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Case Number: T 0755/05 - 3.3.05

Application Number: 00937051.1

Publication Number: 1185347

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Language of the proceedings: EN

Title of invention:
Separating apparatus and method of separating

Patentee:
ATLAS COPCO AIRPOWER N.V.

Opponent:
Jorc Industrial B.V.

Headword:
Separating/ATLAS COPCO

Relevant legal provisions:
EPC Art. 123(2)(3), 56

Keyword:
"Extension of the protection conferred: no"
"Inventive step: yes"

Decisions cited:
T 0582/91

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0755/05 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 2 August 2006

Appellant: (Opponent)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 24 May 2005 concerning maintenance of the European patent No. 1185347 in amended form.

Composition of the Board:

Chairman: M. Eberhard
Members: B. Czech
H. Preglau

Summary of Facts and Submissions

I. The appeal is from the decision of the opposition division concerning the maintenance of European patent No. 1 185 347 in amended form according to the main request filed during the oral proceedings before the opposition division.

II. Independent claim 1 of the patent as granted reads as follows (emphasis added by the board):

"*1. An apparatus for separating from a liquid mixture, first and second liquid components, wherein the first liquid component has a greater density than the second liquid component, the apparatus including a vessel (10) having an inlet (13) through which the mixture is introduced into the vessel (10), and an outlet (14) through which separated first liquid is in use discharged, and there being a separating member (12) within the vessel (10), the separating member (12) including a material which adsorbs the second liquid component the separating member (12) being adapted to move in the vessel (10) downwardly in response to an increase in the weight thereof as second liquid component is adsorbed, characterised in that the inlet (13) is positioned above the outlet (14), and the outlet (14) is positioned towards a bottom of the vessel (10), so that the mixture passes down through the* ***absorbing*** *separating member (12) and is constrained to contact the separating member (12), as it flows from the inlet (13) to the outlet (14).*"

In claim 1 according to the main request as maintained by the opposition division, the term "*a**b**sorbing*" is replaced by the term "*a**d**sorbing*".

Independent claim 10 according to the said request has the same wording as claim 10 as granted, and reads as follows:

"*10. A method of separating from a liquid mixture, first and second liquid components, wherein the first liquid component has a greater density than the second liquid component, the method including introducing the mixture into a vessel (10) through an inlet (13) which is positioned above an outlet (14) from the vessel, so that the mixture is constrained to pass downwardly through and into contact with a separating member (12) in the vessel (10), which member (12) includes a material which adsorbs the second liquid component, the method further including discharging from the vessel (10) through the outlet (14) thereof separated first liquid component, the separating member (12) being adapted to move in the vessel (10) downwardly in response to an increase in the weight thereof as second liquid component is adsorbed thereby, mixture being introduced into the vessel (10) until the separating member (12) has moved to a low position in the vessel (10).*"

III. The prior art documents cited by the opponent include the following:

D2: DE-U-90 04 019

D3: US-A-5 178 778

D4: EP-A-0 531 586

D5: US-A-3 794 583

D6: US-A-4 061 573

D7: GB-A-322 654

D8: US-A-5 145 586

D11: EP-A-0 190 425

D13: US-A-5 820 762

D14: commercial leaflet "ÖWAMAT®", Edition 3/99

The opposition division came to the conclusion that the amended claims according to the main request met the requirements of Articles 123(2) and (3) EPC, and that their subject-matter was novel and inventive.

IV. In its statement of grounds of appeal, the appellant raised objections under Articles 123(2) and (3) and 56 EPC. Concerning the alleged lack of inventive step, it presented detailed arguments based on a combination of D2 with D6. Additionally, it invoked combinations of D2 with each of D3, D4, D5, D8, D11, D13 and D14 in a more general manner. It filed a copy of a Dutch court decision, according to which the Dutch part of the European patent in suit was nullified, and a partial translation of the technical part of the decision into English. Finally, it generally referred to its earlier written submissions.

V. With its reply of 14 April 2006, the respondent filed different versions of amended claims as auxiliary requests 1 to 4. It considered that the claims of the patent as maintained by the opposition division met the requirements of Article 123(2)(3) EPC. The reply also included detailed discussions of all the combinations of documents invoked by the appellant having regard to inventive step.

