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Datasheet for the decision of 15 January 2019

Case Number: T 2264/17 - 3.2.01

Application Number: 10189883.1

Publication Number: 2325060

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Language of the proceedings: EN

Title of invention:
Seat having occupant detection circuit isolation from seat heating circuit using a common mode choke

Patent Proprietor:
Delphi Technologies, Inc.

Opponent:
IEE International Electronics & Engineering S.A.

Headword:

Relevant legal provisions:
EPC Art. 56

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Catchword:

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Case Number: T 2264/17 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 15 January 2019

Appellant: (Patent Proprietor)	Delphi Technologies, Inc. PO Box 5052 Troy, MI 48007 (US)
Representative:	Manitz Finsterwald Patentanwälte PartmbB Postfach 31 02 20 80102 München (DE)
Appellant: (Opponent)	IEE International Electronics & Engineering S.A. Zone Industrielle 6468 Echternach (LU)
Representative:	Office Freylinger P.O. Box 48 8001 Strassen (LU)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 14 September 2017 concerning maintenance of the European Patent No. 2325060 in amended form.**

Composition of the Board:

Chairman	G. Pricolo
Members:	J. J. de Acha González
	S. Fernández de Córdoba

Summary of Facts and Submissions

I. The appeals of the proprietor and the opponent are directed against the interlocutory decision of the Opposition Division concerning the maintenance of the European Patent in amended form on the basis of the auxiliary request 6 as filed during the opposition proceedings on 15 March 2017 and renumbered as auxiliary request 3 during the oral proceedings before the Opposition Division.

II. In the contested decision the following documents are inter alia cited:

D1: WO 01/92900 A,
D2: "A METHOD FOR SEAT OCCUPANCY DETECTION FOR AUTOMOBILE SEATS WITH INTEGRATED HEATING ELEMENTS", ISBN 978-963-88410-0-1,

III. Oral proceedings were held before the Board on 15 January 2019.

The appellant (patent proprietor) requested to set aside the contested decision and to maintain the patent according to the main request or, in the alternative, according to the auxiliary request (both requests filed with the statement of grounds of appeal), or to dismiss the appeal of the opponent.

The appellant (opponent) requested that the decision under appeal be set aside and that the European patent be revoked.

IV. Claim 1 of the main request reads as follows:

"**1.** An occupant detection system controller (30) electrically interconnected to a heating element (14) formed of electrically conductive material and located adjacent a seating surface (24) of a seat assembly (10), said controller comprising:
an occupant detection circuit (28) electrically interconnected to the heating element, said occupant detection circuit configured to output an excitation signal to the heating element effective to detect an occupant presence near the heating element based on an electrical impedance of the heating element; an isolation circuit interposed between a heating circuit (38) and the heating element,
said isolation circuit (68) electrically interconnected to the occupant detection circuit and the heating element, said isolation circuit comprising a common mode choke (T1)."

Claim 1 of the auxiliary request differs from claim 1 of the main request in that it further includes the following feature:

"..., said heating circuit using MOSFET transistors for switching the electrical current,"

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

"**1.** An occupant detection system controller (30) electrically coupled to a heating element (14) formed of electrically conductive material and located adjacent a seating surface (24) of a seat assembly (10), said controller comprising:
an occupant detection circuit (28) electrically coupled

to the heating element, said occupant detection circuit configured to output an excitation signal to the heating element effective to detect an occupant presence near the heating element based on an electrical impedance of the heating element; an isolation circuit interposed between a heating circuit (38) and the heating element,
said isolation circuit (68) electrically coupled to the occupant detection circuit and the heating element, said isolation circuit comprising a common mode choke (T1) formed by a first inductor L1 and a second inductor L2, wherein the value of the first inductor L1 and the second inductor L2 is at least 1 mH,
wherein said heating circuit (38) is electrically coupled to the heating element (14), said heating circuit configured to supply an electrical current to the heating element effective to generate heat by the heating element, said heating circuit using MOSFET transistors for switching the electrical current."

V. The appellant's (patent proprietor) submissions relevant to the decision can be summarised as follows:

The subject-matter of claim 1 according to the main request involved an inventive step when starting from D1 as the closest prior art. D1 did not disclose that the isolation circuit comprised a common mode choke but only two separate choke coils (see figure 4, chokes 50 and 52). The technical effect of this difference was to avoid the coupling of the heating element to the heating voltage through the open-switch impedances of the heater switch that would affect the accuracy of the electric field impedance measurement (see paragraph [0017] and [0018] of the contested patent). Accordingly and in contrast to the problem formulated by the Opposition Division in its decision (see point 41 of

the decision), the objective technical problem solved by the invention was to provide a simplified isolation circuit which still prevented any open-switch impedances to influence the accuracy of the detection signal.
When seeking to solve the problem posed, the skilled person would not find any motivation in D2 to use a common mode choke as an isolation element. D2 was based on another principle (achieving a parallel resonance condition for reaching a floating condition of the heating element) and exclusively suggested to use such a choke to minimize an impedance in the heating element circuit (see point 2.1, last paragraph). This was not the problem to be solved by the invention.

