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Datasheet for the decision of 12 October 2023

Case Number: T 0032/21 - 3.5.02

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Language of the proceedings: EN

Title of invention:
Noise filter

Applicant:
Mitsubishi Electric Corporation

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - main request and auxiliary requests 1 and 2 (no)

Decisions cited:
G 0010/93

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Case Number: T 0032/21 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 12 October 2023

Appellant: (Applicant)	Mitsubishi Electric Corporation 7-3 Marunouchi 2-chome Chiyoda-ku Tokyo 100-8310 (JP)
Representative:	Hoffmann Eitle Patent- und Rechtsanwälte PartmbB Arabellastraße 30 81925 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 15 September 2020 refusing European patent application No. 13893859.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Lord
Members:	C.D. Vassoille
	A. Bacchin

Summary of Facts and Submissions

I. The appeal of the applicant lies against the decision of the examining division to refuse European patent application no. 13 893 859.2.

II. The following document is relevant for the present decision:

D1: JP 2000 315930 A

III. In a communication under Article 15(1) RPBA 2020, annexed to the summons to oral proceedings, the board informed the appellant that the subject-matter of claim 1 of the main request as well as that of auxiliary requests 1 and 2 appeared not to involve an inventive step in view of document D1.

IV. Oral proceedings before the board took place on 12 October 2023.

The appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the set of claims filed on 19 May 2020 (main request), or as auxiliary request 1 on the basis of the set of claims filed during the oral proceedings on 6 July 2020, or as auxiliary request 2 on the basis of the set of claims filed with the statement of grounds of appeal.

V. Claim 1 of the main request has the following wording (feature numbering added in bold brackets):

"**[1.1]** A noise filter comprising **[1.2]** a first film condenser (C1) and **[1.3]** a second film condenser (C2),

characterized by **[1.4]** the first film condenser (C1) and the second film condenser (C2) **[1.4.1]** being arranged at a distance in which they are magnetically coupled with each other and **[1.4.2]** being connected in parallel with each other by a first wiring lead (3) for connecting one terminal (1) of the first film condenser (C1) with one terminal (2) of the second film condenser (C2) and a second wiring lead (6) for connecting the other terminal (4) of the first film condenser (C1) with the other terminal (5) of the second film condenser (C2), and **[1.5]** wherein the first wiring lead (3) and the second wiring lead (6) are arranged in such a way as to intersect each other odd-number times."

VI. Compared to claim 1 of the main request, claim 1 of auxiliary requests 1 and 2 each contain minor linguistic changes which are not reproduced here.

VII. The appellant essentially argued that the subject-matter of claim 1 of the main request and auxiliary requests 1 and 2 involved an inventive step because the person skilled in the art would not have modified the noise filter disclosed in document D1 so as to arrive at the claimed invention.

Reasons for the Decision

1. *Patentability requirements in ex parte proceedings*

In *ex parte* proceedings, a board is not restricted either to examination of the grounds for the contested decision or to the facts and evidence on which that decision was based, and could include new grounds. This also holds good for requirements the examining division had not considered in the examination proceedings or had regarded as fulfilled. The board should then, where appropriate, decide either to rule on the case itself or send it back to the examining division (see G 10/93).

In the decision under appeal, the examining division came to the conclusion that the subject-matter of claim 1 of the main request and of auxiliary request 1 was not new in view of document D1.

In application of this principle, the board in the present case not only reviews the contested decision but also considers it appropriate to assess further patentability requirements, primarily the presence of inventive step.

2. Main request - Inventive step (Article 56 EPC)

2.1 The subject-matter of claim 1 of the main request does not involve an inventive step in view of document D1.

Distinguishing feature

2.2 The appellant argued that document D1 did not disclose features 1.4.1 and 1.4.2 of claim 1 of the main request.

2.3 As regards feature 1.4.1 of claim 1 of the main request, the board considers document D1 to disclose that the first film condenser and the second film condenser are arranged at a distance in which they are magnetically coupled with each other.

The appellant argued that the distance between the capacitors 1 and 3 of D1 was large due to the common mode choke and that therefore there was only weak magnetic coupling between the two condensers. The board, however, notes that claim 1 does not define the level or magnitude of magnetic coupling between the two capacitors present in the noise filter of document D1. Consequently, even if only a weak magnetic coupling develops between these two capacitors, this still anticipates feature 1.4.1 of claim 1.

