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File Number: T 386/89 - 3.2.1
Application No.: 80 303 122.8
Publication No.: 0 025 677
Title of invention: Wheels manually adjustable for varying track

Classification: B60B 23/12, B60B 35/10

DECISION
of 24 March 1992

Proprietor of the patent: GKN Sankey Limited
Opponent: 01 Lemmerz-Werke KGaA
02 Levypyörä OY

Headword: Tractor wheel/SANKEY

EPC Article 56

Keyword: "Complete reformulation of problem in terms of an alleged effect not deducible from original disclosure (not allowed)"

Catchword

The alleged effect of a described feature cannot be taken into account when determining the problem underlying the invention for the purpose of assessing inventive step, if it cannot be deduced by the skilled person from the application as filed considered in relation to the nearest prior art.



Case Number : T 386/89 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 24 March 1992

Appellant :
(Proprietor of the patent)

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Decision under appeal :

Decision of Opposition Division of the European
Patent Office dated 25 January 1989, with written
reasons posted on 27 April 1989 revoking
European patent No. 0 025 677 pursuant to
Article 102(1) EPC.

Composition of the Board :

Chairman : F. Gumbel
Members : M. Ceyte
W. Moser
S. Crane
J.C. De Preter

Summary of Facts and Submissions

- I. European patent No. 0 025 677 was granted on 2 January 1985 on the basis of European patent application No. 80 303 122.8.
- II. The patent was opposed by the Respondents 01 and 02 on the ground that its subject-matter did not involve an inventive step. In support of their requests, they referred inter alia to the following prior art:
 - D1, "Fertigungszeichnung No. 247 938 713" of Rheinstahl Hanomag AG, 15 July 1966 (D1 was filed as "Anlage 14" by Opponent I with a letter dated 22 May 1985) and
 - the wheel shown in Figure 1 of the patent specification, which represents prior art.
- III. The patent was revoked by a decision taken at the oral proceedings on 25 January 1989 with written reasons posted on 27 April 1989.
- IV. The Appellant (proprietor of the patent) filed an appeal against this decision on 14 June 1989 and paid the appeal fee on the same day. The Statement of Grounds of Appeal was filed on 25 August 1989.
- V. In a communication pursuant to Article 11(2) of the Rules of Procedure dispatched on 7 November 1991, the Board, applying the principle of examination by the European Patent Office of its own motion as set out in Article 114(1) EPC, introduced into the proceedings the further document:
 - DE-C-928 868 (D3)

which was cited in the search report, taken into consideration during the examination proceedings and discussed in the specification of the patent in suit.

- VI. At the oral proceedings held on 24 March 1992 the Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of conditional Claim I filed with the Statement of Grounds.

A request for reimbursement of the appeal fee was withdrawn.

The Respondents requested that the appeal be dismissed.

- VII. The Appellant's arguments set forth in his written and oral statements can be summarised as follows:

The problem with which the invention is concerned is the increase of the fatigue life of a manually adjustable wheel for a vehicle, in particular for a high powered tractor, by which the track of the vehicle can be adjusted.

A wheel with inadequate fatigue life will suffer failure sooner than is acceptable but the type of failure is also of significance. A failure of one of the bolts securing the disc to the lugs might be inconvenient but occurs infrequently and in any case is not serious since a replacement can readily be obtained and is easily fitted. On the other hand, a failure of the rim, the disc or the lugs would normally require the purchase of a new wheel.

In practice, it was found that failures most commonly occurred at the points of attachment of the lugs to the rim. Either the lugs became detached or the rim cracked at

the point of lug attachment (see Mr E. Williams' Affidavit filed during the opposition proceedings). Hence, at the time when the invention was made, a skilled person attempting to improve the fatigue life of the wheels of high-powered tractors would most likely have turned his attention to the lugs and their attachment to the rim. In particular, the skilled person would have tried to minimise the maximum stress range in each lug and its attachment as the wheel rotates under load and to maximise the ability of the lug and its attachment to withstand this stress range. In doing this, the skilled person would, of course, be constrained by cost considerations since a customer would not accept significant cost increases even if a somewhat improved fatigue life could be achieved. In order to achieve fatigue life improvements, the skilled person might have considered increasing the number of lugs thus reducing the stress peaks by distributing the total load over more lugs but would then have realised that this would require not only more lugs, but also more welding of lugs to the rim, more bolts and possibly more disc material so that the costs would increase considerably. It might also be considered that bigger lugs could be used while retaining the same number of lugs but clearly this would increase material and welding costs. The same applies for an increase of thickness of material for the rim and the lugs.

That the invention actually solves the problem of increasing the fatigue life of the wheels of high-powered tractors without an unacceptable additional cost is clear from the comparative fatigue life tests made and the fact that nevertheless costs were reduced (see the Williams Affidavit - paragraphs 8, 13 and Exhibits A and C).

