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T 98/83

Case Number: T 98 / 83

DECISION

of the Technical Board of Appeal 3.4.1

of 31 January 1984

Appellant: Pall Corporation
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USA

Representative: Gudel Diether, Schmied-Kowarzik Volker,
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Decision under appeal: Decision of Examining Division 128 of the European Patent Office dated 25 January 1983 refusing European patent application No 79 102 467.2 pursuant to Article 97(1) EPC

Composition of the Board:

Chairman: R. Kaiser
Member: O. Huber
Member: P. Ford

Summary of Facts and Submissions

I. European patent application No. 79 102 467.2, filed on 16 July 1979 and published on 20 February 1980 (publication No. 0 008 018) and claiming priority of 21 July 1978 from a previous application in the USA, was refused by decision of Examining Division 128 of the European Patent Office, dated 25 January 1983. The claims considered were claims Nos. 1 and 5-7 received on 12 March 1982 and Nos. 2-4 received on 22 January 181. The ground for refusal was that in view of the disclosure of US-A-2 058 669 and FR-A-932 260 it appeared obvious to a man skilled in the art to use comb means to support a corrugated filter sheet of a filter assembly according to US-A-3 815 754 forming the precharacterising portion of claim 1. It was further pointed out that mating ribbed flanges clamping between them the ends of the filter element sheet were known from US-A-3 932 153 and could be used for a box filter described in US-A-3 815 754. The Examining Division did not see any interactive effect from the simultaneous provision of the two characterising features (comb means, flanges) of claim 1 and concluded that the subject matter of claim 1 did not involve an inventive step in the sense of Article 56 EPC.

II. On 2 March 1983, the appellant lodged an appeal against the decision and paid the appeal fee. A Statement of Grounds was submitted on 27 April 1983.

III. During oral proceedings, held on 31 January 1983 at the request of the appellant, the appellant's professional representative requested

- that the decision under appeal be set aside,
- and that a patent be granted on the basis of the following documents:

Claim 1 as filed on 2 November 1983
Claims 2-4 as filed on 22 January 1982
Claims 5-7 as filed on 12 March 1982
Claim 8 as filed on 27 April 1983
Description as on file with an adapted introduction of the description
2 sheets of drawings as on file.

The independent claims 1 and 8 read as follows (for the present purposes the characterising portion of claim 1 has been divided into two parts, marked (a) and (b)):

1. A disposable filter assembly comprising a housing (1) having two mating housing portions (2,3) defining a fluid chamber (4) therebetween, each housing portion has a fluid port (5,6) and a pair of opposed sides (8,8', 12,13), a filter element (10) in the form of a corrugated sheet which extends across the fluid ports and is held in a fluid seal extending along the length of two opposed sides (26,27), and side caps (30,31) bonded in a fluid-tight seal to the sides of the filter element,
characterised by
(a) the pair of opposed sided (8,8', 12,13) of the housing portions (2,3) terminate in mating ribbed flanges (15,16), the housing portions (2,3) being attached together at the mating flanges (15,16), and clamping between them the ends of the filter element sheet, and

(b) spaced comb means (7a,7b,7c; 11a,11b,11c) integral with each housing portion(2,3) and extending outwardly therefrom being provided the comb means (7a,7b,7c; 11a,11b,11c) being evenly spaced with one comb means (7a,7b,7c; 11a,11b,11c) at each end and one approximately equidistant from each end of each housing portion (2,3), and intergiditatedly inserted between corrugation folds and between each other and having tynes (7d,7e,7f; 11d,11e,11f) of a width substantially equal to the spacing between corrugation folds, the corrugation folds properly fitting over the comb tynes; the comb means (7a,7b.7c; 11a,11b,11c), the side caps (30, 31), the pair of opposed sides (8,8', 12,13) and housing portions (2,3) together holding the sides and corrugation folds of the filter element (10) and positioning the filter element (10) across the fluid chamber (4) and supporting the folds against displacement in any direction.

