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D E C I S I O N
of 31 August 2000

Case Number: T 0969/97 - 3.2.4

Application Number: 91870106.1

Publication Number: 0465454

IPC: A47L 15/00

Language of the proceedings: EN

Title of invention:
Method and spray head for atomizing a concentrated liquid product

Patentee:
EPENHUYSEN CHEMIE N.V.

Opponent:
Henkel KGaA
Diversey Corporation

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - main request - yes"

Decisions cited:
-

Catchword:
-

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Case Number: T 0969/97 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 31 August 2000

Appellant: (Opponent I)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 16 July 1997 rejecting the oppositions filed against European patent No. 0 465 454 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: C. A. J. Andries
Members: M. G. Hatherly
R. E. Teschemacher

Summary of Facts and Submissions

I. The decision of the opposition division to reject the oppositions against European patent No. 0 465 454 was posted on 16 July 1997. On 16 September 1997 the appellant (opponent I) filed an appeal against this decision and paid the appeal fee. The appellant filed the statement of grounds of appeal on 19 November 1997.

II. Claim 1 as granted reads:

"A method for atomizing a concentrated liquid product over an object by means of a spray head (1), wherein said product is led to a first outlet (13) of the spray head and a pressurized gas is led to a second outlet (9) of the spray head, said first and second outlet being arranged in such a manner that the product leaving the first outlet is taken up and atomized by said gas leaving said second outlet, characterized in that a product having an active agent content of at least 30 percent by weight, is used as the product and the gas is sprayed out through the second outlet, which is slit-shaped, in a fan-shaped spray pattern."

Claim 6 as granted reads:

"A spray head for atomizing a concentrated liquid product, comprising a first (4) and a second (7) inlet for supplying respectively said product and a pressurized gas, which first and second inlet are connected respectively through a first (12) and a second (11) channel to respectively a first (13) and a second (9) outlet, said first and second outlets being arranged in such a manner that the product leaving the first outlet is taken up and atomized by said gas

leaving said second outlet, characterized in that the first inlet is provided for supplying said product under pressure and in that the second outlet is slit-shaped and provided for spraying the gas in a fan-shaped pattern out of the spray head, with the outlet opening of said first outlet being smaller than 4 mm^2 and said second slit-shaped outlet has a width of up to 1 mm at the most."

Claim 13 as granted reads:

"Use in an atomising device of a spray head (1) as defined in anyone of the claims 6 to 12, the method as defined in claim 1 being applicable with said atomizing device."

Claim 14 as granted reads:

"A dishwashing machine comprising at least a main wash zone, an after-rinse zone and a drying zone, said dishwashing machine being provided with at least one spray head (1) according to anyone of the claims 6 to 12, said spray head being mounted in said main wash zone."

III. The following documents were considered in the appeal proceedings:

D1: EP-A-0 282 214

D3: FR-A-377 864

D7: US-A-1 888 791

D8: US-A-4 046 321

D9: US-A-2 960 064

D15(1) Industrial Catalog 27 of Spraying Systems Co., Wheaton, Illinois, USA entitled "Spray nozzles and accessories", 1978, page 51

D15(2) Drawing 10616 of Spraying Systems Deutschland GmbH, Hamburg, Germany, dated 8-4-80

D15(3) Data Sheet 10616-1 of Spraying Systems Deutschland GmbH, Hamburg, Germany, no date, "EXAMPLE : AIR CAP NO. 200278-45°"

D16: Ullmanns Encyklopädie der technischen Chemie, 4th edition, volume 15, Verlag Chemie, Weinheim, New York, 1978, pages 592 to 596 and 655

D17: Sketch of a dishwashing machine

D18: Ullmanns Encyklopädie der technischen Chemie, 4th edition, volume 2, Verlag Chemie, Weinheim/Bergstr., 1972, pages 256 and 257

D19: Catalogue, Spraying Systems M 27 G, pages 1, 4, 36, 37, 45, 46 and 50 to 52

D20: Letter of 28 July 1997 from Ernst Schrader of Spraying Systems Deutschland GmbH to Mr Rings of Henkel-Ecolab

D21: Part of D15(2), with added reference numerals

D22: As D15(3), with added reference numerals

D23: Sketch of spray patterns

D24: DE-A-3 707 366

IV. Oral proceedings took place on 31 August 2000, attended by the appellant and the respondent (proprietor). Although duly summoned, the party as of right (opponent II) did not attend the oral proceedings which, in accordance with Rule 71(2) EPC, took place without him.

