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File Number: T 86/90 - 3.2.3

Application No.: 84 301 542.1

Publication No.: 0 122 034

Title of invention: Method of painting an automobile body

Classification: B05B 13/04, B05B 5/04, B05D 1/04

D E C I S I O N  
of 9 July 1991

Proprietor of the patent: General Motors Corporation

Opponent: Behr Industrieanlagen GmbH & Co.

Headword:

EPC Article 56

Keyword: "Inventive step (denied)"

Headnote



Case Number : T 86/90 - 3.2.3

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.3  
of 9 July 1991

**Appellant :**  
(Proprietor of the patent)

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**Decision under appeal :**

Decision of Opposition Division of the European  
Patent Office dated 12 December 1989 revoking  
European patent No. 0 122 034 pursuant to Article  
102(1) EPC.

**Composition of the Board :**

**Chairman :** C.T. Wilson  
**Members :** F. Brösamle  
W. Moser

## Summary of Facts and Submissions

- I. European patent application No. 84 301 542.1, filed on 8 March 1984 and published on 17 October 1984 under publication No. 0 122 034, was granted with five claims.

Claim 1 as granted reads as follows:

"1. A method of painting an automobile body by the use of an electrostatic spray coating system utilizing translatable rotating heads (74) for atomizing paint to be deposited on the automobile body (20), characterised in that the method is carried out with a robot system (10) which includes a paint module (12) having at least two robots (26 to 32) located therein and each of said robots having an arm (38) provided with a support head (42) movable about five control axes (46 etc.), and a bell-type atomizing device (44) attached to the support head (42) and adapted to rotate about a spin axis (80), and that the method comprises:

- a. conveying (chain 24) the automobile body (20) into the paint module (12);
  - b. locating (switch 66) the automobile body (20) in a predetermined stationary position in the paint module (12);
  - c. rotating (drive 78) the bell (74) of the atomizing device (44) about the spin axis (80) at a speed sufficient to mechanically atomize a liquid paint supplied to the interior of the bell (74);
  - d. creating (generator 72) an electrostatic field between the rotating bell (74) and the automobile body (20) for causing the atomized liquid paint to be directed from the rotating bell (74) to the automobile body in a cone-shaped pattern (84);
- and

e. moving (controller 64) the rotating bell (74) at a speed which will prevent any gyroscopic effect developed by the rotating bell (74) from distorting the cone-shaped pattern (84) as the bell (74) is moved about the five control axes (46 etc.)."

This Claim 1 is followed by dependent Claims 2 to 5.

II. The patent was opposed in due time and form on 17 October 1988; the Respondent (Opponent) requested revocation of the patent on the grounds of Articles 52(1) and 56 EPC (inter alia) in the light of

(D1-FR): FR-A-2 397 234,  
(D2): JP-A-144 763,  
including translation into English  
(D3): US-A-3 279 421, and  
(D4): Brochure "De Vilbiss"  
W 12/81, "Elektrostatischer Hoch-Rotations-  
Zerstäuber RAB-500".

III. By a decision of 12 December 1989 the Opposition Division revoked the European patent No. 0 122 034 pursuant to Article 102(1) EPC, whereby this decision was based on the documents (D1) to (D3).

IV. The Appellant (Proprietor of the patent) appealed against this decision on 29 January 1990 and paid the appeal fee in due time. The statement of grounds of appeal was received on 6 April 1990; the Appellant requested the maintenance of the patent in amended form, i.e. on the basis of apparatus claims instead of the granted method claims. The apparatus claims were objected to by the Respondent who felt that the change of category in the present case would constitute an infringement of

Article 123(3) EPC. Beyond that, the objection under Article 56 EPC was upheld. To clarify the question whether document (D4) was publicly available before the date of priority of the patent in suit, the Respondent filed a letter of 18 July 1989 of the company "De Vilbiss" in which letter it was confirmed that the (D4) brochure was printed in August 1981 in its first version.

- V. In a communication of the Board pursuant to Article 11(2) RPBA dated 15 April 1991 the Board gave its provisional opinion essentially to the question "change of category" and to the starting point of the invention, since the document (D1-FR) is not clear in itself, nor when other members of the (D1) family such as (D1-GB) GB-A-2 002 142 and (D1-JP) JP-A-54-40840 are also considered.

In response thereto the Respondent pointed to the non-prepublished (D1-FR) patent specification and also to DE-B-1 175 126.

- VI. During the oral proceedings before the Board, the latter gave its decision on the question of change of category with the result that any apparatus claims were rejected as inadmissible under the provisions of Article 123(3) EPC. After a short discussion of amended method claims the Appellant returned to the claims as granted.

