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Datasheet for the decision of 21 November 2012

Case Number: T 0154/10 - 3.2.01

Application Number: 05102092.3

Publication Number: 1577185

IPC: B60T 8/00, B60T 8/88, B60T 17/20, B60T 8/32

Language of the proceedings: EN

Title of invention:
A braking control system for a railway or tramway vehicle with integrated anti-slip and anti-lock functions for the wheels

Patentee:
Faiveley Transport Italia S.p.A.

Opponent:
KNORR-BREMSE Systeme für Schienenfahrzeuge GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)(3)

Relevant legal provisions (EPC 1973):
EPC Art. 56, 83

Keyword:
"Amendments - Added matter (no) - Extension of scope of the claims (no)"
"Insufficiency of disclosure (no)"
"Inventive step (yes)"

Decisions cited:
G 0002/88, T 1898/07, T 0190/99, T 0514/06

Catchword:
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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0154/10 - 3.2.01

D E C I S I O N
of the Technical Board of Appeal 3.2.01
of 21 November 2012

Appellant: (Opponent)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 27 November 2009 concerning maintenance of the European patent No. 1577185 in amended form.

Composition of the Board:

Chairman: G. Pricolo
Members: Y. Lemblé
T. Karamanli

Summary of Facts and Submissions

I. The Opponent's appeal is directed against the interlocutory decision of the Opposition Division posted 27 November 2009 according to which, account being taken of the amendments made by the Patent Proprietor during the opposition proceedings, European patent No. 1 577 185 and the invention to which it related were found to meet the requirements of the EPC.

II. In its decision, the Opposition Division held that the amended claims met the requirements of Article 123 (2) and (3) EPC, that the claimed invention was disclosed in a manner sufficiently clear and complete for it to be carried out by a skilled person and that the subject-matter of the amended claims met the requirements of novelty and of inventive step having regard, inter alia, to the following prior art documents

D1: US-A-5 826 954,
D2: US-A-5 548 601,
D4: US-A-4 085 979.

III. In the oral proceedings, held 21 November 2012, the Appellant requested that the decision under appeal be set aside and that the European patent be revoked.

The Respondent (Patent Proprietor) requested that the appeal be dismissed.

IV. Claim 1 of the patent as maintained by the Opposition Division reads as follows:

"A railway vehicle provided with a pneumatic braking system including brake control apparatus (BCA) to which is connectable a plurality of electro-pneumatic valve units (G1-G4) for control of the brake cylinders (BC1-BC4) associated with the wheels/axles (1-4) of the vehicle, and a braking control system (A,B; BCA; G1-G4; S11-S42) with anti-slip and anti-lock functions for the wheels; the said valve units (G1-G4) being controllable by control means (A, B) in such a way as to allow, selectively, application of a braking pressure to the associated brake cylinders (BC1-BC4), holding of this pressure, and release of the pressure of the said brake cylinders (BC1-BC4);
characterised in that
each axle (1-4) of the vehicle has associated therewith at least one first and respectively one second angular speed sensor (S1, S2; ...; S41, S42) independent from one another;
the said electro-pneumatic valve units (G1-G4) include respective solenoid control valves (12-15) with first and second independent control input units (G11, G12); and
the control means (A, B) comprise
first and second independent electronic control units (A, B); the first speed sensors (S11,...; S41) of each axle (1-4) and the first control input units (G11,...; G41) of the said valve units (G1-G4) being connected only to the first control unit (A); the second speed sensors (S12,...; S42) and the second control input units (G12;...; G42) of the said valve units (G1-G4) being connected only to the second control unit (B); said control units (A,B) being predisposed to transmit from one to the other a respective state signal or

vital signal (L1; L2) indicative of its operating condition;
the first unit (A) being arranged to perform a wheel anti-slip procedure;
the second unit (B) being arranged to perform a wheel anti-lock procedure when the state signal (L1) transmitted to it from the first unit (A) indicates that this latter is functioning normally and to perform both the wheel anti-lock procedure and an anti-slip procedure when the state signal (L1) transmitted to it from first unit (A) is indicative of a malfunction or breakdown condition of this latter."

