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Datasheet for the decision of 4 August 2020

Case Number: T 0922/17 - 3.5.02

Application Number: 04704453.2

Publication Number: 1590877

IPC: H02M3/335, H02J5/00

Language of the proceedings: EN

Title of invention:
Adaptive inductive power supply

Applicant:
Philips IP Ventures B.V.

Relevant legal provisions:
EPC Art. 123(2), 56
RPBA 2020 Art. 13(2)

Keyword:
Amendments - main request - allowable (no)
Inventive step - third auxiliary request - obvious alternatives

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Case Number: T 0922/17 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 4 August 2020

Appellant: (Applicant)	Philips IP Ventures B.V. High Tech Campus 5 5656 AE Eindhoven (NL)
Representative:	Montie, Edwin André Philips International B.V. Philips Intellectual Property & Standards High Tech Campus 5 5656 AE Eindhoven (NL)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 25 October 2016 refusing European patent application No. 04704453.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Lord
Members:	H. Bronold
	R. Cramer

Summary of Facts and Submissions

I. The appeal of the patent applicant lies from the decision according to the state of the file of the examining division refusing European patent application No. 04 704 453.2. The examining division argued in a communication dated 29 September 2016 that the main request lacked an inventive step in the sense of Article 56 EPC.

II. The appellant requested that the decision under appeal be set aside and that a patent be granted based on their main request filed together with the statement setting out the grounds of appeal, or on the basis of the claims of their third auxiliary request filed with letter dated 21 July 2020. Previously filed first and second auxiliary requests were withdrawn.

III. In a communication under Article 15(1) RPBA 2020 the board had informed the appellant of its preliminary opinion that claim 1 according to the main request contravened Article 123(2) EPC and that the subject-matter of claim 1 of that request lacked an inventive step in the sense of Article 56 EPC over a combination of document D1 with the common general knowledge of the person skilled in the art.

IV. Oral proceedings before the board were held on 4 August 2020.

V. The following document cited by the examining division is relevant for this appeal:

D1 : WO 00/54387 A1

VI. Claim 1 according to the main request reads as follows:

"A method of operating a contactless power supply (305) to power a load, the contactless power supply having a tank circuit (314), the tank circuit (314) having a resonant frequency, the contactless power supply also having a sensor coupled to the tank circuit for detecting an operating parameter in the tank circuit, the tank circuit (314) being inductively coupled to the load (320), wherein the tank circuit (314) is coupled to an inverter (312), the inverter (312) having a frequency and a duty cycle, where the inverter (312) is coupled to a DC power source (310) having a rail voltage, the method comprising:
changing the resonant frequency in response to changes of the operating parameter detected by the sensor in the tank circuit;
changing at least one of the inverter frequency, duty cycle, and the DC power rail voltage in response to changes of the operating parameter detected by the sensor in the tank circuit."

VII. Claim 1 according to the third auxiliary request differs from claim 1 of the main request only in that "at least one of" before "the inverter frequency" has been deleted.

VIII. The appellant's arguments, as far as they are relevant for this decision, can be summarised as follows:

Claim 1 according to the main request did not contravene Article 123(2) EPC. It was originally disclosed that the claimed method used one or more of the inverter frequency, duty cycle, and the power rail

voltage to optimise power transfer, which was reflected in the expression "at least one of". The "and" originally disclosed with respect to the latter options of optimisation meant an "or", as it was true for the statements like "a train, a plane and a car can take you to Munich" or "antibiotics, painkillers, diuretics and vitamins .... can cure a variety of different diseases".

The third auxiliary request fulfilled the requirements of Article 13(2) RPBA 2020 because the board had reintroduced an objection which the examining division had regarded as overcome. This represented a special circumstance in the sense of Article 13(2) RPBA 2020.

Claim 1 according to the third auxiliary request also involved an inventive step. Document D1 disclosed no primary side variable capacitor. The variable capacitor of D1 was disclosed as part of background art in D1. Moreover, D1 disclosed keeping the resonant frequency on the primary side constant. The capacitance of D1 was varied only for this purpose. Therefore, changing the resonant frequency was not disclosed in D1. Further, D1 did not take any operating parameter of the primary side into account. Even if the skilled person were to take the background system of D1 into account, he would implement its features at the secondary side, not at the primary side, thus leading to a different system.

