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D E C I S I O N
of 15 May 1997

Case Number: T 0563/96 - 3.4.2

Application Number: 92200933.7

Publication Number: 0507414

IPC: B01D 24/24, B01D 24/42

Language of the proceedings: EN

Title of invention:
Cap for underdrains in gravity filters

Applicant:
F. B. LEOPOLD COMPANY, Inc.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 123(2), 84, 54, 56

Keyword:
"After amendment (second auxiliary request)"
"Unallowable extension of subject-matter - (no)"
"Clarity - (yes)"
"Inventive step - (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0563/96 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 15 May 1997

Appellant: F. B. LEOPOLD COMPANY, Inc.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 6 February 1996 refusing European patent application No. 92 200 933.7 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: E. Turrini
Members: M. Chomentowski
M. Lewenton

Summary of Facts and Submissions

I. European patent application No. 92 200 933.7 (publication No. 0 507 414) was refused on the grounds of lack of inventive step, having regard to US-A-4 065 391 and US-A-2 154 167, of the subject-matter of the only independent claims of the submitted set of 7 claims , i.e. claims 1 and 5, which read as follows:

"1. A capped filter underdrain block (16) in a gravity filter (10) having a filter bottom (12) on which said block is located, said block having a plurality of orifices (34) in a top wall (24) for receiving effluent in a downflow mode from a filter media disposed above said block and for discharging a backwash fluid in an upflow mode into said filter media, characterized by a cap (18) comprising:
a porous, planar body (36) having a top surface (38) and a bottom surface (40), said body having a first lateral edge (42), a second lateral edge (44), a front edge (46), and a rear edge (48) with a flange (50, 52, 54) extending downward from each edge;
said bottom surface and said flanges defining a distribution chamber (64) above said orifices;
at least one groove (62) formed in said bottom surface (10); and means (60) for securing said cap (18) to the top wall of said block so that said bottom surface (40) extends above said orifices, and said top surface (38) supports said filter media (20);
wherein said groove (62) defines means for uniformly distributing backwash fluid across the top surface of said cap and wherein the pores in said body (36) are sized to support said filter media without said media penetrating therethrough."

"5. A capped filter underdrain block (76) for a gravity filter having a filter bottom with a plurality of blocks located on said filter bottom, said blocks supporting a filter media and receiving effluent therefrom in a downflow mode while discharging a backwash fluid thereto in an upflow mode, said capped filter underdrain block, characterized by: a block having a top wall (90), a bottom wall and two side walls extending between said top wall and said bottom wall, said block having at least one conduit (86) therethrough, said top wall (90) having a plurality of orifices (96) in communication with said conduit for receiving said effluent and discharging said backwash fluid; a plurality of ribs (92) defining a plurality of sectors, each sector encompassing at least one of said orifices;
a cap (80) having a porous, planar body, said body having a top surface and a bottom surface (98), said body further having pores which are sized so that said body supports said filter media without said media penetrating therethrough; and
means for securing said cap to the top wall of said block so that said bottom surface engages said ribs and extends above said orifices and said top surface supports said filter media;
said bottom surface and said ribs (92) defining a plurality of distribution chambers above said orifices;
wherein said ribs define means for uniformly distributing backwash fluid across the top surface of the cap."

The Examining Division took the following view:

From US-A-4 065 391, there is known a filter underdrain block in a gravity filter having a filter bottom on which said block is located, said block having a plurality of orifices in a top wall for

receiving effluent in a downflow mode from a filter media disposed above said block and for discharging a backwash fluid in an upflow mode into said filter media; this underdrain block is not capped, but is provided with an overlying layer of a material such as sand gravel. In order to avoid the problems related with the use of such a layer of sand gravel, which in particular is expensive and may mix with the filtering media, the invention proposes a cap of porous material. However, the problem and its solution, a porous planar body in place of the gravel, are known from US-A-2 154 167, and the planar body of US-A-2 154 167 can be used in an obvious way as cap over the underdrain blocks of US-A-4 065 391.

Moreover, the Examining Division made reference to objections in former official communications concerning formal deficiencies (Article 84 and Rule 27(1)(c) EPC).

