BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen
(D) [ ] No distribution

D E C I S I O N
of 23 November 2005

Case Number: T 0948/03 - 3.2.01

Application Number: 96300406.4

Publication Number: 0722872

IPC: B61D 17/02

Language of the proceedings: EN

Title of invention:
Railway vehicle

Patentee:
Hitachi, Ltd.

Opponent:
Deutsche Bahn AG
Patentes Talgo, S.A.
Bombardier Transportation Sweden AB
Siemens AG

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 83, 114(2)
RPBA Art. 10a, 10b

Keyword:
"Late submitted ground - admitted (no)"
"Amendment to party's case - admitted (no)"
"Disclosure - sufficiency (yes)"
"Novelty (yes)"
"Inventive step - (yes) after amendment"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0948/03 - 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 23 November 2005

Appellant I: (Opponent I)
Deutsche Bahn AG
Völckerstr. 5
D-80939 München (DE)

Representative:
Schnekenbühl, Robert Matthias L.
DTS München Patent- und Rechtsanwälte
St.-Anna-Strasse 15
D-80538 München (DE)

Appellant II: (Opponent III)
Bombardier Transportation Sweden AB
Östra Ringvägen 2
S-721 73 Västeräs (SE)

Representative:
Broydé, Marc
Breese Derambure Majerowicz
38 Avenue de l'Opéra
F-75002 Paris (FR)

Appellant III: (Opponent I)
Siemens AG
Postfach 22 16 34
D-80506 München (DE)

Representative:
-

Respondent: (Proprietor of the patent)
Hitachi, Ltd.
6, Kanda Surugadai 4-chome
Chiyoda-ku
Tokyo 101 (JP)

Representative:
Hackney, Nigel John
Mewburn Ellis LLP
York House
23 Kingsway
London WC2B 6HP (GB)

Party as of right: (Opponent II)
Patentes Talgo, S.A.
Montalban, 14
E-28014 Madrid (ES)

Representative:
Elzaburu Marquez, Alberto
Sres. Elzaburu
Industrial Property Attorneys
Miguel Angel, 21
E-28010 Madrid (ES)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 26 June 2003 rejecting the opposition filed against European patent No. 0722872 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: S. Crane
Members: J. Osborne
C. Heath

Summary of Facts and Submissions

I. The appeals are directed against the decision posted 26 June 2003 to reject the oppositions against European patent No. 0 722 872.

II. Grant of the patent was mentioned on 3 May 2000 following which oppositions were filed by four parties, *inter alia* "DaimlerChrysler Rail Systems Sweden AB" (opponent III). The notice of opposition from opponent III was signed by an employee of the company who supplied a copy of a general authorisation dated 5 February 2001. Authorisations in favour of professional representatives were filed 19 March 2003 by "Bombardier Transportation AB (former Daimler Chrysler Rail Systems Sweden AB" but no evidence in support of the change of status was filed.

III. Within the period for opposition according to Article 99(1) EPC the opponents named the grounds for opposition according to Article 100(a) EPC (novelty and inventive step) and 100(b) EPC. The Opposition Division summoned the parties to oral proceedings and set a final date in accordance with Rule 71a EPC of 2 May 2003. With a letter received 21 May 2003 opponent III introduced an additional ground of opposition according to Article 100(c) EPC. During the oral proceedings the Opposition Division disregarded the additional ground for opposition.

IV. Appeals were filed by *inter alia* "Bombardier Transportation AB (former Daimler Chrysler Rail System Schweden AB)".

V. The following evidence filed during the opposition proceedings was also referred to during the appeal proceedings:

R3: T. Maeda *et al.*, "Effect of Shape of Train Nose on Compression Wave Generated by Train Entering Tunnel", Proceedings of the International Conference on Speedup Technology for Railway and MAGLEV Vehicles, Yokohama, Japan, 22-26 November 1993, Vol. 2, 315-319

R11: collected documentation (R10, R11.1 - R11.7) regarding alleged public prior use by presentation of the nose shape of the "Neumeister" design for the ICE 3 train.