There is no disclosure or suggestion of a prior art wheel that does not have its lugs equally spaced around the

rim. Thus, if four lugs are used, as is the case with the wheel according to D1, they are at 90 degree angles, six lugs at 60 degree angles and so on. Tractor wheel designers had considered that the lugs must be equally spaced since any other arrangement would apparently cause uneven loading of the lugs with resultant stress peaks in certain areas which would lead to a decrease in the expected fatigue life.

The irregular octagonal disc of the D1 wheel, while it may save disc material in wheels with 4 lugs, was not seen as having any fatigue life increasing properties.

If the skilled person were to consider the possibility of modifying the D1 wheel to provide a wheel with higher fatigue life for high powered tractors, he would have had the possibilities of thickening the rim, altering the disc, increasing the number of lugs, increasing the size of the lugs, or altering the welding of the lugs to the rim. None of these possibilities lead towards the invention.

The impugned Decision suggests that the skilled person starting from D1 might have considered adopting the type of lug used in the wheel of Figure 1 of the patent without giving any reason why he should adopt just this type of lug, even though many other possibilities exist. This is however unlikely and the provision of twice as many lugs would be resisted on cost grounds. Furthermore, the provision of the lugs in pairs would be resisted on the ground that it would be expected to reduce the fatigue life (see discussion in the previous sections).

The wheel of Figure 1 of the patent in suit also has equi-angularly spaced lugs. Thus this prior art document similarly contains no suggestion that the above defined

technical problem can be solved by a wheel having its lugs unequally spaced in pairs about the rim.

VIII. The Respondents contested the Appellant's arguments and particularly took the view that the idea of using separate lugs in the case of bolts arranged in pairs as known from D1 did not imply an inventive step, considering the prior art according to Figure 1 of the patent in suit.

Although in the Williams Affidavit filed by the Appellant during the opposition proceedings it is specified that wheels which do not have lugs equally spaced around the rim have an increased fatigue life if compared with wheels having equi-angularly spaced lugs, the comparative tests referred to in this affidavit did not provide a fair basis for this conclusion. In any case, the finding of an additional useful and unexpected effect was not necessarily indicative of inventiveness (see ST 21/81, OJ EPO 1983, 15) if a claimed solution was suggested by the prior art for other reasons.

In the present case the teachings of the state of the art according to D1 and Figure 1 of the patent led directly to the adoption of lugs arranged in pairs to solve the technical problem actually underlying the patent in suit, i.e. the reduction of material consumption.

Moreover this additional effect was nowhere mentioned in the documents as filed and could also not be deduced by a skilled person from the original application as filed. Hence, it could not be taken into account when assessing the issue of inventive step.

IX. Valid Claim 1 reads as follows:

"1. A manually adjustable wheel for a vehicle, e.g. a tractor, the wheel comprising a rim (51) to receive a tyre, fixing lugs (58) spaced apart around the radially inner periphery of the rim, the lugs being of equal length considered parallel to the rotary axis of the wheel with their one ends co-planar and their other ends co-planar, each lug being welded directly to the rim, a disc (50) of uniform thickness for connection to a hub of the vehicle, the disc having a generally flat outer portion (54) which is generally perpendicular to the rotary axis of the wheel, and bolt means (61, 65) detachably securing the disc to the lugs, the disc and the lugs being arranged so that the disc may be selectively secured to the lugs in either of two axially spaced positions, each lug being channel-shaped and having a flange formed integrally with each wall of the channel, the flanges overlying the inner surface of the rim and being welded thereto, and each lug receiving a single bolt of the bolt means, characterised in that: the shape of the disc is that of a square with the corners cut off so that the disc has an irregular octagonal shape which has four longer sides (56) and four shorter sides (57) arranged alternately around the periphery of the octagon, and the lugs are arranged in four pairs so that the circumferential spacing between the lugs in a pair is substantially less than the circumferential spacing between adjacent lugs of adjacent pairs, each of the shorter sides of the disc being juxtaposed against the ends of a pair of lugs, and the two bolts received by that pair of lugs passing through one said shorter side of the disc."

X. At the conclusion of the oral proceedings the Board's decision to dismiss the appeal was announced.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is admissible.

2. Article 123

During the oral proceedings, the Respondents raised the objection that the amendments to the characterising portion of Claim 1 concerning the addition of the term "substantially" and the excision of the requirement that the bolts are "only" located along the shorter sides of the disc did not meet the provisions of Article 123.

However, the Board is of the opinion that there is sufficient support for the term "substantially" in the application as originally filed (see original Figures 6 and 8) and that the extent of protection conferred is not extended by the omission of the word "only" since it is clear from the patent specification and the claims as amended that the bolts cannot be situated along the longer sides of the disc because there are no lugs here.

