Internal distribution code:

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

Datasheet for the decision of 31 January 2017

Case Number: T 2041/12 - 3.3.03

Application Number: 02804579.7

Publication Number: 1453898

IPC: C08K3/04, F16L11/127, B23B27/18

Language of the proceedings: EN

Title of invention:
CONDUCTIVE POLYOLEFINS COMPRISING CONDUCTIVITY BLACK HAVING HIGH IODINE ADSORPTION

Patent Proprietor:
Basell Polyolefine GmbH

Opponents:
Premix Oy
Total Research & Technology Feluy

Relevant legal provisions:
RPBA Art. 13(1)
EPC Art. 56

Keyword:
Objection of insufficient disclosure - justification for late filing (no)
Inventive step - non-obvious modification

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 2041/12 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 31 January 2017

Appellant: (Opponent 2)	Total Research & Technology Feluy Zone Industrielle C 7181 Seneffe (BE)
Representative:	Raboin, Jean-Christophe Total Research & Technology Feluy Zone Industrielle C 7181 Seneffe (BE)
Respondent: (Patent Proprietor)	Basell Polyolefine GmbH Brühler Strasse 60 50389 Wesseling (DE)
Representative:	Basell Polyolefine GmbH Intellectual Property Bldg. C657, 2nd floor Industriepark Höchst 65926 Frankfurt/Main (DE)
Party as of right: (Opponent 1)	Premix Oy PL 12 05201 Rajamäki (FI)
Representative:	Kolster Oy Ab Iso Roobertinkatu 23 PO Box 148 00121 Helsinki (FI)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 31 July 2012 rejecting the opposition filed against European patent No. 1453898 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	F. Rousseau
	C. Brandt

Summary of Facts and Submissions

I. The appeal by opponent 2 (appellant) is against the decision of the opposition division posted on 31 July 2012 rejecting the oppositions against European patent 1 453 898. The claims of the patent as granted relevant for the present decisions are claims 1, 5, 10, 11 and 12 reading as follows:

"1. An electrically conductive polyolefin comprising a conductivity black, wherein the conductivity black has specific iodine adsorption of at least 1 080 mg/g.

5. A process for producing items, in particular fuel tanks, from electrically conductive polyolefins by mixing a melt of the polyolefin with a conductivity black and then using a molding process, which comprises using a conductivity black whose specific iodine adsorption is at least 1 080 mg/g.

10. A process as claimed in any of claims 5 to 9, wherein, after the molding process, the item is surface-treated, in particular surface-fluorinated.

11. An item encompassing a hollow article, a pipe, preferably a tank-filling pipe, a hose, or a container, preferably a fuel tank, where the item itself, or preferably at least one wall of the item, or preferably at least one layer of the item, encompasses an electrically conductive polyolefin as claimed in any of claims 1 to 4.

12. An item encompassing a hollow article, a pipe, preferably a tank-filling pipe, a hose, or a container, preferably a fuel tank, obtainable as claimed in any of process claims 5 to 10."

II. Two notices of opposition had been filed requesting revocation of the patent in its entirety on the grounds that its subject-matter lacked novelty and inventive step (Article 100(a) EPC), was insufficiently disclosed (Article 100(b) EPC) and extended beyond the content of the application as filed (Article 100(c) EPC). The oppositions were based, *inter alia*, on the following evidence:

E1: Technical information, Degussa, Printex XE 2 and Printex XE 2-B
E2: WO 00/29773
E5: Solvay Chemicals, Internet printout "Elemental Fluorine F2(C)-Market & Applications"
E9: WO 99/41304
E11: Spécification spéciale, Degussa, Printex XE 2
E13: Akzo Nobel, Ketjenblack EC600JD, product data sheet
E16: Single-step barrier coating for containers, Plastics Engineering, September 1978, pages 40-43

III. In the decision under appeal it was held that the patent as granted did not extend beyond the content of the application as filed, was sufficiently disclosed, was novel *inter alia* over the disclosure of any of E1, E2 and E9 and was inventive starting amongst others from E2 as the closest prior art.