Using a variable capacitor, which was only disclosed for the secondary side of the power transfer system of D1, for the primary side was further not trivially possible. Primary and secondary sides of loosely coupled power transfer systems differed in effects and operations and were therefore not trivially exchangeable. The skilled person would also not take

the further steps of adapting the frequency, duty cycle or power rail voltage. In particular, D1 disclosed that the primary side frequency should be fixed. Thus, the skilled person would not consider changing the operating frequency.

Reasons for the Decision

1. Admissibility of the appeal

The appeal was filed in due time and form and it was sufficiently substantiated. Therefore, the appeal is admissible.

2. Main request - Article 123(2) EPC

In the communication of the examining division dated 29 September 2016, which is referred to in the contested decision according to the state of the file, the examining division had waived their previous objection under Article 123(2) EPC. The board is however not convinced by the examining division's finding that the main request does not contravene Article 123(2) EPC. The board further does not agree with the appellant's arguments concerning claim 1 according to the main request and Article 123(2) EPC.

Independent claim 1 comprises the feature "changing at least one of the inverter frequency, duty cycle, and the DC power rail voltage".

However, according to page 3, lines 7 to 9 of the application as filed (published as WO 2004/073150 A1), it is not "at least one of", but instead all of the variables mentioned in the above cited feature which are mandatory. It is true that page 3, lines 2 to 4 of the originally filed description relates to "the frequency and the duty cycle of the inverter". But even this disclosure does not define "at least one of" the duty cycle and the frequency. Moreover, the context of that passage is to define what is controlled by the drive circuit connected to the inverter, which is not reflected in claim 1 either.

Regarding the desired effect of the invention, i.e. the ability to contactlessly energise a variety of devices as set out on page 2, lines 21 and 22, the original description is clear on page 3, lines 7 to 9 in that "the resonant frequency of the tank circuit, the frequency of the inverter, the duty cycle of the inverter and the rail voltage of the power supply" need to be modified to achieve the desired effect.

The board is further not convinced by the examples presented by the appellant which relate to a different technical context. It may be true that the word "and" can mean "or" under special circumstances. In order to decide whether the "and" as originally disclosed in the application means "or", the relevant context is the one given by the application as filed, i.e. the original disclosure, and not some other context in which "and" may mean "or". The same holds true for originally filed claims 1 to 12 which, contrary to the appellant's arguments, do not provide a basis for the contested feature. Those claims are only directly dependent on each other in sequence such that they disclose only very specific combinations, in contrast to any

combination of the different measures that is represented by "at least one of" according to the wording of claim 1.

Consequently, the board concludes that claim 1 according to the main request contravenes Article 123(2) EPC.

3. Third auxiliary request

3.1 Article 13(2) RPBA 2020

The appeal was filed before the RPBA 2020 entered into force. However, the summons to oral proceedings were notified after their entry into force. Thus, it follows from Article 25(1) and (3) RPBA 2020 that Article 13(2) RPBA 2020 applies.

According to Article 13(2) RPBA 2020 any amendment to a party's appeal case made after notification of a summons to oral proceedings shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.

Although no reasons were presented in the written procedure to justify exceptional circumstances for the late filing of the third auxiliary request other than that the third auxiliary request was intended "to overcome the extension of subject matter objection raised in the board's preliminary opinion", the board has decided to exercise its discretion under Article 13(2) RPBA 2020 to admit the third auxiliary request into the appeal proceedings.

While the objection, that the introduction of "at least one of" in claim 1 of the main request contravened Article 123(2) EPC had already been introduced by the examining division in their communication dated 9 May 2016, the communication of the examining division dated 29 September 2016 underlying the contested decision according to the state of the file contains no such objection under Article 123(2) EPC with respect to the main request. The contested decision found instead that the subject-matter of claim 1 according to the main request lacked an inventive step.

In the present case, the board finds that the fact that the objection under Article 123(2) EPC with respect to "at least one of" had been reintroduced by the board in its communication under Article 15(1) RPBA can be regarded as an exceptional circumstance in the sense of Article 13(2) RPBA 2020.

Although the reasons presented by the appellant in their letter dated 21 July 2020 may not completely fulfil the requirement of being cogent, the appellant provided additional reasons during the oral proceedings before the board as to why the reintroduction of the objection under Article 123(2) EPC in the present case, which had not been maintained during the proceedings before the first instance, should be regarded as an exceptional circumstance in the sense of Article 13(2) RPBA 2020. Moreover, the board notes that the amendments in claim 1 merely consist of the deletion of the expression "at least one of". Thus, the effect of these amendments is readily apparent, such that overall the board is satisfied, that the appellant has justified the amendments in the third auxiliary request by cogent reasons as required by Article 13(2) RPBA 2020.