VI. During the oral proceedings held on 2 August 2006, the appellant confirmed that it had no objections having regard to novelty. It presented for the first time the following further lines of attack on inventive step, which were not included in the grounds of appeal:
- the combination of D2 as closest prior art with the common general knowledge as illustrated by D3 to D8, D11, D13 and D14, and more particularly by D5;
- the combination of D6 as closest prior art with D2; and
- the combination of D5 as closest prior art with D2.

VII. The arguments of the parties can be summarised as follows:

The appellant argued that the incorporation, into claim 1 as granted, of only a part ("*outlet is positioned towards a bottom of the vessel*" but not "*inlet positioned above the separating member*") of the features of claim 3 of the PCT application WO-A-00/74809 in its published version amounted to an addition of subject-matter not allowable under Article 123(2) EPC. These features were originally contained in a single claim and hence technically linked and closely related. Moreover, the passage of the description of the said PCT application describing Figure 4 (page 9, second paragraph) confirmed that if the inlet was not positioned above the separating member as required by claim 3 of the PCT application, there was no downward flow of the mixture through the separating member as required by present claim 1. No other passage of the PCT application referred to embodiments wherein the said features were not present in combination.

The appellant had argued in writing that the PCT application related only to an a**d**sorbing separating member. Therefore, the reference to "*the a**b**sorbing separating member*" introduced into claim 1 during the substantive examination of the case amounted to an addition of subject-matter in the sense of Article 123(2) EPC. It rejected the conclusions drawn by the opposition division and considered that removing this limiting feature by substitution of the word "a**d**sorbing" for "a**b**sorbing" was not possible in view of Article 123(3) EPC. At the oral proceedings, it did not dispute that there was a basis for the latter amendment but it disputed the applicability of Rule 88 EPC. It pointed out that a**b**sorption of water was also mentioned in the description. Since a**d**sorption was something different from a**b**sorption, the terms were not interchangeable, and the removal of the limiting feature "*a**b**sorbing*" from claim 1 constituted a violation of Article 123(3) EPC.

Starting from D2 as the closest prior art, the appellant argued that the claimed subject-matter lacked an inventive step in view of the common general knowledge illustrated by D3 to D8, D11, D13 and D14. These documents, and in particular D5, all showed that constructions with "top-down" flow were well known in the separation of liquids from mixtures. By accordingly arranging the inlet above the outlet in the device of D2, the whole liquid mixture would be constrained to flow down through the separating member as according to present claim 1, the result being a more efficient separation. Arguing along similar lines, the appellant additionally invoked the specific combinations of D2

with D4 and of D2 with D6. Moreover, it argued that starting from D5 (figures 3 and 5) or D6 as closest prior art, the skilled person would opt for the floating/sinking separating member of D2 to avoid the breakthrough of oil upon saturation of the separating member.

The respondent argued that the PCT application as published explicitly referred to embodiments wherein liquid was constrained to flow downward through and into contact with the separating member, and wherein the outlet was positioned towards a bottom of the vessel, although the inlet was not positioned above the separating member. Citing decision T 0582/91 of 11 November 1992 (not published in OJ EPO) and referring in particular to Figure 4 and its description, as well as to the first two paragraphs of page 3, it concluded the requirements of Article 123(2) EPC were met by the amendment in question.

The respondent pointed out that it had presented this amendment as a correction of an obvious error pursuant to Rule 88 EPC and argued that such a correction could not violate Article 123(3) EPC. But it also agreed with the reasoning of the opposition division, which instead had considered the change made in claim 1 as an amendment allowable under Article 123(2) and (3) EPC. Referring to the pre-characterising portion of claim 1, it argued in writing that the separating member included material which adsorbs the second liquid and that, in practice, probably both a**d**sorption and a**b**sorption of the second liquid component would take place. A**d**sorption being a more precise and more limited

description of the process taking place than absorption, the amendment complied with Article 123(2) and (3) EPC.