2.4 Irrespective of the above, a magnetic coupling between the two capacitors (condensers) is directly and unambiguously derivable from document Dl. According to paragraph [0006], there are two high frequency loops that are disclosed to be magnetically coupled. Furthermore, from figure 7 it is evident that the capacitors 1 and 3 form part of the high frequency loops. In this context, the appellant argued that Dl only discloses a magnetic coupling between the high frequency loops as such, but not between the capacitors. The board does not agree with the appellant on this point. In particular, paragraph [0006] of D1 explicitly states that the first high-frequency current loop is formed by the input-side device 11 and the first capacitor 1 and that the second high frequency

loop is formed by the output-side device 12 and the second capacitor 3. Therefore, the high frequency loops clearly cannot be considered to be independent of the capacitors.

2.5 Additionally, from a technical point of view, it is not at all comprehensible how the high-frequency current loops disclosed in D1 should interact with each other without magnetic coupling of the respective capacitors. Moreover, the board notes that the overall invention of document D1 is based on cancelling the magnetic coupling between the capacitors by the current reversal through intersection of the wires. In this context, reference is particularly made to paragraph [0008] of D1, where it is stated that the characteristics of the normal mode filter at high frequencies could be improved, because the direction of transmission of the magnetic coupling of the first high-frequency current loop formed on the input side and the second high-frequency current loop formed on the output side is reversed and the direction of the normal mode high-frequency currents to be blocked by the filter is reversed.

Consequently, from paragraphs [0006] and [0008] in conjunction with figure 7, the person skilled in the art directly and unambiguously understands that a magnetic coupling is present between the first capacitor and the second capacitor disclosed in D1.

Feature 1.4.1 of claim 1 of the main request must therefore be considered to be disclosed in document D1.

2.6 As regards feature 1.4.2 of claim 1 of the main request, the board agrees with the appellant that in document D1 the first film condenser (capacitor 1) and

the second film condenser (capacitor 3) are not disclosed to be connected in parallel with each other by a first wiring lead for connecting one terminal of the first film condenser with one terminal of the second film condenser and a second wiring lead for connecting the other terminal of the first film condenser with the other terminal of the second film condenser.

In particular, the board agrees with the appellant that the meaning of the term "wiring lead", within the meaning of claim 1, is undoubtedly a direct connection, i.e. without interruption. This is also clear from the definition in claim 1 that the first and second wiring leads connect the "terminals" of the first and second condensers. An interpretation in the sense that the first and second wiring leads could be interrupted for the connection of an intermediate component, such as a common mode choke, clearly does not correspond to what the skilled person would normally understand to constitute a wiring lead for connecting a terminal of one capacitor with a terminal of another capacitor.

Thus, the board considers that the wording of claim 1 clearly defines a direct connection between the terminals of the first and second capacitors via the first and second wiring leads. In document D1, however, wiring leads connect the capacitors to a common mode choke. It follows that no first and second wiring leads are provided in the noise filter of document D1 to connect between the terminals of the first and second capacitors, as specified in feature 1.4.2 of claim 1 of the main request.

2.7 Consequently, the subject-matter of claim 1 differs from the noise filter disclosed in document D1 in feature 1.4.2.

Objective technical problem

2.8 The appellant argued that the objective technical problem resulting from distinguishing feature 1.4.2 was that of how to reduce the size of the noise filter whilst maintaining the noise filtering properties of the noise filter.

2.9 Maintaining the noise filtering properties is not an appropriate part of the objective technical problem in view of the distinguishing feature. The only difference between the subject-matter of claim 1 and the noise filter disclosed in D1 is that in the latter a common mode choke is provided between the capacitors. Obviously, the omission of this common mode choke results in a reduction in the physical size of the noise filter, which therefore can be considered to be an appropriate technical effect of the distinguishing feature. On the other hand, however, there is no doubt that the presence or absence of the common mode choke has an effect on the noise filter characteristics. Reducing the physical size of the filter and maintaining the filter properties at the same time are therefore contradictory objectives in the context of the claimed invention.

2.10 There is also nothing in the application to support an objective technical problem as formulated by the appellant. Indeed, the only disclosure of filtering characteristics in the application is in figure 17, which relates to Embodiment 3, i.e. an embodiment which includes a choke, and is thus as in document D1. The

application therefore provides no support for the statement that the filtering characteristics can be maintained without the common mode choke.

2.11 The objective technical problem of the distinguishing feature cannot therefore be considered to be how to reduce the size of the noise filter whilst maintaining the noise filtering properties of the noise filter. Rather, the objective technical problem is exclusively that of how to reduce the size of the noise filter.

2.12 For the sake of completeness, the board notes that the question of whether the person skilled in the art would have accepted a change in the filtering properties associated with the size reduction, in order to solve the objective technical problem, is part of the following discussion of the obviousness of the claimed solution ("could-would-approach").

Obviousness

2.13 The solution to the objective technical problem according to feature 1.4.2 of claim 1 of the main request is obvious to the person skilled in the art.