In the statements of grounds of appeal the appellants referred to *inter alia* the following additional evidence:

R13: EP-A-0 376 351

R14: DE-C-29 10584

R15: DE-A-2 035 450.

VI. Appellant I (opponent I) submitted in its statement of grounds of appeal that the subject-matter of claim 1 as granted did not involve an inventive step with respect to R3. Appellant II (opponent III) submitted in its statement of grounds of appeal that the Opposition Division had incorrectly exercised its discretion in disregarding the late-filed ground according to Article 100(c) EPC, that the subject-matter of claim 1

as granted was not new with respect to R13 and did not involve an inventive step with respect to each of *inter alia* R13, R14 and R15.

VII. In response to the appeals the respondent with a letter received 24 February 2004 filed amended claims according to a main request and first to third auxiliary requests.

VIII. In a letter dated 21 October 2005 appellant I/opponent I argued *inter alia* that the subject-matter of claim 1 according to the patent proprietor's main request was not new with respect to the alleged prior use according to R11. In a letter dated 23 October 2005 appellant II/opponent III argued *inter alia* that the subject-matter of claim 1 according to the patent proprietor's main request was not new with respect to the alleged prior use according to R11 and to R15 and filed the following evidence regarding its identity:

R16: extract from the Swedish Register of Companies, dated 16 April 2002.

IX. In oral proceedings held 23 November 2005 the appellants requested that the decision under appeal be set aside and the patent revoked. The respondent requested that the patent be maintained on the basis of the main request or in the alternative the first to third auxiliary requests as filed on 24 February 2004. The Board exercised its discretion in accordance with Article 10b(1) RPBA and thereby did not consider the objections of lack of novelty with respect to R11 and R15 respectively.

X. Claim 1 according to the respondent's main request reads:

"A railway vehicle having a car body having a nose portion at which the car body cross-sectional area progressively increases in the longitudinal direction from a tip of the car body at one end of the vehicle towards the other end thereof, said nose portion having at least a tip region (11) and an intermediate region (12, 13; 22; 32; 42) adjoining said tip region and more remote from the said tip than said tip region, wherein
(i) throughout said intermediate region the car body cross-sectional area increases at a constant rate in the longitudinal direction away from said tip,
(ii) said intermediate region includes the position at which the car body cross-sectional area is half the maximum car body cross-sectional area of the vehicle, and
(iii) throughout said tip region the car body cross-sectional area increases in the longitudinal direction at a rate greater than said constant rate of said intermediate region,
characterised in that:
throughout said tip region the car body cross-sectional area increases at a constant rate in the longitudinal direction of the car body, and a driver's cab windshield is located in said intermediate region and has an angle to the vertical permitting visibility ahead."

Claim 1 according to the respondent's first auxiliary request reads as above but with the following additional wording:

"and at the location of the windshield in the longitudinal direction, the car body has recesses (34) in its sides."

Claims 2 and 3 according to the first auxiliary request define features additional to those of claim 1.

XI. The submissions in respect of the Opposition Division's exercise of discretion in accordance with Article 114(2) EPC may be summarised as follows:

The objection raised by appellant II/opponent III in accordance with Article 100(c) EPC during opposition was that the feature "throughout said tip region the car body cross-sectional area increases at a constant rate in the longitudinal direction of the car body" in claim 1 as granted is specified in respect of a railway vehicle but was disclosed in the application as originally filed only in respect of models. The Opposition Division and all parties were made aware of the new objection 13 days prior to the oral proceedings. In the opinion of appellant II/opponent III this time was sufficient for its examination which requires merely a comparison between the application as granted and as originally filed. The reasoning given by the Opposition Division in its decision relies on reference to the title of the application and the late filing of the objection by only one of four opponents, neither of which corresponds to a valid test for addition of subject-matter. The Opposition Division based its decision not on the arguments presented by the opponent but on the circumstances under which the objection was raised. The Opposition Division therefore failed to correctly exercise its discretion according to

Article 114(2) EPC when disregarding the late-filed ground for opposition according to Article 100(c) EPC.