The respondent doubted whether D2 actually represented the closest prior art. It submitted however that starting from D2 none of the combinations invoked by the appellant would lead the skilled person to an apparatus according to present claim 1 without hindsight considerations. The documents cited to illustrate the common general knowledge all related to different, very specific separation apparatuses and methods. Moreover D2, in contrast with the other prior art, related to a gravity separator and the absorbing separating member had the function to remove already separated oil. Combinations of features of D2 with features of the other documents were thus not obvious and required purposeful choices in order to arrive at the claimed apparatus. Starting from D5 or D6, the skilled person would not consider D2 but would turn to the solution proposed by D3, a document relating to the same kind of apparatuses, if it wished to detect the upcoming breakthrough of oil.

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

The respondent requested that the appeal be dismissed or in the alternative that the decision under appeal be set aside and the patent be maintained on the basis of one of the auxiliary requests 1 to 4, as filed with letter dated 14 April 2006.

Reasons for the Decision

Main request

1. *Allowability of amendments*

1.1 During the examination procedure, claim 1 has been amended inter alia to require that

i) the inlet (13) is positioned above the outlet (14);

ii) and the outlet (14) is positioned towards a bottom of the vessel (10);

iii) so that the mixture passes down through the separating member (12).

The applicant thus only incorporated into claim 1 part of the features of claim 3 of the PCT application, namely features ii), without incorporating the remaining features of the said claim 3, namely the requirement that the inlet is positioned above the separating member.

1.1.1 The latter type of amendment may be allowable provided there is clearly no close functional or structural relationship between the two groups of features. The fact that the features were present in a single claim at origin is not sufficient to establish such a relationship, contrary to the appellant's allegation, see e.g. T 0582/91, reasons point 2.2.

1.1.2 The features incorporated into claim 1, i.e. that "*the outlet (14) is positioned towards a bottom of the vessel (10)*", can be seen in all the figures of the published PCT application which show the position of the outlet (14), i.e. figures 1, 2, 3, 4 and 5.

Figures 1 to 3 and 5 represent embodiments wherein the inlet (13) is positioned near the top of the vessel (10), above the separating member. On the other hand Figure 4 shows an embodiment wherein the openings (13a) forming the inlet (13) are not arranged near the top of the vessel but at a lower level in the sidewall of vessel (10). According to the most general teaching of the PCT application, the separating member moves downwardly as it adsorbs the second liquid component from the liquid mixture constrained to contact the separating member (see claim 1). In accordance with the description of one preferred embodiment on page 3, lines 3 to 9 and claim 4 of the published PCT application, the inlet is positioned at a level near the lower part of the separation member (12) prior to any second liquid being adsorbed thereby, and hence not above the separating member (12). In Figure 4 the separating member is only slightly submerged at its lower end. This means, in view of the passage on page 3, lines 3 to 9, that in Figure 4 the apparatus is shown in an early stage of operation, before any substantial adsorption of liquid by the separating member has taken place. During ongoing operation of the apparatus, the inlet of the apparatus of Figure 4 will be located laterally of, and not above, the separating member. The inlet will only be located at near the upper end of the separating member once the latter has moved downward to an essentially submerged position, upon its saturation with the adsorbed second liquid component. As pointed out by the appellant, the phrase "*thus introduced mixture does not pass downwardly through the bag*" as appearing in the description of Figure 4 on page 9, second paragraph, of the published PCT application is somewhat confusing. However, other statements contained

in the description of Figure 4 make it clear that "*heavier water will pass* ***downwardly*** *past and/or* ***through*** *the* ***lower portion*** *24 of bag 12*" (emphasis added) and that "*oil/water mixture*" will "*pass through the openings 13a into the vessel 10 with water*", see the second and third paragraphs of page 9. In view of these statements to be read in conjunction with the overall content of the PCT application, the skilled person would understand that in the case of the apparatus shown in Figure 4 the mixture also passes **downwardly through** the separating member, the oil being thereby retained by the separating member.

1.1.3 The figures and description of the PCT application thus explicitly show that the positioning of the outlet towards a bottom of the vessel does not require that the inlet be arranged above the separating member. Figure 4 exemplifies one alternative arrangement, wherein the inlet is not located towards the top end of the vessel but "*elsewhere*" (see page 5, lines 14 to 21). As mentioned above, in this apparatus the liquid mixture also passes down through the separating member as additionally required by amended claim 1. Hence, at least in an apparatus also fulfilling the latter functional requirement, the arrangement of the outlet towards a bottom of the vessel is not associated with an inlet positioned above the separating member and thus there is clearly no close functional relationship between the two features.