IV. In the statement of grounds objections against the patent as granted were only raised with respect to lack of novelty and absence of an inventive step of claims

1, 11 and 12. The argumentation concerning inventive step was based on E2 as the closest prior art in combination with the teaching of E1. The claims dependent on claim 1 were also objected to lack an inventive step, but no separate argumentation was provided in this respect. With the statement of grounds the following items of evidence were filed *inter alia*:

E22: Comparison of the iodine adsorption values using standards ASTM D1510 and ASTM D4607 for Printex XE2 and Printex XE2 B
E24: ASTM D1510 - Standard test method for carbon black iodine adsorption number.

V. With letter of 21 June 2013 the respondent did not dispute the objections raised. Instead the claims were amended according to a main request and an auxiliary request filed with said letter. In the main request consisting of six claims the product claims 1-4 were deleted and the independent process claim was further limited by inclusion of a surface-fluorination step. The independent claims of the main request read as follows:

"1. A process for producing items, in particular fuel tanks, from electrically conductive polyolefins by mixing a melt of the polyolefin with a conductivity black and then using a molding process, which comprises using a conductivity black whose specific iodine adsorption is at least 1 080 mg/g, wherein, after the molding process, the items are surface-fluorinated.

6. An item encompassing a hollow article, a pipe, preferably a tank-filling pipe, a hose, or a

container, preferably a fuel tank, obtainable as claimed in any of process claims 1 to 5."

VI. In response the appellant merely stated by letter of 4 September 2013 that all facts, evidence and arguments provided with the statement of grounds of appeal were maintained. Explicit objections or arguments in respect of the pending requests were not provided.

VII. The Board in its communication of 30 November 2016 indicated that the mere reference to the statement of grounds of appeal did not allow to identify any line of argumentation against the subject-matter of the pending main request, at least for the reason that the statement of grounds of appeal did not appear to deal with the feature of the surface-fluorination which was common to all claims 8 (point 8 in the communication). However, having regard to the conditional request for oral proceedings of the appellant, those had to take place as scheduled.

VIII. With letter of 19 December 2016 the appellant submitted objections and arguments concerning sufficiency of disclosure and inventive step.

IX. The respondent with letter of 23 December 2016 provided brief comments concerning the objections raised by the appellant.

X. Oral proceedings took place on 31 January 2017 in the absence of opponent 1 (party as of right under Article 107, second sentence, EPC), previously announced with letter of 19 December 2016.

XI. The appellant's submissions, as far as relevant to the present decision, can be summarized as follows:

(a) The specific iodine adsorption as defined in the patent in suit, was an unusual parameter, the interpretation of which was essential for assessing the other grounds of opposition raised against the patent in suit, namely lack of novelty and lack of an inventive step. The unusual character of that parameter had been already outlined with the statement of grounds of appeal and did not constitute a new argument. Accordingly, the objection that the claimed subject-matter was lacking sufficiency of disclosure in view of the presence of the parameter in the claims should be admitted into the proceedings.

(b) E2 represented the closest prior art. It was in particular referred to the items represented in its Figures 1 and 5. The layer of HDPE of those items contained a carbon black sold under the trade mark Printex XE 2. A portion of that carbon black necessarily contained particles meeting the specific iodine adsorption value required by operative claim 1, as shown by E11. This followed from the fact that the range of values of 975 to 1175 mg/g indicated in E11 represented the distribution of the iodine adsorption values obtained when measuring a sample of Printex XE 2 according to ASTM D 1510. As to the method to be used for determining iodine adsorption of carbon black, claim 1 was not restricted to the use of a specific standard. In addition, iodine adsorption values measured according to any of ASTM D1510 and ASTM D4607 were comparable as demonstrated by the results presented in E22. Accordingly, apart from the fluorination step E2 discloses all features defined in claim 1 of the present main request.

Similarly, the items of operative claim 5 differed only from those described in Figures 1 and 5 in that their surface was fluorinated.

(c) Experimental evidence as to whether the claimed method or claimed articles provided better properties, in particular better conductivity, than those obtained in E2 had not been submitted. The experimental results presented in the patent in suit did not mimic E2, so that it could only be concluded that the fluorination step was not detrimental to the properties of the articles produced. Accordingly, the problem solved by the claimed subject-matter over E2 could only be seen as the provision of an alternative process or alternative items to those disclosed in E2. The use of a fluorination step in order to solve that problem was trivial. It was not only acknowledged to be conventional in the art as explained in the patent in suit, but also recommended in E5 and E16. Accordingly, the solution to the above problem as defined in the claims of the main request was obvious and the subject-matter of the main request lacked an inventive step.

