

Publication in the Official Journal Yes / No

File Number: T 415/91 - 3.5.2

Application No.: 87 306 549.4

Publication No.: 0 256 689

Title of invention: High DC voltage power supply for motor vehicle electrical circuit

Classification: H02J 7/14

D E C I S I O N
of 13 May 1992

Applicant: GENERAL MOTORS CORPORATION

Headword:

EPC Articles 54(2), 56, 123(2)

Keyword: "Amendment-deletion of feature from claim - not allowed"
"Whole of cited document available to public"
"Inventive step - yes, after amendment"

Headnote



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Boards of Appeal

Chambres de recours

Case Number : T 415/91 - 3.5.2

DECISION
of the Technical Board of Appeal 3.5.2
of 13 May 1992

Appellant :

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Decision under appeal :

Decision of Examining Division of the European
Patent Office dated 14 February 1991 refusing
European patent application No. 87 306 549.4
pursuant to Article 97(1) EPC.

Composition of the Board :

Chairman : R.E. Persson
Members : W.J.L. Wheeler
A. Hagenbucher

Summary of Facts and Submissions

I. The present appeal contests the decision of the Examining Division to refuse Appellant's European patent application No. 87 306 549.4. The reason given for the refusal was that the subject-matter of Claim 1 then on file (i.e. Claim 1 filed with the letter dated 13 November 1990) did not involve an inventive step having regard to the following prior art document:

D1: EP-A-0 016 559.

The Examining Division also expressed the opinion that the application had been amended to contain subject-matter extending beyond the content of the application as filed (omission from Claim 1 of the original limitation to three-phase AC).

II. In the course of oral proceedings held before the Board on 13 May 1992, the Appellant filed a main set of Claims 1 to 12 and an auxiliary set of Claims 1 to 11 (superseding all the previously submitted sets of claims), together with pages 1 to 6 of description to replace pages 1 to 6 of the application as originally filed (corresponding to columns 1 to 3 and lines 1 to 7 of column 4 of EP-A2-0 256 689).

III. Claim 1 of the auxiliary set of claims is worded as follows:

"A motor vehicle electrical circuit (10) of the type providing a low DC voltage with respect to ground (16), including a storage battery (12) for providing standby power at the low DC voltage, a generator (22) for producing a low three-phase AC voltage, a three-phase rectifier (32) for converting the low three-phase AC

voltage to the low DC voltage for charging the storage battery and supplying various low DC voltage loads (20), a three-phase autotransformer (42) of the voltage step-up type for transforming the low three-phase AC voltage put out by the generator to provide a high three-phase AC voltage where the three-phase autotransformer is unrelated to the production of the low DC voltage, a three-phase full-wave rectifier (44) for rectifying the high three-phase AC voltage put out by the three-phase autotransformer to provide a high DC voltage, a pair of ungrounded terminals (62,66) across which the high DC voltage is applied such that with respect to ground the voltage at one terminal is above ground and the voltage at the other terminal is below ground thereby to reduce the voltage available for inadvertent discharge from either terminal to ground by up to approximately one-half the voltage that would otherwise be available for inadvertent discharge from the ungrounded terminal to ground if one terminal was grounded, the three-phase autotransformer (42) including first and second sets of taps (54,56) to provide different voltage step-up transformation ratios in response to application of the low three-phase AC voltage to produce corresponding first and second high three-phase AC voltages where the amplitude of the first high three-phase AC voltage is greater than the amplitude of the second high three-phase AC voltage;

characterised by a high DC voltage window heating element (40) connected across the ungrounded terminals, and in that the three-phase full-wave rectifier (44) rectifies the first and second high three-phase AC voltages to produce corresponding first and second high DC voltages across the window heating element (40) where the magnitude of the first high DC voltage is greater than the magnitude of the second high DC voltage to provide high and low power modes of operation."

Claim 1 of the main set of claims differs from Claim 1 of the auxiliary set recited above in that all references to "three-phase" have been omitted.

Claims 2 to 12 of the main set of claims and Claims 2 to 11 of the auxiliary set are dependent on Claim 1 of the main and auxiliary sets of claims respectively.

