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Datasheet for the decision of 29 March 2007

Case Number: T 0401/05 - 3.4.02

Application Number: 96200678.9

Publication Number: 0735356

IPC: G01M 1/32

Language of the proceedings: EN

Title of invention:
Method and apparatus for balancing vehicle wheels by means of balance weights

Patentee:
CORGHI S.p.A.

Opponent:
Snap-On Equipment GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 100(b), 56

Keyword:
"Sufficiency - yes"
"Inventive step - yes"

Decisions cited:
-

Catchword:
-

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Case Number: T 0401/05 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 29 March 2007

Appellant: (Opponent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 21 February 2005 rejecting the opposition filed against European patent No. 0735356 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: A. Klein
Members: M. Rayner
M. Vogel

Summary of Facts and Submissions

I. The opponent lodged an appeal against the decision of the opposition division rejecting the opposition against European patent number 735 356 (application number 96 200 678.9). The patent concerns balancing vehicle wheels.

II. In the proceedings before the opposition division, reference was made to the following documents:

E1 US-A-4 267 730
E2 US-A-5 355 729
E3 DE-A-41 22 844.

According to the decision under appeal, the case presented by the opponent in relation to lack of sufficiency in relation to position and magnitude of weights for balancing wheels was not convincing, for instance having regard to the teaching given in paragraphs 30 to 39 of the description. Should any weights be out of stock, this does not mean the invention cannot, in principle, be carried out because the skilled person could simply order them. Insofar as the opponents case relates to clarity, it is irrelevant as lack of clarity is not a ground for opposition.

With respect to inventive step, the prior art documents do not hint at computing new weight application planes. A view that ranges referred to in the claim represents the whole width of the wheel, thus including the rims as in the prior art, is contradictory to the meaning in the independent claims.

The lines of argument advanced by the opponent on sufficiency and inventive step therefore failed to convince the opposition division.

III. In its appeal, the appellant requested that the decision under appeal be set aside and that the patent be revoked. The appellant also requested oral proceedings on an auxiliary basis. Consequent to this auxiliary request, oral proceedings were appointed by the board.

IV. The case of the appellant can be summarised as follows.

(a) Sufficiency

The skilled person does not know what the finite number of weights available in practice as referred to in the claims is. Bearing in mind the differing possibilities over the years since the priority date of the patent, this is just not possible. Moreover, claims 1 and 2 specify a different sequence in determining planes and ranges, leading to a contradiction stopping the skilled person carrying out the teaching. Contradictions also exist between claims 1 and 3 in view of use of the word "determining" as opposed to "attributing". With respect to claims 1 and 4, there is a contradiction caused by the indeterminacy of the ranges claimed. If the range in the characterising part is the same range as in claim 3, then the claim is redundant, if different it is not taught sufficiently. The contradictions prevent the teaching of the patent from being carried out.

During the oral proceedings, the appellant argued there is an insuffiency in the teaching of the patent because

reference is made to a pre-chosen plane in the preamble of claim 1 and to another plane (the weight application plane) in the characterising part of the claim. This conflict in the claim also leaves the skilled person in the position of not being able to carry out the invention.

(b) Patentability

Starting from document E2, the problem addressed by the patent in dispute is to effect balancing without using split weights. As document E2 teaches positioning weights out of a finite set at calculated angular positions to achieve exact imbalance correction (see for instance column 8, lines 45-47), the difference in the patent in dispute is mounting the weights within ranges. The skilled person can obviously determine the ranges concerned form document E1, namely the substantially horizontally disposed part of the wheel section as shown in figure 2.