Claim 1 of the auxiliary request further included the feature that the heating circuit used MOSFET transistors for switching the electrical current. This feature was added to claim 1 in the auxiliary request in order to make clear for the skilled person that the problem solved by the controller of claim 1 was the one already formulated for claim 1 of the main request. Thus, the features of the common mode choke and the MOSFET transistors were technically linked. Using MOSFET transistors as switching elements for such heating circuits belonged however to common general knowledge of the skilled person.

As regards claim 1 in the version maintained by the Opposition Division in its decision, none of the available prior art taught or suggested to use the specific value of at least 1 mH for the inductors of the common mode choke. Additionally, the selection of the claimed specific value for the inductors could not be seen as falling within customary practice of the

skilled person when providing a common mode choke for isolation.

VI. The appellant (opponent) counter argued essentially as follows:

The subject-matter of claim 1 did not involve an inventive step in view of the combination of D1 with D2. The difference between the subject-matter of claim 1 and the disclosure of D1 consisted of providing the isolation circuit with a common mode choke. According to the description of the patent (see paragraphs [0016], [0017] and [0022]) the technical effect of the difference was to prevent the heating circuit from influencing the occupant detection circuit irrespective of whether the heater switches were in a closed (ON) or open (OFF) position. The isolation carried out by the isolation circuit had to work in both states of the switches of the heating circuit and not only in their open position. Claim 1 did also not limit its subject-matter to the open position of the heater switches. Therefore, the ON position of the switches represented the most unfavourable configuration of the heating circuit for the occupant detection, so that the open-switch impedance was not decisive for the formulation of the objective technical problem.
Further, the technical effect of providing a common mode choke in the isolation circuit was twofold: firstly, to provide a very low impedance for the direct current flow for the heating circuit, when the system was in heating mode, and secondly, to provide a high impedance to the AC signal of the detection circuit in order to avoid the heating circuit from influencing the detection.
Accordingly, the formulation of the objective technical problem done by the Opposition Division in its decision

was correct, i.e. to ensure a good isolation between heating circuit and the detection circuit that reduced the influence of the heating circuit for occupant detection.

Having this objective technical problem in mind, the skilled person would indeed take D2 into consideration, as it pertained to the same technical field and disclosed exactly a common mode choke as an isolation element presenting the above mentioned twofold technical effect (see last paragraph in point 2.1 of D2). As a consequence the skilled person would replace the two separate chokes of D1 by the common mode choke shown in D2 in an obvious manner.

As regards the auxiliary request, the subject-matter of claim 1 did not involve an inventive step for the same reasons as for the main request and bearing in mind common general knowledge of the skilled person. The additional feature in claim 1, which provided MOSFET transistors in the heating circuit for switching the electrical current, merely specified the type of switch used for providing the DC current to the heater element. The added feature did not limit the subject-matter of claim 1 to a condition where these switches were open or closed. The objective technical problem could not thus be limited to an open-switch problematic of these switches because the invention as claimed in view of the patent specification considered both closed and open position of the heater switches. Providing MOSFET switches as switching elements for the heating circuit was common general knowledge (see paragraph [0003] of the contested patent).

Finally, the additional feature in claim 1 of the patent as maintained by the Opposition Division, which

just specified the value of at least 1 mH for the inductors of the common mode choke, was the result of normal design procedures, once established to implement a common mode choke in the device of D1. This specific selection did not provide any further technical effect to the invention but was solely the result of evident design measures when taking into account the expected values of the other parameters of the system (impedance of the seat with and without occupant, allowed measurement error, frequency of the detection signal...).

Reasons for the Decision

1. The subject-matter of claim 1 as maintained by the Opposition Division in the contested decision does not involve an inventive step in view of D1 in combination with D2 and customary practice of the skilled person (Article 56 EPC).

1.1 The Board considers appropriate in the case at hand to deal directly with the subject-matter of claim 1 of the patent as maintained. This subject-matter is more limited than the one of claim 1 of both the main request and the auxiliary request such that the reasons presented below apply inevitably to the subject-matter of claim 1 of the higher ranking requests of the patent proprietor. The fact that claim 1 as maintained recites "electrically coupled" and claim 1 of the main request and of the auxiliary request recites "electrically interconnected" does not change the reasoning below because the feature in question is undisputedly disclosed in D1 irrespective of the different wordings.