V. The Appellant's submissions can be summarised as follows:

Claim 1 of the patent had been amended in such a way that it contained subject-matter which extended beyond the content of the application as originally filed so that it failed to meet the requirements of Article 123(2) EPC.
Claim 1 as granted had been worded such that it referred only to a braking system and did not contain features of the railway vehicle and its axles (see also formulation: "sensor associatable to each axle") and the application as originally filed did not provide any basis for the change of the claimed subject-matter to a "railway vehicle". Moreover, this amendment represented an undisclosed selection from a list of various types of vehicles (including a tramway vehicle) in which the braking system might be used.
Amended claim 1 recited that (i) "the first speed sensors of each axle and the first control input units of the said valve units being **connected only** to the

first control unit; the second speed sensors and the second control input units of the said valve units being **connected only** to the second control unit" (bold characters by the Board). Contrary to what was mentioned by the Opposition Division in its decision, this feature was not clearly and unmistakeably derivable from figure 1 in combination with page 3, third paragraph of the originally filed application documents. In figure 1 as filed, sensor S12 was linked to an arrow pointing to reference number A. However, an arrow labelled with the reference number S12 was indicated as entering control unit B. Similarly, sensor S11 associated in the bottom left hand corner with an arrow and the letter B was shown in the top left portion of figure 1 associated with an arrow directed towards control unit A. In a similar manner, the connection of the sensors S31 and S32 illustrated for axle number 3 was also in contradiction with feature (i). Therefore, the figure and the passage of the description mentioned by the Opposition Division failed to disclose the amendment.

Besides, the requirement "**connected only** to the … control unit" in feature (i) meant in English language that the mentioned sensors and control input units were connected only to the respective control unit and not to any further element. For the skilled person however, the sensors must have a connection to the ground or to the electrical supply. In the same way, the control input units had to be additionally connected to the respective solenoid control valves. Thus, the ambiguous and indefinite expression "connected only to the … control unit", in excluding the possibility of any other connection, could only be interpreted by the skilled person as technically wrong and not disclosed

(undisclosed disclaimer). Thus, the amendment introducing the word "only" in claim 1 also added subject-matter that extended beyond the content of the application as filed.

Claim 1 had been amended in such a way as to extend the protection conferred so that it contravened the provisions of Article 123(3) EPC. Claim 1 as granted was directed to a braking control system for a railway or tramway vehicle and had been written in terms deliberately excluding the railway vehicle and its axles from the scope of protection (see for example the formulations: "valve units controllable…", "apparatus to which is connectable…", "sensor associatable to each axle…"). In order to decide if the scope of protection had been extended, the subject-matter of claim 1 after amendment should be compared to the subject-matter of the claim as granted. In the present case, to amend claim 1 such that it was now directed to "a railway vehicle provided with a braking system" had changed the claimed subject-matter (see also T 1898/07). The amended subject-matter comprised the additional features of a railway vehicle having wheels and axles. Since braking systems and railway vehicles were typically manufactured by different companies, the companies which would now be at risk of infringing the patent as amended were different to those which might have infringed the patent as granted. It was exactly this sort of uncertainty for third parties that Article 123(3) EPC was intended to avoid.

The amended patent failed to fulfil the requirements of Article 83 EPC. As discussed above, the amended patent did not describe how the first speed sensors of each

axle and the first control input units of each valve unit could be connected only to the first control unit and to no other component as claimed in feature (i) of claim 1. The patent contained no indication as to how a functional braking system could be provided if the first input control unit was not connected to the solenoid valves and the brake cylinder. This deficiency could also not be made up by the common knowledge of the skilled person. The same reasoning also applied to the second speed sensor and the second control input units recited in feature (i) of claim 1. Therefore, the railway vehicle of claim 1 is not described in a manner sufficiently clear and complete for it to be carried out by the skilled person.

Additionally, claim 1 required that the first and second control units were predisposed to transmit from one to the other a respective state signal or vital signal indicative of its operating condition and that the second unit was arranged to perform both the wheel anti-lock procedure and an anti-slip procedure when the state signal transmitted to it from the first unit was indicative of a malfunction or breakdown a condition of this latter. The patent failed to disclose how a control unit could transmit a state or vital signal if it malfunctioned, particularly in the event of a breakdown. Since claim 1 required that the first control unit transmitted a signal to the second control unit, it excluded the possibility of the absence of a signal being itself a signal indicative of malfunction of the first control unit.