During the oral proceedings, the appellant explained the standard approach used in wheel balancing machines involving determining the geometric dimensions of the wheel, a measuring run for unbalanced forces, determining balancing weights for the compensation planes and attaching weights having appropriate values. The balancing weights are available in step values and therefore machines calculate weights in these steps, showing the appropriate multiple. Document E1 discloses a system for mag wheels as well as steel wheels, for the former, the weights are attached adhesively inside the rim. Equations 5 and 6 in column 3 refer to the weights W_{t1} and W_{t2} to be fixed. Equations 3 and 4

include distances a, f and b of the measuring system. It is obvious in view of document E2, that if the weights are not in the available steps, then the machine has to calculate in another way. Here it is only possible to change the distances a and b because the other parameters are fixed. In other words the person creating the software constructs the machine to achieve stepwise weights and axial placement change. Accordingly, it is obvious not to use the initial compensation planes but to place the weights in other planes. Document E1 gives the necessary teaching as to how to structure the machine and perform the calculations to get weight values which are available. From column 6, line 44 of document E1 it can be seen, for instance, that a signal representing a lesser spacing between the planes of the weights is determined. Confirmation that the spacing is reduced is given in lines 63-65 in column 10. In the patent, as in document E1 weights les than 5 grams are ignored.

Therefore, so far as it is possible to carry out the claimed invention, the subject matter claimed does not involve an inventive step.

V. The respondent (=patent proprietor) requests that the appeal be dismissed and its case can be summarised as follows.

(a) Sufficiency

Weights (N1,N2) for application in planes Q1, Q2 position in a range are simply chosen from those available and nearing the calculated weights (M1,M2) calculated for the pre-chosen plane. Claim 2 recites a

further restriction that prechosen planes are at the centre of the ranges, which is taught in the description. With respect to claim 3, the terms "attributing" and "determining" overlap, what is to be done is again taught sufficiently for the skilled person in the description. Claim 4 is not dependent from claim 3 but from claim 1 and does not refer to the central planes. Thus, when claims 2 to 4 are properly read with claim 1 there is no contradiction. Thanks to the invention, the operator can use the available weights without modifying their value or splitting. The teaching is therefore sufficient. So far as the arguments of the appellant relate to clarity, it is underlined that this is not a ground of opposition.

(b) Patentability

The part of document E2 referred to by the opponent in connection with calculating imbalance concerns splitting, i.e. just the operation the patent in dispute seeks to avoid. Document E2 thus only teaches splitting an in practice non-available balance weight into two available balance weights at different angles in the same plane as calculated for the non-available weight. The correction suggested by document E1 for different wheels involves using a mean diameter representing the average between the two diameters of the rim in the two weight application planes chosen by the operator. This procedure and the detailed references to document E1 made by the appellant has nothing to do with the invention. The subject matter of the independent claims can therefore be considered to involve an inventive step.

During the oral proceedings, the respondent explained that document E1 is an old document, which starts from steel wheels where the operator provides the a, b and D parameters. The document teaches how to modify the information for certain types of mag wheels to correct imbalance. At the end of the operation, there are two teachings, namely the position of two application planes and weights, whereby the distance between the planes is fixed. The equations shown in document E1 are respected by all machines, yet they are not reversible in the way indicated by the appellant because there is no weight available at the start for substitution into the equations. This can be contrasted with the invention, where there is an initial plane with a range about the plane, permitting a determination of the weight for the pre-chosen balancing planes, but where a closer calculation for the application planes is performed only in a second step. All the machine of document E1 does is adjust placement distances to a specific mag wheel. The teaching of document E3 is far removed from that of the patent in dispute.

VI. Independent claims 1 and 6 of the patent in dispute are worded as follows:

"1. A method for balancing vehicle wheels (18) by means of at least one balance weight (8) to be applied to the wheel rim (11), comprising determining and memorizing the position of a prechosen balancing plane (P1, P2) for each balance weight (6), characterized by attributing to each balancing plane (P1, P2) a range (Plmin-P1max, P2min-P2max) in which the weight application plane (Q1, Q2) must lie, determining by electronic computing means (71) the position of the

weight application plane (Q1, Q2) within said range (PLMAX-P1MIN; P2MAX-P2MIN), and the angular position (Z1, Z2) of each balance weight (8: N1, N2) computed on the basis of weight values chosen from a finite number of values available in practice.