3. Novelty

Neither the wheel shown in Figure 1 of the patent in suit nor the D1 or D3 wheels disclose a manually adjustable wheel having all the features specified in Claim 1. Therefore the subject-matter of Claim 1 is novel within the meaning of Article 54 EPC. This was, in fact, not put into question by the Respondents during the opposition and appeal proceedings.

4. Problem and Solution

- 4.1 Contrary to the teachings of the original disclosure in which the sole emphasis was on the achievement of material

savings with respect to the disc the Appellant now argues that the technical problem solved by the invention is to be seen in the enhancement of the fatigue life of the wheel through the arrangement of the lugs in pairs, this being irrespective of whether the wheel of D1 or of Figure 1 of the patent in suit is taken as the closest state of the art.

- 4.2 There can be no doubt that the feature that the lugs are arranged in pairs is, as such, disclosed in the patent application as originally filed. Such a feature is clearly shown or described in particular in the embodiments of original Figures 6 and 8. At the oral proceedings the Appellant contended that the effect of enhancement of fatigue life can be derived from the statement at page 1 of the application as originally filed according to which the manually adjustable wheel is "suitable for use on tractors of high power". In the Board's opinion, the technical significance concerning the increase of fatigue life through the arrangement in pairs of the bolts is not derivable from such a statement by a skilled person. This effect is also not self-evident: the Appellant himself has admitted that the increase in fatigue life was surprising and is indeed still not fully understood. Furthermore, no distinction is made in this context between the embodiments of original Figures 6 and 8 and that of original Figure 3 where a single lug rather than a pair of lugs is associated with each short side of the disc.

There is no disclosure or suggestion in the application as originally filed that this feature or indeed any other feature was in any way associated with increasing the fatigue life of the wheel.

- 4.3 It belongs to the well-established jurisprudence of the Boards of Appeal that where a specific problem is identified in the description, the applicant or patentee

may be allowed to put forward a modified version of the problem particularly if the issue of inventiveness has to be considered on an objective basis against a new prior art which comes closer to the invention than that considered in the original patent application or granted patent specification. Reference is made in this respect to the decision T 184/82 (OJ EPO 1984, 261) where the Board allowed a re-definition of the problem to such an extent that the skilled person "could recognise the same as implied or related to the problem initially suggested" (see point 5 of the reasons).

In the decision T 13/84 (OJ EPO 1986, 253) the Board held that the reformulation of the problem is not precluded by Article 123(2) EPC if the problem could be deduced by a person skilled in the art from the application as originally filed when seen in the light of the nearest prior art (see point 11). The same was confirmed in the decisions T 547/90 of 17 January 1991 (unpublished) and T 469/90 of 6 February 1991 (unpublished).

According to the above decisions, the reformulation of the problem would not contravene Article 123(2), that is to say would not constitute added subject-matter when amending the statement of the problem in the description as long as the problem can be clearly deduced by the skilled person from the application as originally filed when considered in relation to the nearest prior art.

Applying the above principles, the Board in the present case concludes that the alleged unexpected effect, i.e. the improved fatigue life, which as indicated above is not deducible from the application as originally filed, cannot be taken into account when determining the problem underlying the invention for the purpose of assessing the issue of inventive step.

Hence, the problem actually to be taken into account is in essence still the same as that expressly mentioned in the application as originally filed in relation to the Figure 1 wheel which is regarded as the nearest prior art by the Appellant. According to this problem the amount of material used for the disc shall be optimised having regard to the required strength of the wheel, in particular when used on tractors of high power.

4.4 According to the Appellant's submissions valid Claim 1 comprises in essence the following features:

1. a rim,
2. fixing lugs welded to the rim,
3. a disc,
4. bolts securing the disc to the lugs,
5. the disc has an irregular octagonal shape,
6. the lugs are channel shaped,
7. the lugs have flanges welded to the rim,
8. there are 8 lugs,
9. the lugs are arranged in pairs.

The Figure 1 wheel, against which the preamble of Claim 1 is correctly delimited, comprises a wheel rim provided on its radially inner surface with a set of eight equidistantly spaced apart lugs welded to the rim. The disc which is detachably secured to the rim lugs by means of bolts, is of generally circular configuration but has a scalloped periphery with the apices of the scallops providing portions adjacent the rim which are bolttable to the lugs (column 2, lines 42-50 of the patent specification).

According to the description as originally filed (page 4, lines 1-4) and the patent specification (column 2, lines 61-65), "the construction of the disc 14 is extremely wasteful of metal since it is generally circular and is usually produced as a steel stamping out of a square or rectangular blank". The Appellant has set out to remove this disadvantage (see statement of problem above).

4.5 According to the characterising portion of Claim 1 this problem is in essence solved by the above features (5) and (9), that is to say:

- 5. the disc has an irregular octagonal shape,
- 9. the lugs are arranged in pairs.