The respondent submits that the essential teaching of the application as originally filed related to the beneficial effects achievable by a constant rate of change of cross-sectional area, as embodied by a paraboloid of revolution. The application taught in figure 8 a combination of three sections each having a constant rate of change of cross-sectional area and the practical embodiment of figure 9 disclosed the application of that teaching to a railway vehicle. Since the late-filed objection evidently was invalid the Opposition Division correctly exercised its discretion when disregarding it.

XII. The parties' submissions in respect of the ground for opposition according to Article 100(b) EPC may be summarised as follows:

Appellant II/opponent III takes the view that the ground for opposition according to Article 100(b) EPC relates to disclosure not of the claimed subject-matter but of "the invention". According to case law the existence of an invention can be recognised only if a problem is solved. However, in the present case the originally stated problem is already solved by R3. Moreover, according to R3 there is no correlation between shape and pressure gradient in the tip region and a particular shape therefore will have no effect.

The respondent's rebuttal was essentially that the requirements of Article 100(b) EPC in respect of a product claim are consistently understood as relating

to the ability to perform or produce the subject-matter as claimed. The approach taken by the appellant would require that a technical effect must be achievable by any feature which happens to be novel in comparison with a particular prior art. Even if the appellant's approach to the requirements of Article 100(b) EPC were correct, R3 does not relate to a realistic train and so cannot provide information relating to technical effect achievable by the presently claimed subject-matter which provides sufficient capacity in a vehicle whilst optimally reducing the micro-pressure wave. Moreover, the results shown in figure 11 of R3 are only valid in respect of the models tested and give no information regarding the results achievable with the presently claimed subject-matter.

XIII. As regards novelty and inventive step of claim 1 according to the main request, the appellants essentially submitted the following:

R3 discloses the features contained in the preamble. Moreover, it is implicit that a windscreen ("windshield") must be present in the intermediate region of the nose portion. Although figure 12 of R3 shows a rounded front extremity, this must also be the case with the presently claimed railway vehicle. The tip region shown in figure 12 exhibits a constant rate of change of area away from the front extremity and so R3 discloses a tip region within the meaning of present claim 1. It follows that the subject-matter of present claim 1 is not new with respect to the disclosure of R3.

If the subject-matter of present claim 1 were to be considered novel, R3 would then be the closest prior

art for consideration of inventive step and disclose the features contained in the preamble. The presently claimed location of the windscreen is conventional. As already submitted in respect of insufficiency of disclosure, there is a strong argument that there is no technical effect derivable from the claimed feature relating to the tip region and therefore no inventive step can be recognised. However, even if there were a technical effect, the problem of reducing the micro-pressure wave is already known from R3 which discloses the solution, to employ a paraboloid of revolution and the only scope for further improvement is in the tip region. Since figure 11 of R3 shows that further shortening beyond model "D" is disadvantageous the skilled person would be encouraged to experiment with the shape of the tip portion. Of the three shapes disclosed in R3, the paraboloid of revolution is disclosed as being the most effective. It is the higher rate of increase of cross-sectional area in the tip region, which is already known from R3, which influences the capacity of the vehicle, not the presently claimed constancy of the rate of increase.

XIV. In respect of novelty and inventive step of claim 1 according to the main request the respondent essentially replied as follows:

Whereas the present patent relates to a realistic vehicle, R3 discloses merely results relating to models. The real-life problem of achieving sufficient capacity in the vehicle and visibility for the driver whilst nevertheless minimising problems with the micro-pressure wave is not addressed by R3 and the appellants' case relies on hindsight. R3 contains no

teaching even that a constant rate of change of cross-sectional area provides the best result in respect of reduction of a micro-pressure wave and certainly does not disclose two areas of constant rate of change of cross-sectional area. The authors of R3 have made an assumption that the tip region has little effect on the micro-pressure wave and have made no attempt to investigate its shape in order to optimise results. Not only does figure 12 of R3 give no indication of any windscreen position but none is visible in the photograph of figure 13.

