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EUROPEAN PATENT OFFICE
Opposition Division
Postbus 5818, Patentlaan 2
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THE NETHERLANDS

Re: Opposition against European Patent No. 2 368 252
granted on 16.01.2013 to Piantelli Silvia, et al.
Opponent: Leonardo Corporation
Our ref.: OPP Leonardo v. Piantelli

Sirs,

This is to provide the Opponent's **requests, facts and arguments** with respect to the Opposition hereby lodged against the above-identified European patent (hereinafter referred to as the "opposed patent").

I. REQUESTS

We request

1) full revocation of the opposed patent in all designated members states,

2) should the request under 1) not be granted in the written procedure, the setting of a date for oral proceedings according to Art. 116 EPC, and

3) the issuance of a written interlocutory decision together with the summons to attend oral proceedings, if deemed useful.

II. CITATIONS

European Patent No. 2 368 252 B1 was filed on 24.11.2009 and claims a priority date of 24.11.2008. Therefore, everything that was made available to the public by means of a written or oral description, by use, or in any other way before 24.11.2008 is part of the state of the art under Art. 54(2) EPC.

The following documents form the basis of the present opposition:

D1: International publication No. WO 2009/125444 A1 in the name of Pascucci Maddalena filed on 04.08.2008 claiming priority of Italian Patent Application No. MI2008A000629 of 09.04.2008.

This document is submitted herewith to establish the state of the art of the opposed patent under Art. 54(2) EPC.

D1 claims:

1. A method for carrying out an isothermal reaction of nickel and hydrogen, characterized in that said method comprises injecting nitrogen into a metal tube filled by a nickel powder, even of nanometric dimensions, or nickel granules or bars, in a high temperature and pressurized hydrogen gas saturated environment, thereby generating energy.

2. A method according to claim 1, characterized in that in said method catalyzer materials are used.

3. A method according to claim 1, characterized in that said high

temperature is preferably from 150 to 500°C.

4. A method according to claim 1, characterized in that said hydrogen is injected into said nickel powder filled metal tube at a pressure preferably from 2 to 20 bars.

5. An apparatus for carrying out an exothermal reaction by a method according to claim 1, characterized in that said apparatus comprises a metal tube filled by a nickel powder and heated to a set temperature, hydrogen being further injected into said metal tube.

6. An apparatus according to claim 5, characterized in that said nickel powder contains catalyzer materials.

7. An apparatus according to claim 5, characterized in that said hydrogen is injected into said tube under a non-constant pulsating pressure.

8. An apparatus according to claim 5, characterized in that said temperature is variable.

9. An apparatus according to claim 5, characterized in that said nickel powder filled metal tube is coated, on an outside thereof, by a jacket of water or boron, or steel and boron, and by a lead layer.

10. An apparatus according to claim 9, characterized in that said layer is coated by a steel layer.

11. An apparatus according to claim 5, characterized in that apparatus comprises a steel pipe therethrough a flow of water, or other fluid, is caused to flow, said steel pipe being anempted in a heat exchanging relationship with said metal tube.

12. An apparatus according to claim 5, characterized in that said nickel powder is a nickel isotope powder.

13. An apparatus according to claim 5, characterized in that said nickel powder is replaceable by a copper powder.

14. An apparatus according to claim 5, characterized in that said apparatus is an apparatus module susceptible to be series and/or parallel coupled with like apparatus modules.

15. An apparatus according to claim 5, characterized in that said exothermal reaction is a multiple exothermal reaction, adapted to provide different atoms depending on an amount of protons interacting with nickel nuclei.

III. SUBSTANTIATION

The following will serve as substantiation of this opposition.

The opposed patent was granted based on a set of 15 claims, of which claims 1 and 14 are the independent claims. In the following, the lack of patentability of the granted claims will be discussed separately for each claim.

III.1. Independent claim 1

Independent claim 1 is directed to the following:

1. A method for producing energy by nuclear reactions between hydrogen and a metal, said method providing the steps of:
- prearranging (110) a predetermined quantity of crystals of a transition metal (19), said crystals arranged as micro/nanometric clusters (21) having a predetermined crystalline structure, each of said clusters having a number of atoms of said transition metal less than a predetermined critical number of atoms;
- bringing (120) hydrogen (31) into contact with said clusters (21);
- heating (130) said clusters (21) up to an adsorption temperature (T_1) larger than a predetermined critical temperature (T_D), and causing an adsorption into said clusters (21) of hydrogen as H-ions (37), after said heating step (130) said hydrogen as H-ions (37) remaining available for said nuclear reactions within said active core (1,81,85);
- triggering (140) said nuclear reactions between said hydrogen as H-ions (37) and said metal (19) within said clusters (21) by an impulsive action (26) on said active core (1) that causes said H-ions (37) to be captured (150) into respective atoms (38) of said clusters (21), said succession of reactions causing a production (160) of heat (27);
- removing (170) heat from said active core (1,81,85) in order to obtain a determined power and to maintain the temperature (T_{eq}) of said active core (1) above said critical temperature (T_D).