5. Inventive step

5.1 The provision of an "octagonal" disc (above feature (5)) was already known from the undisputed prior use of a wheel according to D1 and from document D3. Referring in particular to Figure 3 of document D3, it will be seen that the shape of the disc is that of an irregular octagon having four long sides and four short sides constituted by the corner portions, the long sides and short sides arranged alternately around the periphery of the disc.

It is expressis verbis stated in this document that a disc of this shape provides the advantage of saving material (column 1, lines 8, 9).

Thus the "octagonal" design (feature (5)) proposed in this citation is immediately suggested to the skilled person trying to solve the problem underlying the disputed patent.

5.2 Having regard now to the remaining feature (9), i.e. the arrangement in pairs of the lugs, any skilled person would be aware that once having chosen the octagonal shape of the disc the eight lugs of the Figure 1 wheel can only be located on the four shorter sides of the disc, because only these shorter sides come into contact with the rim, and that each shorter side is to be provided with a pair of lugs (since 8 lugs are to be distributed on the 4 shorter sides). Thus the idea of arranging the lugs (or the corresponding bolts) in pairs is imposed by the design of the disc. Therefore the Board considers that feature (9) merely represents a mandatory step not apt to impart inventiveness to the claimed subject-matter.

5.3 The Appellant argues that it is questionable whether the skilled person would in fact have considered retaining the same number and type of lugs and producing an uneven spacing since an uneven spacing of the lugs would have been thought unacceptable according to the conventional wisdom that only even lug spacing would equalize the stress across each lug and thereby reduce the stress peaks occurring at the welds between the rim and the lugs. This argument is not convincing to the Board: The claimed number of bolts (8) and the claimed number of lugs (8) are known from the nearest prior art, i.e. the Figure 1 wheel used as starting point. There would be no sound reason to deviate from the teaching of this nearest prior art and thus to provide a modified number of bolts and lugs. Moreover as to the arrangement of the bolts with a disc having an irregular octagonal shape, the wheel according to D1 also has them arranged in pairs at the shorter sides of the disc. The fact that in D1 unitary "boat lugs" are used for each pair of bolts instead of separate channel-shaped lugs as used with the invention and as known from the Figure 1 wheel does not detract from that general teaching.

5.4 No general prejudice that might have prevented a wheel designer from pairing the lugs can be seen by the Board and the Appellant did not bring forward any evidence in support of such a prejudice.

5.5 As pointed out above under point 4.3, in the present case the effect concerning the improved fatigue life cannot be taken into account for reformulation of the problem when assessing inventive step. Hence, the argument that the skilled person would have considered different solutions rather than arranging the lugs in pairs when trying to enhance fatigue life of the wheel, need not be dealt with.

5.5.1 However, even if this effect were to be taken into consideration as an additional surprising effect, the Board considers that it merely represents a "bonus effect" which would not be apt to impart inventiveness to the claimed subject-matter. Reference is made in this context to the decision T 21/81 (OJ EPO 1983, 15) where it is stated (point 6 of the reasons) that

"if having regard to the state of the art, it would already have been obvious for a skilled person in the art to arrive at something falling within the terms of a claim, because an advantageous effect (here, the reduction of material consumption) could be expected from the combination of the teachings of the prior art documents (here, Figure 1 wheel and document D3 or D1), such claim lacks inventive step irrespective of the circumstance that an extra effect (possibly unforeseen) is obtained".

Hence, since in the present case the advantageous effect of a reduction of material consumption while maintaining good mechanical properties could be expected by combining

teachings of the prior art, the extra effect of an improved service life cannot render the subject-matter of present Claim 1 inventive.

- 5.6 In these circumstances there is no necessity to investigate whether the alleged effect is properly demonstrated as being related to the features claimed by the comparative test according to Table C annexed to Mr Williams' affidavit and discussed therein.
- 5.7 For the above reasons the Board comes to the conclusion that the subject-matter of Claim 1 does not involve an inventive step within the meaning of Article 56 EPC. As the Board is bound by the single request of the Appellant it is not necessary to consider the merits of the subject-matter of dependent Claims 2 and 3.
6. The Board is thus of the opinion that the grounds for opposition prejudice the maintenance of the patent.

Order

For these reasons, it is decided that:

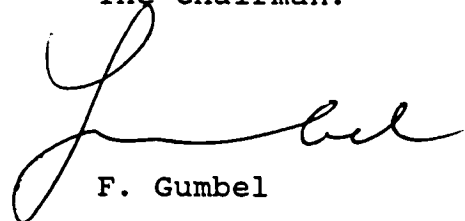
The appeal is dismissed.

The Registrar:



S. Fabiani

The Chairman:



F. Gumbel

03349

U. Moser

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