XV. The arguments presented by the respondent in support of inventive step of the subject-matter of claim 1 according to the first auxiliary request may be summarised as follows:

The additional feature of the recesses ensures satisfactory visibility by permitting the windscreen to be more upright than the remainder of the intermediate region without deviating from the constant rate of change of cross-sectional area. The prior art is silent on this matter.

XVI. In respect of inventive step of the subject-matter of claim 1 according to the first auxiliary request the appellants replied essentially as follows:

If the skilled person is to abide by the constant rate of change of cross-sectional area whilst providing a windscreen at an angle sufficiently steep for visibility recesses must be provided. No additional technical problem is solved by the feature of the recesses. According to the description of the concrete

embodiment of figure 9, which must be taken as the essential teaching, the recesses are provided because of the width of the underframe which it not mentioned in the claim so that no problem is solved by the subject-matter of the claim.

Reasons for the Decision

Identity of appellant II

1. The opposition by opponent III was filed in the name of "DaimlerChrysler Rail Systems (Sweden) AB giving an address "Östra Ringvägen 2, S-721 73 Västeras" in Sweden. R16 indicates that the company name "Bombardier Transportation Sweden AB" having a registered office in "721 73 Västeras" was registered on 28 June 2001 and that the company in the period between 3 September 1999 and 28 June 2001, which includes the period for opposition of the present patent, was named "Daimler Chrysler Rail Systems (Sweden) AB". Amongst those listed as having signatory power are Staffan Henning Håkanson and Per Åke Mikael Norling, whose signatures are on both the general authorisation dated 5 February 2001 from "DaimlerChrysler Rail System (Sweden) AB" and the authorisation dated 20 February 2003 and filed 19 March 2003 from "Bombardier Transportation (Sweden) AB (former Daimler Chrysler Rail Systems (Sweden) AB)" having the same address as given on the original notice of opposition. From this chain of facts it is clear that appellant II is the same company as that which filed an opposition as opponent III but operating under a different name whereby its status as a party remains unchanged.

The omission of "Sweden" from the name of the appellant stated in the notice of appeal is a mere clerical error (perhaps due to the fact that the name given for this opponent in the decision under appeal also omits it) which can, and has now been, corrected according to Rule 65(2) EPC.

Exercise of discretion by the Opposition Division

2. Appellant II/opponent III primarily uses the reasons given in the contested decision as the basis for its argument that the Opposition Division failed to correctly exercise its discretion in disregarding the late-filed ground of opposition according to Article 100(c) EPC. This reasoning given by the Opposition Division in support of its finding refers to the timing of the objection, its introduction by only one of the four opponents and to the title of the application. Although the Opposition Division did use the correct test of *prima facie* relevancy in exercising its discretion, the Board is not able to use the reasoning in order to assess whether the late-filed ground is in fact *prima facie* relevant and therefore has itself considered the arguments presented by appellant II/opponent III during the opposition procedure and as repeated during the appeal procedure.

2.1 In the application as originally filed it is clear that the "invention" relates to an actual vehicle. For example, according to the first paragraph of the description "the invention relates to a nose shape of a vehicle …". The second paragraph introduces the aerodynamics problems arising with high speed trains

and the fourth paragraph relates specifically to problems when trains exit tunnels and generate a micro-pressure wave. Moreover, beginning in column 6, line 45 of the published application there is discussion of the problem of combining optimal aerodynamic results with a shape which will provide sufficient capacity of the vehicle. The skilled person learns from this that the application is not directed merely to theoretical studies but to practical vehicle shapes. Subsequently, figures 7 and 8 introduce more complex shapes. Figure 8 introduces the concept of a constant rate of increase of cross-sectional area in the tip region which is now in claim 1 and which appellant II/opponent III argues was disclosed only in respect of models. However, figure 9 is then stated to be a "concrete embodiment … based on the … shape shown in Fig. 8 …" and introduces the location of the windscreen and underframe portions. This is a clear disclosure to the skilled person of a constant rate of increase of cross-sectional area in the tip region of a vehicle.