He requests the setting aside of the impugned decision and the maintenance of the patent as granted, since in his opinion the documents to be considered - whether singly or in combination - would not lead a skilled person to the subject-matter of granted Claim 1, since the prior art would not teach how gyroscopic effects caused by the rotating bell have to be dealt with when the rotating bell (atomizing unit) is manipulated by a robot. In this context the document "WARD'S Auto World", 6-84, pages 71-

72 was submitted. The Appellant pointed to the fact that a five axes robot is admitted as prior art so that the disclosure of the D1 family should no longer be under discussion, since the inventive concept of Claim 1 is basically to be seen in holding the car stationary, while painting it and in moving the rotating bell at such a speed that the cone-shaped pattern of the atomized paint is not distorted as the rotating bell is moved along the five control axes of the robot.

The Respondent requests the dismissal of the appeal, since in his opinion the teaching of Claim 1 is not based on an inventive step within the meaning of Article 56 EPC. Concerning the efficiency in paint transfer, i.e. the problem of the contested invention, it is observed that the question of a moved or of a stationary car within the paint module has no influence on the paint transfer and has to be dealt with as a marginal problem lying in the design freedom of an average engineer. The Respondent comes to the result that the specific speed of the rotating bell can easily be found by "trial and error" without the exercise of an inventive activity, see documents (D1) and (D4) in combination.

At the end of the oral proceedings the Chairman announced the decision of the Board.

#### Reasons for the Decision

1. The appeal is admissible.
2. Granted Claims 1 to 5 directly correspond to Claims 1 to 5 as originally filed so that the granted set of claims is not open to an objection under Article 123(2) EPC.

Since the granted set of claims is defended unamended it also meets the requirements of Article 123(3) EPC.

3. Novelty of the subject-matter of granted Claim 1 was never disputed so that no further argument is necessary in this respect.
4. Concerning the question of obviousness or non-obviousness of the teaching of granted Claim 1, the Board comes to the following result:
  - 4.1 Nearest prior art is a method of painting an automobile body by the use of a spray coating system according to the D1 family. Though the Board expressed some doubt whether the documents of the D1 family unambiguously disclose a five axes robot, the Appellant admitted during the oral proceedings before the Board that this piece of prior art provides five control axes of the robot system.
  - 4.2 Apart from this starting point of the invention it has to be considered that the Appellant himself already has indicated in the application as originally filed that five control axes robot systems are known, see original page 5, lines 17 to 25 (Grayco Robotics Inc. and Hitachi Limited) and page 8, lines 4 to 8, so that the starting point of the invention is beyond discussion.
  - 4.3 As set out in the opening of the patent in suit, see column 1, lines 23 to 47, the efficiency in paint transfer normally is low and as a consequence additional paint stations are required for providing full coverage of the automobile body, see column 1, lines 48 to 53 of the patent specification.
  - 4.4 Starting from this background the problem to be solved by the subject-matter of granted Claim 1 is to overcome the

aforesaid drawbacks of prior art systems (objectively remaining technical problem when starting from the nearest prior art method).

4.5 The above problem is solved with the features as set out in granted Claim 1, essentially by combining a known five axes robot with a bell type atomizing device being based on a bell rotating about the spin axis at a speed sufficient to mechanically atomize a liquid paint supplied to the interior of the bell and on an electrostatic field between the rotating bell and the automobile body, whereby the painting is carried out while the automobile body is stationary within the paint module. The speed of the spray gun (robot arm carrying the spray gun) is moreover limited to values which do not distort the cone-shaped pattern of the rotating bell.

4.6 It has now to be decided whether or not this teaching is based on an inventive step.

The Respondent argued that combining the teachings of documents (D1) and (D4) would lead a skilled person immediately to the method of Claim 1 as granted. The Appellant contested this opinion.

4.6.1 It is true that neither of the documents (D1) or (D4) per se reflects the teaching of granted Claim 1. It has, however, to be considered that their combination is already stipulated by document (D4) which not only deals with an atomizing device within the meaning of Claim 1, i.e. with a rotating bell that enables paint to be mechanically atomized and with an electrostatic field application between the rotating bell and the automobile body, but also with the possibility of combining this type of spray technology with a robot system for instance of the type "De Vilbiss TRALLFA", see document (D4) from



W 12/81, second page headed "Anwendungs-Flexibilität" respectively "Technische Daten" left column headed "Einfache Handhabung und zuverlässiger Betrieb", where it is clearly set out that robot systems can be equipped with these spray guns.

