

Internal distribution code:

- (A) [-] Publication in OJ
- (B) [-] To Chairmen and Members
- (C) [-] To Chairmen
- (D) [X] No distribution

**Datasheet for the decision
of 12 May 2022**

Case Number: T 2032/18 - 3.2.03

Application Number: 12190581.4

Publication Number: 2587175

IPC: F24F1/00, H05K7/20, F24F13/20,
F24F13/32, F24F13/08

Language of the proceedings: EN

Title of invention:
Fan supporting structure for climate control machines with
underfloor air flow

Patent Proprietor:
VERTIV S.R.L.

Opponent:
Hiref S.p.A.

Headword:

Relevant legal provisions:
EPC Art. 54, 56

Keyword:

Novelty - (yes) - main request (yes) - implicit disclosure (no)
Inventive step - (yes) - problem and solution approach - main
request (yes)

Decisions cited:

T 0939/92

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 2032/18 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 12 May 2022

Appellant: Hiref S.p.A.
(Opponent) Viale Spagna 31/33
35020 Tribano (PD) (IT)

Representative: Zamprogno, Bruno
STUDIO TORTA S.p.A.
Via Viotti, 9
10121 Torino (IT)

Respondent: VERTIV S.R.L.
(Patent Proprietor) Via Leonardo Da Vinci 16-18
35028 Piove Di Sacco (PD) (IT)

Representative: Modiano, Micaela Nadia
Modiano & Partners
Via Meravigli, 16
20123 Milano (IT)

Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 21 June 2018
rejecting the opposition filed against European
patent No. 2587175 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman C. Herberhold
Members: R. Baltanás y Jorge
D. Prietzel-Funk

Summary of Facts and Submissions

- I. European patent No. 2 587 175 relates to a fan supporting structure for climate control machines with underfloor air flow.
- II. An opposition was filed against the patent based on Article 100(c) EPC and Article 100(a) EPC with Articles 54 and 56 EPC.
- III. The appeal lies from the decision of the opposition division to reject the opposition.

The opponent ("appellant") filed an appeal against the above-mentioned decision of the opposition division.

- IV. Oral proceedings were held on 12 May 2022.
- V. Requests

The appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed or that the patent be maintained in amended form on the basis of one of the first to third auxiliary requests submitted with the letter dated 23 February 2022.

VI. Claim 1 as granted, including the numbering of its features as adopted by the Board, reads as follows:

- 1.1 *A fan supporting structure (10)*
- 1.2 *for climate control machines with underfloor air flow, said climate control machines (11) comprising a cabinet (12) with one or more air intake grilles (13), inside which there are heat exchange means (14)*
- 1.3 *below which, supported by a corresponding supporting frame (15), there are two or more fans (16, 17)*
- 1.4 *adapted to draw air from the overlying cabinet and to propel it into the space (18) below a raised floor (19),*
- 1.5 *said fan supporting structure comprising a partition (20) interposed on said supporting frame (15) between two adjacent fans (16, 17)*
- 1.6 *and being characterized in that it has a substantially S-shaped profile with respect to a sectional plane that is perpendicular to the rotation axis of a fan and is designed to divide the air flows among the fans and guide them toward the outside of the supporting frame (15).*

VII. State of the art

The following documents have been cited, both in the grounds of appeal and during the opposition proceedings, and are relevant for this decision:

- D1: US 5,277,547 A
- D2: US 957,607 A
- D3: US 2005/0088818 A1
- D4: US 2010/0041327 A1

VIII. The appellant's arguments can be summarised as follows.

Interpretation of claim 1

The following interpretation of claim 1 was provided in the statement setting out the grounds of appeal.

Claim 1 had to be interpreted such that the supporting frame did not form part of the claimed fan supporting structure since the supporting frame belonged to the climate control machine and not to the claimed device. This interpretation was confirmed by paragraphs [0020] and [0033] of the patent specification, which listed the elements of the climate control machine - including the supporting frame - and disclosed that the fan supporting structure could be installed on conventional underfloor climate control machines.

