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**Datasheet for the decision
of 21 September 2016**

Case Number: T 1373/14 - 3.2.01

Application Number: 05795729.2

Publication Number: 1872983

IPC: B60H1/00

Language of the proceedings: EN

Title of invention:
VEHICLE AIR CONDITIONER

Patent Proprietor:
Valeo Japan Co., Ltd.

Opponent:
MAHLE International GmbH

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes)

Decisions cited:

Catchword:



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Case Number: T 1373/14 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 21 September 2016

Appellant:
(Opponent)

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Decision under appeal:

**Decision of the Opposition Division of the
European Patent Office posted on 6 May 2014
rejecting the opposition filed against European
patent No. 1872983 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman G. Pricolo
Members: W. Marx
 P. Guntz

Summary of Facts and Submissions

- I. The opponent's appeal is directed against the decision of the opposition division posted 6 May 2014 rejecting the opposition against European patent No. 1 872 983.
- II. In its decision the opposition division held, *inter alia*, that the subject-matter of claim 1 as granted was inventive in view of document D2 (DE 101 59 364 A1) combined with the skilled person's general knowledge.
- III. Oral proceedings before the board took place on 21 September 2016.

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

The respondent (patent proprietor) requested that the appeal be dismissed.

- IV. Claim 1 as granted reads as follows:

"An automotive air-conditioning system equipped with an air-conditioning unit (1) disposed under a steering member support part (23) when mounted in a vehicle body, which includes a blower (3), an evaporator (5) and a heater core (6) disposed substantially along a longitudinal direction inside a unit case (2), with said evaporator (5) disposed on the front side along a frontward/rearward direction relative to the vehicle body, said heater core (6) disposed on the rear side along the frontward/rearward direction relative to the vehicle body, a vent opening (15) to communicate with a vent outlet port (20) formed inside the cabin and a defrost opening (16) to communicate with a defrost

outlet port (21) formed inside the cabin both formed at said unit case (2), said vent opening (15) and said vent outlet port (20) made to communicate with each other via a vent duct (25) and said defrost opening (16) and the defrost outlet port (21) made to communicate with each other via a defrost duct (26),

characterized in:

that said vent opening (15) assumes a position further frontward than said steering member support part (23) along the frontward/rearward direction relative to the vehicle body; and

that said defrost opening (16) assumes position further rearward than said steering member support part (23) along the frontward/rearward direction relative to the vehicle body."

- V. The appellant's submissions in as far as they are relevant to this decision may be summarised as follows:

According to the established case law of the boards of appeal, alleged advantages to which the patent proprietor referred without offering sufficient evidence could not be taken into consideration in determining the problem underlying the invention and therefore in assessing inventive step. In the present case, the object of the alleged invention was to prevent the occurrence of turbulence inside the unit case and associated noise (see paragraph [0004] of the patent specification). In addition, defrost ducts or vent ducts were supposed to be of similar length so that imbalance in the airflow resistance could be avoided (see paragraph [0006]). It was acknowledged that the characterising features of claim 1 were not known from the prior art according to D2 or Figure 4 of the contested patent. However, it was completely incomprehensible that the alleged advantages were

achieved by the characterising features of claim 1 and that the claimed subject-matter solved the alleged problem, i.e. to avoid noise caused by turbulence. In particular, it was not turbulence in airflow but the blower itself that represented the main source of noise occurring in the air-conditioning unit; furthermore, tight cross-sections of the air flow paths and control flaps also contributed to the generation of noise. Moreover, significant noise reduction was achieved by variation in the diameter of the ducts, whereas the effect of increasing their length and the advantages associated therewith were negligible, because although a duct's airflow resistance was proportional to its length, it was much more dependent on its diameter. Therefore, equal distribution of air at the air outlets could be achieved, if required, by appropriate dimensioning of the diameter of the ducts, and it could be left open whether the known air-conditioning unit of Figure 4 of the contested patent typically had ducts of substantially different lengths.

In the known prior art according to Figure 4 of the contested patent, a flow of cool air from the evaporator to the vent opening crossed a flow of warm air from the heater core to the defrost opening, leading to turbulence and noise. However, the contested patent did not show an operating mode of the air-conditioning unit requiring at the same time maximum heating power for providing warm air to the windscreen and maximum cooling power for providing cool air to the passenger compartment. In fact, such an operating mode as indicated in Figure 4 of the contested patent, in which high volumes of warm and cold air were generated simultaneously, did not exist. The typical operation of an air-conditioning unit, which was not addressed in the contested patent, was characterised by mixing warm

and cold air and controlling their ratio, which induced turbulence and could not be realised by means of laminar flows of warm and cold air being parallel to each other. The contested patent addressed a defrost mode (large volume of warm air to the windscreen) and a rapid cooling mode (large volume of cold air to the passenger compartment). As shown in Figure 4, the evaporator and the heater were positioned at a distance from each other in the longitudinal direction of the vehicle, so that in the defrost mode warm air was directed (passing the evaporator) via corresponding ducts in the forward direction to the windscreen, whereas in the rapid cooling mode cold air was directed (passing the heater) via corresponding ducts in the rearward direction. Although both airflows crossed each other viewed from the vehicle's side, the ducts for warm and cold air were typically arranged separately side by side in the lateral direction so that any negative impact on the fluid flow was avoided.

