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D E C I S I O N
of 9 May 2000

Case Number: T 0024/98 - 3.5.2

Application Number: 89901888.1

Publication Number: 0398929

IPC: H02K 13/00

Language of the proceedings: EN

Title of invention:

Radio Frequency supression for fuel pump

Patentee:

Electro-Mechanical Products, Inc.

Opponent:

Robert Bosch GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 123(2)

Keyword:

"Admissibility of amendments (yes)"

"Novelty (yes)"

"Inventive step (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 0024/98 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 9 May 2000

Appellant: Robert Bosch GmbH
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D-70442 Stuttgart (DE)

Representative: -

Respondent: Electro-Mechanical Products, Inc.
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Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 14 November
1997 concerning maintenance of European patent
No. 0 398 929 in amended form.

Composition of the Board:

Chairman: W. J. L. Wheeler
Members: M. R. J. Villemin
B. J. Schachenmann

Summary of Facts and Submissions

I. The Appellant filed an opposition against European patent No. 0 398 929 and now contests the interlocutory decision of the opposition division that account being taken of the amendments made during the opposition proceedings, the patent and the invention to which it related met the requirements of the EPC.

II. The opposed patent has been maintained in amended form by the opposition division on the basis of claim 1 of the fourth auxiliary request. The patent as amended has 14 claims. Claim 1 is worded as follows:

"A unitary, radio frequency suppression system for a fuel pump, said system comprising:

a radio frequency noise suppression circuit adapted to be interposed between the fuel pump motor and the power supply for the motor, said circuit further adapted to pass direct or low frequency current to the motor while blocking the flow of radio frequency energy generated by the motor;

a pair of motor brushes (40) in electrical communication with said noise suppression circuit and adapted to establish sliding electrical contact with the armature of the pump motor; and

a housing (10) adapted to support and retain said circuit and brushes (40) in a predetermined spatial relationship and providing (i) a pair of terminals (34) for interfacing with an external power source and adapted to provide electrical communication with the noise suppression circuit and (ii) a discharge outlet (14) for the pump, characterised in that, the electrical interfaces between said circuit and said brushes (40) are located within the housing, and said

housing is adapted to function as a fuel pump end cap and includes means (12) for attaching the housing to the remainder of the fuel pump, whereby said system combines end cap function and noise suppression function in a single, compact unit."

Claims 2 to 14 are dependent on claim 1.

III. The following documents cited in support of the opposition have been taken into consideration in the appeal procedure:

D4: US-A-4 718 827

D5: DE-A-2 702 404.

IV. Oral proceedings were held on 9 May 2000 in the absence of the respondent, who had informed the Board with the letter dated 9 March 2000 that he would not be represented at the oral proceedings.

V. The appellant argued essentially as follows:

The opposition division had decided that the subject-matter of claim 1 as granted was not new in view of D4. The present claim 1 differed therefrom by the additional feature that "the electrical interfaces between said circuit and said brushes are located within the housing". According to the decision under appeal this added feature was supported by the passage at column 7, lines 10 to 15 of the patent specification. However, the description did not clearly disclose the nature of the interfaces or that they were accommodated within the housing. Consequently, this new feature infringed Article 123(2) EPC.

In any case, this feature implied only a simple choice between two possibilities for locating the interfaces: within the housing, or outside of it. D4 did not disclose anything about the interfaces between the noise suppression circuit 58 and the brushes 50, so the skilled person had to choose for himself where to put the interfaces and would thereby arrive at the claimed RF noise suppression system without taking an inventive step.

The contested patent did not teach that it was important to protect the interfaces from corrosion, but it was obvious to the skilled person to provide such protection, and he would learn from D5 that this could be achieved by putting the RF noise suppression circuit in the fuel pump end cap, since it was clear that electrical connection terminals of the motor had to be provided within the housing 25 attached to the fuel pump known from D5 (see Figure 3 and page 9 last paragraph). These terminals were interfaces within the meaning of claim 1. The brush assembly supporting plate 11 and the cover 25 in the fuel pump known from D5 exactly fulfilled the same function as that of the housing 10 defined in claim 1, namely to support and retain the brushes 12a, 12b and the radio frequency noise suppression components 15, 16 (see D5, page 8, third paragraph).

Claim 1 did not mention that the housing consisted of only one single part. The supporting plate 11 and the cover 25 disclosed in D5 together formed a housing which was a fuel pump end cap similar to the housing 10 in the contested patent which also consisted of two parts 30 and 32. It then followed from D5 that the radio frequency noise suppression components 15, 16 and

their connection terminals were located within the housing formed by the supporting plate 11 and the cover 25. All the features of the system defined in claim 1 of the contested patent as granted were disclosed in D5. As far as the subject-matter of the present amended claim 1 was concerned, the location of the interfaces within the housing was also implicitly known from D5, or at least did not involve an inventive step having regard to D5 alone or to an obvious combination of D4 and D5.