Furthermore, the amended patent failed to disclose in a manner sufficiently clear and complete how the function anti-skid and anti-slip could be fulfilled in a railway vehicle by the braking system as described and as shown

in figure 1 of the amended patent. Figure 1 only showed black boxes entitled "ANTI-SLIP" and "ANTI-LOCK (ANTI-SLIP)" and the description did not contain any technical explanation as to how anti-slip and anti-skid could be achieved in a railway vehicle. To conceive a railway vehicle having a braking control system with anti-skid and anti-lock functions was, however, not a trivial exercise that belonged to the general knowledge of the person skilled in the art.

Claim 1 lacked an inventive step in view of document D1. This document disclosed, see figures 1 and 2 and column 3: lines 55 to 58, a braking control system with anti—slip and anti—lock functions. This braking control system included valve units 120,122,132,134 for control of brake cylinders associated with the wheels/axles in such a way as to allow, selectively, application of a braking pressure to the associated brake cylinders, holding of this pressure, and release of the pressure of said brake cylinders (see column 3, lines 29 to 43 and column 2, lines 32 to 54). Each axle of the vehicle was associated with at least one first and one second angular speed sensor (column 3, lines 32 to 43). Since the front axle and rear axle of the vehicle each have two wheels, see for example figure 2, Dl disclosed one first and one second angular speed sensor associated with each axle. The valve units of Dl included respective solenoid valves with first and second independent control inlets 124,132; 126,134 as was illustrated in figure 1. The control means of Dl, as illustrated in figure 2, comprised first and second independent electronic control units 202 and 204 which were connected to the respective first and second speed sensors 216, 218, 220, 222 as well as to the respective

first and second control inlet units of the said valve units, as illustrated in figure 2 and disclosed in column 3, lines 29 to 33. The control units 202 and 204 were predisposed to transmit signals from one another (column 3, lines 51 to 54) and both control units were able to perform anti-lock and anti-slip (column 3, line 55 to column 4, line 13). D1 also mentioned that the electrically controlled valves might be of the electro-pneumatic valve type (column 3, lines 21 to 28).
The subject-matter of claim 1 differed from the disclosure of D1 in that the vehicle was a railway vehicle, in that the first and second sensors, the first and second control input units and the first and second control units were connected according to feature (i) of claim 1, and in that a vital signal was transmitted from one control unit to another.
The objective technical problem was therefore to transpose the teaching of document D1 to a railway vehicle in order to provide that vehicle with a braking system performing anti-slip and anti-lock functions.
The person skilled in the art was here the specialist in braking control systems for whom the adaptation of the braking control system of document D1 to a railway vehicle was obvious. Since the system of D1 made use of one sensor for each single wheel, the application of the same principle to a railway vehicle would provide each axle of the railway vehicle with two sensors, as required by claim 1. In analogy to feature (i), Dl taught that a sensor, for example sensor 216 illustrated in Figure 2, might be connected to both control units 202, 204 and that the valve units 120, 122 might be connected to both the control units 202, 204. Since the technical effect resulting from this architecture was identical to that obtained by feature

(i), the claimed system failed to disclose any technical advantage arising from feature (i). In the absence of a technical advantage, this feature was not relevant in the assessment of inventive step.
Dl also disclosed that signals could be transmitted between two control units 202 and 204, see the arrow in Figure 2. Dl did not explicitly disclose that this signal was a vital signal or a state signal. However, if one of these control units malfunctioned, the other control unit would perform its functions as it ran the same program (column 3, lines 44 to 46). Therefore, transmitting a state or vital signal from one control unit to the other was only equivalent to what was performed by the control units of D1. As a whole, the technical effects achieved by the railway vehicle and the braking control system of claim 1 were the same as those achieved by the braking control system of Dl when the latter was installed in a railway vehicle.
Therefore, claim 1 lacked an inventive step.

The above reasoning made with respect to the braking system of document D1 equally applied when starting from the braking system of document D2 or of document D4 and led to the same conclusion, namely that it was not apparent for the person skilled in the art how the claimed railway vehicle and braking control system could lead to technical advantages which went beyond what was already achievable by the braking control system of D2 or D4. Therefore, claim 1 lacked also an inventive step in view of D2 or D4.