Lack of support and clarity (Article 123(2) EPC)

Claim 1, paragraph 4 recites:
"heating (130) said clusters (21) up to an adsorption temperature (T_1) larger than a predetermined critical temperature (T_D), and causing an adsorption into said clusters (21) of hydrogen as H-ions (37), after said heating step (130) said hydrogen as H-ions (37) remaining available for said nuclear reactions within said active core (1,81,85)".

No active core has been defined in the preceding paragraphs of claim 1.

Thus, the words "within said active core (1,81,85)" make claim 1 insufficiently disclosed and accordingly unclear.

Claim 1, paragraph 5 recites:
" triggering (140) said nuclear reactions between said hydrogen as H-ions (37) and said metal (19) within said clusters (21) by an impulsive action (26) on said active core (1) that causes said H-ions (37) to be captured (150) into respective atoms (38) of said clusters (21), said succession of reactions causing a production (160) of heat (27)".

No active core has been defined in claim 1.

Accordingly, the words "on said active core" make claim 1 insufficiently disclosed and accordingly unclear.

Claim 1, paragraph 6 recites:
"removing (170) heat from said active core (1,81,85) in order to obtain a determined power and to maintain the temperature (T_{eq}) of said active core (1) above said critical temperature (T_D)".

No active core has been defined in claim 1, moreover, "the temperature (T_{eq}) of said active core (1)" has no antecedent basis in claim 1 formulation.

Thus, the words "said active core (1,81,85)" and the words "the temperature (T_{eq}) of said active core (1)" make claim 1 insufficiently disclosed and accordingly unclear.

Lack of novelty of claim 1 over D1 (Art. 54 EPC)

All the steps of method claim 1 are anticipated by document D1, whose claim 1 anticipates the basic idea of using nickel as a transition metal.

The single difference between claim 1 of D1 and claim 1 of the opposed patent is that in the opposed patent is used the word "clusters" instead of "powder".

However, the clusters may be considered as a powder, as mentioned, for example, at column 20 of the opposed patent, lines 19 to 25, stating that "... the active core can also be a plurality of particles of whichever shape, preferably with nano- or micro- granulometry, in particular micro/nanometric clusters. Such particles can be sintered as shown in Fig. 20 to form a body 85 having a desired geometry, or they can be loose, enclosed in a container 84, preferably of ceramic".

Thus, the term "clusters" is anticipated by the term "powder" of D1.

A further non-inventive difference between claim 1 of the opposed patent and document D1 is that the generic term "metal" is used for indicating a transition metal.

However, the opposed patent recites (column 3, line 54 to column 4, line 10):
"Preferably, said transition metal is Nickel. In particular, said Nickel is selected from the group comprised of:
- natural Nickel, i.e. a mixture of isotopes like Nickel 58, Nickel 60, Nickel 61, Nickel 62, Nickel 64;
- a Nickel that contains only one isotope, said isotope selected from the

group comprised of:
- Nickel 58;
- Nickel 60;
- Nickel 61;
- Nickel 62;
- Nickel 64;
- a formulation comprising at least two of such isotopes at a desired proportion".

Thus, the generic transition metal of the opposed patent is preferably nickel, and the use of nickel is anticipated by D1 claim 1.

In other words, D1 anticipates the use of a preferred metal nickel of the opposed patent, and accordingly it immediately derives that all transition metals are anticipated by nickel, as disclosed by claim 1 of D1.

In this connection, it is respectfully submitted that Piantelli et al. have never got a single watt from other metals, that is different from nickel, making them react with hydrogen.

Thus, claim 1 of the opposed patent not only lacks support and clarity based on Article 123(2) EPC, but also lacks novelty (based on Article 54 EPC) and inventive step (based on Article 56 EPC) since, as discussed, it is fully anticipated by claim 1 of D1.

Insufficiency of disclosure (Article 83 EPC)

The disclosure of the opposed patent does not provide any proofs or operating Examples demonstrating generation of energy by the method of claim 1.

III.2. Dependent claims 2 to 13 of the opposed patent

All these claims depend on claim 1. It is submitted that none of these claims

represents patentable subject-mater.

Claim 2 is directed to the following:

A method according to claim 1, wherein said step of prearranging (110) is carried out in such a way that said determined quantity of crystals of said transition metal (19) in the form of micro/nanometric clusters is proportional to said power.

Claim 2 lacks inventive step over D1.