(d) The same reasoning and conclusion in respect of inventive step applied when starting from the disclosure of E9. That document described the use of a conductive black which could be for example Printex XE 2 described in E11 or Ketjenblack EC600JD described in E13.

XII. The respondent's submissions, as far as relevant to the present decision, can be summarized as follows:

(a) The meaning of the specific iodine adsorption as defined in the patent in suit had been already addressed in the statement of grounds of appeal in relation to novelty and inventive step, so that there was no reason to allow an objection for lack of sufficiency of disclosure raised shortly before the oral proceedings in order to consider the meaning of that parameter. There was indeed no justification to raise an objection of sufficiency of disclosure at that stage, which therefore should not be allowed into the proceedings.

(b) E2 was the closest prior art for the subject-matter of the main request. E2 disclosed the use of Printex XE2, which product according to E11 could have a iodine adsorption value in the range indicated therein, depending on the wishes of the customers, a value of 1075 mg/g being the value sought to be produced. Hence, the fluorination was not the sole feature distinguishing the claimed subject-matter from the disclosure of E2, the value of the iodine adsorption constituting a further difference. The experimental part of the patent in suit showed that using a conductive black having a iodine adsorption value in the range claimed led not only to a better surface and volume conductivity of the article when surface fluorinated, but also to less variability of those conductivities upon increased degree of fluorination. The process of the patent in suit took advantage of the fluorination step, which did not require the complicated design used in E2. The problem solved by the claimed subject-matter over

E2 could be seen as reducing the fuel permeability of polyolefin items, while meeting the requirements placed upon their electrical properties. E2 was silent on the criticality of iodine adsorption of the conductive black and on the relevance to keep it above the limit defined in claim 1 when using a fluorination step. Furthermore, although a fluorination step was already known in the art at the filing date of the patent in suit, E2 went in a different direction and therefore taught away from the presently claimed subject-matter. Accordingly, an inventive step should be acknowledged.

The admittance of the objection of lack of inventive step against the subject-matter of the main request was not disputed.

XIII. The appellant requested that the decision under appeal be set aside and that the patent be revoked.

XIV. The respondent requested that the patent be maintained on the basis of the claims of the main request, or alternatively, on the basis of the auxiliary request, both requests filed with letter dated 21 June 2013.

XV. The party as of right under Article 107 EPC, second sentence, had not made any request.

Reasons for the Decision

Lack of sufficiency of disclosure - Admittance

1. According to Article 13(1) RPBA any amendment to a party's case after it has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion. Concerning the objection of insufficient disclosure, the Board notes that the corresponding part of the decision has not been contested in the statement of grounds, but that an objection was introduced with letter of 19 December 2016 shortly before the scheduled oral proceedings and after a communication in preparation thereof had been sent to the parties. The Board sees no justification why this was done at such a late stage, all the more as the objection is not related to the amendments in the current requests, nor to any observation present in the communication. Moreover, no justification was presented by the appellant. In addition, the meaning of the parameter iodine adsorption can be addressed if necessary in the framework of the assessment of inventive step. Therefore, the Board exercising its discretion under Article 13(1) RPBA finds it appropriate not to admit into the proceedings the objection of insufficiency of disclosure raised by the appellant.

Inventive step

Closest prior art

2. Both in the decision under appeal and in the parties' submissions document E2 is considered to represent the closest prior art. A first embodiment of E2 represented

in Figures 1 and 2 and a second embodiment represented in Figure 5 were considered by the appellant to represent a suitable starting point for assessing inventive step, which was not disputed. The Board sees no reason to take a different approach.