1.1.4 Under these circumstances, the board concludes that the amendment in question meets the requirements of Article 123(2) EPC.

1.2 The incorporation of features i) and iii) into claim 1, and analogously into independent claim 10, is sufficiently based on the PCT application as published, see e.g. claim 2 and page 2, line 26 to page 3, line 9. They thus also meet the requirements of Article 123(2) EPC. This was not disputed.

1.3 Whether the qualification, in claim 1 as amended and granted, of the separating member (12) as "*a**b**sorbing*" amounted to a violation of the requirements of Article 123(2) EPC need not be discussed, since this term is no longer present in claim 1. Claim 1 has been amended in the opposition procedure by replacing the expression "*a**b**sorbing separating member*" (see claim 1 as granted, column 7, lines 34 to 35) by the expression "*a**d**sorbing separating member*". This amendment is sufficiently based on the PCT application as published, which repeatedly refers to such a separating member a**d**sorbing or having a**d**sorbed the second liquid component, see e.g. page 2, lines 22 to 23; page 3, lines 3 to 7; page 4, lines 19 to 21; and the characterising clause of claim 12. It therefore meets the requirements of Article 123(2) EPC.

1.4 The appellant also raised an objection under Article 123(3) EPC against the replacement of "*a**b**sorbing separating member*" by "*a**d**sorbing separating member*" in claim 1.

1.4.1 During the oral proceedings, the appellant pointed out that it was common general knowledge that a**d**sorption and a**b**sorption were two distinct processes. Whereas a**b**sorption meant that a first substance was taken directly into a second substance, a**d**sorption meant that

the first substance was adhered to the surface of the second substance. The appellant also stated in the oral proceedings that in view of the references in the description to the a**b**sorption of water (see sections [0030] and [0035] of the patent in suit and the corresponding passages of the PCT application), the separating member was to be considered as being both a**d**sorbing and a**b**sorbing. The respondent did not contest the definitions given by the appellant but argued that since the separating member 12 referred to in claim 1 **included** an a**d**sorbing **material**, the separating **member** could indeed be described as a**b**sorbing or "sucking" liquid into its interior (emphasis added by the board). The liquid component to be separated had to penetrate the separating member, e.g. a bag filled with oleophilic material, to be a**d**sorbed by the said a**d**sorbing oleophilic material. This understanding of the expression "*a**b**sorbing separating member*" was not contested by the appellant who acknowledged at the oral proceedings that there was, therefore, no discrepancy between the expressions "*material which a**d**sorbs*" and "*the a**b**sorbing separating member*" in claim 1 as granted. In its view, the first expression described what the "*material*" did whereas the second expression described what the "*member*" containing it did.

1.4.2 Both the patent in suit and the PCT application relate to the flow of the liquid mixture into and through a separating member which retains and becomes saturated with the second liquid component, the retention of the latter being due to the presence of a**d**sorbing material included in the member. In accordance with the definition given by the appellant, what occurs can thus be described as the taking of a first substance, i.e.

the second liquid component, directly into a second substance, i.e. the separating member considered as a whole, and hence as a**b**sorption of the second liquid component by the separating member. As already mentioned, the view of the respondent presented in reaction to the definition of a**b**sorption provided by the appellant has not been contested by the latter. This view does also not conflict with the terminology used in the cited prior art documents. In its statement of grounds of appeal, the appellant also considered D2 to disclose the a**d**sorption of the oil component, even though the term a**b**sorption is actually used in D2 (see e.g. page 7, lines 9 to 12). Moreover, the references to a**b**sorption in the patent itself, although relating to the undesirable uptake of water by the separating member (see column 5, section [0030] and column 6, section [0035]), are also in line with the said understanding of the term.

1.4.3 The board thus takes the view that under these circumstances, the replacement of "*a**b**sorbing separating member*" by "*a**d**sorbing separating member*" does not mean that the separating member is no longer to be considered as a**b**sorbing. Considering that in the claimed apparatus the separating member is implicitly a**b**sorbing, the replacement of the latter term by a**d**sorbing does not remove a limitation from the claim. The amendment is thus not considered to extend the protection conferred by present claim 1 compared to claim 1 as granted.