II. The appellant (applicant) lodged an appeal against this decision. The statement of grounds of appeal contained a main request with 7 claims, whereby the last feature of claim 1 comprised the additional indication "(38)" after "the top surface", claim 1 and the only other independent claim being otherwise identical with the corresponding claims of the set of claims having formed the basis for the decision under appeal. Moreover, the statement of grounds of appeal contained an auxiliary request (here after "first auxiliary request") wherein the following feature was added to the end of claims 1 and 5 of the main request:

"and wherein said underdrain block (16, 76) has at least two conduits (30, 32 and 86, 88) with metering orifices (72) providing communication between said two conduits".

III. With the official communication dated 22 October 1996, the Board of appeal expressed the opinion that the main and the auxiliary requests did not appear to be allowable because, in particular, they contained subject-matter which extended beyond the content of the application as filed, but that a new set of 6 claims, with an amended text of the only independent claims 1 and 5 reading as follows, could meet the mentioned deficiencies and could be allowable having regard to the cited prior art and the arguments of the appellant:

"1. A capped filter underdrain block (16) in a gravity filter (10) having a filter bottom (12) on which said block is located, said block having at least three conduits (30, 32 and 86, 88) with metering orifices (72) providing communication between said conduits and a plurality of orifices (34) in a top wall (24) for receiving effluent in a downflow mode from a filter media disposed above said block and for discharging a backwash fluid in an upflow mode into said filter media, the capped block having a cap (18) comprising:
a porous, planar body (36) having a top surface (38) and a bottom surface (40), said body having a first lateral edge (42), a second lateral edge (44), a front edge (46), and a rear edge (48) with a flange (50, 52, 54) extending downward from each edge;
said bottom surface and said flanges defining a distribution chamber (64) above said orifices;
at least one groove (62) formed in said bottom surface (40); and means (60) for securing said cap (18) to the top wall of said block so that said bottom surface (40) extends above said orifices, and said top surface (38) supports said filter media (20);
wherein said at least one groove (62) defines means for maximizing the distribution of backwash fluid into the filter media above the top surface (38) of said

cap and wherein the pores in said body (36) are sized to support said filter media without said media penetrating therethrough."

"5. A capped filter underdrain block (76) for a gravity filter having a filter bottom with a plurality of blocks located on said filter bottom, said blocks supporting a filter media and receiving effluent therefrom in a downflow mode while discharging a backwash fluid thereto in an upflow mode, said capped filter underdrain block having:
a block having a top wall (90), a bottom wall and two side walls extending between said top wall and said bottom wall, said block having at least three conduits (30, 32 and 86, 88) therethrough with metering orifices (72) providing communication between said conduits and said top wall (90) having a plurality of orifices (96) in communication with said conduits for receiving said effluent and discharging said backwash fluid;
a plurality of ribs (92) on said top wall (90) forming a grid defining a plurality of sectors, each sector encompassing at least one of said orifices;
a cap (80) having a porous, planar body, said body having a top surface and a bottom surface (98), said body further having pores which are sized so that said body supports said filter media without said media penetrating therethrough; and
means for securing said cap to the top wall of said block so that said bottom surface engages said ribs and extends above said orifices and said top surface supports said filter media;
said bottom surface and said ribs (92) defining a plurality of distribution chambers corresponding to said sectors above said orifices;
wherein said ribs define means for maximizing the distribution of backwash fluid into the filter media above the top surface of the cap."

IV. With letter dated 22 April 1997, the appellant agreed to the text of the set of claims proposed by the Board as his second auxiliary request and mentioned that if said second auxiliary request were accepted, be it with minor amendments, there was no need for his request of oral proceedings in the statement of grounds of appeal.