Disclosure of E2

2.1 E2 concerns as shown in its claim 1 conduits for hydrocarbon containing fuels which conduits comprise a plurality of layers including i) an inner layer of an electrically conductive high density polyethylene and ii) a barrier layer for inhibiting permeation of gaseous hydrocarbons through said conduit. E2 discloses two embodiments of such conduits, the first being represented in Figures 1 and 2

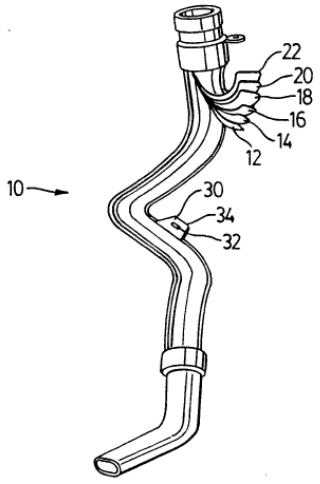

Figure 1

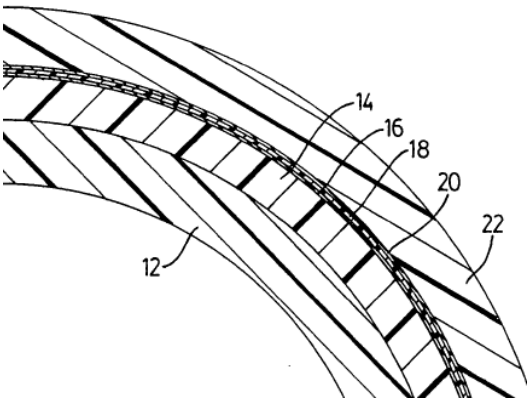

Figure 2

and the second in Figure 5

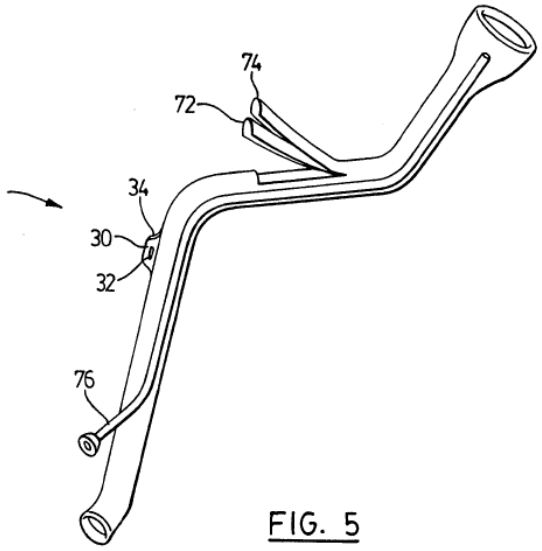

FIG. 5

2.2 Both have an inner layer (12 in Figures 1 and 2, and 72 in Figure 5) which will be in contact with fuel passing along the conduit and is made of an high density polyethylene that is rendered electrically conductive in order to dissipate static electricity and thus prevent the generation of sparks. The high density polyethylene is made conductive by including within the resin, carbon black, preferably that sold under the trade mark PRINTEX XE 2 (page 6, first full paragraph; page 12, second and third full paragraphs). As shown in Figure 2, the first embodiment presents a barrier layer 18 for inhibiting permeation of gaseous hydrocarbons which is placed outwardly of that inner layer, but not adjacent to it. A further layer 14 and an adhesive layer 16 are present between the inner layer 12 and the barrier layer 18 (page 7, lines 15-27). The embodiment depicted in Figure 5 is made of only two layers of material, namely the inner layer 72 manufactured from the same conductive material as used for embodiment of Figure 1 and an outer layer 74 of a barrier material

(page 12, lines 14-24). The conduits of E2 are prepared by co-extusion of the various layers (page 8, lines 25-27; page 13, lines 2-3). A fluorine treatment step is not disclosed.

2.3 As to the nature of the carbon black Printex XE 2 the appellant referred to E11, which is a technical specification of the producer of that carbon black. E11 indicates that the value of 975 to 1175 mg/g are limits corresponding to the required value of 1075 ("valeurs exigée") for the iodine adsorption. This is to be understood by the skilled person as an indication provided to the customers that Printex XE 2 as sold is requested to have a iodine adsorption value of 1075, which value can vary according to the production batches, but remains in the range of 975 to 1175 mg/g.

2.4 The information provided in E2 is merely to use Printex XE 2 as carbon black, but not that the specific iodine adsorption of that product when used in the context of the invention according to E2 should be at least 1080 mg/g as defined in operative claim 1. E2 does not refer to E11, let alone to use Printex XE 2 whith a iodine value above the requested value of 1075 mg/g disclosed in E11.