V. In the appeal proceedings the appellant argued that there was no technical difference between active and inactive agents in the patent unless commercial dishwasher cleaning formulations were concerned. He considered that the subject-matter of all the granted claims was not novel or not inventive over the prior art.

In the appeal proceedings the proprietor countered the appellant's arguments.

The party as of right did not comment in the appeal proceedings.

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

The respondent's main request was that the appeal be dismissed (i.e. maintenance of the patent as granted). Alternatively, it was requested that the patent be maintained on the basis of one of the sets of claims submitted as the first to the eighth auxiliary requests during the oral proceedings.

The respondent withdrew the objection in his letter of 8 May 1998 to the admission of documents D16 to D24

into the proceedings and his request in the same letter to refer the case to the first instance.

There were no requests in the appeal proceedings from the party as of right.

Reasons for the Decision

1. The appeal is admissible.

2. *Interpretation of the granted claims 1 and 6*

2.1 Both these claims refer to a concentrated liquid product which, according to the granted claim 1, has an active agent content of at least 30 percent by weight.

While not objecting to these features where dishwasher detergents are concerned (as in the granted claim 5), the appellant argues that the features could also be, for example, the water sprayed by the nozzle of D7, the palm oil sprayed by the nozzle of D9 and molten metal. He adds that, as the last paragraph of page 593 of D16 states that all paint components have particular functions, all the components of the paint atomised in D3 are active components.

As the respondent maintains that the features in the claims cover even products with 100% active agent and as it is clear that an agent can be active for one purpose but inactive for another, the board cannot see how the features restrict the claims.

Accordingly the board will examine whether the subject-matter of these claims is patentable when these

statements are ignored.

2.2 The appellant argues that mixing of the product and the pressurized gas either outside or inside the spray head falls within the scope of the granted claims 1 and 6.

2.2.1 The granted claim 1 states that "said product is led to a first outlet (13) of the spray head and a pressurized gas is led to a second outlet (9) of the spray head, said first and second outlet being arranged in such a manner that the product leaving the first outlet is taken up and atomized by said gas leaving said second outlet".

Thus it is clear from the granted claim 1 that only product leaves the first outlet and only gas leaves the second outlet. The product and the gas mix outside the outlets and, as these two outlets are specified to be outlets of the spray head, the outlets must be located on the exterior of the spray head. Thus mixing must take place outside the spray head.

2.2.2 The granted claim 6 refers to "said first and second outlets being arranged in such a manner that the product leaving the first outlet is taken up and atomized by said gas leaving said second outlet".

Thus again it follows from the granted claim 6 that only product leaves the first outlet, that only gas leaves the second outlet, and that the product and the gas mix outside the outlets. As the "the second outlet is ... provided for spraying the gas ... out of the spray head" the mixing of product and gas must take place outside the spray head.

2.2.3 Thus, as confirmed by the respondent, the granted claims 1 and 6 are limited to the product and gas being mixed outside the spray head.

3. *Novelty - the granted claims 1 and 6*

3.1 D7

3.1.1 D7 discloses a machine for spraying water onto glassine webs. Water jets are provided by openings 1, 2 and 3 while air jets are provided by openings 4, 5 and 6 (see the Figures and page 1, lines 62 to 64 and 71 to 73).

3.1.2 Claim 1 of D7 refers to "the discharge openings of the liquid jets being arranged outside of the air columns of the air jets to cause the latter to oppose the flow of the liquid jets and create uniform impedance thereto" while claim 3 adds that "liquid is distributed to a plurality of discharge points by discharging it under pressure against a uniform back pressure set up by a blast of air."

Moreover, lines 89 to 93 of page 1 of D7 state that "the liquid jet tube should not enter the air jet because if it did it would produce a swirling action that would not exert back pressure but would exert a suction effect."