VI. The Respondents countered essentially as follows:

The claims as amended in opposition proceedings met the requirements of Article 123(2) EPC. The amendments made had a basis in the original disclosure and the claim must be interpreted as the skilled person would understand it in the context thereof. Therefore, the meaning of the term "connected" is here to be understood in the context of a control system with anti-slip and anti-lock functions for the wheels. The "connection" which was meant in the claim was the connection though which information/control signals were transmitted. In the whole context of the original disclosure (see paragraphs [0009] to [0012] and figure 1 of EP-A-1 577 185), there was no ambiguity as to the fact that feature (i) did not extend beyond the content of the application as originally filed.

Claim 1 also met the requirements of Article 123(3) EPC. Paragraph [0007] of EP-A-1 577 185 clearly disclosed a railway vehicle in which the braking control system of claim 1 as granted was incorporated. Claim 1 had therefore not been amended in such a way as to extend the protection conferred.

The amended patent fulfilled the requirements of Article 83 EPC. The skilled person would have no difficulty in carrying out the invention. Anti-slip and anti-lock procedures for railway vehicles were well known from the prior art (see for example, US-A-4 457 237 cited in paragraph [0001] of the patent and as document D13 in the opposition proceedings). The person skilled in the art was also aware of the prescriptions of the regulation UIC-541-05 relative to the anti-slip

procedure as cited in paragraph [00013] of the patent. Paragraph [0018] of the patent disclosed how a state signal could be produced by a control unit even in case of a breakdown.

The subject-matter of claim 1 involved an inventive step. The documents D1, D2 and D4 cited by the Appellant referred to a braking system for automotive vehicles and could not, therefore, lead in an obvious manner to the claimed railway vehicle with its specific braking control system. The Appellant's arguments were also based on hindsight.

Reasons for the Decision

1. The appeal is admissible.

Admissibility of the amendments under Article 123(2) EPC

2. The Board does not agree with the Appellant when it contends that the application as originally filed did not provide any basis for the amendment of the claimed subject-matter to a "railway vehicle" and that this amendment represented an undisclosed selection from a list of various types of vehicles (including also tramway vehicle).
The application as originally filed EP-A-1 577 185 (hereinafter referred to as D0) clearly disclose that the braking control system of the invention may be incorporated in a railway vehicle or a tramway vehicle (see paragraphs [0001] to [0003] of D0). Moreover, paragraph [0006] and especially paragraph [0007] of D0

specifically disclose a railway or tramway vehicle into which the claimed braking system is incorporated. Since the application as originally filed discloses both the incorporation of the claimed braking system in a tramway vehicle or, alternatively, in a railway vehicle, there is a basis for limiting the claim to the combination of a railway vehicle and the braking control system of claim 1 as granted.

3. Concerning the question of the connection between the control units A,B and the speed sensors, it is true that figure 1 as originally filed contains some inconsistencies (S11 associated with letter B in the bottom left-hand corner of the figure is shown associated with control unit A in the top left portion of the figure). However, in the whole context of the original disclosure (see paragraphs [0009] to [0012] of D0), there is no ambiguity as to the fact that the first speed sensors of each axle 1-4 and the first control input units of each valve units G1-G4 are connected only to the first of the control units and the second speed sensors of each axle 1-4 and the second control input units of each said valve units G1-G4 are connected only to the second of the control units. For the person skilled in the art, it is obvious that a mere erroneous permutation has occurred when indexing the sensors of the first and of the third axles of figure 1.

4. As a matter of English language and from a pure semantic point of view, it might be criticized that, in feature (i), the expression "connected only to the first (respectively second) control unit" could be interpreted as meaning "connected only to the first

(respectively second) control unit and not connected to any further element". However, the Board agrees with the general principle of interpretation as set out in T 190/99, according to which, when considering a claim, the skilled person should rule out interpretations which are illogical or which do not make technical sense. He should try, with synthetical propensity, i.e. building up rather than tearing down, to arrive at an interpretation of the claim which is technically sensible and takes into account the whole disclosure. It is obvious to the skilled person that the respective sensors and control input units may have other connections, for example to the ground or to an electrical supply or even mechanical connections as mentioned by the Appellant. However, in the present case, the "connections" are to be interpreted in the technical context of the claimed subject-matter with due consideration of the other technical features of the claim and of their technical significance.

