in the light of common general knowledge.

5.5.1 E7 suggests designing the two traction members as two composite members, each consisting of a core and a shell fitted to the core. The two shells are obtained by dividing a ring-shaped shell into two halves (par. [0020, 0043]). The shells' outer contour may be semicircular with varying radius along the shell's axial extension, leading to a convex or conical shape, or it may be overall cylindrical but with an elliptical cross-section (par. [0033, 0035, 0038-40]). This composite construction of the traction members allows the control of the breaking behaviour by selecting appropriate shells ([0019, 0045]). As acknowledged by the appellant (letter of 20 April 2010, page 6), there is however no explicit indication in E7 to select the cap-side member's radius of curvature to be bigger than that of the rod-side traction member. The appellant's argument that the skilled person, in particular when considering paragraph [0019] of E7, would have

automatically arrived at the claimed combination of features by simply trying all possible different combinations of radii, (i.e. equal radii, rod-side radius bigger, cap-side radius bigger) is not persuasive. This relies on an *ex-post facto* consideration which assumes that the skilled person would have derived from E7 that the radii of the traction members are the critical parameters to control, for which assumption the Board cannot find any basis in E7. Rather E7 teaches the skilled person to consider the overall, in particular non-cylindrical, shape of the members so as to apply the breaking forces along line-shaped circumferential or, in particular circumstances, also additionally in axially extending surface sections (see [0008]).

- 5.5.2 Similarly, E8 does not provide a pointer to the solution as defined in claim 1. As a result of a finite-element study of the distribution of strain and deformation within the connecting rod's big end when exposed to breaking forces (see chapter 8 of E8), a new design of the traction members was derived. The thrust surface of the rod-side traction member has an overall semi-circular cross-section with a radius of curvature $R = 22,21$ mm (see also page 54 "Einzelheit Z"). The cap-side traction member is specifically designed to "remove" forces applied to the connecting rod's cap portion ("*Wegnehmen der Kraft im Deckelbereich*", page 38 of E8). Breaking forces acting on the cap portion in a direction parallel to the longitudinal axis of the connecting rod are therefore to be limited to an area enclosed by an angle α measured from the cross-sectional plane of the rod's eye perpendicular to the rod's longitudinal extension (coinciding approximately with the future break plane). The resulting cross-sectional shape of the cap-side traction member

deviates from a semi-circular shape in that it comprises two lateral arc-shaped surface segments, serving to transmit the breaking forces to the cap portion over the angle α , each of which has a radius of curvature identical to that of the rod-side traction member (R). The surfaces of the cap-side and rod-side traction members which are designed to apply the breaking forces to the different portions of the inner surface of the connecting rod's big end eye, i.e. their "thrust surfaces", have thus identical radii of curvature and hence do not satisfy the requirement defined in the characterising portion of claim 1.

5.5.3 Furthermore, the outside surface of the cap-side traction member comprises two flats adjacent the respective arc-shaped thrust surfaces. The flats are joined to each other by another arc-shaped surface extending over a small angle at the zenith of the cap-side member's cross-section. Although this surface portion is provided to support the cap against being drawn inside during breaking (E8, section 8.7, page 53), it could function as a thrust surface in the limit of its contact with the cap's inner surface due to a potential cap deformation during breaking. Its radius of curvature is $r = 22,15$ mm (see page 54 "Einzelheit Z"), thus smaller than that of the rod-side traction member. So if this surface would be considered as a thrust surface within the meaning of claim 1, the resulting configuration is consequently the exact inverse to that claimed. The Board is unable to see that the skilled person would be led by common general knowledge to go against the results of the study performed in E8, which yielded the specific design of the traction members mentioned above, and to use an inverse configuration.

5.5.4 The Board furthermore cannot find any indication in E8 which would have led the skilled person to derive from the specifically designed cross-sectional shape of the cap-side traction member an "effective average radius of curvature" as suggested by the appellant. An effective average radius of curvature obtained by integrating the radius of curvature along the entire contour of the outer surface of the cap-side traction member is technically meaningless since the outer contour comprises the two flats which each have an infinite radius of curvature, so that the resulting average radius of curvature would then also be infinite. If the flats were disregarded in the determination of an "average radius", which would make sense since they are not intended to transmit thrust onto the cap-portion (and the claim is directed to the thrust surfaces), the average of the radii of the two lateral thrust surfaces and that at the zenith, can still only be lower than the maximum value, which maximum value is on the other hand equal to the radius of curvature of the rod-side traction member. In other words: such an average radius of curvature would be smaller than that of the rod-side traction member, contrary to the definition provided by the features in the characterising portion of claim 1.

5.5.5 The Board is also not convinced that the reference to known traction members of oval shape, (E8, page 53, last sentence), would have led the skilled person in an obvious manner to the invention. The reference to ovally shaped members leaves it open whether the known configurations comprised combinations of a semi-circular traction member with a cylindrical oval traction member or only pairs of equally shaped oval traction members. The appellant's argument that the skilled person would, when considering alternatives to

the shape of the mandrel halves shown in E8, only consider replacing one part of the round spreading mandrel with an oval form thus lacks support, since the last sentence on page 53 merely refers to the new mandrel shape as compared to an oval shape. Figure 4 in E7 is the only example on file of a known elliptically shaped traction member, in which however in all embodiments both (cap- and rod-side) traction members have the same outer shape. The description of E7 does not unambiguously suggest the combination of differently shaped shells.

5.5.6 The Board therefore concludes that starting from E7 as the closest prior art, the subject-matter of claim 1 is not obvious to the skilled person in view of the available prior art and/or the skilled person's common general knowledge. Since E2 has even less features in common with claim 1, including features missing also in E7, it cannot lead to a different conclusion. The invention defined in claim 1 thus involves an inventive step within the meaning of Article 56 EPC.

5.6 The fact that, as the appellant argued, claim 8 had a broader scope than claim 1 due to the lack of traction members (which was replaced by a "traction step"), has however no bearing on the conclusion regarding inventive step since the relationship of the radii of curvature of the first and second thrust surfaces being the same in both claims 1 and 8. Therefore also the subject-matter of claim 8 involves an inventive step.

6. Since the grounds of opposition raised under Article 100 (a) EPC do not stand against the maintenance of the patent, the appellant's requests to set aside the decision and to revoke the European patent cannot be met.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



B. Atienza Vivancos

M. Harrison

Decision electronically authenticated