IV. Concerning the omission of "three-phase" from Claim 1 of the main set of claims, the Appellant argued essentially that the present invention was described in the application as originally filed in the context of a three-phase system because such electrical systems were very common in motor vehicles. The present case was distinguishable from decision T 260/85 (OJ EPO, 1989, 105), since it was not stated anywhere in the application or implied that three phases were essential to the invention. Indeed, it would be immediately evident to a person skilled in the art that the invention could work with other numbers of phases. The number of phases could be changed without having to modify other features to compensate for the change. The situation was therefore analogous to that in decision T 331/87 (OJ EPO, 1991, 22). The Appellant drew the Board's attention to decision T 192/89 ([1990] EPOR 287), where two features were allowed to be removed from Claim 1 on the grounds that the skilled person would supplement the information in the description as filed with his own general knowledge and that it would not be equitable to deny the Appellants the right to cover in their claims embodiments which would be obvious to the skilled person from reading the original description. It was known that alternators for vehicles could have other than three phases, as could be seen from the second paragraph on page 2 of D1. The person skilled in the art would therefore have regarded the references to

"three-phase" in the application as filed as being purely by way of example.

- V. Concerning inventive step, the Appellant argued essentially that electrical appliances in vehicles were, wherever possible, of the low voltage type. Although many hundreds of patents had been issued for heated windscreens, there was no previous disclosure of a high voltage windshield heating element. Even if a skilled person had contemplated a high voltage windscreen heating element, he would not have thought of combining it with the power supply known from D1, which was directed to providing a power supply for power tools or powerful lighting in places where a mains supply was not available. The skilled person would discard D1 after reading the first few paragraphs and would not pay any attention to the throwaway statement on page 5, line 17, that electrical appliances used in cars could be replaced by high voltage devices. Although it was known from GB-A-1 483 033 and GB-A-2 115 241 to provide an electrical window heater with a high power de-icing mode and a low power demisting mode of operation, there was no disclosure in those documents of the use of first and second high voltages as in the present invention, as now claimed.
- VI. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main set of claims (main request) or on the basis of the auxiliary set of claims (auxiliary request).

Reasons for the Decision

1. The appeal is admissible.
2. Main request
 - 2.1 The critical question to be decided in respect of the main request is whether it complies with Article 123(2) EPC.
 - 2.2 The Board has studied the application as originally filed. The low and high AC voltages are consistently referred to in the description and claims as being three-phase and it is equally clear throughout that the autotransformer and the full-wave rectifier are three-phase. The expression "three-phase" appears about 200 times in the application as originally filed and no other number of phases is mentioned at all. There is no suggestion that the described number of phases, three, is by way of example. The opening sentence of the description states: "The invention herein relates to a high DC voltage power supply adapted for incorporation within a motor vehicle electrical circuit of the low DC voltage type." This statement is too general to permit the deduction of an intermediate generalisation in respect of the number of phases. The only passage which contains any generalisation in respect of the details of the vehicle electrical circuit, namely lines 9 to 18 of page 10 of the application as originally filed, ends by stating: "In particular, the three-phase AC generator 22 may take other well-known forms effective to provide the required low three-phase AC voltage." Thus, the overall impression is of a rock solid commitment to three-phase.
 - 2.3 In the opinion of the Board, the skilled person reading the application as originally filed would not necessarily have regarded the numerous references to "three-phase" as being purely by way of example. Now, it may well be that,

upon reflection, and using his imagination, he would get the idea that it is not essential to use three phases. This, however, would be his own idea, resulting from his own thinking. It is not part of the content of the application as originally filed.

- 2.4 The Appellant has not identified any disclosure in the application as originally filed which could lead to a conclusion other than that the application as originally filed consistently presents three-phase AC as being an essential feature of the invention.
- 2.5 In decision T 260/86 (OJ EPO, 1989, 105), it was decided that it is not permissible to delete from an independent claim a feature which the application as originally filed consistently presents as being an essential feature of the invention, since this would constitute a violation of Article 123(2) EPC.
- 2.6 The Appellant referred to the decision T 331/87 (OJ EPO, 1991, 22), where it was decided that the replacement or removal of a feature from a claim may not violate Article 123(2) EPC provided the skilled person would directly and unambiguously recognise that
- (1) the feature was not explained as essential in the disclosure,
 - (2) it is not, as such, indispensable for the function of the invention in the light of the technical problem it serves to solve, and
 - (3) the replacement or removal requires no real modification of other features to compensate for the change.