V. The appellant did not provide any argument against the objections of the Board concerning the formal deficiencies in the main and first auxiliary requests. In support of his requests of setting aside the decision under appeal and for granting a patent, arguments on inventive step in the statement of grounds of appeal were as follows:

No underdrain construction with conduits with metering orifices is derivable from US-A-2 154 167. Starting from US-A-4 065 391, which shows an underdrain block containing a plurality of conduits and metering orifices to the effect of distributing the backwash fluids, but which does not include any cap, and taking into account the problem mentioned in the present application of avoiding the penetration of fine grain filter media in this underdrain block, it is only with hindsight that it would be obvious to superpose the porous plate of US-A-2 154 167 on the underdrain block of US-A-4 065 391 or to replace the gravel in said US-A-4 065 391 by said porous plate because such a porous plate is directly derivable as being a poor distributor, in particular for the backwash fluids. Therefore, the subject-matter of the independent claims involves an inventive step.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request*

2.1 *Allowability of the amendments*

2.1.1 Claim 1 of the main request specifies that, in the capped filter underdrain block for supporting a filter media, the cap has a bottom surface (40) wherein at least one groove (62) is formed, whereby said groove (62) defines means for uniformly distributing backwash fluid across the top surface (38) of said cap.

In the original application (see page 5, lines 15 to 19), it is mentioned that it is an object of the invention to enhance distribution of backwash fluids evenly across the entire filter bed located above said cap to avoid the development of dead spots within the filter bed. According to further statements in the original application (see page 12, lines 1 to 12; see also page 14, lines 14 to 16 and 25 to 28), the specific configuration of the shown plurality of grooves assures that the backwash air, i.e. a part of the backwash fluid, is likewise distributed across the full length and width of the cap; as a result, distribution of backwash air into filter bed (19) is maximized despite inherent deviations from level and variations in cap porosity. However, the terms "likewise distributed" are somewhat ambiguous and, in any case, a groove or a plurality of grooves, resulting in uniformly distributing backwash fluid across the top surface (38) of the cap, is not derivable from the original application.

2.1.2 Claim 5 of the main request specifies that, in the capped filter underdrain block covered with a cap and intended for supporting a filter media, said block having a plurality of ribs (92) defining a plurality of sectors, said ribs define means for uniformly distributing backwash fluid across the top surface of the cap. As already mentioned here above in relation with claim 1 of the same request, it is specified in the original application (see page 5, lines 15 to 19) that it is an object of the invention to enhance distribution of backwash fluids evenly across the entire filter bed located above said cap to avoid the development of dead spots within the filter bed. According to further statements in the original application (see page 13, lines 16 to 25 and page 14, lines 14 to 16 and 25 to 28), the specific configuration of the shown plurality of ribs assures that minimum migration of backwash air, i.e. a part of the backwash fluid, occurs beneath the cap (80); as a result, distribution of backwash air into filter bed (19) is maximized despite inherent deviations from level and variations in cap porosity. In this respect, it is to be noted that the information, in the original application (see page 12, lines 34 to 35), that the ribs (92) need not all be contiguous, does not directly define a uniform distribution of backwash fluid across the top surface of the cap. Incidentally, it is also to be noted that, since it is derivable that the ribs could indeed be contiguous and thus form chambers entirely surrounded laterally by said ribs, there is no apparent original disclosure of uniform distribution of backwash fluid. In any case, a configuration of ribs resulting, in combination with other means of the capped underdrain block, in uniformly distributing backwash fluid across the top surface of the cap, is not derivable from the original application.

2.1.2.1 Moreover, it is to be noted that, contrary to the indications in the original application (see in particular independent claim 9; see also page 13, lines 4 to 8 and Figures 7 to 9), present claim 5 does not specify that each distribution chamber formed by the bottom surface of the cap and the ribs on the top wall of the block corresponds to one of the sectors of the grid formed by said ribs on said top wall of the block.

In this respect, it is also to be noted that claim 5 indeed states that the capped filter underdrain block comprises a plurality of ribs (92) defining a plurality of sectors, each sector encompassing at least one of the orifices of the top surface of the block; however, contrary to the original application (see in particular independent claim 9), claim 5 does not specify that the plurality of ribs is on the top wall of the block and form a grid.

2.1.3 The appellant has not commented these objections, which were contained in the official communication of the Board dated 22 October 1996. Therefore, since these objections can still be maintained, the European patent application according to the main request does not satisfy the requirement of Article 123(2) EPC, that it may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed. Thus, the main request is not allowable (Article 97(1) EPC.