Moreover, the design of air-conditioning units had to satisfy constraints of the vehicle manufacturer, so the arrangement of the defrost and vent duct could not establish an inventive step. The given mounting situation was dependent upon the position of the steering member support part. According to Figure 4 of the contested patent, the steering member support part (106) was positioned close to the blower in a front area of the air-conditioning unit, so behind it there was sufficient space for the defrost opening and the vent opening of the air-conditioning unit. In comparison, according to Figure 1 the steering member support part (23) was provided more rearward in the vehicle's longitudinal direction, i.e. behind the steering member support part of Figure 4 (106) in the area of the ducts (107, 108) provided in the instrument

panel. Starting from the known arrangement according to Figure 4, in case the steering member support part was situated more rearward, in the area of the ducts as depicted in Figure 1, the defrost and vent openings had to be relocated. There was sufficient space in front of the steering member support part and behind it for providing the openings of the air-conditioning unit and the ducts connected thereto. As regards the instrument panel, which was designed as a deformable zone with given ducts or cavities, position and length of the air ducts could be chosen as required. In order to install control flaps within the ducts, which required an increase in length of the flow paths, it was expedient, and also possible, to connect the ducts to the air-conditioning unit as depicted in Figure 1. The combination of features of claim 1 was therefore the result of routine considerations of the skilled person. He or she would maintain a duct for warm air passing over the steering member support part as known from Figure 4. An increased length of the ducts within the instrument panel, providing additional cavities, would also improve impact protection.

Document D2 showed a different arrangement, in which the steering member support part was not situated above the air-conditioning unit but on its front side.

VI. The respondent countered essentially as follows:

Contrary to the appellant's allegation, there was a need for a mode of operation of the air-conditioning unit in which warm air was provided for defogging a windscreen simultaneously with cool air for cooling the passenger compartment, e.g. during tropical storms when warm air saturated with water cooled down at the windscreen.

The constraints imposed by the vehicle manufacturer normally included the position of the steering member support part, the positioning of the defrost outlet port and of the vent outlet port, and the installation space provided for the air-conditioning unit. However, there was nothing from which the skilled person could derive the vent opening position and the defrost opening position according to claim 1. In particular, there was no motivation for exchanging the position of the defrost opening and the vent opening of the prior art according to Figure 4 of the contested patent.

Reasons for the Decision

1. The subject-matter of claim 1 as granted is new over the prior art, which was not contested.
2. The closest prior art is represented by Figure 4 of the patent specification, which shows an automotive air-conditioning system equipped with an air-conditioning unit according to the preamble of claim 1, as agreed by the parties.
 - 2.1 When mounted in a vehicle body, the known air-conditioning unit is disposed under a steering member support part (106) and includes a blower, an evaporator disposed on the front side and a heater core disposed on the rear side inside a unit case (101) along a frontward/rearward direction relative to the vehicle body, a vent opening (103) to communicate - via a vent duct (107) - with a vent outlet port (102) formed inside the cabin and a defrost opening (105) to communicate - via a defrost duct (108) - with a defrost

outlet port (104) formed inside the cabin both formed at said unit case (101).

2.2 The subject-matter of claim 1 therefore differs from the prior art according to Figure 4 of the contested patent by the characterising features, defining a position of the vent opening further frontward than said steering member support part and a position of the defrost opening further rearward than said steering member support part. In the known arrangement of Figure 4, both the defrost and the vent opening are positioned further rearward than the steering member support part, with the defrost opening being located further frontward than the vent opening so that the ducts connected thereto - when viewed in the vehicle's lateral direction - do not cross each other and can be guided directly to the corresponding outlet ports. The modified positioning of the openings according to claim 1 requires an increased length of the vent duct leading to the passenger compartment and of the defrost duct leading to the windscreen.

2.3 The appellant argues that, according to the established case law of the boards of appeal, alleged advantages to which the patent proprietor referred without offering sufficient evidence could not be taken into consideration in determining the problem underlying the invention (prevention of the occurrence of turbulence inside the unit case and associated noise, avoidance of imbalance in the airflow resistance) and therefore in assessing inventive step.