2.7 The Board is not convinced that the present case passes all these tests. As far as the first test is concerned, it is far from certain that the skilled person would directly and unambiguously recognise that three-phase AC is not explained as essential in the application as originally filed (see paragraphs 2.2 to 2.4 above). As far as the third test is concerned, it is noted that in the cited case T 331/87, the allowed amendment, namely replacing "laser cutting head carried by the main frame" by "laser cutting head (17) carried in fixed horizontal relationship to the frame (12)", has no real effect on the other features of the claim. However, in the present case, the removal of "three-phase" from Claim 1 would require changes in the generator, the rectifiers and the autotransformer, in fact only the battery and the window heating element would remain unchanged.

2.8 The Appellant also drew the Board's attention to decision T 192/89 ([1990] EPOR, 287). Here it must be pointed out that the editor's headnote published in EPOR is not part of the decision. Paragraph 4 of the reasons of that decision refers to the first two sentences of the originally filed description (see EP-A-0 191 485), which explain that the invention concerns apparatus for homogenising a fluid circulating in a pipeline and comprising two non-miscible phases, for example a mixture of petroleum and water circulating in a horizontal pipeline. Thus, in that case, the application as filed contains a disclosure of a not necessarily horizontal pipeline, so that replacement of the words "more or less horizontal pipeline" in Claim 1 by "transport pipeline" does not introduce subject-matter extending beyond the content of the application as filed. The same applies to the removal of the reference to a zone enriched by gravity which is meaningful to a person skilled in the art only in the case of a substantially horizontal pipeline. Thus,

when the cited decision is considered as a whole, as it should be, it is clear that the statement in paragraph 7 of the reasons (that it would not be equitable to deny the appellants the right to cover in their claims embodiments which would be obvious to a person skilled in the art on reading the initial text of the description) applies to the particular circumstances of that case. It should not be taken out of context as permitting amendments beyond the content of the application as originally filed, or as notionally extending the content of the application as originally filed to include obvious modifications.

2.9 In the opinion of the Board, there is no inconsistency between the cited decisions, once the circumstances of each case are taken into account, and, for the reasons given in paragraphs 2.2 to 2.8 above, the Board concludes that the Appellant's main request violates Article 123(2) EPC, and must therefore be rejected.

3. Auxiliary request

3.1 The auxiliary set of claims does not violate Article 123(2) EPC. The main question to be decided in respect of this request is whether or not the subject-matter of Claim 1 involves an inventive step within the meaning of Article 56 EPC.

3.2 In the opinion of the Board, Document D1 should not be ignored, as suggested by the Appellant. The whole of its disclosure is available to the public and thus is part of the state of the art as defined by Article 54(2) EPC.

3.3 Document D1 discloses a motor vehicle electrical circuit of the type providing a low DC voltage with respect to ground, including a storage battery (4) for providing standby power at the low DC voltage, a generator (1, 2a,

2b, 2c) for producing a low three-phase AC voltage (14V), a three-phase rectifier (3) for converting the low three-phase AC voltage to the low DC voltage for charging the storage battery and supplying various low DC voltage loads, a three-phase voltage step-up autotransformer (7) for transforming the low three-phase AC voltage put out by the generator to provide a high three-phase AC voltage (240V or 110V), the autotransformer being unrelated to the production of the low DC voltage, a three-phase full-wave rectifier (8a - 8f) for rectifying the high three-phase AC voltage put out by the autotransformer to provide a high DC voltage, and a pair of ungrounded terminals (-, +) across which the high DC voltage is applied. The arrangement is such that the voltage at one terminal (+) is above ground and the voltage at the other terminal (-) is below ground thereby reducing the voltage available for inadvertent discharge from either terminal to ground to approximately one-half the voltage that would otherwise be available for inadvertent discharge from the ungrounded terminal to ground if one terminal was grounded. As stated in the sentence bridging pages 4 and 5, the autotransformer may have a plurality of sets of taps to provide different voltage step-up transformation ratios.

3.4 Thus, D1 discloses an electrical circuit according to the prior art part of Claim 1 of the auxiliary set of claims.

3.5 The present invention, as now claimed in the auxiliary request, differs from the prior art known from D1 in that the load connected across the ungrounded terminals is a high DC voltage window heating element, and in that the three-phase full-wave rectifier rectifies first and second high three-phase AC voltages put out by the autotransformer to produce corresponding first and second high DC voltages across the window heating element to provide high and low power modes of operation.