Claim 1 had to also be interpreted in a way in which features 1.2 ("for climate control machines...") and 1.4 ("adapted to draw air from the overlying cabinet and to propel it into the space below a raised floor") were only considered as limiting the intended use to the function of the S-shaped partition, i.e. to it being designed to be placed between two adjacent fans.

Novelty

In view of the interpretation of claim 1 proposed in the statement setting out the grounds of appeal, each of D1, D2 and D3 disclosed the subject-matter of the invention since each of them disclosed a fan supporting structure comprising an S-shaped partition intended to be placed between two adjacent fans. D1 disclosed such an S-shaped partition (2) between two fans (1, 1') in

Figures 1, 2, 3, 6 and 7 which was designed to divide the air flows. D2 likewise disclosed a fan supporting structure ("casing a") comprising partition plates (n) placed between two adjacent fans (c) as shown in Figures 1 and 3 to divide the air flows (see page 1, lines 62 to 69). Finally, D3 disclosed a fan supporting structure ("housing 1") comprising also an S-shaped partition ("S-shaped partition device 4") arranged between two adjacent fans (2, 3) to divide the air flows (paragraph [0017] and Figure 3).

Even if the proposed interpretation of claim 1 were not accepted, D1 disclosed a motor fan unit suitable for climate control machines with underfloor air flow. Figures 2, 9b and 10 showed that the shroud 3 was coupled to the motor since the whole ensemble was built as a modular unit. This was confirmed by column 1, lines 6 to 8 and by the list of figures, which consistently disclosed the ensemble as a unit with all elements being connected. The skilled person thus clearly and unambiguously understood that the shroud and the motor were connected. Consequently, the shroud 3 was part of a supporting frame in the sense of claim 1, such that the rectifying plate 2 corresponded to the partition of feature 1.5.

Inventive Step

Firstly, it was not plausible that the technical effect was achieved across the whole scope of claim 1 due to the different embodiments encompassed by the definition of the S-shaped partition, some of which resulted in obstructions of the output air flow. This implied that claim 1 had to be considered to lack an inventive step in accordance with T 0939/92.

Moreover, the subject-matter of claim 1 was obvious in view of the combination of D4 and D1. The invention of claim 1 differed from D4 in feature 1.6 (S-shaped profile to divide the air flows). The technical effect of the differentiating feature was that the air flow of each fan was guided in a precise way towards the outside of the supporting structure. Two interrelated technical problems had to be considered, namely reducing the turbulence and noise generated by the air flows. The skilled person would have found a solution in D1, which presented eight equally likely embodiments solving this problem, five of which corresponding to an S-shaped partition. In accordance with T 1045/12, Reasons 4.7.7 and the Guidelines for Examination, inventive step could be denied if the application of the teaching according to only some of such equally likely embodiments fell under the definition of the claim. Even if the air flow produced by the fans of D1 was axial instead of radial, the skilled person would have taken D1 into consideration since the solution worked equally well in radial air flow fans. The skilled person would have considered the partition in isolation from the shroud of D1 since no function was disclosed for this last element. In fact, D1 comprised only marginal references to the shroud.

As explained in the written proceedings, other lines of attack starting from D4 as the closest prior art in combination with the common general knowledge of the skilled person evidenced by D2 or D3 demonstrated the lack of inventiveness of the claimed invention.

D2 belonged to the field of "fan systems" and taught the use of S-shaped partitions between two fans "to improve dynamics between fans". The use of S-shaped partitions for this purpose was thus known for a long

time, and the skilled person would consequently have thought of shaping the flat partition plate of D4 as an S-shaped element by making use of their common general knowledge proven by D2.

Similarly, D3 showed that the skilled person was aware of the fact that S-shaped partitions belonged to the common general knowledge of the skilled person in the field of fan systems in general.

IX. The respondent's arguments can be summarised as follows.

Interpretation of claim 1

The feature "supporting frame" belonged to the claimed fan supporting structure since the fans were supported by this supporting frame according to feature 1.3. Any other interpretation of claim 1 was illogical and made no technical sense.