Lines 10 to 14 of page 2 of D7 remark that "the columns of the air jets uniformly impede the flow of the water jets but whether the retarding effect on the water jets be regarded as back pressure or impedance is not important."

Finally, lines 73 to 76 of page 2 add that "the air jet

impedes the progress of the liquid jet and causes no sucking effect at the nozzle from which the liquid jet is discharged."

3.1.3 Both the granted claims 1 and 6 specify that "the product leaving the first outlet is taken up and atomized by said gas leaving said second outlet". However it can be seen from the passages cited in the above section 3.1.2 that D7 makes no mention of atomisation of the water by the air and indeed implies that the air, instead of taking up the water from the openings 1, 2 and 3, impedes its discharge. This should create a more uniform dividing of the supply of liquid under pressure over the different liquid outlet openings.

Furthermore the appellant was unable to point to a clear and unequivocal teaching in D7 of the liquid product leaving the outlet being taken up and atomized by the gas leaving the respective outlet.

3.1.4 Thus the subject-matter of each of the granted claims 1 and 6 is not disclosed by D7.

3.2 D9

3.2.1 Figure 3 of D9 shows a nozzle that "comprises a nozzle plate 10 located vertically between two support plates 11, 12", see column 2, lines 16 to 18. This nozzle corresponds to the spray head of the present invention. Pressurized air passes from aperture 13 on Figure 4 (although wrongly numbered, the Figure to the left of Figure 3 will continue to be called Figure 4) through throat 14 at high velocity to meet and atomise palm oil discharged from a passage 24, the resultant mixture

being "blown from the nozzle in the form of a mist, the jet being defined by the divergent sides 16[a], 16[b] of the mouth 15 to form a fan-shaped spray", see column 2, lines 42 to 61.

3.2.2 The aperture 13, throat 14 and passage 24 are not outlets of the nozzle because they are located within the nozzle which, as explained above, is bounded by the support plates 11 and 12. Thus the mixing of air and palm oil takes place inside the spray head not outside. The air and the palm oil leave the spray head together, through the same exit 15 (which is the only outlet of the spray head).

3.2.3 Thus, in view of sections 2.2.1 to 2.2.3 above, the subject-matter of each of the granted claims 1 and 6 is not disclosed by D9.

3.3 D15(1) and D19

3.3.1 The board sees no reason to doubt the statement in D20 that D19 was publicly available before the present priority date. D23, based on dimensions given for spray set-ups in D15 and D19, plays no role in the following analysis.

3.3.2 Page 51 of D15(1) and the corresponding page 51 of D19 show spray set-ups for external mixing, e.g. spray set-up no. E15 comprises a fluid cap 2850 and an air cap 67228-45°. It can be derived from D15(3) or the corresponding D22 that this air cap 67228-45° has two round air orifices at the sides. Thus, contrary to what is laid down in the granted claims 1 and 6, the air cap 67228-45° does not have a gas outlet which is slit-shaped. Furthermore, none of the other air caps on this

page 51 has a slit-shaped gas outlet.

3.3.3 The spray set-up 14 on page 50 of D19 has an air cap 73320 which can be seen from the picture "Flachstrahl-Luftdüsen" and from D15(2) or the corresponding D21 to have a slot. However this page 50 deals with mixing inside the nozzle, i.e. the liquid and gas leave the nozzle together through the slot. This differs from the granted claims 1 and 6 which are restricted to external mixing and to only the gas leaving the slit-shaped outlet.

3.3.4 Thus D15(1) and D19 do not disclose the subject-matter of either of the granted claims 1 and 6.

3.4 Thus these prior art documents do not disclose all the features of either claim 1 as granted or claim 6 as granted. Moreover the board does not see that any other prior art document in the file that is novelty destroying.

Thus the subject-matter of the granted claims 1 and 6 is novel within the meaning of Article 54 EPC.

4. *Closest prior art, problem and solution*

4.1 Various starting points have been mooted for assessing inventive step. Basically the problem arising from each of these starting points is to spray in a different way. The solution presented by the present invention is based on the design of the nozzle and the way it is used.