VI. The Respondent's written arguments can be summarised as follows:

The specification in the opposed patent made it clear that all the components of the noise suppression circuit were disposed within the housing. It was obvious from Figure 3 of the patent that the connections between the noise suppression circuit and the brushes 40 were within the housing.

The noise suppression circuit disclosed in D4 was arranged as a separate add on module which could not have fully internal connections. This document did not disclose the need for enclosing the electrical interfaces within a housing and the "simple choice" referred to by the appellant (inside or outside the housing) would not have occurred to the skilled person. It was believed that the present amended claim 1 was patentably distinguished from D5. The claim required that the housing was adapted to function as a fuel pump end cap, which was clearly not the case in D5. The arrangement of the noise suppression circuits and the brushes disclosed in D4 and D5 were so different that the combination of D4 and D5 advanced by the appellant

could not be considered obvious.

VII. The appellant requested that the decision under appeal be set aside and the European patent No. 0 398 929 be revoked.

VIII. The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.
2. *Admissibility of the amendments of claim 1*

The appellant raised the objection that the added feature that "the electrical interfaces between said circuit and said brushes are located within the housing" was not apparent from Figure 3 nor explicitly disclosed in the description of the patent specification, in particular not at column 7, lines 10 to 12. However, the Board notes that the information given by Figure 3 and the statement in column 7, lines 10 to 12, that "all of the components of the radio frequency suppressing fuel pump end cap 10 are configured so as to readily fit within the housing 30, 32..." are to be read in connection with the rest of the description of the patent specification. It is clear from the figures and from the description, both of the granted patent and the originally filed application, that the ends 36 of the coils 20, the connector clips 42, the wires 37 and the upper ends of the brushes 40 constitute the electrical interfaces between the RF noise suppression circuit and the brushes and that they are all located within the

housing. The other ends 34 of the coils 20 are coined so as to form a connector terminal adapted to interface with an external power source. Therefore, the feature introduced in the present amended claim 1 is disclosed in the application for the contested patent as filed and this amendment complies with Article 123(2) EPC.

3. *Novelty*

3.1 Document D4 discloses a radio frequency (RF) noise suppression system for a fuel pump, comprising:

- an RF noise suppression module 58 mounted on a housing 30 attached at one end of the fuel pump,
- a pair of motor brushes 50 in electrical communication with the RF noise suppression circuit 58,
- wherein the housing 30 functions as a fuel pump end cap provided with a discharge outlet 42 and supports and retains the noise suppression module 58 and the brushes 50 in a predetermined spatial relationship, providing a pair of terminals 56 for interfacing with an external power source.

D4 discloses nothing about the location of the interfaces between the RF noise suppression module 58 and the brushes 50. From Figures 1 and 2 of this document, it is apparent that the RF noise suppression module 58 has an external end portion projecting in the open air and is mounted on the outside of housing 30 while brushes 50 are disposed on the inside of it. Furthermore, this known RF suppression system is modular rather than unitary as required by claim 1.

Thus the claimed RF noise suppression system is novel over the RF noise suppression system known from D4.

3.2 Document D5 discloses a fuel pump with a RF noise suppression system. The RF noise suppression system includes RF noise suppression elements 15, 16 encapsulated in a protective polymer and supported on the surface of a brush mounting plate 11. According to the embodiment depicted in Figure 1 of D5, the RF noise suppression elements 15, 16 project from the surface of the brush mounting plate 11 into recesses 30, 31a and 31b formed in an end cap arranged as a cover 25 affixed to one end of the fuel pump.

The appellant considers that the plate 11 is clearly attached to the cover 25 and forms with it a two-part housing of the same kind as the housing 10 constituted by the two parts 30 and 32 of the claimed RF noise suppression system. If this view is accepted, it would also have to be accepted that the brushes 12a, 12b in document D5 are slidably mounted in the brush holders 13a, 13b affixed to the side of the mounting plate 11 opposite to the side supporting the RF noise suppression elements 15, 16 disposed in recesses 30, 31a and 31b of the cover 25. Clearly, no part of the brushes can project into the housing 11, 25 and the ends of the electrical wires connected to the brushes (shown in Figure 2), which are part of the electrical interfaces between the RF noise suppression circuit and the brushes, cannot be located within the two-part housing 11, 25. Thus the claimed RF noise suppression system is also novel over the RF noise suppression system known from D5.