Before introducing feature (i), the claim specifies that the electro-pneumatic valve units G1-G4 include respective solenoid valves with first and second control input units. The expression "control input units" indicates here that these two units input the control signals to the electro-pneumatic valve units (see paragraph [0030] and figure 2 of D0). The person skilled in the art knows that the control of the braking is performed through control signals which are transmitted in accordance with the anti-slip and anti-lock control procedure performed by the control means (see paragraph [0013] of D0), whereby the control means have been specified in the claim as comprising first and second independent control units. Therefore the

features "the first speed sensors of each axle and the first control input units of the said valve units being connected only to the first control unit" and "the second speed sensors and the second control input units of the said valve units being connected only to the second control unit" have to be interpreted in the context of the possible connections that the respective two sensors and two control input units may have with the first and second control units A and B only (see paragraphs [0011] and [0012] of D0). The person skilled in the art would not consider connections which are totally irrelevant from this context. Therefore the wording "connected only to…" does not introduce subject-matter that extend beyond the content of the application as originally filed.

Admissibility of the amendments under Article 123(3) EPC

5. For the Appellant, modifying claim 1 such that it is now directed to "a railway vehicle" while claim 1 as granted is directed to "a braking control system" amounted to an extension of the protection conferred which contravened Article 123(3) EPC.

5.1 The Board does not agree. When deciding whether a claim has been amended in such a way as to extend the protection conferred, the determination of the extent of protection has to be carried out in accordance with Article 69(1) EPC by interpretation of the terms of the claim. National laws of the Contracting States in relation to the infringement or, for example, the question whether the financial value of a railway vehicle is greater than that of a braking control

system, need not to be taken into account in this respect (See G 2/88, OJ EPO 1990, 93, item 3.3).

5.2 Considering the question of the protection conferred by a claim directed to a physical entity, it is a general principle established by the jurisprudence of the Boards of Appeal that a patent which claims a physical entity per se confers absolute protection upon such entity, namely protection not only for such physical entity but also for all uses or all physical activities of such entity, for instance the integration into a larger entity (see G 2/88, loc. cit., item 5; T 514/06, points 5.1.1 to 5.1.2).

5.3 In the present case, claim 1 as granted was directed to a braking control system for a railway. This conferred an absolute protection on any claimed braking control system, including those which may be installed and have not yet been installed and those which have been installed in a railway vehicle, this being the vehicle for which they undoubtedly have been specifically conceived (see paragraphs [0001] to [0003] and [0006] of the patent).

5.4 Therefore the scope of claim 1 as granted already included the incorporation of the granted braking control system into a railway vehicle and the amended formulation "a railway vehicle… and a braking control system" is in effect a claim to a braking control system when incorporated in the railway vehicle. The change of the claimed subject-matter from "a braking control system" to "a railway vehicle… and a braking control system" confers less protection and is actually a limitation of the scope of protection initially

conferred by the patent as granted since it is now required that the braking control system is incorporated in a railway vehicle (see also T 514/06, points 5.1.1 to 5.1.2). The decision T 1898/07 which was cited by the Appellant refers to a change of the claimed subject-matter from "a liquid composition" to "a package kit containing a syringe pre-filled with liquid composition". This situation differs drastically from the present one, because, as explained in point 22 of T 1898/07, the liquid composition could not be seen as a feature of the package per se.

Claim 1 has therefore not been amended in such a way as to extend the protection conferred.

Disclosure of the invention (Article 83 EPC 1973)

6. For the Board, the amended patent fulfils the requirements of Article 83 EPC.

6.1 As discussed above in relation with Article 123(2) EPC, the skilled person would have no difficulty in carrying out feature (i) and will readily understand that "connected only to the first control unit" is to be interpreted as "connected to only the first of the control units". Similar considerations apply for the wording "connected only to the second control units" which is to be interpreted as "connected to only the second of the control units".