2.2 On the basis of the foregoing the Board concludes that the late-filed ground for opposition according to Article 100(c) EPC was not *prima facie* relevant and that the Opposition Division therefore correctly exercised its discretion in disregarding it.

Main request

Sufficiency of disclosure

3. Article 100(b) EPC provides that a patent may be opposed on the ground that it does not disclose "the invention" in a manner sufficiently clear and complete

for it to be carried out by a person skilled in the art. Appellant II/opponent III reasons that according to case law the solution to a technical problem is a prerequisite for recognition of an "invention". It further reasons that R3 shows that no reduction in micro-pressure wave is achievable by the form of the tip region, which is the only characterising feature of granted claim 1, and that the patent therefore fails to sufficiently disclose the "invention" within the meaning of Article 100(b) EPC. This approach confounds the requirements of disclosure and patentability.

3.1 Whether a problem is solved by claimed subject-matter normally forms part of the assessment of inventive step and takes into account the relevant state of the art. The state of the art is also pertinent to the requirements of sufficiency of disclosure in a patent specification because the former partly defines the knowledge of the skilled person. However, whether a problem is solved in comparison with the state of the art is not a correct test for assessing compliance with the requirements of the EPC in respect of sufficiency of disclosure. For example, assume that in a patent application a claim defines subject-matter which with respect to available prior art is novel by virtue of a single technical feature, solves a technical problem and involves an inventive step and the disclosure is sufficient for the skilled person to put that subject-matter into effect. If that technical feature were to be deleted from the claim such that the subject-matter were no longer novel the technical problem would no longer be solved. However, since the subject-matter which remains was sufficiently disclosed as part of the

former claim this must still be the case after deletion of the feature.

3.2 On the basis of the foregoing the Board cannot agree with the appellant's contention that the term "invention" within the meaning of Article 100(b) EPC requires that the subject-matter of a claim must solve a technical problem in order that the disclosure be considered as sufficient. At least within the technical field to which the present patent belongs, a disclosure is normally regarded as sufficient within the meaning of Article 100(b) EPC provided the skilled person is capable of putting into effect the claimed subject-matter without the need for inventive activity. Whether the appellant's assertions based on the disclosure of R3 are correct therefore is not relevant to this matter and need not be considered further.

Novelty

4. Before considering the matter of novelty of the subject-matter of claim 1 it is necessary to determine which evidence is to be considered in respect of this ground.

4.1 In the statements of grounds of appeal which were directed against claim 1 as granted, R15 was cited in respect of inventive step whilst R11 was not mentioned at all, although it had been explicitly considered in respect of novelty in the contested decision. One month before the date set for the oral proceedings new objections of lack of novelty of the subject-matter of the now restricted claim 1 were raised by appellant I

with respect to R11 and by appellant II with respect to both R11 and R15.

4.2 Article 10a(2) RPBA states *inter alia* that "the statement of grounds of appeal and the reply shall contain a party's complete case." Article 10b(1) RPBA states "Any amendment to a party's case after it has filed its grounds of appeal … may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy." In the present appeal claim 1 had been restricted in response to the grounds of appeal by the addition of a feature. Amendment of the claim therefore could not serve to put into question the novelty of its subject-matter with respect to documents which previously were relevant only to inventive step. The new submissions therefore amount to an amendment of the parties' respective cases and the Board must consider these amendments in the light of the above provisions.