1.4.4 Moreover, the board notes that the appellant has not referred to a single concrete conceivable embodiment of an apparatus which would fall within the terms of

present claim 1 but not within the terms of claim 1 as granted, i.e. within the part allegedly extending the protection conferred by claim 1.

1.4.5 The board thus concludes that present claim 1 also meets the requirements of Article 123(3) EPC. Under these circumstances, it was not necessary to decide on whether the amendment in question can be considered as a correction of an obvious error in the sense of Rule 88 EPC.

2. *Novelty*

None of the cited prior art documents discloses the claimed subject-matter. Since novelty was no longer in dispute in the appeal proceedings, detailed reasons need not be given.

3. *Inventive step*

3.1 Document D2 - Closest prior art

3.1.1 D2 discloses an apparatus for separating light, i.e. low density liquids such as oil and petrol from a mixture thereof with (waste) water in a separation chamber 2 in which the lower density liquid rises to the surface and forms a layer on top of the water. D2 is concerned with the provision of means differing from the means previously known for removing or sucking-off ("Absaugen") the already separated ("abgeschiedener") light liquid from the surface. For this purpose, D2 proposes the use of a container 7 with a wall having openings and containing a bag 9 permeable to the light liquid filled with a granular material 8 which is able

to float and which absorbs and retains the light liquid. The container is adapted to move downwardly in response to its increase in weight as it absorbs and retains the light fluid. Reference is made to the title of D2, pages 1 and 2 in their entirety, page 3, the first two paragraphs, page 4, the first two paragraphs, page 8, lines 16 to 19, claims 1 to 3 and the figure.

3.1.2 It was common ground between the parties that D2 discloses all the features of the pre-characterising part of present claim 1. In particular, it was agreed that the moving container was a separating member within the terms of claim 1. Moreover, D2 discloses a separation chamber comprising an inlet for the waste water containing the light liquid, an outlet 21 for the purified water near the bottom of the chamber and a flow of liquid from the inlet to the outlet. As acknowledged by the appellant, it is not disclosed in D2 that the inlet is positioned above the outlet and that the whole liquid mixture is constrained to flow downwardly through the separating member.

3.1.3 The separating principle of D2, i.e. gravity separation, is thus different from the one according to the patent in suit. As pointed out by the appellant during the oral proceedings, D2 also mentions that lighter liquids may already be absorbed before they reach the surface of the water (see page 3, lines 11 to 14, page 7, lines 16 to 19). However, as can be gathered from the figure and the reference to a light liquid layer not being too thick (page 8, lines 9 to 12 and lines 32), this does not mean that no light liquid layer is formed at all, or that the actual separation of the liquids does not primarily occur through gravity.

3.1.4 However, considering that D2 also relates to the separation of light liquids from water and shows many of the features of the present claims 1 and 10, and in particular a movable separating member, the board can accept, at least for the sake of argument, that the disclosure of this document represents the closest prior art.

3.2 Technical problem

3.2.1 In its statement of the grounds of appeal (page 4, first paragraph), the appellant has argued that starting from D2 the objective technical problem may be seen in "that the mixture is not constrained at all to flow through the material of the separating member". This formulation however contains pointers to the solution proposed by claim 1, i.e. "mixture passes down through" and "is constrained to contact", and can thus not be retained, see "Case Law of the Boards of Appeal of the EPO", 4th edition 2001, page 107, section 4.2. At the oral proceedings, the appellant argued that "the problem of D2 solved with the patent is that in D2 the mixture to be separated could potentially flow from the inlet to the outlet beneath or under the separating member without being filtered". However, this formulation of the technical problem cannot be retained either since the potential flow of liquid mixture beneath the separating member does not, as such, represent a technical problem, the possible negative effect thereof on the separation performance representing in fact the technical problem. Considering the figure of D2, it can be assumed that depending on the operating conditions and/or the nature of the

liquid mixtures treated, a small amount of light liquid contained in the waste may by-pass the separating member and leave the apparatus together with the purified water through outlet 21, the result being an unsatisfactory degree of oil separation. Assuming that light liquid was not removed to the desired degree using the apparatus of D2, the technical problem can thus in any case be seen in providing a further liquid/liquid separator permitting a higher separation efficiency in the sense of a better separation performance.