- 4.6.2 The Board is fully convinced that document (D4) reflects prior art, since the editor of this brochure has confirmed by letter of 18 July 1989, submitted to the Board with Respondent's letter of 5 March 1991, that its first version was printed in August 1981 - that is nearly two years before the claimed date of priority. It can be assumed that the brochure has been made available to the public in these two years so that the Appellant's objection in this respect cannot be accepted.
- 4.6.3 Even if one is not inclined to accept document (D4) as state of the art within the meaning of Article 54(2) EPC, then document DE-B-1 175 126, submitted with Respondent's letter of 13 May 1991 and discussed in the oral proceedings before the Board, would also disclose the teaching that a robot system as disclosed in the single figure and described in column 1, line 39 to column 2, line 43 can be combined with a rotating electrostatic spraying bell "6" and "7", see column 1, line 52 and first three lines of column 2 of the document under discussion. Since granted Claim 1 does not exactly prescribe the rate of rotation of the bell, the document under discussion can be interpreted as fulfilling these features of granted Claim 1.
- 4.6.4 The state of the art according to documents (D4) and DE-B-1 175 126 does not prescribe that the automobile body is stationary while being painted in a painting module. Documents (D1) are also silent in this respect so that the skilled person has to decide which one of the two

alternatives is chosen, be it a moving or a stationary automobile body in the paint module.

Due to the fact that automobile bodies have to be painted on their outer surfaces and in their interior it is obvious that a stationary body facilitates the operation and especially the programming of the robot system so that a skilled person, without having to perform an inventive step, would envisage this alternative, which per se is well known in the art, see document D2 (translation) page 3, paragraph 3 ("placed in position") and page 6, paragraph 2 ("positioning car bodies").

- 4.6.5 It is true that none of the relevant documents literally discloses the choice of a speed of the spray gun such that the cone-shaped pattern of the rotating bell is not exceedingly distorted as the bell is moved by the robot system.

On the other hand, it is clear that the efficiency in paint transfer can only be increased if the atomized paint is transferred to the automobile body unobstructed i.e. not distorted by too high a handling speed. As can be seen from column 1 of the attacked patent it is easily possible to determine the extent of paint transfer and to determine whether or not an additional paint station fulfilling the requirement of providing full coverage of the automobile body is necessary. Waste of paint or incomplete coverage means poor efficiency. In document (D4), see page already discussed above, left column, paragraph 2, it is set out that the De Vilbiss gun achieves an increase in efficiency ("die Wirtschaftlichkeit beim Beschichten erhöht wird"). For a skilled person it is therefore absolutely self-evident that the positive properties of such a spray technology must not be diminished by inappropriate handling of the spray gun. In the technical field of the

attacked patent it is therefore quite common to apply an approach of "trial and error" to optimize the most favourable conditions, in the present case the handling speed of the spray gun.

- 4.6.6 It has also to be considered that Claim 1 as granted does not prescribe a specific speed to be followed, but only teaches that the speed has to be so chosen that distorting of the cone-shaped pattern is avoided. This teaching is, however, exactly what can be expected from a skilled person who is confronted with a robot to which a spray gun of the type as defined in granted Claim 1 is fixed, and who has to decide about the question of choosing the right handling speed.
- 4.6.7 The Board is thus of the opinion that neither the problem to be solved nor its solution according to granted Claim 1 require the performance of an inventive step, in the light of the duly considered prior art.
- 4.6.8 Claim 1 as granted can therefore not be upheld, since it does not meet the requirements of Article 56 EPC.

Granted Claim 1 not being valid the dependent claims of the attacked patent fall likewise.

5. The arguments presented by the Appellant are not convincing for the following reasons:
- 5.1 During the oral proceedings before the Board the Appellant submitted the document "WARD'S Auto World" (not prepublished) to demonstrate that it is easier in respect of programming a robot system when the automobile bodies are stationary while being painted. Exactly this feature can, however, already be seen from document (D2) so that this late filed document can be left out of consideration under Article 114(2) EPC.

- 5.2 The Appellant contended that questioning the inventive step of granted Claim 1 would be the result of inadmissible hindsight. The Board cannot accept this argument, since basically gyroscopic effects are existent when for instance a bell of an electrostatic spray gun is rotating with such a rotational speed that liquid paint can be mechanically atomized. It is therefore *prima facie* not important if such an effect is described in the prior art, if it can be derived from the prior art, see document (D4) in particular, that such an effect and its outcome is unambiguously known to the skilled person. The hint in document (D4) that by using this technology good economical results are possible, is for the Board sufficient proof that - at least implicitly - the gyroscopic effect and its influence on paint transfer efficiency and on coverage was already known to a skilled person.
- 5.3 From document (D2) a painting method is already known in which the automobile body is stationary when being painted, so that it is not essential for the assessment of inventive step that "WARD'S" makes back-up provisions for manual spraying superfluous as is the case with the method according to granted Claim 1, since the Board is of the opinion that the prior art in the form of documents (D1) and (D4) seen in combination also achieves this result.
6. Summarising, the Board is of the opinion that the attacked patent cannot be upheld so that the request of the Respondent to confirm the revocation of this patent has to be followed in the present case.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:



N. Maslin

The Chairman:



C.T. Wilson

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