First auxiliary request

3.1 Allowability of the amendments

According to claim 1 of the first auxiliary request, in the capped filter underdrain block, the underdrain block (16, 76) has at least two conduits (30, 32 and

86, 88) with metering orifices (72) providing communication between said two conduits. In the original application (see page 8, line 31 to page 9, line 5; Figures 3 to 6), there is disclosed an underdrain block with at least one conduit, and a specific example with three conduits with metering orifices. The same remark applies to claim 5 of the first auxiliary request, according to which, in the capped filter underdrain block, the block has at least one conduit (86) therethrough and a top wall (90) having a plurality of orifices (96) in communication with said conduit for receiving said effluent and discharging said backwash fluid, whereby it is further specified that said underdrain block (16, 76) has at least two conduits (30, 32 and 86, 88) with metering orifices (72) providing communication between said two conduits. Also in this case, the specific example shown by original Figures 7 to 9 is with at least three conduits with metering orifices. However, a basis in the original application for an underdrain with only two conduits and metering orifices has not been indicated by the appellant and could not be detected either.

The appellant has not commented these objections, which were also contained in the official communication of the Board dated 22 October 1996. Therefore, the European patent application according to the first auxiliary request does not satisfy the requirement of Article 123(2) EPC, that it may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed.

4. *Second auxiliary request*

4.1 Allowability of the amendments

Claim 1 of the second auxiliary request is based on claim 1 of the first auxiliary request and specifies additionally that the block has at least three (and not two) conduits with metering orifices providing communication between said conduits and that the at least one groove formed in the bottom surface (40) of the cap is for maximizing the distribution of backwash fluid into the filter media above. This construction corresponds to the capped filter underdrain block disclosed in relation with Figures 2 to 6 of the application as originally filed.

Claim 5 of the second auxiliary request is based on claim 5 of the first auxiliary request and specifies additionally that the block has at least three (and not two) conduits with metering orifices providing communication between said conduits and that the ribs on the top wall (90) of the block form a grid and define a plurality of sectors and distribution chambers corresponding thereto, said ribs defining means for maximizing the distribution of backwash fluid into the filter media above. This construction corresponds to the capped filter underdrain block disclosed in relation with Figures 7 to 9 of the application as originally filed.

The dependent claims 2 to 4 and 6 of the second auxiliary request correspond to the dependent claims 4, 5, 8 and to the embodiment of Figures 7 to 9, as originally filed, respectively.

Therefore, the European patent application satisfies the requirement of Article 123(2) EPC.

4.2 Clarity

The independent claims 1 and 5 of the second auxiliary request are in the one part form, which, taking into account objections of lack of clarity during the examination and the appeal procedures, is appropriate in the present case (Rule 29(1) EPC). Although the independent claims refers, for the definition of the porous material of the cap, to features of the filter media which is disposed above the capped filter underdrain block but is not part thereof, this is acceptable in view of the indications in the description (see page 10 as originally filed, lines 6 to 12), for instance about the size of the pores of the cap (700 to 800 µm), whereby ambiguities about the features of the claimed device are avoided. It is to be noted that, in the description (see page 5 as filed with applicant's (appellant's) letter of 5 September 1994, lines 30 to 32), the words "the characterizing part of" are to be deleted, because claims 1 and 5 are in the one-part form; moreover, on page 9, lines 2 to 5, the words "at least one conduit" are to be replaced by "at least three conduits", for conformity to the claims 1 and 5. Therefore, the claims of the second auxiliary request define correctly the matter for which protection is sought, so that they are clear in the sense of Article 84 EPC.

4.3 Novelty

The capped filter underdrain block of claim 1 of the second auxiliary request has a cap (18) having at least one groove (62) formed in the bottom surface (40) of said cap, said at least one groove (62) defining means for maximizing the distribution of backwash fluid into the filter media above the top surface (38) of said cap. The device of claim 5 of the same request comprises a plurality of ribs (92) on the

top wall (90) of the block forming a grid defining a plurality of sectors, each sector encompassing at least one of said orifices, wherein said ribs define means for maximizing the distribution of backwash fluid into the filter media above the top surface of the cap. Thus, the device of claim 5 is distinguished from the device of claim 1 in that it comprises, for maximizing the distribution of backwash fluid into the filter media, ribs on the block in place of grooves in the cap.