3.2.2 It is plausible and it was not contested that this problem is solved by the provision of the apparatus according to present claim 1. However, for the following reasons, none of the appellant's approaches based on the cited prior art documents leads to the claimed solution in an obvious manner.

3.3 D2 combined with alleged general knowledge

3.3.1 To illustrate the common general knowledge the appellant, knowing the invention according to the patent in suit, has selected a group of patent documents (D3 to D8, D11, D13 and D14) from the available prior art, all of them allegedly showing the specific features "top-down construction" in connection with oil/water separation. The board is not convinced that this approach of the appellant is appropriate for illustrating common general knowledge in a technical field like the present one. Moreover, the board notes that not all of these documents clearly disclose a "top-down" construction or a separation involving an adsorbing or absorbing separating member. More

particularly, D11 is silent about a vertical arrangement of the device described (see page 5, lines 5 to 6 and page 7, lines 3 to 22) and D7 describes an apparatus wherein the liquid mixture is merely subjected to gravity separation, optionally after having been screened or filtered (see the figures, sieve or screen 26; claims 1 and 4; page 2, lines 30 to 35 and lines 72 to 77). Moreover, although the other documents disclose a top-down flow of liquid mixtures to be separated, they relate to apparatuses of very different construction, in particular having regard to the way in which the liquid mixture is contacted with oil adsorbing or absorbing material. For instance, whereas D3 (see figures and column 4, lines 16 to 19), D6 (Figure 2 and column 5, lines 24 to 27) and D13 (figures 1, 6 and 7; ABSTRACT, lines 6 to 13) rely on the use of non-moving disposable materials which are replaced when saturated with oil, D5 inter alia mentions the removal of retained oil by squeezing and cleaning the mop structure used (see Figure 5 and column 3, lines 28 to 33) and D4 (see Figure 1 and page 4, lines 14 to 18) and D8 (Figure 1, column 3, lines 16 to 20) describe a floating layer of a multitude of particles remaining within the apparatus and having a coalescing effect on the oil in the liquid mixture. What can possibly be gathered from D3 to D6, D8, D13 and D14 is that many different specific apparatuses and processes were known for separating oil from aqueous mixtures involving "top-down" flow of the mixture and/or constraining it into contact with an adsorbing material.

3.3.2 What cannot be gathered from these documents taken as a group is which particular features amongst the ones

they have in common would lead to an improvement of the separation efficiency of the apparatus according to D2, let alone how these features would concretely have to be incorporated into the apparatus of D2. More particularly, it is at the least questionable whether the skilled person, starting from D2, would consider the "top-down" flow of the mixture into contact with the separating member as a sensible measure to use in a gravity separator wherein a relatively slow and undisturbed flow of the liquid mixture is usually required for achieving the formation of an oily supernatant layer. Moreover, changing the way in which the mixture is fed to the apparatus of D2 such that the whole mixture is constrained to contact the separating member (7;8;9) thereof, would amount to changing the underlying separation principle from gravity separation to a different one that could e.g. be qualified as adsorbing and/or coalescing filtration, as well as to changing the primary function of the separating member from sucking off separated oil (see also point 3.1.3 above) to retaining oil flowing therethrough.

3.3.3 For the preceding reasons, the board is not convinced that common general knowledge can be distilled from the cited bundle of documents which would induce the skilled person to modify the specific gravity separator of D2 by providing means which constrain the liquid mixture to flow "top-down" through the container 7, whilst keeping the latter movable, in order to improve the efficiency of the separation.

3.3.4 The particular emphasis of the appellant on the text corresponding to Figure 5 of D5 (see column 3, lines 18 to 21) cannot alter this view. Even though the

apparatus shown in Figure 5 is referred to by the authors of D5 as "elemental or basic oil-water separation unit", it is nevertheless a very specific apparatus and the actual oil/water separation is based on a different principle to that in D2 (gravity separation). Without knowing the present invention, the skilled person would thus not have considered merging the features of D2 and D5 in the manner mentioned under 3.3.3 above.