Thus, the board has decided to exercise its discretion under Article 13(2) RPBA 2020 to admit the third auxiliary request into the appeal proceedings.

3.2 Article 56 EPC

The board is not convinced that the subject-matter of claim 1 according to the third auxiliary request involves an inventive step in the sense of Article 56 EPC.

It is uncontested that document D1 discloses in the description of its embodiment all features of claim 1 except that the resonant frequency of the tank circuit and the inverter frequency, duty cycle, and the DC power rail voltage are changed in response to changes of an operating parameter detected by a sensor in the tank circuit.

As objective technical problem may therefore be regarded as being provide a method of operating a contactless power supply with controllable energy transfer characteristics.

The board notes in this context that the description of the embodiment of D1 teaches the concept of optimising the energy transfer by adapting the inverter frequency with respect to the resonant frequencies of the primary and secondary circuits. D1 indicates further on page 5, lines 34 to 36 with respect to the background art, that it is possible to vary the capacitance of a variable capacitor bank in the inductive coupling of a contactless power supply in order to optimise power transfer. The fact that according to D1 the variable

element, i.e. the tank circuit of the inductive coupling, is foreseen on the secondary side instead of the primary side, does not seem to be relevant because tuning the inductive coupling for optimum power transfer is possible from either side.

In this context, the board is not convinced by the appellant's argument that the primary side and the secondary side provided different functions in a loosely coupled power transfer system such as D1 and were therefore not interchangeable. In particular, claim 1 does not define a "loosely coupled" power transfer system, such that it can be left open whether the conclusions drawn by the appellant apply to the subject-matter of claim 1. Claim 1 merely defines a method of operating a contactless power supply for which the coupling distance or possible air gap is left completely open. Therefore, arguments based on a specific kind of electromagnetic coupling which is not reflected in subject-matter of claim 1 cannot imply technical effects of the subject-matter of claim 1.

The appellant argued inter alia that in a resonant wireless power transfer system with loosely coupled coils like D1, the technical operation and effects of capacitors and tank circuits on the primary and secondary system are very different and not trivially interchangeable. The primary operated as a load to the inverter, whereas the secondary aimed at the extraction of power from a magnetic field. The board can not see any reason why these alleged effects might distinguish the discussed loosely coupled system from a normal switching power supply having a tight electromagnetic coupling. The alleged differences seem to apply to any electromagnetically coupled power transfer device.

Therefore, the board is not convinced that the skilled person is hindered in any way from transferring the concept of variable capacitors disclosed in D1 for the secondary side to the primary side. The effect of a variation of the capacitance is readily apparent to the skilled person, namely tuning the respective primary or secondary side resonant frequency. Whether such tuning is done to deliberately change the resonant frequency at the primary side or to adapt the secondary side to the resonant frequency of the primary side is irrelevant because these are equivalent interchangeable measures for achieving a resonant power transfer. Given that claim 1 is not restricted other than by known alternative measures to optimise power transfer, the board arrived at the conclusion that the person skilled in the art would have applied the variable capacitors disclosed in D1 to the primary side of the power supply referred to in the method of claim 1.

Moreover, as claim 1 is worded, no resulting technical effect can be derived from it, because the condition for the defined variation is left open by the use of the formulation "operating parameter", which is extremely broad in meaning. The board therefore interprets the claimed method steps as an accumulation of (known) alternative ways of optimising electromagnetic power transfer based on a not further specified operating parameter.

Although D1 does not disclose adapting the frequency, duty cycle, and the DC power rail voltage accordingly, this remaining difference is considered trivial by the board. For a person skilled in the art, it is clear that the most efficient operation of an inductive coupling is at its resonant frequency. Thus, it lies within the field of ordinary skill to make use of the

known alternatives of optimising electromagnetic power transfer, i.e. to adapt the frequency of the inverter, the duty cycle and the DC power rail voltage to the (modified) resonant frequency of the inductive coupling. This applies even more because claim 1 is completely silent about the criterion for the optimisation. Thus, starting from the disclosure of document D1 and taking into account the background art described in document D1 and his common general knowledge, the person skilled in the art would arrive at the subject-matter of claim 1 in an obvious manner.

Consequently, the board has arrived at the conclusion that the subject-matter of claim 1 according to the third auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

4. Conclusion

Since none of the appellant's requests is allowable, the board cannot accede to the appellant's request to grant a patent.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Rodríguez Rodríguez R. Lord

Decision electronically authenticated