In fact, claim 2 is an obvious and non-inventive combination of claims 1, 5 and 11 of D1.

Claim 3 is directed to the following:

A method according to claim 1, wherein said step of prearranging (110) a determined quantity of micro/nanometric clusters (21) comprises a step selected from the group comprised of:

- depositing (113) a predetermined amount of said transition metal (19) in the form of micro/nanometric clusters (21) on a surface (23) of a substrate (3,22), i.e. a solid body that has a predetermined volume and shape, wherein said substrate (3,22) contains on its surface a number of clusters (21) that is larger than a minimum number, in particular said minimum number at least 10^9 cluster (21) per square centimeter, preferably, at least 10^{10} clusters (21) per square centimeter, more in particular at least 10^{11} clusters (21) per square centimeter, much more in particular at least 10^{12} clusters (21) per square centimeter;
- aggregating said determined quantity of micro/nanometric clusters (21) by sintering, said sintering preserving the crystalline structure of said clusters (21), said sintering preserving substantially the size of said clusters (21);
- collecting into a container (84) a powder that is made of said clusters (21), i.e. a determined quantity of clusters or aggregation of loose clusters.

Claims 3 lacks inventive step over D1.

In fact, claim 3 of the opposed patent is a fake claim because systems to produce nanometric powders "or clusters" of nickel and other transition metals are well known and have been used for fifty years; for example, Kolzer spa, in via Francia, Cologno Monzese (Milan) has sold to the Opponent a vacuum deposition plant which carries all the steps disclosed in claim 3 of the opposed patent to make nanometric powders or clusters.

Claim 4 is directed to the following:

A method according to claim 3, wherein said step (113) of depositing said transition metal (19) is effected by a process of physical deposition on said substrate (22) of a metal vapour that is made of said metal (19).

The same observations made for claim 3 also apply to claim 4, thereby also claim 4 lacks inventive step over D1.

Claim 5 is directed to the following:

A method according to claim 3, wherein said step of depositing said transition metal (19) is effected by a process selected from the group comprised of:

- sputtering;
- a process comprising evaporation or sublimation and then condensation on said substrate (3,22) of said predetermined amount of said metal (19);
- epitaxial deposition;
- spraying;
- heating up to approaching the melting point (Tf) followed by slow cooling (118), in particular up to an average core temperature of about 600°C.

The same observations made for claim 3 also apply to claim 5, thereby also claim 5 lacks inventive step over D1.

Claim 6 is directed to the following:

A method according to claim 3, wherein after said step (113) of depositing a predetermined amount of said transition metal a step is provided of quickly cooling (119) said substrate (22) and said deposited

metal (19), in order to cause a "freezing" of said transition metal (19) according to clusters (21) having said crystalline structure, said step of quickly cooling (119) selected from the groups comprised of: tempering; causing a current of hydrogen to flow near said transition metal (19) as deposited on said substrate (22), said hydrogen having a predetermined temperature that is lower than the temperature of said substrate (22).

The same observations made for claim 3 also apply to claim 6, thereby also claim 6 lacks inventive step over D1.

Claim 7 is directed to the following:

A method according to claim 1, wherein said step (120) of bringing hydrogen (31) into contact with said clusters (21) is preceded by a step of cleaning (114) said substrate (22), in particular by applying a vacuum of at least 10 bar at a temperature set between 350°C and 500°C for a predetermined time, in particular said vacuum applied according to at least 10 vacuum application cycles and following reinstatement of substantially atmospheric pressure of hydrogen.

Claim 7 also lacks inventive step over D1 for the same observations made about claim 3.

Claim 8 is directed to the following:

A method according to claim 1, wherein during said step (120) of bringing hydrogen (31) into contact with said clusters (21) said hydrogen (31) satisfies at least one of the following conditions:
- it has a partial pressure set between 0.001 millibar and 10 bar, in particular between 1 millibar and 2 bar;
- it flows with a speed (32) less than 3 m/s, in particular according to a direction substantially parallel to said surface (23) of said clusters (21).

Claim 8 also lacks inventive step over D1 since it is substantially a combination of claims 4 and 7 of D1.

In this connection, it is submitted that the speed of 3 m/s is a mistake: the H at 3 bars has a speed order of larger magnitude.

Claim 9 is directed to the following:

A method according to claim 1, wherein said adsorption temperature is close to a temperature of sliding the reticular planes of the transition metal (19), in particular a temperature set between the temperature corresponding to absorption peaks α and β.

Claim 9 lacks inventive step over D1 since it claims a well known physical phenomenon which derives from pressure, and accordingly is a physical law and not an inventive feature.