As explicitly stated in paragraph [0004] of the patent specification, "it is crucial to prevent the occurrence of turbulence inside the unit case and to attenuate any turbulence (pulsation) having occurred to a sufficient

extent before it reaches the space inside the cabin, in order to reduce the noise level". At least as far as the attenuation of turbulence and noise is concerned, the board finds, on the background of the well-known principles of fluid mechanics, that an increased length of the ducts leading to the outlet ports contributes to an improvement in noise reduction so that a reduced noise level reaches the cabin, irrespective of whether the primary source of noise in the air-conditioning unit is represented by the blower or by the mixing of airflows of warm and cold air. Moreover, as apparent from the figures in the patent specification, by positioning the vent opening further forward, the detrimental effect of the prior art mentioned in paragraph [0006] - an imbalance in the airflow resistance in the vent duct between the central and the side communication passages causing an even distribution of air - can be alleviated. Therefore, the alleged advantages addressed in the patent are achieved by the characterising features of claim 1 and are considered when assessing inventive step. It is noted that the problem to be solved according to the patent specification (see paragraph [0008]: "to greatly reduce noise in an air-conditioning system") does not refer to noise avoidance but to noise reduction, and this problem is solved by the characterising features of claim 1 as argued above, contrary to the appellant's allegations. Since the physical laws of fluid mechanics are known to the skilled person, no further evidence or support is considered necessary in this respect, e.g. by way of comparative examples, so the case law referred to by the appellant is not applicable in the present case.

The appellant argues that significant noise reduction and equal distribution of air was achieved by variation

in the diameter of the ducts, whereas the effect of increasing their length was negligible. It is not contested that the influence of cross section or diameter on the airflow resistance of ducts is much higher than the influence of their length. However, this does not prevent the skilled person from also taking benefit from the known proportional relationship between duct length and airflow resistance when e.g. designing branching ducts with the aim of achieving equal air distribution, starting from the air-conditioning unit of Figure 4 of the contested patent, which showed (see Figure 5) central and side communication passages of the vent duct of substantially different lengths. Moreover, further requirements, such as the maximum flow rate that should be provided by the air-conditioning, might even prevent the skilled person from taking into consideration a reduction of the duct's diameter in order to increase the airflow resistance.

- 2.4 It can be left open whether the claimed invention also solves the problem of avoiding the occurrence of turbulence inside the unit case, e.g. in an operating mode where high volumes of warm and cold airflows were generated simultaneously, crossing each other on their paths to the defrost opening and to the vent opening respectively and leading to turbulence and noise. It was in dispute whether such an operation mode existed as indicated in Figure 4, in particular because ducts for cold and warm air were typically arranged separately side by side in the vehicle's lateral direction. Corresponding passages in the description of the contested patent might be erroneous or unclear. Nevertheless, as acknowledged by the appellant, noise in an air-conditioning unit is generated when operating the blower and also during the typical mixing of warm

and cold air, which induces turbulence and therefore noise. As already argued in the preceding paragraph, the effect of noise attenuation provided by the characterising features of claim 1 cannot be disregarded and will therefore be considered in the assessment of inventive step.

- 2.5 The appellant's line of argument against inventive step of the subject-matter of claim 1 relies on the given constraints provided by the vehicle manufacturer, in particular the given mounting position of the steering member support part. As argued by the appellant, starting from the known arrangement according to Figure 4 of the patent specification, the claimed subject-matter allegedly was the result of routine considerations of the skilled person in case the steering member support part was situated more rearward.

However, this line of argument cannot be followed by the board and is considered to be based on an ex post facto analysis of the case requiring the knowledge of the invention. It is acknowledged that, with a change in the position of the steering member support part, the defrost and vent opening might have to be relocated. However, placing the defrost opening as close as possible in direction of the windscreen (as known from the prior art according to Figure 4 of the contested patent) helps in efficiently providing a maximum volume of warm air to the windscreen, which is typically required in the defrost mode of the air-conditioning unit, and no convincing argument was provided why the skilled person would be tempted to deviate from such a design. Moreover, the skilled person tends to maintain a universal design of a given air-conditioning unit for different mounting

situations, i.e. to apply only slight modifications which require less changes in tooling and less efforts in testing. The board also holds that the mounting situation as specified by the characterising features is at first glance counter-intuitive and therefore not obvious for the skilled person, because assembly of the air-conditioning unit within the vehicle might be more complicated when a connection between the vent opening and the vent duct has to be established further forward than the steering member support along the frontward/rearward direction relative to the vehicle body, although there might be sufficient space. The board cannot find that the requirements with regard to the design of the instrument panel as a deformable zone, providing impact protection to the passengers, would suggest to modify the position of the vent and defrost openings as known in the prior art, as alleged by the appellant.

The board therefore follows the respondent in that there is no motivation for exchanging the position of the defrost opening and the vent opening as known from Figure 4 of the patent specification. As a consequence, the board finds that the subject-matter of claim 1 as granted involves an inventive step (Article 56 EPC).

3. In its written submissions, the appellant also argues lack of inventive step starting from document D2 as closest prior art. However, the appellant did not present any arguments why the decision under appeal should be corrected in this respect. Nor does the board see any reasons to deviate from the conclusion of the opposition division in this respect.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



A. Vottner

G. Pricolo

Decision electronically authenticated