Furthermore, the claimed device had to be suitable for drawing air from the overlying cabinet and propelling it into the space below a raised floor (see feature 1.4). Also, according to feature 1.2, it was to be used in a climate control machine with underfloor air flow.

Novelty

None of D1, D2 and D3 disclosed all the features of claim 1 when interpreted in a way which made technical sense.

In D1, there was no direct and unambiguous disclosure of a connection between the shroud and the motor of the motor fan unit such that the shroud was not inherently

part of a supporting frame in the sense of claim 1. The device of D1 concerned the automotive industry, and there were different options for the connection of such a shroud and fan motors to the structure of a car. For instance, they could be separately connected to the chassis of the car, independently from each other, or the shroud could be attached to the radiator or condenser. In view of the plurality of options available and the lack of information in D1, a connection between the shroud and the motor was neither implicitly nor explicitly disclosed. Considering such a connection inherently present did not satisfy the "gold standard" regarding disclosure. The fans of D1 were supported by the shafts of the motors, and this was indeed the only supporting frame disclosed in this document. Since such a "supporting frame" did at least not comprise a partition interposed on it between the fans, D1 did not disclose feature 1.5.

The compound centrifugal blower of D2 took air from below and above the fans (c) to generate an air flow. This was incompatible with the intended use of the claimed device as defined in feature 1.4 (drawing air from the overlying cabinet and propelling it into the space below a raised floor). Therefore, the device of D2 was unsuitable for the claimed purpose.

In D3, the gravity-operated shutter (6) was incompatible with the claimed use in a climate control machine as defined in feature 1.2 for performing the function defined in feature 1.4 since it did not allow for normal operation of the fans when the device of D3 was mounted on a climate control machine. Consequently, the device of D3 did not disclose a fan supporting structure according to claim 1.

Inventive Step

The skilled person would not have arrived at the invention in view of the available prior art.

Concerning the proposed combination of D4 and D1, the skilled person starting from the teaching of D4 had no motivation to look for a solution to the proposed technical problem since D4 considered the problem solved by the straight partitions it used. Furthermore, D4 concerned radial air flow fans, whereas D1 provided a solution for axial air flow fans, D1's teaching thus not being directly applicable to the device of D4. Even if the skilled person took it into account, they would have also recognised the importance of the shroud in D1 for guiding the air flow axially and would have integrated the fan only in combination with the shroud into the climate control machine of D4. This was, however, inconsistent with the flow path in D4 (see e.g. Figure 16).

Concerning the combination of D4 with D2, the provision of the casing (a) from D2 in the climate control machine of D4 would result in impaired operation since the casing (a) comprised air intake openings on both sides, and air would be drawn from both the upper (cooler side) and the lower (underfloor space) side of the fan.

The combination of D4 with D3 would require major modifications in the device disclosed in the latter. Firstly, the fan module (9) of D3 would have to be arranged in a different, upturned position, with the bottom air inlets (121, 122) facing upwardly. A further modification would then be needed to overturn the

second backflow prevention shutter (6), which was gravity actuated, to allow proper operation when the housing was overturned.

Reasons for the Decision

1. Interpretation of claim 1

The Board disagrees with the interpretation of claim 1 proposed by the appellant in its statement setting out the grounds of appeal.

While it is true that the claimed device does not define a climate control machine but a fan supporting structure suitable for use with a climate control machine as defined in feature 1.2., claim 1 must be interpreted in a way which makes technical sense. For this, the relationship between the features of claim 1 must be taken into account.

Feature 1.1 defines the claimed device as a "fan supporting structure". Thus, the invention concerns a support means for the fans, and the elements of claim 1 playing a role in that function must be interpreted as being part of the claimed device.

The only element of claim 1 which plays a role in supporting the fans is the supporting frame defined in feature 1.3, which explicitly defines that the fans are supported by the supporting frame. Excluding the feature "supporting frame" from the subject-matter of the claimed fan supporting structure would result in the claimed supporting structure lacking any means of

support for the fans. This would not be logical and not make technical sense.