Claim 10 is directed to the following:

A method according to claim 1, wherein after said heating step (130) of said determined quantity of clusters (21) a step is provided of cooling said active core (1) down to room temperature (T_a), and said step of triggering (140) said nuclear reactions provides a quick rise of said temperature of said active core (1) from said room temperature to said adsorption temperature, in particular said quick rise is carried out in a time (t^*) that is shorter than five minutes.

Claim 10 lacks inventive step over D1 since it is substantially an obvious and non-inventive combination of claims 8 and 3 of D1 regarding temperature range and variations.

Claim 11 is directed to the following:

A method according to claim 1, wherein said step of triggering (140) said nuclear reactions is associated with a step of creating a gradient (ΔT), i.e. a temperature difference, between two points of said active core (1), said gradient (ΔT) in particular set between 100°C and 300°C, in order to enhance the anharmonicity of the reticular oscillations and to assist the production of the H-ions (35).

Claim 11 is not inventive over D1 since it is substantially a combination of claims 8 and 3 of D1 regarding temperature range and pressure variations.

Claim 12 is directed to the following:

A method according to claim 1, wherein said clusters (21) have a face-centred cubic crystalline structure, fcc (110).

Claim 12 is not inventive over D1 since it claims a well known physic status and arrangement and not an invention.

Claim 13 is directed to the following:

A method according to claim 1, wherein said reactions with production (160) of heat (27) occur in the presence of a magnetic and/or electric field selected from the group comprised of:

- a magnetic induction field of intensity set between 1 Gauss and 70000 Gauss;
- an electric field of intensity set between 1 V/m and 300000 V/m.

Claim 13 identically reflects the disclosure of D1 related to the apparatus: in fact, D1 heats the reactor with an electric resistance, thereby generating electric and magnetic fields depending on the amount of energy drawn from the heater. In other words, claim 13 is an obvious and non inventive combination of claims 1,2,3 of D1.

III.3. Independent claim 14

Independent claim 14 of the opposed patent recites:

"An energy generator (50) for obtaining energy from a succession of nuclear reactions between hydrogen (31) and a metal, wherein said metal is a transition metal (19), said generator comprising:

- an active core (1) that comprises a predetermined amount of said transition metal (19);
- a generation chamber (53) that in use contains said active core (1);
- a means for causing said hydrogen (31) to flow within the treatment

chamber (53);

- a means (56) for heating said active core (1) within said generation chamber (53) up to a temperature (T_1) that is higher than a predetermined critical temperature (T_D);

- a means (61,62,67) for triggering said nuclear reactions between said transition metal (19) and said hydrogen (31) by an impulsive action (26) on said active core (1);

- a means (54) for removing from said generation chamber (53) the heat (27) that is developed during said reactions within said active core (1) according to a determined power,

characterized in that said active core (1) comprises a determined quantity of crystals of said transition metal (19), said crystals being micro/nanometric clusters (21) that have a determined crystalline structure, said clusters (21) comprising an average number of atoms of said transition metal (19) that is less than a predetermined critical number of atoms, such that when said means for heating said clusters (21) up to an adsorption temperature larger than said critical temperature (T_D), an adsorption is caused into said clusters (21) of hydrogen as H-ions (37) which cause said nuclear reactions within said active core (1), and such that said means for triggering can trigger said nuclear reactions between said hydrogen as H-ions (37) and said metal (19) within said clusters (21) by said impulsive action (26) on said active core (1) that causes said H-ions (37) to be captured into respective atoms (38) of said clusters (21) with production of heat (27)".

This independent claim 14 is anticipated, both in its preamble and in its characterizing part, by a combination of claims 1,3,4,5,7,8,11,13 and 15 of D1.

As stated about the other transition metals, that is different from nickel, Piantelli et el. have not demonstrated to have obtained a single watt from said other transition metals making them react with hydrogen.

III.4. Dependent claim 15

Dependent claim 15 depends on claim 14.

It is submitted that also dependent claim 15 does not represent patentable subject-matter.

Claim 15 is directed to the following:

An energy generator (50) according to claim 14, wherein said determined quantity of crystals of said transition metal (19) in the form of micro/nanometric clusters (21) is proportional to said power.

Claim 15 is not inventive since anticipated by the nanometric structure disclosed by D1.

Moreover, the fact that such a nanometric structure is related to the power is a physical obvious consequence, not an invention.

IV. SUMMARY

The above facts and arguments show that the subject-matter claimed in the opposed patent does not meet the patentability requirements set forth under Articles 123(2), 54, 56 and 83 EPC.

The Opponent respectfully submits that an evaluation of the above arguments and of the enclosed document can only lead to a decision to revoke the opposed patent in its entirety in all of the designated member states.

Respectfully submitted,

Encl.: D1 - WO 2009/125444 A1