- 3.6 As pointed out by the Appellant, the main embodiment disclosed in D1 provides an electrical power supply for power tools or flood lighting in places where a mains supply is not available. However, the disclosure of D1 is not limited to the main embodiment. On page 5, lines 16 to 19, it is stated: "The electrical appliances such as used in cars and boats, e.g. fans, lights, and windscreen wipers, could be replaced by high voltage appliances with the use of this invention."
- 3.7 The critical question to be decided is, therefore, would it be obvious to a person skilled in the art, in the light of this hint, to adapt the circuit disclosed in D1 to produce first and second high DC voltages across an electrical window heating element in a motor vehicle to provide high and low power modes of operation?
- 3.8 None of the prior art documents on the file contradicts the Appellant's assertion that, before the present invention, electrical window heating elements in motor vehicles, even those with high power de-icing modes of operation such as disclosed in GB-A-1 483 033 and GB-A-2 115 241, did not use high voltages in the sense of the present application. None of the prior art documents on the file discloses the idea of supplying an electrical window heating element in a motor vehicle with different voltages to obtain high and low power modes of operation.
- 3.9 As noted at the end of paragraph 3.3 above, D1 mentions that the autotransformer may have a plurality of sets of taps so that the output voltage can be varied. However, this does not amount to a suggestion to supply different voltages to one and the same load to provide high and low power modes of operation of that load. When considered in the context of D1, uninfluenced by knowledge of the present invention, the provision of plural tapplings on a

single transformer is suggested as an alternative to providing different transformers for different output voltages to suit different loads requiring different mains voltages (such as 240V or 110V).

- 3.10 In order to go from the prior art circuit known from D1 to the circuit claimed in Claim 1 of the auxiliary request, it would be necessary to take at least two steps away from what was customary in the prior art, without any prompting. While it could be argued that a person skilled in the art would, in the light of the statement on page 5 of D1 (see paragraph 3.6 above), contemplate adapting the teaching of D1 for use with other already available electrical appliances, such as windscreen or rear window heaters, it has to be remembered that there is no evidence on the file that motor vehicle window heaters having two different voltage modes of operation were already known and there is no suggestion to use the circuit known from D1 to supply different voltages to a load having two different voltage modes of operation.
- 3.11 In the result, the Board takes the view that Claim 1 of the auxiliary request involves an inventive step over the cited prior art. The same applies to Claims 2 to 11, which are properly dependent on Claim 1.
4. Thus, the reason for which the Examining Division refused the present application does not apply to the auxiliary set of claims.
5. In the opinion of the Board, the application, as amended in accordance with the Appellant's auxiliary request, meets the requirements of the EPC.

Order

For these reasons, it is decided that:

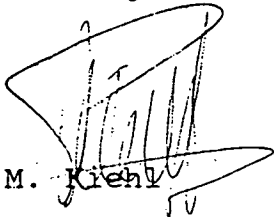
1. The decision under appeal is set aside.
2. The Appellant's main request is rejected.
3. The case is remitted to the first instance with the order to grant a patent on the basis of the Appellant's auxiliary request, i.e. on the basis of:

Claims 1 to 11 of the auxiliary set of claims filed during the oral proceedings on 13 May 1992;

Description, pages 1 to 6 filed during the oral proceedings on 13 May 1992, and pages 7 to 59 of the application as originally filed, with the insertion after "No." in line 20 of page 59 (line 26 of column 35 of EP-A2-0 256 689) of "87306550.2 (publn. no. 0,256,690)", as requested in the Appellant's letter dated 9 April 1990;

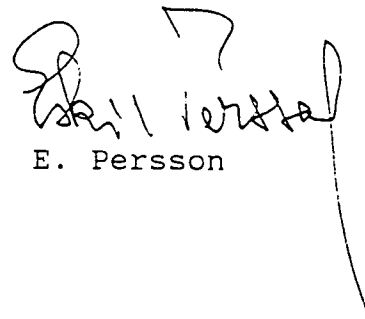
Drawings, sheets 1/17 to 17/17 as originally filed.

The Registrar



M. Kiehl

The Chairman



E. Persson

hjs