Consequently, the Board considers the subject-matter of claim 1 to be a device comprising features 1.1, 1.3, 1.5 and 1.6 suitable for mounting under a climate control machine as defined in feature 1.2 to perform the function defined in feature 1.4.

The intended use in feature 1.4 cannot be considered limited to the function of the S-shaped partition, i.e. to it being designed to be placed between two adjacent fans. The claimed device is defined as being suitable for use with the climate control machine defined in feature 1.2 to perform the function defined in feature 1.4. Consequently, the inherent limitations implied by this suitability must be taken into account when considering the prior art. The fan supporting structure must be suitable to work with a climate control machine with underfloor air flow comprising the characteristics of feature 1.2 and to draw air from the overlying cabinet of the climate control machine and propel it into the space below a raised floor (i.e. the function defined in feature 1.4) when working in combination with the climate control machine of feature 1.2

2. Novelty - Article 54 EPC

2.1 D1

The appellant argued that D1 directly and unambiguously disclosed a connection between the shroud 3 and the motor of the motor fan unit, such that the shroud (to which the rectifying plate is connected) was considered part of a supporting frame in the sense of claim 1.

This is not persuasive.

The figures of D1 are schematic and therefore not conclusive about the relationship between the shroud 3 and the motor(s) of the fan(s). In fact, the figures do not show or make reference to any motor. Even if some motor means must be present in the device of D1 - which is defined as a "motor fan unit" - this document focuses on the guidance of the air flow, and it could well be that, while referring to a **functional** unit which comprises a motor means, this motor means is not even represented in the figures. Even if the motor were hidden behind the shroud in Figures 2, 9b and 10, this would not automatically amount to a necessary connection of the motor and the shroud, particularly in view of the large opening in the shroud facing the fan (see e.g. Figures 1 and 9a).

The invention of D1 (lines 6 to 8 of column 1) is "*a motor fan unit incorporated in a cooling system such as a radiator or a condenser for automobiles*". The list of figures is consistent with this definition, and lines 62 to 63 of column 1 state that Figure 1 shows "*a motor fan unit of one preferred embodiment of the present invention*". However, the same remarks as for the figures apply in this case: there is no doubt that D1 discloses a **functional** unit in which a motor and a fan are associated and arranged in cooperation with a shroud, but this does **not inherently** imply a monobloc construction of the ensemble or a particular connection between the motor and the shroud. The only details about a connection among elements of the embodiment concern the fans and the motor shafts on which they are mounted (see column 1, lines 37 and 38 or column 2, lines 24 to 26). The document is silent about the fixation of the shroud, let alone any connection to the

motor which would imply that the shroud was part of a "supporting frame".

Even if it can be accepted that all elements in a car are in some way directly or indirectly connected to the superstructure of the vehicle, such a "supporting frame" (in the sense of the claim) formed by the chassis and all intermediate connecting elements would render the device of D1 unsuitable for the claimed purpose of use in a climate control machine.

In view of the above, claim 1 differs from the device shown in D1 at least in feature 1.5 since the partition 2 ("rectifying plate") is not clearly and unambiguously disclosed as being interposed on the "supporting frame".

2.2 D2

Document D2 discloses a compound centrifugal blower for use in smithies (page 1, lines 6 to 14). The compound centrifugal blower comprises a casing "a" with circular apertures "b" on both its opposite sides which are the intake openings for the air.

The compound centrifugal blower of D2 thus takes air from below and above the fans "c" to generate an air flow.

The Board agrees with the respondent that this is incompatible with the intended use of the claimed device as defined in feature 1.4 (drawing air from the overlying cabinet and propelling it into the space below a raised floor) to such an extent that it renders the device of D2 unsuitable for the claimed purpose.

Indeed, if the compound centrifugal blower of D2 were installed below a climate control machine as defined in feature 1.2, it would only partially draw air across the upper heat exchange means and would recirculate air in a constant manner from the lower side, thus resulting in unacceptable performance.