6. An apparatus for balancing vehicle wheels (10) by applying at least one balance weight (8), comprising a rotary shaft (20) on a base (2). means (30, 31, 32) for clamping the wheel (10) onto said rotary shaft (20), means for measuring the vibrations of said rotary shaft (20) in at least two reference planes, computing means for computing unbalance, and processing means (73) for computing balance weights to be applied in two application planes (Q1 , Q2) of the wheel (10) in two angular positions (Z1 , Z2) computed by the processing means (73), said computing means comprising a memory for memorizing the unbalance data, characterised in that said processing means are arranged to compute said application planes (QI , Q2) to lie within a range around a prechosen balancing plane (P1 , P2). and to compute said angular positions (Z1 , Z2) and said application planes (Q1 , Q2) on the basis of weight values (N1, N2) chosen from a finite number of values available in practice."

VII. At the end of the oral proceedings, the board gave its decision.

Reasons for the Decision

1. The appeal is admissible.

2. *Sufficiency (Article 100(b) EPC)*

2.1 Two issues have been raised by the appellant, namely the availability of weights to the skilled person and whether the claims contain inconsistent teachings preventing the invention from being carried out.

2.2 During the oral proceedings, the appellant explained in what steps in weights are available in practice. This explanation also fits with the prior art, for instance line 2 of column 4 of document E2. The board is therefore satisfied that the skilled person knows what weights are available in practice. If, for some reason, a particular weight is missing or if the set of weights changes over time, this applies to all balancing machines, not just those the subject of the patent in dispute. Such a situation does not mean that the teaching of the patent is insufficient, it just means that in a particular situation, the operator may in carrying out the sufficient teaching, for example, have to order out of stock weights as explained by the opposition division. Therefore the board found the approach of the appellant in relation to insufficiency as pertaining to weights available in practice rather contrived and was not persuaded as to insufficiency thereby.

2.3 With respect to the reference to a prechosen balancing plane (P1,P2) in the preamble of the claim and to a weight application plane (Q1,Q2) in the characterising part of the claim, the different wording pertains to differing stages because the former is the plane which may involve a weight not available in practice as in a calculation common with the prior art, and the latter a

plane involved in a second calculation for a weight available in practice. The description on page 3 of the published patent teaches how these calculations are to be performed and the board sees no insufficiency therein. The board does not, moreover, see any insufficiency caused by reading of any of claims 2 to 4 with claim 1. With respect to claim 2, the description teaches that the prechosen balancing planes (P1,P2) are central planes (see for example paragraph 0033). Claim 3 recites more detail of the method, all the steps are taught in the description and therefore here also no insufficiency arises. Moreover, the ranges are sufficiently taught in the description and claim 4 pertains to contains different subject matter to claim 3 from which it is not dependent. The board therefore reached the conclusion that there is no insufficiency in the teaching of the patent.

2.4 The approach of the appellant amounts to a contrived and artificial attempt to misread the claims by repeatedly confusing the prechosen planes P1 and P2 with the weight application planes Q1 and Q2. This approach did not convince the board.

2.5 So far as the approach of the appellant in relation to looking for inconsistent wording or order of method steps is more an attempt to challenge the clarity of the claims than sufficiency of the patent, the board observes that as the opposition division pointed out, lack of clarity is not a ground of opposition.

3. *Prior art*

3.1 Document E1

This document starts from an established process for balancing steel wheels in a standard manner by disposing weights at the edge of the wheel rims according to the equations given in column 3 of the document. Exactly what weights are available is not described in document E1, but the parties assumed that these were the usual standard weights. At all events, the operator has to input parameters including, for instance, an *a* and *b* dimension, which represent the distance from a machine point of reference to the nearest and furthest edge of the wheel rim. The document identifies a problem for the machine with mag wheels, e.g. alloy wheels, where rather than at the edge of the wheel rims, the weights are disposed closer together and at a smaller diameters. The solution offered by document D1 is to use correction factors in the machine so as to convert readings taken in a standard manner to readings appropriate for the mag wheel, which entails taking an average diameter in the balancing planes and allowing for the reduced spacing therebetween. For instance, addition of a certain Zener voltage to a potentiometer output representing the *a* dimension allows for the further distance of the weight application plane of a mag wheel. It can thus be said that, according to document E1, different balancing planes for different types of wheels are contemplated, but not that the weight application planes for the same wheel are determined within a range attributed to a prechosen balancing plane.