6.2 Furthermore, contrary to the opinion of the Appellant, the Board judges that the principles underlying anti-slip and anti-lock procedures in a braking control system are generally known to the person skilled in the

art who is here the specialist in braking systems. This person is for example aware of the prescriptions of the regulation UIC-541-05 relative to the anti-slip procedure which is mentioned in paragraph [00013] of the patent. As mentioned in paragraph [0002] of the patent which cites document US-A-44 57 237 (D13), the implementation of such anti-slip and anti-lock functions in a braking system for a railway vehicle is known. Document D13 was cited by the Appellant in the opposition proceedings and discloses an electronic anti-spin and anti-slip control for the drive and the brake of a railway vehicle. The person skilled in the art would therefore have no difficulties in providing a suitable soft- and hardware for the boxes entitled "ANTI-SLIP" and "ANTI-LOCK (ANTI-SLIP)" in figure 1 of the patent (see also paragraph [0021] of the patent).

6.3 The Board does not share the view of the Appellant when it contends that the patent failed to disclose how a control unit could transmit a state or vital signal if it malfunctioned, particularly in the event of a breakdown. Paragraph [0018] of the patent discloses how a state signal (second state of the signal being the absence of a pre-determined frequency) can be produced by a control unit even if it has broken down. In fact, even the absence of a signal transmitted by the first control unit can be regarded as a state signal "transmitted" to the second control unit, if the absence of a signal is representative of a state of malfunction (the presence of a signal being, on the contrary, representative of a normal state).

Inventive step

7. In its attempt to demonstrate lack of inventive step the Appellant has started from document D1, or document D2 or document D4. None of these three lines of argumentation have convinced the Board.

7.1 The Board agrees with the Appellant that the person skilled in the art is here the specialist in braking control systems and that his technical knowledge is transferable to the field of railway vehicles. However, the subject-matter of claim 1 does not relate to a peculiar procedure for performing anti-skid and anti-lock functions in a braking control system for a railway vehicle but to the particular control architecture of a control system which is especially adapted for a greater operating safety of a railway vehicle and for a more effective protection of the wheels thereof (see paragraph [0003] of the patent).

7.2 Accordingly claim 1 specifies that there are first and a second wheel speed sensors associated to each axle and respectively connected to each of the first and second control units A and B. This provides each control unit A and B with its independent sensing of the rotating speed of each axle.

All three documents D1, D2 and D4 relates to a control system for controlling the brakes of an automotive vehicle having four independently rotating wheels and one specific speed sensor for each wheel -that is one speed sensor for each rotating item-. Transposing this teaching to a railway vehicle would imply the use of only one sensor pro axle, since the wheels of one axle

of a railway vehicle are not independent but fixedly connected together.

7.3 Furthermore, claim 1 specifies that the electro-pneumatic valve units G1-G4 include respective solenoid control valves with first and second independent control input units. This feature in combination with feature (i) allow the respective solenoid control valve to be independently controlled by either one or the other of the first and second control units A and B.

This independency in respect the control of the solenoid valves is not given in any of the prior art documents D1, D2 or D4 cited by the Appellant. In document D1 the valve units 120,122 are controlled by both control units (micro-computer 202 and 204) through a common output unit interface 236. The same is true for document D2, in which the signals to the solenoid valves 15R,15L,16R,16L are not independently inputted to them from separate control units (see figure 3, column 5, lines 16-18). In document D4, each valve unit, comprising an inlet and an outlet valve 14,24; 15,25, is respectively associated with one of the control units 12,13; 22,23. The (first) valve unit is exclusively controlled by the first control unit 12,13 and the (second) valve unit 24,25 by the second control unit 22,23 (see D4: figure 1 and column 3, lines 15-20).

7.4 The Board also notes that none of the documents D1, D2 or D4 proposes that the two electronic control units of a braking control system perform asymmetrical tasks when they operates normally, namely a wheel anti-slip procedure for the first one and a wheel anti-lock procedure for the second one. The mentioned documents

also do not disclose that the assignment of tasks of the control units be dependent on their operative status as claimed in the last feature of claim 1.

7.5 It follows from the above that the arguments of the Appellant are not such as to convince the Board that the Opposition Division was not correct in its finding that the subject-matter of claim 1 involves an inventive step in accordance with Article 56 EPC 1973.

8. Accordingly there is no reason to set aside the Opposition Division's decision and thus the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The registrar The Chairman

A. Vottner G. Pricolo