2.5 The appellant's argument that the range of values of 975 to 1175 mg/g indicated in E11 for the iodine adsorption corresponds to the distribution of iodine adsorption values obtained when measuring a sample of Printex XE 2 was not substantiated by any corroboratory evidence. On the contrary, the lack of credibility for the appellant's interpretation of the range of values disclosed in E11 is demonstrated by E24, which is the document describing the test method ASTM D1510 referred to in E11 as the method of analysis to determine iodine

adsorption. The two test methods A and B indicated in this standard are summarized in point 3. Both methods are carried out by treating a weighted sample of carbon black with a portion of standard iodine solution, the excess iodine being titrated and the adsorbed iodine being expressed as a fraction of the total mass of black. This shows that a measure of the iodine adsorption of Printex XE 2 when using the standard method identified in E11 does not provide a distribution of values of the iodine adsorption, but a single value.

2.6 Furthermore, the appellant's argument presupposes that claim 1 requires that only a portion of the carbon black used should have a specific iodine adsorption of at least 1 080 mg/g. However, the sole sensible technical meaning of claim 1 in view of the expressions "by mixing a melt of the polyolefin with a conductivity black" and "which comprises using a conductivity black whose specific iodine adsorption is at least 1 080 mg/g" is that a measure of specific iodine adsorption carried out on the carbon black to be mixed with the polyolefin should lead to a specific iodine adsorption of at least 1 080 mg/g.

2.7 Summing up, the items produced in accordance with the process of operative claim 1 differ from those obtained in E2, not only in that their surface is fluorinated, but also in that the conductive black contained in the polyolefin, whose surface is fluorinated, has a specific iodine adsorption of at least 1 080 mg/g. Corresponding differences are present in the process of claim 1.

Problem and solution

3. As to the question which technical problem can be considered to be successfully solved by the subject-matter of the present claims over the disclosure of E2, it was not disputed that a fluorination step is an effective means of reducing fuel permeability of polyolefins. In comparison to the co-extrusion of a barrier material layer, such an option is less complex in terms of process and structure of the item obtained. However, according to paragraph [8] of the specification a problem with fluorination is that it can considerably reduce the electrical conductivity of electrically conductive polyethylenes. Accordingly and in line with the submissions of the respondent, the problem meant to be solved by the subject-matter of present claims over the disclosure of E2 is the provision of a simpler method of reducing the fuel permeability of polyolefins, while meeting the requirements placed upon their electrical properties.

3.1 As to whether evidence has been provided that the claimed subject-matter provides a successful solution to the problem defined above, the respondent referred to the experimental results described in the patent in suit (paragraphs [41] to [43] and table 1). Those experimental results show that a moulded HDPE item comprising a conductivity black having a iodine adsorption above 1080 mg/g, namely 1150 mg/g, exhibits much lower electrical volume and surface resistivity after surface fluorination (and therefore much higher conductivity), when compared to the same article prepared and fluorinated in the same manner, but containing a conductivity black having a iodine adsorption of 1075 mg/g as exhibited by a Printex XE 2 conductivity black. Those experimental results also

show that, all other things being equal, a conductivity carbon black having an increased iodine adsorption value leads to a much lower increase of the electrical surface resistivity when increasing the fluorination intensity, the electrical volume resistivity being even almost independent of the intensity of that treatment. The validity of the experimental evidence provided in the patent in suit and the above conclusions drawn on their basis was not disputed by the appellant. It is also undisputed that use of a fluorination step is an effective means, as for example illustrated in E5 and E16, and in comparison to the process of E2 simpler process for reducing fuel permeability of polyolefins.

3.2 Accordingly, the Board is satisfied that the problem successfully solved over the disclosure E2 is the provision of a simpler and effective means to reduce fuel permeability of electrically conductive polyolefins while meeting the requirements placed upon their electrical properties.

3.3 As a solution to this problem, the patent in suit proposes the processes and the items defined by operative claims 1 and 6, respectively, characterized in that the polyolefin contains a conductivity black having a iodine adsorption of at least 1080 mg/g, the surface of the item produced being treated by surface-fluorination.

Obviousness

4. It remains to be decided whether or not the proposed solution to the problem underlying the patent in suit is obvious in view of the cited state of the art. As indicated in above point 3 the two embodiments of E2

represented in Figure 1 and Figure 5 were considered as suitable starting points for assessing inventive step.