1.2 The undisputed differences between the subject-matter of claim 1 as maintained and the occupant detection system controller of D1 (see figure 4 and the corresponding passages of the description) are:

(i) "said isolation circuit comprising a common mode choke (T1) formed by a first inductor L1 and a second inductor L2, wherein the value of the first inductor L1 and the second inductor L2 is at least 1 mH"; and

(ii) "said heating circuit using MOSFET transistors for switching the electrical current.".

1.3 Features (i) and (ii) in claim 1 represent juxtaposed features which do not have any technical relationship.

The patent proprietor alleged that feature (ii) was added into the wording of claim 1 in order to highlight that the problem solved by these differences was to provide a simplified isolation circuit which still prevented any open-switch impedances to influence the accuracy of the detection signal. This feature was thus in his opinion intrinsically connected to the common mode choke.

The Board however concurs with the opponent's refutative arguments that the formulation of the objective technical problem of the patent proprietor cannot be related to any open-switch impedance of the heating circuit. Indeed, according to the patent specification, the invention also considers an occupant detection when the heater switches (MOSFET transistors of figure 4) are in closed or on position (see paragraphs [0016], [0017] and [0022] of the patent

specification). This closed position of the switches represents a less favourable configuration of the heating circuit for occupant detection since the impedance of the heating circuit is smaller and accordingly a better isolation is needed in order to avoid detection signal loss through the heating circuit thereby providing an accurate occupant detection. Further, the claim wording is not limited to a detection of an occupant in such a position of the heating circuit switches. Consequently, feature (i) and (ii) are not linked by any synergetic technical effect and merely represent a juxtaposition of features.

1.4 Regarding feature (i) and as confirmed by the Opposition Division in its decision (see point 65), the use of MOSFET transistors as switching elements for switching electrical current belongs to common general knowledge of the skilled person and cannot justify an inventive step. The patent itself (see paragraph [0003]) confirms this fact and the patent proprietor acknowledged it during the oral proceedings before the Board.

1.5 Feature (ii) requires that the isolation circuit comprises a common mode choke and that the respective value of the two inductors of the choke is at least 1 mH. The technical effect of the common mode choke, irrespective of the open or closed position of the heater switches, is to prevent the alternating detection signal from the occupant detection circuit from dissipating into the heater circuit which may affect the electric impedance measurement and thereby reducing the confidence of determining the presence of an occupant, while at the same time allowing a steady current flow during the heating mode (see paragraphs [0016] and [0017] of the patent specification). In

other words, the effect of the common mode choke is to provide a high impedance to an AC detection signal into the heating circuit and a very low impedance to a DC signal coming from the heating circuit.

This effect is achieved in D1 by the two inductors 50 and 52 (see figure 4 and page 9, lines 10 to 13).

D2, which pertains to the same technical field, i.e. capacitive seat occupancy detection for automobile seats with a heating elements, teaches that the technical effect of a common mode choke is to provide a low impedance for a differential signal, and hence to the DC power supply of the heating circuit, and a large impedance to common mode signals, i.e. the AC measurement signal, while providing some advantages with respect to two separate inductors (see page 2114, last paragraph of point 2.1 and figure 4).

Thus D2 points exactly to the same solution having the same technical effect as the patent in suit. The skilled person would indeed apply the teaching of D2 and replace the two separate choke coils of D1 by a common mode choke as suggested by D2.

Accordingly, the view of the Opposition Division that it would be obvious to provide a common mode choke in the device of D1 is also shared (see point 65 of the contested decision).

1.5.1 As regards the claimed specific selection for the values of the inductors of the common mode choke no further technical effect than the one mentioned above is addressed in the patent specification. The values of the inductors for the common mode choke (see paragraph

[0022] of the patent) merely amount to set values for the inductors which will provide the above desired technical effect under given specific values of the other components of the system (field impedance of the empty and occupied seat assembly, frequency of the AC detection signal...) while maintaining the measurement error within a specific range. Thus, once the skilled person would consider using a common mode choke for the isolation circuit, the selection of the concrete value of its inductors is a design issue which falls under customary practice of the skilled person for the specific device in order to provide the desired technical effect. Accordingly, the skilled person would fall inevitably in the claimed range when carrying out an occupant detection system controller including a common mode choke in its detection circuit. Thus, contrary to the view taken by the Opposition Division, this range cannot justify an inventive step, because it would be arrived at in an obvious manner when putting in practice the above-mentioned modification of D1 consisting in providing a common mode choke.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

A. Vottner G. Pricolo

Decision electronically authenticated