2.14 Document D1 consistently discloses a noise filter that is composed of two line capacitors 1 and 3 with a common mode choke 2 interposed between them. A corresponding well-known type of filter serves to suppress normal (also called "differential") mode noise as well as common mode noise. In this context, the line capacitors serve to suppress the normal or differential mode noise while the common mode choke primarily serves to suppress common mode noise.

2.15 The person skilled in the art, when looking for solutions to the objective technical problem of how to reduce the size of the noise filter of document D1, would, without any doubt, have considered removing the common mode choke, thus resulting in a parallel connection of two capacitors 1 and 3 within the meaning of feature 1.4.2.

The invention disclosed in document D1 relates to the intersecting arrangement of the wiring leads, which improves the filter characteristics of the normal mode filter (see D1 in particular in paragraph [0011]). It is further clear for the person skilled in the art that the intersecting arrangement of the wiring leads has no effect on the common mode choke, because this arrangement only effects the current flow direction in the line capacitor 1 but not in the common mode choke. Thus, contrary to the appellant's argument, this aspect does not play a subordinate role, but rather the skilled person would understand this to constitute the relevant invention disclosed by document D1.

2.16 The foregoing is also entirely consistent with the present application, which states in paragraph [0041] (reference is made to EP 3 048 726 A1) that in the noise filter according to Embodiment 3 of the present invention, the mechanism for improving the attenuation characteristics of the noise filter is the same as the mechanism in the noise filter according to Embodiment 1, whereas Embodiment 1 corresponds to the claimed embodiment and Embodiment 3 corresponds to what is disclosed in figure 1 of document D1. Thus, the application itself supports the fact that the skilled person would understand that the additional provision of a common mode choke is unrelated to the feature

relating to the intersecting arrangement of the wiring leads.

2.17 As regards the appellant's argument that the skilled person would not have omitted the common mode choke of the noise filter of document D1, the board notes the following:

There may indeed be filtering applications which require the presence of a common mode choke in order to filter out common mode noise. The board agrees with the appellant that in these cases it is not an option to omit the common mode choke coil as this would have a negative impact on the filtering characteristics. However, in applications where a common mode choke is not required because only differential/normal mode noise is present and needs to be filtered, the skilled person not only could, but would clearly have omitted the common mode choke present in the filter in D1 in order to reduce the size of that filter.

Therefore, the fact that the omission of the common mode choke results in a change in the filtering characteristics of the filter disclosed in D1 would not have prevented the skilled person from making the corresponding modification in the context of suitable filter applications, in particular those which do not require a common mode choke. On the contrary, the skilled person would have recognised as advantageous the arrangement of the intersecting wiring leads disclosed in D1 according to feature 1.5 of claim 1 and would have adopted it for differential mode filter applications without the common mode choke in order to reduce the size of this noise filter.

2.18 It may also be true that the skilled person could have chosen other filtering options to obtain a pure differential/normal mode filter of reduced size. However, in the present case, an inventive step of the subject-matter of claim 1 is to be assessed in relation to document D1, and the decisive question is therefore not what type of filter the person skilled in the art would generally have used to obtain a differential/normal mode filter of reduced size, but whether the person skilled in the art would have modified the filter of document D1 by omitting the common mode choke in order to reduce the size of that filter. Moreover, the mere existence of alternatives is not sufficient proof of the existence of an inventive step, because each of these alternatives could have been obvious.

2.19 In view of the foregoing, the board concluded that the skilled person would have omitted the common mode choke in suitable filter applications in order to reduce the size of the noise filter of document D1. In this way, the advantageous effect of the invention disclosed in document D1 with respect to the characteristics of the differential/normal mode filter would be preserved while solving the objective technical problem.

2.20 It follows that the subject-matter of claim 1 of the main request is obvious to the person skilled in the art in view of document D1 and therefore does not involve an inventive step, contrary to the requirement of Article 56 EPC.

3. Auxiliary requests 1 and 2

3.1 Claim 1 of each of the auxiliary requests 1 and 2 contains minor linguistic amendments which do not change the substance of the subject-matter of these

claims compared to claim 1 of the main request. The appellant did not submit any further arguments concerning an inventive step of the subject-matter of claim 1 of these requests, but referred to their arguments provided in respect of the main request.

3.2 Therefore, the reasons set out above for the main request apply identically to claim 1 of the auxiliary requests 1 and 2. It follows that the subject-matter of claim 1 of each of auxiliary requests 1 and 2 does not involve an inventive step with respect to document D1, contrary to the requirement of Article 56 EPC.

4. *Result*

Since neither the main request nor auxiliary requests 1 and 2 meet the requirement of Article 56 EPC, the board could not accede to any of the appellant's requests.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann R. Lord

Decision electronically authenticated