8. A method for assembling a disposable filter assembly comprising a housing (1) having two mating housing portions (2,3) defining a fluid chamber (4) therebetween, each housing portion (2,3) having a fuid port (5,6), a filter element (10) in the form of a corrugated sheet extending across the fluid chamber (4) in the line of fluid flow between the fluid ports (5,6) and being held in a fluid seal, the corrugated sheet first being fastened with its ends to projections (20) provided at opposed sides of the first of the housing portions (3) and then the other housing portions (2) being fitted over the first housing portion (3) and pressed down against the filter sheet, pinching the sheet against the tips of the projections (20) and holding it firmly in place by the tight engagement between the housing portion (2,3), wherafter side caps

(30,31) are bonded across openings (28,29) into the housing portions (2,3) and to the filter sheet edges (32,33), bonding the filter sheet to the side caps (30,31) and completing the fixing of the filter sheet in place in the fluid chamber (4) and the seals between the filter sheet and the side walls of the housing, characterized by both housing portions (2,3) being provided with mating spaced comb means (7a,7b,7c; 11a,-11b,11c) with tynes (7d,7e,7f; 11d,11e,11f) and with mating ribbed flanges (15,16), one first places the filter sheet in the first housing portion (3) with its edges lapped over the flanges (16) over their ribs (20), the corrugation folds being positioned between the tynes (11d,11e,11f) of the comb means (11a,11b,11c) of said first housing portion (3), and then one fits the other housing portion (2) over the first housing portion (3) such that the tynes 7d,7e,7f) of that comb means (7a,7b,7c) which is fixed to the other housing portion (2) are fitting in the other side of the corrugation folds and beig pressed down smartly against the filter sheet, pinching the sheet edges between the ribs (17,20) of both pairs of flanges (15,16), holding the sheet firmly in place by the tight engagement between the flanges (15,16) of the housing portions (2,3) and the ribs (17,20), the comb means interdigitadly being inserted between the corrugation folds and between each other and the tynes being of a width substantially equal to the spacing between the corrugation folds, whereafter the ribs (18,19) are integrated.

The representative argues essentially as follows:

The box filter according to US-A-3 815 754 does not have any means for supporting the corrugations of the filter element against displacement in any direction.

It is true that in US-A-2 058 669 several embodiments of filters are described using comb means for supporting the corrugations of the filter sheet. However, the essential contents of US-A-2 058 669 are the configurations (cross-sections) of the filter sheet e.g. in the form of dove tail or honey comb shaped channels, see claims 5, 6 and 7, Figures 6, 7 and 8, page 2 left-hand column, lines 29-52, in order to increase the filtering area and to keep the folds from collapsing. In this way the corrugations of the filter sheet are supported only over a very small area by the comb means, see Fig. 6, and not over the whole length of the folds as in the case of the subject matter of the application. Only by accident, in the embodiment of a filter according to Fig. 1-3 the comb means are adapted to the configuration of the filter sheet. However, the inventor of the filter described in US-A-2 058 669 was not aware of the value of having tynes properly fitted to the corrugation folds, so as to support the folds against displacement in any direction. Therefore, there was no reason for a person skilled in the art to provide a filter as described in US-A-3 815 754 with comb means according to the characterising feature (b) of claim 1. In this context the representative has cited the decision in the case T 39/82 published in the "Official Journal of the European Patent Office" 23 November 1982, page 419-424.

As to the characterising feature (a) the representative points out that the ends of the filter sheet must be firmly held. The feature (a) serving this purpose is not disclosed in the above cited two documents but only in a third document, namely US-A-3 932 153.

Therefore, three references are required to prove that the subject matter of claim 1 might be obvious and this indicates inventiveness, particulaly considering the fact that there was no inducement to combine the disclosures of the three documents.

Reasons for the Decision

1. The appeal complies with Articles 106-108 and Rule 64 EPC. It is therefore admissible.

2. There is no formal objection to the current claims. They are supported by the original documents.

3. The preamble of claim 1 is based on disposable filter assemblies as described in US-A-3 815 754.

4.(a) The housing portions (2,3) of the known filter have internal projections (7,11) serving as supports extending across the corrugations of the filter sheet (10), see column 3, lines 24-29 and Figures 2 and 3.

As pointed out in the original description of the application, see page 3, line 14 to page 4, line 6, the box filter described in US-A-3 815 754 has several shortcomings:

The filter is not suitable for use under high fluid pressure differentials. The corrugations are prone to displacement (in any direction as emphasised in the oral proceedings), distortion, and even collapse upon each other. Sealing the side caps across the open sides of the box housing to the sides of the filter sheet

causes difficulty. The appellant aims to overcome these deficiencies of the known filter. The problems are solved by the characterising feature (b) of claim 1.

(b) A further problem is to improve the holding means of the ends of the filter sheet in the housing in comparison with the filter described in US-A-3 815 754 such that the filter sheet will withstand also higher pressure differentials, see original description page 9, lines 1-19. This is achieved by the characterising feature (a) of claim 1.