4. *Inventive step*

4.1 In the Board's view, document D5 discloses the prior art closest to the claimed RF noise suppression system.

Starting from D5, the problem underlying the contested patent is to provide a fuel pump with a compact system having an improved radio frequency noise suppression efficiency and better protection of the components of the system (see description of the European patent specification, column 1, line 52 to column 2, line 5; column 7, line 43 to column 8, line 16). This problem is solved according to claim 1 by having the electrical interfaces between the RF noise suppression circuit and the brushes located within the housing.

4.2 Document D5

The Board agrees with the appellant that the cover 25 and the mounting plate 11 may be regarded as forming a two-part housing adapted to function as an end cap in the fuel pump disclosed in D5 in the same manner as the upper part 30 and the lower part 32 of the housing 10 of the radio frequency noise suppression system of the contested patent. However, as already observed in section 3.2 above, in the configuration shown in D5 the brushes 12a, 12b are mounted on the side of the mounting plate 11 facing away from the cover 25 in which the RF noise suppression elements 15 and 16 are received in the cavities 30, 31a and 31b (see in particular page 7, lines 26 to 29, and claim 4 of D5).

The appellant appears to have assumed that only the end part of the wires connected to the RF noise suppression components can be regarded as "the electrical interfaces". This is not justified, because claim 1 recites "**the** electrical interfaces between said circuit

and said brushes (40) are located within the housing", the highlighted word "**the**" meaning "all the" in the given context according to normal English usage, it being necessary to specify "at least some of the" if that is what is meant. In particular, the ends of the wires connected to the brushes are also to be regarded as comprised in "the electrical interfaces".

In the system known from D5, the brushes and the ends of the wires connecting them to the RF noise suppression elements 15 and 16 are located outside of the housing formed by the cover 25 and the mounting plate 11. As seen best in Figure 2 of this document the electrical wires connected to the brushes 12a, 12b pass through slits in the walls of the brush holders 13a, 13b which face towards the rotor 3 (see Figure 1) and away from the plate 11. These wires constitute part of the electrical interfaces between the RF noise suppression circuit and the brushes and it cannot be considered that they are located within the housing as specified in claim 1.

It remains to answer the question as to whether the skilled person would, on the basis of his general knowledge and without taking an inventive step, consider modifying the system known from D5 so as to locate all the electrical interfaces between the RF noise suppression circuit and the brushes within the housing. This would necessitate a drastic redesign of the arrangement for holding the brushes so that the connecting wires could be attached to the brushes on the side facing away from the rotor which would have to be inside the two-part housing 11, 25. Alternatively, a redesign of the cover 25 would be necessary so that it could surround the brush holders. In the judgement of

the Board such far reaching modifications cannot be expected from the notional knowledgeable, but rather unimaginative, skilled person, in the absence of a hint that it might be advantageous to do so, and there is no disclosure, nor any implied suggestion in D5 to perform such a modification. The Board therefore concludes that the subject-matter of the present claim 1 is not obvious having regard to D5, considered alone.

4.3 Document D4

The Board shares the respondent's views that the housing 30 of the fuel pump disclosed in D4 does not compare with the housing 10 of the radio frequency noise suppression system defined in the present claim 1. The RF noise suppression module 58 of the system described in D4 is mounted on the outside of the housing 30 as an "add on" element of the type mentioned in the introductory part of the description of the contested patent (see column 1, lines 37 to 51). As a separate, external part distinct from the housing 30 this module 58 must be electrically connected to the brushes when it is fitted to this housing. Consequently, the electrical interfaces between the radio frequency noise suppression circuit and the brushes 50 cannot be located within said housing.

D4 contains no hint which could make it obvious to the skilled person to place the electrical interface between the RF suppression circuit and the brushes within the housing. This would necessitate a redesign of the housing 30 so that it could surround the RF noise suppression module (which would then no longer be an add-on module). In the judgement of the Board such a modification cannot be expected from the skilled

person, in the absence of a hint that it might be advantageous to do so, and there is no disclosure, nor any implied suggestion in D4 to perform such a modification. The Board therefore concludes that the subject-matter of the present claim 1 is not obvious having regard to D4, considered alone.

5. *Combination of D4 and D5*

5.1 The different structures of the fuel pumps disclosed in D4 (brushes mounted to slide in the axial direction of the rotor) and D5 (brushes mounted to slide radially) make a straightforward combination of their relevant features impossible. It is unlikely that the skilled person would take certain features from the system known from one of these documents and modify them so that they could be combined with certain features from the other document in such a way as to arrive at the subject-matter of claim 1 (*ex post facto* mosaic).

Thus the subject-matter of the present claim 1 is considered as involving an inventive step within the meaning of Article 56, having regard to the prior art known from D4 and D5.

6. Summarising, the opponent has not convinced the Board that the contested patent in the amended form approved by the opposition division and the invention to which it relates do not meet the requirements of the EPC. Therefore, the appeal has to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Hörnell

W. J. L. Wheeler