4.2.1 R11 is a collection of documents relating to the presentation of models of the shape of the ICE 3 train. Analysis of the evidence by the Board would require extensive investigation to consider both which features were present in the models and whether the presentation of the models would render those features publicly available. The result of a *prima facie* consideration of the matter is that R11 contains no statement that a property of constancy of rate of change of cross-section was mentioned during the presentation of a model and, moreover, the Board finds plausible the view of the Opposition Division that mere presentation of

the model would not have made such a feature available to the public.

4.2.2 The disclosure of R15 is relatively simple and it discloses the frontal form of a locomotive only in as far as it exhibits channels comprising side plates, to direct air above and below the locomotive body. However, the detailed form of the surface forming the floor of the channel is not mentioned and the question arises whether features shown only in the drawings can be regarded as unambiguously disclosed. Moreover, if the form of the locomotive as shown in the drawings were to be considered as a proper disclosure the tip region would begin at the vertical front edge of the side plates, whereby the body cross-sectional area would not increase at a constant rate throughout that region.

4.3 It follows from the above that the evidence R11 and R15 is not *prima facie* detrimental to novelty of present claim 1. The Board therefore exercises its discretion to not consider the amendments to the parties' cases.

5. The only remaining attack on novelty is that launched by appellant I/opponent I based on R3. Claim 1 is presented in the two-part form based on R3 and the disputed features are those in the characterising portion, namely that:

- throughout the tip region the body cross-sectional area increases at a constant rate in the longitudinal direction; and

– a driver's cab windscreen is located in the intermediate region and has an angle to the vertical permitting visibility ahead.

5.1 The full disclosure of R3 will be acknowledged later when considering inventive step. For the matter of novelty it is sufficient to consider only that part relevant to the above-mentioned characterising features, namely the disclosure in figure 12. Figure 12 is a non-dimensional graphical indication of the effective nose shape of a train for reducing the micro-pressure wave and which shows variation of cross-sectional area with distance from the front end. The essential property is a small but constant variation of cross-sectional area, as designated by a straight line, except at the front end where the rate of increase is initially very high but decreases with increasing distance from the tip, as designated by a curved line. According to present claim 1 the rate of increase of cross-sectional area is greater throughout the tip region than in the intermediate region. It follows that the tip region in R3 when defined in this way extends rearwards only to the point at which the line becomes straight. The tip region in R3 therefore does not exhibit a constant rate of increase of cross-section.

5.2 Appellant I/opponent I argues that the front end having the non-constant rate of change of cross-sectional area should be disregarded since also in the realistic vehicle according to the present claim the front end of the tip region would not obey this requirement. However, that approach leaves no tip region having a rate of change of cross-sectional area greater than in the intermediate region as required by present claim 1.

5.3 On the basis of the foregoing the Board concludes that the subject-matter of present claim 1 is novel.

Inventive step

6. The Board and the parties are in agreement that R3 forms the closest prior art for consideration of inventive step. R3 relates to the same problem as the present patent, namely optimisation of the shape of the nose portion of a railway vehicle in order to reduce the micro-pressure wave at the exit of a tunnel and reports on experiments performed using axisymmetrical models. It was previously known that the creation of a micro-pressure wave at a tunnel exit could be reduced by minimising the maximum pressure gradient of the wavefront of the compression wave arriving at the tunnel exit. According to R3 of three geometrical forms used for the nose shapes of the experimental models the paraboloid of revolution generates the lowest maximum pressure gradient. Moreover, the greater the ratio of train nose length to radius of the body, the more the pressure gradient is reduced. However, the best results are achieved with a long nose which, it is acknowledged in R3, is impractical for a realistic vehicle. Experiments were therefore made with various reduced lengths of the nose having an unspecified geometrical form of the tip region which it was assumed would have only a small effect on the form of the compression wave. Present claim 1 is correctly delimited with respect to R3 and the subject-matter of the claim differs from the disclosure of R3 by the characterising features.