4.1 Starting from embodiment of Figure 5, the skilled person wishing to solve the first aspect of the above problem, i.e. to provide a simpler and effective mean to reduce fuel permeability of polyolefin would find the suggestion in E16 (see title and first two paragraphs) to replace barrier layer 74 by surface fluorination of inner layer 72. However, the skilled person wishing the solve the second aspect of the above problem, namely providing polyolefins meeting the required electrical properties would not be guided by the prior art cited to use a conductivity carbon black having a iodine adsorption of at least 1080 mg/g. The appellant did not cite any prior art or even argue that the skilled person would find the suggestion that the selection of a minimum limit for the iodine adsorption is essential to keep electrical volume and surface conductivity at a sufficient level when surface fluorination of the moulded HDPE item is to be carried out, let alone that it allows a lower variation of the electrical surface and volume resistivity as a function of the fluorination intensity. In the absence of such indication, the Board has no reason to consider that the skilled person starting from the embodiment represented in Figure 5 of E2 and wishing to solve the problem defined in above point 3.2 would arrive in an obvious manner at the process of present claim 1 or at the item of claim 6.

4.2 Starting from embodiment of Figure 1 (also represented in Figure 2), the skilled person wishing to solve the first aspect of the above problem, i.e. to provide a simpler and effective mean to reduce fuel permeability of polyolefins would find obvious to replace the

barrier layer 18 and the adhesive layer 16 the existence of which was justified by the necessity to reduce fuel permeation through layer 14, by a fluorine surface treatment of layer 14. Doing so, he would not arrive at something falling within the ambit of present claims 1 and 6, since layer 14 is not disclosed to contain conductive black. Even if he decided to apply a surface treatment directly on inner layer 12 in order to simplify even further the structure of the embodiment disclosed in figures 1 and 2 of E2, for the same reasons as provided in above point 4.1, he would find no hint to employ a conductivity black having the minimum iodine adsorption value defined in operative claim 1 in order to solve the second aspect of the problem defined in above section 3.2. Accordingly, the skilled person starting from the embodiment represented in Figures 1 and 2 of E2 and wishing to solve the problem defined in above section 3.2 would not arrive in an obvious manner at the process of claim 1 or at the item of claim 6.

5. The same line of argumentation starting from the disclosure of E9 was submitted by the appellant. Similarly to the previous one, it was based on the allegation that the definition of the conductive black in operative claim 1 did not result in a distinguish feature and on the argument that the fluorination step as the sole distinguishing feature was an obvious measure. The conductive blacks used in E9 and cited by the appellant (paragraph bridging pages 16 and 17 of F9) are Printex XE 2 (as in E2) and Ketjenblack EC600JD which is described in document E13. According to E13 Ketjenblack EC600JD exhibits a iodine adsorption in the range of 1000 to 1150 mg/g, i.e. a value which in analogy to the analysis of E11 given above, is not identical for all batches of conductive black produced,

but must be within that range. Accordingly, the disclosure of E9 to use Ketjenblack EC600JD without any additional information does not result in the unambiguous disclosure that a conductive black having a iodine adsorption of at least 1080 mg/g is used. The same holds for Printex XE 2 (see discussion above). The definition of the conductive black in operative claim 1 results therefore in an additional distinguishing feature over E9. Consequently, for the same reasons as provided above with respect to the analysis of inventive step starting from E2, the objection of lack of an inventive step based on the combination of E9 with the known fluorination surface treatment cannot succeed.

6. Thus, on the base of the appellant's submissions, the Board has no reason to conclude that the subject matter of independent claims 1 and 6, as well as that of claims 2 to 5 dependent on claim 1 derives in an obvious way from the state of the art. The objection of lack of inventive step must therefore fail.

7. The main request being thus allowable, it is not necessary to consider the auxiliary request.

Order

For these reasons it is decided that:

8. The decision under appeal is set aside.

9. The case is remitted to the department of first instance with the order to maintain the patent on the basis of the claims (1 to 6) of the main request filed with letter dated 21 June 2013 and after any necessary consequential amendment of the description.

The Registrar: The Chairman:

P. Martorana D. Semino

Decision electronically authenticated