5. When operating filter assemblies according to US-A-3 815 754, the manufacturer and user will undoubtedly discover the shortcomings mentioned above. Therefore, a person skilled in the art could be expected to seach the prior art for a support of the filter sheet which is able to perform better and more perfectly the function than the projections 7,11 of the filter according to Fig. 2 in US-A-3 815 754.

In order to hold the forms of the filter sheet uniformly spaced apart, to increase the rigidity of the filter sheet and to keep the folds from collapsing, US-A-2 058 669, see Fig. 1-3, page 1, right-hand column, lines 12,13, 36-40, page 2, left-hand column, line 44, discloses in compliance with the essential features of the characterising portion (b) a filter comprising spaced comb means (3) fixed in the housing (1) and interdigitedly inserted between corrugation folds and practically between each other and having tynes (4) on a width substantially equal to the spacing between corrugation folds, the corrugation folds properly fitting over the comb tynes. The comb means and the four walls of the

housing together are holding the sides and corrugation folds of the filter sheet and positioning the filter sheet in the housing and supporting the folds against displacement in any direction. As to the remaining features of the characterising portion (b), Fig. 4,5 and 6 in US-A-2 058 669 show that in the case of a housing having two mating housing portions (preamble of present claim 1), each housing portion (5,6) is provided with spaced comb means (8,9) and that the comb means is integral with each housing portion, see page 1, right-hand column, lines 48-50.

Under these circumstances, the replacement of the internal projections (7,11) in the filter assembly according to Fig. 2 in US-A-3 815 54 by comb means as disclosed in US-A-2 058 669, in order to make use of the readily apparent technical advantages of such comb means, is to be regarded as a obvious step for a person skilled in the art. There are no difficulties or obstacles which could prevent a designer from doing so. The location of the comb means follows from common sense considerations.

The decision in T 39/82 cited by the appellant is not pertinent to the present case for the following reason: The problems solved by comb means in the known filter (US-A-2 058 669) and in the case in suit are the same, as mentioned above, contrary to the case T 39/82 where the state of the art addresses a different problem than the subject matter of the application.

6. In the box filter according to US-A-3 815 754, see Fig. 2, the ends of the filter element sheet ar also clamped between mating ribs (20,21 of housing portion 3 - the

ribs on the base 9 of the housing portion 2 has no numeral but is clearly to be seen) projecting from the housing portions The clamping means according to the characterising feature (a) of claim 1 differ from this prior art only in that the ribs are integrals of flanges projecting from the two housing portions. However, this feature is known from US-A-3 932 153, see Fig. 5 and 7, which is also related to a filter. The clamping flange construction of US-A-3 932 153 is used to tension the filter sheet, see col. 4, lines 46-50. Stretching of the filter element requires a fast seat of the filter sheet between the ribs and a high clamping force. Therefore, it falls within the scope of a practitioner to replace the clamping means according to US-A-3 815 754 by the flange construction disclosed in US-A-3 932 153 in order to improve the clamping effect

7. The Board can also see no functional interrelationship between the features (a) and (b) of claim 1. So the support of the filter sheet by comb means is not improved in any way by the flange construction for the clamping means and vice versa the clamping force is independent from the provision of comb means.

8. Thus, the subject-matter of claim 1 does not involve an inventive step in the sense of Article 56 EPC. Claim 1 is therefore not allowable under Article 52(1) EPC.

9. The basic steps for assembling a filter according to claim 8, namely placing the filter in the first housing portion, fitting the other housing portion over the first housing portion and pinching the sheet edges between the ribs of the clamping means are the same as disclosed in US-A-3 815 754, see column 4, lines 40-61.

If the housing portions are provided with mating spaced combs (a non-inventive measure as stated above) it is self-evident that the corrugation folds of the filter element are positioned between the tynes of the combs, see also US-A-2 058 669, Fig. 4-6. The non-inventive use of flanges as connectors of the two housing portions requires that the sheet edge of the filter element are pinched between the flanges as in the case of the filter according to US-A-3 932 153.

Therefore, the method for assembling a disposable filter according to claim 8 is not based on an inventive step. Claim 8 is not allowable.

10. Claims 2-7 are formulated as dependent claims, the allowability of which is conditional on that of claim 1. Furthermore, in view of the prior art (US-A-3 815 754) the Board cannot find any patentable features in the sub-claims.

Order

For these reasons

it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

J. Rückerl R. Kaiser