4.2 The opposition division considered the closest prior art to be the atomiser of D3 which has the features of

the pre-characterising portion of each of the granted claims 1 and 6. The solution to the problem arising from this prior art atomiser is basically that the outlet for the gas is slit-shaped and, as specified in the granted claim 1 ("the gas is sprayed out through the second outlet ... in a fan-shaped spray pattern") and in the granted claim 6 ("spraying the gas in a fan-shaped pattern out of the spray head"), produces a fan-shaped spray pattern for the gas already on leaving the slit, see column 7 lines 19 to 21 ("The pressurized gas escapes ... in a fan-shaped way out of the slit 9").

As indicated in column 2, lines 1 to 11 of the granted patent, by this kind of spraying "a gas flow is created over a sufficiently large surface around the second outlet so that the concentrated product, which flows out of the first outlet, is taken up and mixed well there into the gas flow."

4.3 If one starts from other prior art apparatuses and methods then obviously the problem and solution will be formulated in slightly different ways.

5. *Inventive step*

5.1 The board will take the various suggested starting points in numerical order.

5.2 D1 concerns spraying aqueous cleaning formulations containing active agents up to perhaps 30 % by weight although the critical factor is that the formulation remains flowable, see column 2, lines 20 to 26. The board remarks here that, although column 4, lines 3 to 11 specifies a highly concentrated product, there is no disclosure that this product is sprayed at the

manufactured concentration, indeed it seems from column 4, lines 13 to 15 lines that it is diluted for spraying.

5.2.1 No details are given in D1 of the nozzles used to spray these formulations. The appellant maintains that spraying would be as shown in the sketch D17 where highly concentrated cleaning fluid from container 5 is diluted with water and sprayed from a spray arch 8. However, as D17 does not disclose or even hint at the use of air in the spraying or a slit-shaped outlet to the spray arch 8, it is irrelevant whether D17 shows a prior art machine or not because in any case the arrangement shown could not lead the skilled person starting from D1 any closer to the present invention.

5.2.2 Since D1 gives no nozzle details, the skilled person would look in the prior art for a suitable nozzle.

5.2.3 He might well consider the nozzles shown on page 51 of D15(1) or D19 because these are stated to be "Especially effective for higher viscosity liquids and abrasive suspensions." However, while these nozzles mix externally and produce a flat spray pattern, the air outlets are shown in D15(3) to be round not slit-shaped.

While the nozzles on page 50 of D19 have a slit-shaped outlet, they mix internally so that the slit-shaped outlet carries both the air and the liquid. Thus, contrary to the present invention, the product is not taken up and atomized by the gas leaving the slit-shaped outlet because the product and gas have already met each other upstream of the slit-shaped outlet.

5.2.4 The board sees no reason why the skilled person should combine features of the external mixing nozzle of page 51 of D15/D19 with the internal mixing nozzle of page 50 of D19 - unless of course he knows of the present invention.

Furthermore it is clear to the person skilled in the art that fluid streaming and fluid spraying depend on each constructional feature being present. Replacing a feature in a well functioning entity by a feature from a different functioning entity would not be obvious unless there were convincing indications that the latter feature could contribute to a good streaming in its new surroundings. Such a change, purely for the sake of change and without guidance to make it, cannot support an argument of lack of inventive step.

5.2.5 Thus if the skilled person combined the teachings of D1 and D15/D19 he would still not arrive in an obvious way at the subject-matter of the granted claims 1 and 6.

5.3 The atomiser of D3 delivers product ("couleurs") and air through separate nozzles a and b.

5.3.1 There is no hint that the air nozzle b is slit-shaped or that it produces a fan-shaped spray pattern. Accordingly, to arrive at the present invention, the skilled person would need to exchange the air nozzle b for a nozzle with the specified shape that produces the specified spray pattern.

5.3.2 The board however sees no reason why he should do this. It would not be obvious to exchange the nozzles of D3 for either the external mix nozzles or the internal mix nozzles of D15/D19 because this would so completely

change the configuration of D3 that the skilled person would not have chosen D3 in the first place - he would have started from D15/D19. Moreover choosing either the external mix nozzle or the internal mix nozzle of D15/D19 would not yield the claimed invention, the skilled person would need to combine the two, something that the board does not consider to be obvious, see the above section 5.2.4.