Thus, at least features 1.2 and 1.4 are not disclosed in D2.

2.3 D3

The opposition division considered that a modification or replacement of the gravity-operated shutter 6 of D3 was needed if the device were to be mounted in a climate control machine as defined in feature 1.2 to perform the function defined in feature 1.4.

The Board agrees with these considerations. Consequently, D3 does not disclose a fan supporting structure suitable to be used with the defined climate control machine in the way defined (features 1.2 and 1.4).

2.4 To conclude, the subject-matter of claim 1 is novel with regard to each of D1, D2 and D3.

3. Inventive Step - Article 56 EPC

3.1 "Plausibility"

The appellant argued that the technical effect was not plausibly reached over the whole scope claimed because there were embodiments of S-shaped partitions resulting in obstructions of the output air flow. Thus, in

accordance with T 0939/92, an inventive step could not be acknowledged.

The Board does not accept this argument.

According to claim 1, feature 1.6, the S-shaped profile must have the functionality of separating the air flows produced by the adjacent fans and guiding them toward the outside of the supporting frame (i.e. the claim defines the means as well as its function). An S-shaped profile obstructing the output air flow does not fall under the claim and thus cannot raise concerns as to its technical effect not being achieved.

3.2 D4 in combination with D1

3.2.1 Document D4 discloses a fan-supporting structure for climate control machines (300) with underfloor air flow (see Figure 14) comprising a cabinet (306) with one or more air intake grilles (see Figure 14), inside which there is a heat exchange means (Figure 4, 408a, 408b) below which, supported by a corresponding supporting frame (Figure 14, 1404, 1414), there are two or more fans (1412) adapted to draw air from the overlying cabinet (306) and to propel it into the space below a raised floor (see Figure 14), the fan supporting structure comprising a partition (Figure 3, 304a, 304b) interposed on the supporting frame (1404, 1414) between two adjacent fans (1412).

This is not contested by the respondent.

3.2.2 Claim 1 differs from D4 in feature 1.6 (S-shaped profile to divide the air flows).

The technical effect of the differentiating feature is that the air flow of the fans is divided and guided toward the outside of the supporting structure in an optimised way.

The objective technical problem addressed by the invention can thus be defined as reducing the turbulence between two adjacent fans and optimising their performance (patent, paragraph [0014]).

The appellant argues that two technical problems should be considered, namely reducing the turbulence and noise generated by the air flows. Since noise is a consequence of turbulence, this formulation is equivalent to the one defined by the Board.

- 3.2.3 The Board cannot agree with the argument of the respondent as to the lack of a motivation for the skilled person to consider the posed technical problem. The respondent argued that a suggestion towards this technical problem would need to be present in D4 for the skilled person to take it into consideration. Since D4 actually stated that the technical problem was satisfactorily addressed by the solution provided in this document (see last two sentences of paragraph [0067]), the skilled person would have never thought that this technical problem deserved any consideration.

If this approach were to be followed, explicit acknowledgement of a disadvantage in the closest prior art would be needed to justify an inventive-step objection. Such explicit acknowledgement is not only rarely found in prior-art documents, the approach proposed by the appellant is not in line with the problem/solution approach, in which the objective technical problem is to be derived from the

distinguishing features. The problem solved by these features and their effect is the one to take into account, not a problem acknowledged in the closest prior-art document.

In this case, the skilled person starting from D4 would thus consider the objective technical problem of reducing the turbulence between two adjacent fans and optimising their performance, even if reducing turbulence and optimising performance had been addressed in D4.

- 3.2.4 The Board agrees with the appellant that since the technical problem relates to the air flow optimisation of fans in a heat exchange system, the skilled person would consult prior art in the general technical field of fans for use in similar heat exchange systems.

However, the starting point, D4, uses **radial** air flow fans (see Figure 16). The skilled person is aware of the turbulence caused by two contiguous radial air flow fans. They would therefore look for a solution to the posed technical problem in documents dealing with devices suffering from the same kind of turbulence.