From US-A-4 065 391 (see column 2, lines 15 to 58; column 3, line 22 to column 7, line 34; Figures 1 to 7), there is known a filter underdrain block (14) in a gravity filter having a filter bottom on which said block is located, said block having a plurality of orifices (43) in a top wall (34) for receiving effluent in a downflow mode from a filter media (11) disposed above said block and for discharging a backwash fluid in an upflow mode into said filter media (11); moreover, the block (14) has at least three conduits (31, 32) therethrough with metering orifices (41, 42) providing communication between said conduits; the plurality of orifices (43) in the top wall of the block are in communication with said conduits for receiving the effluent and discharging the backwash fluid. However, contrary to the devices of the independent claims of the second auxiliary request, the block of US-A-4 065 391 is not capped, but is provided with an overlying layer (12) of a material such as sand gravel and thus does not comprise all the features of these claims related to the cap.

From US-A-2 154 167 (see page 1, left-hand column, line 1 to right-hand column, line 10; line 32 to page 3, left-hand column, line 3; Figures 1 to 5), there is known another filter underdrain block (8) in

a gravity filter having a filter bottom on which said block is located, said block having a plurality of orifices in a top wall for receiving effluent in a downflow mode from a filter media (9) which can be disposed above said block and for discharging a backwash fluid in an upflow mode into the volume above it, in particular in said filter media, when disposed in said volume; moreover, the block (8), which is made of adjacent ceramic units, has at least three conduits. However, contrary to the devices of the independent claims of the second auxiliary request, the lateral walls of said conduits of US-A-2 154 167 are not provided therethrough with metering orifices (41, 42) providing communication between said conduits and the top wall of the block for receiving the effluent and discharging the backwash fluid, but are indicated as being impervious to said fluids; moreover, the block of US-A-2 154 167 is not capped. Incidentally, it is to be noted that the further embodiments of US-A-2 154 167 (see page 3, left-hand column, lines 4 to 53; Figures 6 and 7) are of a different type in that the units of the underdrain block themselves perform the filtering function and the channels (19) are in the foundation of the drain and not in the flat permeable ceramic units (20), respectively. Thus, US-A-2 154 167, from which an underdrain construction with conduits with metering orifices is not derivable, is less relevant than US-A-4 065 391.

Therefore, the subject-matter of claims 1 and 5 is novel in the sense of Article 54 EPC.

4.4 Inventive step

Starting from US-A-4 065 391, which shows an underdrain block containing conduits and metering orifices to the effect of distributing the backwash

fluids, and taking into account the particular problem mentioned in the present application (see page 1, line 7 to page 3, line 6; Figure 1) of avoiding the penetration of fine grain filter media in this underdrain block, it is only with hindsight that it would be obvious to superpose, for supporting the filter media, the porous plate of US-A-2 154 167, which is either an underdrain or an underdrain and a filter, on the underdrain block of US-A-4 065 391 or to replace the gravel in said US-A-4 065 391 by said porous plate because, as convincingly argued by the appellant, such a porous plate is directly derivable as being a poor distributor, in particular for the backwash fluids. Therefore, the subject-matter of claims 1 and 5 of the second auxiliary request involves an inventive step in the sense of Article 56 EPC.

5. Therefore, the claims of the second auxiliary request are allowable and a patent can be granted (Article 52(1) and 97(2) EPC), so that oral proceedings are not necessary.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division with the order to grant a patent on the basis of the following documents:

Claims: Nos. 1 to 6 annexed to the official communication of the Board dated 22 October 1996 and accepted as second auxiliary request by the appellant with his letter dated 22 April 1997;

Description: Pages 1 to 4 and 6 to 15 as originally filed; Page 5 filed with applicant's (appellant's) letter of 5 September 1994; with the words "the characterizing part of", on page 5, lines 30 to 32, to be deleted, and
the words "at least one conduit", on page 9, lines 2 to 5, to be replaced by "at least three conduits"; and

Drawings: Sheets 1/3 to 3/3 as originally filed.

The Registrar: The Chairman:

P. Martorana E.Turrini

MCH