6.1 R3 reports on experiments performed on models but in considering the problem of excessive nose length it does also relate to aspects of a realistic vehicle. Nevertheless, there is no consideration of where the windscreen would be located. Moreover, the teaching is silent as regards which form might be chosen for the tip region of a shortened nose. The work reported in R3 is evidently intended for application to realistic vehicles and the skilled person when wishing to put the teaching into practical effect would be required to consider both the location of the windscreen and the form of the shortened nose. Contrary to the view of the respondent, there is no combinatorial effect achieved by the two characterising features. The constancy of rate of change of cross-sectional area is an aerodynamic consideration of one region of the nose portion whilst the arrangement of the windscreen results from practical considerations of space and visibility in another region.

6.1.1 When performing the experiments reported in R3 it was assumed that the tip region would have little effect on the form of the compression wave. For the case of the body based on a paraboloid of revolution the results of three different nose portion lengths confirmed this assumption only for the smallest reduction in length, with the ratio of nose length to diameter reduced from 7 to 6.2. Greater reductions in length produced an increase in the pressure gradient. The skilled person seeking a realistic nose shape would have to consider which form to adopt for the tip region and, particularly if a ratio of nose length to diameter below 6.2 were desired, he would look for hints as to how the aerodynamic performance could be improved. The

only recommendation from R3 is that the rate of change of cross-sectional area in what is presently termed the tip region should be greater than in the intermediate region. As reported in R3 the result of the tests on three geometrical shapes for the nose portion was that the paraboloid of revolution provided the best results because of its constant rate of change of cross-sectional area. In the light of this the skilled person would consider providing this form also at the shortened tip region.

6.1.2 When choosing a location for the windscreen the skilled person is constrained by the factors of volume necessary for the cabin and the visibility requirements. In the light of these considerations the presently claimed arrangement is merely the result of the normal design process performed by the skilled person.

6.2 On the basis of the foregoing the Board concludes that the subject-matter of present claim 1 does not involve an inventive step.

First auxiliary request

7. The only matter contested by the appellants in respect of this request which remains to be considered is that of inventive step.

8. The subject-matter of claim 1 according to this request includes the additional feature that:

- at the location of the windshield in the longitudinal direction, the car body has recesses in its sides.

8.1 This feature has the effect that the windscreen may be arranged more steeply than the surrounding bodywork, whereby the recesses allow the constant rate of increase of the cross-sectional area to be maintained whilst nevertheless satisfying visibility requirements. The fact that in the practical embodiment in the patent specification (figure 9) the recesses are provided above the underframe portions does not detract from the fact that they are also at the longitudinal location of the windscreen and so does not contradict the above determination of the effect achieved.

8.2 R3 gives no consideration whatsoever to the problem of implementing a constancy of rate of change of cross-section in the intermediate region of a realistic vehicle. Moreover, the photograph in figure 13 of R3 of the nose shape of the MAGLEV "Aero-wedge" appears to be of a model since no windscreen is visible. There is no reason why the skilled person without knowledge of the present patent would have understood the black lines passing along the body to be recesses. Moreover, even if he were to do so in the absence of any windscreen visible in the photograph there is no teaching to link the provision of recesses to the longitudinal location of the windscreen. The appellants' argument that the skilled person will necessarily provide recesses in order both to maintain the constant rate of change of cross-sectional area and to provide a windscreen satisfying practical considerations results from an *ex post* analysis of the situation.

8.3 The Board concludes from the foregoing that the subject-matter of present claim 1 involves an inventive step. Since claims 2 and 3 contain all features of claim 1 this conclusion applies equally to those claims.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of the first instance with the order to maintain the patent on the basis of the following documents:

   - claims 1 to 3 of auxiliary request 1 as filed on 24 February 2004;

   - description as filed during oral proceedings;

   - drawings as granted.

The Registrar: The Chairman:

A. Vottner S. Crane