3.4 Combination of D2 with D6

3.4.1 D6 discloses a portable apparatus for separating a mixture of oil and water. The board can accept, at least for the sake of argument, that D6 discloses all the features of present claim 1 except for the separating member being adapted to move downwardly in response to an increase in the weight thereof as second liquid component is adsorbed, claim 1, see figures 1 and 2, column 4, lines 45 to 53, and claim 1. The separating member of D6, i.e. a bag containing ground, oleophilic, hydrophobic foamed polymeric material, is not movable in response to oil adsorption. Moreover, according to D6, the mixture is separated in the separating member by a mechanism based on the combined attraction and retention of oil (see claim 1 and column 2, lines 27 to 42), which mechanism is different from gravity separation as described in D2.

3.4.2 D6 does not aim at improving the separation performance as compared to the one of gravity separators, but mainly aims at providing inexpensive, yet efficient, portable devices, see column 1, lines 11 to 23 and 45 to 47. Therefore, assuming for the sake of argument

that the skilled person starting from D2 and confronted with the stated technical problem would consider D6, it would not find in D6 any information as to which parts of the apparatuses of D2 and D6 would have to be retained and how these parts would have to be put together to improve the separation performance. On the other hand, connecting the two known devices in series, so that the water leaving the separator of D2 is further purified in a device according to D6, would be an effective way of solving the problem. As pointed out by the respondent, such apparatuses appear to be known (see sections [0004] and [0006] of the patent in suit), and represent a much more straightforward solution to the technical problem than designing a new apparatus by combining selected features of very different apparatuses. However, this straightforward solution does not lead to the claimed apparatus.

3.4.3 The board concludes that a combination of D2 and D6 may only lead to the apparatus of claim 1 on the basis of hindsight considerations.

3.5 Combination of D2 with D4

3.5.1 D4 discloses methods and apparatuses for the efficient and economic purification or cleaning of waste liquid, more particularly for "cleaning organic waste liquid containing oil matters which can eliminate contaminants to a sufficient extent to allow it to be released to rivers and lakes". In some embodiments, the apparatus used comprises a vessel with downward flow of liquid from an inlet to an outlet through a "floating filter layer" consisting of a multitude of individual particles which are kept within a certain zone inside

the vessel, see page 2, lines 28 to 32, claim 1, Figure 1 and the left part of Figure 3. The particles described are made of a lipophilic plastic material. Part of the oil adhering to the particles of the floating filter layer may grow into larger aggregates which rise upwardly to a supernatant oil layer 9 in the upper part of the vessel. This oil layer may be pumped off or removed by oil absorbing agents. Another part of the oil adhering to the surface of the particles is decomposed by anaerobic processes, see page 2, lines 34 to 53, page 3, lines 42 to 51, and page 4, lines 11 to 18.

3.5.2 It is clear from the cited passages that the oil component "absorbed by the floating filter layer 7 by adhering to the surface of the small particles" does not make these particles or the floating filter layer formed by them sink, and that the particles saturated with oil are not removed from the apparatus. The floating filter layer can thus not be considered as a moving separating member in the sense of claim 1.

3.5.3 Moreover, D4 does not suggest that the efficiency of a separator of the type shown in D2 could be improved by adopting some of the features disclosed in D4. The sentence on page 3, lines 55 to 58, referred to by the appellant in the oral proceedings merely indicates that a favourable contact between the floating particles and the contaminants may be achieved without increasing the flow rate of the waste liquid by using an inlet defining a certain angle relative to the radial line. As pointed out by the respondent, this passage appears to relate to the stirring of the floating particles for improving the contact.

3.5.4 In view of the above, the board is not convinced that the skilled person starting form D2 would consider D4 at all. Moreover, neither D4 nor D2 suggests which parts of the apparatuses of D2 and D4 would have to be retained and how these parts would have to be combined to improve the separation performance. In the board's view, the combination made by the appellant to arrive at an apparatus according to present claim 1 is thus based on hindsight considerations.