In contrast, D1 concerns only **axial** air flow fans (see column 2, lines 24 to 27; Figure 2 and claim 1). The skilled person knows that turbulence caused by two contiguous axial air flow fans is different to that in D4, and would therefore have no incentive to take D1 into consideration.

- 3.2.5 Moreover, D1 discloses a solution to the problem of turbulence in axial air flow fans based on the provision of a rectifying plate in combination with a shroud. The skilled person understands that the shroud

plays an essential role in ensuring the axial air flow which the fans of D1 must provide and that the shroud necessarily has an influence on turbulence and on the effect of the rectifying plate. They would thus consider the shroud an essential part of the air guiding structure of D1 which could not be simply omitted.

Thus, D1 provides an incentive to use the combination of axial air flow fans, shroud and rectifying plate to minimise turbulence. The skilled person would, however, not contemplate integrating such a solution in the climate control machine of D4 since the axial air flow fans of D1 do not provide the air flow in the direction required by D4 (see Figure 16 of D4) and the skilled person would have to modify the device of D4 - which comprises a more or less open framework structure surrounding the cabinet and the fans - to provide the air guiding shroud of D1. Such necessary modifications are not straightforward and require the exercise of inventive skill. This argument applies to all the eight embodiments for the rectifying plate suggested in D1.

- 3.2.6 Consequently, the combination of D4 and D1 does not lead the skilled person towards the invention.
- 3.3 D4 in combination with common general knowledge as proven by D2
 - 3.3.1 Firstly, a patent document cannot be taken in general as evidence of common general knowledge. Thus, the mere disclosure of S-shaped partitions in D2, irrespective of its publication date, cannot establish that their use for reducing turbulence between two adjacent fans is to be considered to form part of the common general

knowledge. Thus, the argument about a combination of D4 with the common general knowledge is not persuasive.

- 3.3.2 Considering the disclosure of D2 by itself does not result in a different conclusion on the inventiveness of the claimed invention.

D2 discloses a partition in combination with a casing "a". In view of the considerations in point 3.2.5 above (with respect to the shroud of D1) and the presence of the circular openings "b" on both sides in the casing "a" of D2, the skilled person would not consider integrating the teaching of D2 in the climate control machine of D4 given the complexity of it and the poor resulting performance due to recirculation (see point 2.2 above).

Furthermore, D2 does not refer to the objective technical problem apart from a vague statement about the general aim of the invention in the context of generating a unidirectional air flow within a casing (see page 1, lines 62 to 70). The skilled person would thus have no reason to believe that the S-shaped partitions "n" of D2 address the objective technical problem better than the straight partitions of the starting document.

- 3.3.3 Consequently, the subject-matter of claim 1 involves an inventive step with regard to the combination of D4 with the common general knowledge allegedly proven by D2 or D2 itself.

- 3.4 D4 in combination with common general knowledge as proven by D3

- 3.4.1 D3 is also a patent document, and the same observations made in point 3.3.1 above apply. The line of attack based on the common general knowledge allegedly proven by D3 must thus fail.
- 3.4.2 Similarly, the disclosure of D3, taken by itself, does not lead to a different conclusion.

D3 is mainly concerned with the prevention of air backflow and does not mention the role of the S-shaped partition in addressing the posed objective technical problem. The skilled person would thus not even consider D3 when looking for a solution to the objective technical problem, in particular in view of the much smaller size of the fan supporting structure and its intended use of "dissipating heat in a computer" (see paragraphs [0002] and [0004]).

Moreover, as was mentioned in point 2.3 above - and also in view of the presence of the housing 1 playing an important role in the air flow direction - the skilled person would need to carry out a number of substantial modifications to combine the teaching of D3 with the climate control machine of D4.

Consequently, the combination of D4 and D3 cannot put into question the inventive step of the invention.

- 4. In view of the above, there is no reason to set aside the contested decision.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



C. Spira

C. Herberhold

Decision electronically authenticated