5.4 It has been stated in the above section 3.1.3 that D7 makes no mention of atomisation of the water by the air and indeed implies that the air - instead of taking up the water from the openings 1, 2 and 3 - impedes it. The board thus sees no reason why the skilled person should start from this prior art method and machine if he wanted to atomise a liquid product.

5.5 D9

5.5.1 While the nozzle assembly of D9 produces a fan-shaped spray, as stated in section 3.2.2 above the nozzle assembly mixes internally so that the fan-shaped spray leaving the only outlet 15 is a mixture of product and air. There is no hint in D9 to change this nozzle assembly into one that mixes externally and even if the skilled person were to make use of D15/D19 he would still not arrive in an obvious manner at the claimed invention, see the above section 5.2.4.

5.5.2 The appellant suggested in the oral proceedings that the skilled person would start from the nozzle assembly of D9 and modify it using the teaching of D8. However the board considers the combination most unlikely since D9 deals principally with oiling while D8 deals with cleaning. Moreover the carrier "fluid" in D8 is clearly

meant to be liquid while both D9 and the invention employ a gas. Finally the combination could not yield the claimed subject-matter since the carrier fluid orifice 167 (see Figures 12 and 13 and column 8, lines 64 and 65) is nowhere disclosed as being slit-shaped.

5.6 The left hand half of Figure 4 on page 256 of D18 shows a two component spray nozzle which mixes liquid and gas exteriorly. As only one cross-sectional view is shown the skilled person would conclude that the nozzle is circular in cross section. The gas outlet is thus a single annular outlet, there is no reason to suppose that the Figure is depicting **two slit-shaped** gas outlets.

There is also no reason why the skilled person would be led to make the single gas outlet slit-shaped and he would be inhibited from doing this because he would see that the gas would then no longer envelop the liquid, departing thereby from the intended mixing and arriving at a completely different stream pattern.

5.7 The external mixing spray set-up no. E15 on page 51 of D19 would be an appropriate starting point for the present invention but to arrive at the claimed invention the skilled person would need to modify the external mixing nozzle by taking a part of the internal mixing spray set-up on page 50 of D19 which has a slotted air cap. However, as stated in the above section 5.2.4, the board sees no reason why the skilled person should combine parts of basically different designs of spray set-ups.

5.8 D24, the priority document for D1, also does not

disclose what nozzles are used to spray the highly concentrated cleaning solution. The above sections 5.2.1 to 5.2.5 apply analogously to D24.

5.9 Each of the inventive step arguments relies at least in part on it being known or obvious to provide a slit-shaped outlet for the gas which produces a fan-shaped spray pattern for the gas already on leaving the slit, see the above section 4.2. However the appellant has failed to satisfy the board on this point and so each of the inventive step arguments must fail. Even small changes in nozzle form can have great effects on fluid flow from the nozzle so it is insufficient to argue that slit-shaped outlets for nozzles are known per se and that it would thus be obvious to employ them wherever the skilled person might want to.

5.10 Thus the board cannot see that the prior art documents on file, on their own or in combination, could lead the skilled person in an obvious manner to arrive at the method specified in the granted claim 1 or the spray head specified in the granted claim 6.

6. The subject-matter of the granted independent claims 1 and 6 is thus patentable as required by Article 52 EPC. Their dependent claims 2 to 5 and 7 to 12 are also patentable.

The granted claim 13 is tied to the "Use ... of a spray head (1) as defined in anyone of the claims 6 to 12 ...". Since the subject-matter of each of the latter claims is novel and inventive, the granted claim 13 is patentable.

The granted claim 14 to a dishwashing machine is

patentable because the dishwashing machine must have "at least one spray head (1) according to anyone of the claims 6 to 12", all of which claims have novel and inventive subject-matter.

The patent may therefore be maintained unamended with the granted claims 1 to 14 (main request of the respondent).

7. Since the main request of the respondent can be granted there is no need to look at his auxiliary requests.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Magouliotis C. Andries