3.6 Combinations of D5 or D6 with D2

3.6.1 The oil/water separator shown in Figure 5 of D5 is comparable to the one of D6 since it also relies on the "top-down" flow of the whole liquid mixture through an oil-retaining separating member snugly fitted into a tubular vessel. The material attracting and retaining the oil consists of an "oil mop structure 58" of fibrillated polypropylene strips, see Figure 5 and column 3, lines 22 to 25. At the oral proceedings, the appellant also referred to Figure 3 of D5 which it considered to show an apparatus which like D2 combined gravity separation (in the middle chamber 24) and separation by adsorption involving a "top-down" flow of liquid mixture (in the right-hand chamber 28), see column 2, lines 35 to 61. It was common ground between the parties that neither D5 nor D6 discloses a separating member that moves downward in response to an increase in its weight as it adsorbs the second liquid component.

3.6.2 According to D6, the separating member (bag 42) is replaced when the effluent starts to show signs of oil

(column 5, lines 24 to 27). D5 is silent concerning possible ways of detecting the point at which the mop is saturated with retained oil. Taking either of D5 or D6 as the closest prior art, the appellant argued that the technical problem thus consisted in providing an apparatus which permitted to know before saturation of the separating member that it has to be replaced, in order to comply with legislation requiring reduction of the oil contamination to less than 20ppm.

3.6.3 The appellant argued at the oral proceedings that in the apparatus of D2 the degree of saturation of the separating member with oil was indicated by the level to which the floating separating member sinks. Hence, the loaded separating member could be removed before it becomes ineffective due to its full saturation. In the appellant's view the skilled person starting from D5 or D6 would thus be prompted by D2 to use a floating separating member of the type disclosed in D2.

3.6.4 For the reasons already indicated above, it is however questionable whether the skilled person would consider combining features of apparatuses as different as the ones of D5 (Figure 5) or D6 on the one hand and the one of D2 on the other hand. As pointed out by the appellant, Figure 3 of D5 shows an apparatus combining gravity separation and separation by an adsorbing material. However, it is noted that the liquid passing from the gravity separation chamber 24 to chamber 28 to be contacted with the oil mop is essentially water with a reduced oil content (see column 2, lines 36 to 45), and not the supernatant oil phase formed in and withdrawn from the gravity separation chamber 24 by weir line 25. Since in contrast therewith, D2 teaches

that it is primarily the separated oily phase that is sucked off by the separating member to thereby remove it from the apparatus, it is equally questionable whether the skilled person would have considered this particular combination.

3.6.5 Moreover, as pointed out by the respondent during the oral proceedings, solutions were known for detecting an imminent breakthrough of the oil in a separator of the filtering type. For instance, D3 addresses this issue and discloses an indicator layer arranged so as to indicate immediately (e.g. by colour change) when the liquid component to be separated reaches a certain point of the device, see column 3, lines 15 to 25. The board notes that D3 mentions further ways of detecting imminent oil breakthrough and hence the need for replacing the filter material, see e.g. column 2, lines 28 to 52. Since D3 also relates to the separation of an oil/water mixture by constraining it to flow through an immobile separating member retaining the oil, and moreover addresses the same technical problem, the skilled person starting from D5 or D6 would readily adopt the solution proposed in D3. It would have no reason to explore more remote prior art, let alone to consider constructing a new device by merging the features of very different apparatuses. Combinations of D5 or D6 with D2 can only lead to the apparatus of present claim 1 on the basis of hindsight considerations.

3.7 No other attack based on a combination of documents cited in the appeal and opposition proceedings has been substantiated by the appellant in the course of the appeal proceedings including the oral proceedings. The

board is also convinced that the remaining documents contain no additional relevant information which would point towards the claimed subject-matter.

3.8 Independent claim 10 is directed to a separation method which de facto requires an apparatus according to claim 1, except for the fact that exact position of the outlet is not mentioned. Since claim 10 however requires that the liquid mixture is constrained to pass downwardly through the adsorbing separating member, this difference does not hinder the conclusion that the method of claim 10 is also novel and inventive, the reasons given above in connection with apparatus claim 1 applying analogously to method claim 10. The patentability of dependent claims 2 to 9 and 11 to 13 is supported by that of claims 1 and 10.

Order

For these reasons it is decided that:

The appeal is dismissed.

The registrar The chairman

C. Vodz M. Eberhard