3.2 Document E2

This document is also concerned with improving balancing, while using standard weights available in practice. Here the approach involves the calculated weight being split into two weights available in practice and applied in two different angular positions in the same plane so that the imbalance correction is the vector sum of two standard weights.

3.3 Document E3

This document discloses a balancing machine having, amongst other things, a member for sensing compensation planes and radii. Values can be inputted into the machine before a balancing run and can be also thereafter to allow for any correction of the balancing weight which may be required.

4. *Substantive Patentability*

4.1 As can be seen from a comparison of the independent claims 1 and 6 with the prior art documents, no more than the features of the preamble of claims 1 and 6 are disclosed by any one of documents E1 to E3. The problem addressed by the novel features of the claims 1 is that of improving wheel balancing, in particular, by avoiding difference between the calculated weight to be applied and available standard weights, which difference would be detrimental to the balance. Thus, an advantage of the claimed subject mater, shared by the subject matter of document E2, is that weights available in practice can be used. An advantage of the

claimed subject matter with respect to document E2 is that the weights do not need to be split.

4.2 The appellant challenged inventive step of the subject matter of claim 1 starting either from document E1 or document E2.

4.3 In the board's view, document E1 represents the closest prior art document to the invention because it mentions different weight application planes, albeit, however, for different types of wheels. Document E2, the other candidate, like the patent in dispute, addresses the problem of improving wheel balancing, but offers the solution of weight splitting so as to be able to use weights which are available in practice. Therefore, in order to be the starting point for the patent in dispute, it would be necessary for the skilled person to step back from the teaching of document E2 by dispensing with the solution taught. For this reason, it is not the closest starting point.

4.4 Starting from document E1, the appellant would have the board believe that the skilled person would have been taught that document E2 teaches use of available weights per se, i.e. out of the context of the split weight method. This approach is not credible because, for example, just column 8, line 43, referred to by the appellant, recites that split weight mode provides exact imbalance correction. In other words, the use of weights available in practice is tied to the split weight approach. The appellant would also have the board believe that the skilled person understands from document E1 that weight application planes have to be moved to use weights available in practice, but this is

not the case because such movement is already committed for using the machine for different wheels. The board had therefore to conclude that the position of the appellant is hindsight driven and not reached on the basis of the prior art. An even more adventurous approach was to argue that the equations in document E1 show that the position of the planes and not the weights are to be used for balancing. In such a case, unlike measured planes, there are no starting weights to be put into the equations in the calculation disclosed. Thus no solution to the equations is reached. The reality is that if any further calculation is to be made in the light of document E2, it is obvious that it would pertain to splitting weights as there taught.

4.5 A similar situation applies when starting from document E2, as any shifting of weight application planes taught by document E1 is solely for adapting to different types of wheels, the split weights remain the way to improve balancing with weights available in practice.

4.6 The teaching of document E3 relating to the sensor means offers is not relevant to using a different weight application plane.

4.7 The remaining lines of argument of the appellant against the subject matter claimed amount are based on ex post facto analysis or are simply not relevant. It is not true that it is just using a range which is novel over document E2. In reality, the skilled person can see perhaps from document E1 where weights for different wheels can be applied, but this would then mean that no more than the usual pre-selected plane is determined as there is no question of replacing the

split weight technique. A further teaching of document E1 is that weights calculated by the machine are zeroed out if they fall below a certain level. The board does not, however see in ignoring small weights, any teaching towards determining the weight application planes so as to use weights available in practice.

4.8 Accordingly, the case of the appellant failed to convince the board, which is therefore satisfied, that the subject matter claimed in independent claims 1 and 6 can be considered to involve an inventive step. The same conclusion applies to the independent claims by virtue of their dependence.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl A. G. Klein