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D E C I S I O N
of 29 October 1996

Case Number: T 0814/94 - 3.2.4

Application Number: 90122049.1

Publication Number: 0433676

IPC: A47L 15/42

Language of the proceedings: EN

Title of invention:

Improvements to the water softening system in a washing machine

Applicant:

MERLONI ELETTRODOMESTICI S.p.A.

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step - yes"

Decisions cited:

-

Catchword:

-



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Boards of Appeal

Chambres de recours

Case Number: T 0814/94 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 29 October 1996

Appellants:

MERLONI ELETTRODOMESTICI S.p.A.
Viale Aristide Merloni, 45
I-60044 Fabriano (AN) (IT)

Representative:

Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 19 May 1994
refusing European patent application
No. 90 122 049.1 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: C. A. J. Andries
Members: M. G. Hatherly
J. P. B. Seitz

Summary of Facts and Submissions

I. On 15 July 1994 the appellants (applicants) lodged an appeal against the decision of the examining division dispatched on 19 May 1994 to refuse the European patent application No. 90 122 049.1 (publication No. 0 433 676) for lack of inventive step. The appeal fee was paid simultaneously and the statement of grounds of appeal was received on 19 September 1994.

II. The search report lists the following prior art documents:

D1: EP-A-0 219 704
D2: DE-A-2 630 164
D3: FR-A-1 420 017

III. The statement of grounds of appeal included new sets of claims for main and auxiliary requests. The board suggested amendments in its communication of 8 August 1996 that it considered would bring the application into a grantable condition. In their letter of 8 October 1996 the appellants agreed to the suggestions except for the final part of the suggested claim 1.

IV. The appellants' **main request** is that the decision of the examining division be set aside and that a patent be granted on the basis of:

claims: claim 1 accompanying the board's communication of 8 August 1996 but ending "being located in the lowermost zone of the salt container (3)."
claims 2 to 10 accompanying the board's communication of 8 August 1996

description: pages 1 to 5 accompanying the board's communication of 8 August 1996

drawings: Figures 1 to 3 of the patent application as originally filed on 17 November 1990

The appellants' **auxiliary request** is the same as the main request except that the final part of claim 1 reads "being substantially located in the bottom of the salt container (3)."

There is also an **auxiliary request** for oral proceedings.

V. Claim 1 of the main request reads as follows:

"Water softening system in a washing machine, particularly a dishwasher for domestic use, comprising:

- a vessel (1) for ion exchange resins which have to be periodically regenerated by passing a sodium chloride solution through them;
- a salt container (3) for sodium chloride having an inlet (4), adapted to be supplied with a fixed volume of water, and an outlet (14) connected to said vessel (1) for ion exchange resins;
- means (6-10,12) operable for changing the path of said water within said salt container (3) in order to vary the sodium chloride concentration of said fixed volume of water to be used for the regeneration of said ion exchange resins,

characterised in that said means (6-10,12) allow the selection of the desired path or paths among a plurality of possible paths of different lengths (6,8a,8b,8c;7,9a,9b,9c) being located in the lowermost zone of the salt container (3)."

Reasons for the Decision

1. The appeal is admissible.
2. *Amendments - main request*

Claim 1 of the main request is the result of clarifying all the features of the originally filed claim 1 and features from the originally filed claims 4, 8 and 9.

The dependent claims 2 to 10 for the main request are derivable from the originally filed dependent claims, description and drawings.

The present description for the main request is a clarified version of the originally filed description with a acknowledgement of the prior art and adaptation to claim 1 of the main request.

The drawings for the main request are as originally filed.

Accordingly the board sees no objection under Article 123(2) EPC to the present version of the application for the main request.

3. *Novelty - claim 1 of the main request*

Claim 1 of the main request specifies that the paths of different lengths are located in the **lowermost** zone of the salt container, whereas in the system of document D1 (see Figure 1) one flow path 21 of the two flow paths is in the **upper** portion of the salt container 7.

Document D2 discloses one path through the brine container and one path bypassing the brine container. Figure 2 of document D3 shows paths 13, 14 through the salt and a path (via a hole 13 in a separating wall 12) which bypasses the salt. Thus neither document discloses a plurality of **selectable** paths through the salt as required by claim 1 of the main request.

Therefore the subject-matter of claim 1 of the main request is considered novel within the meaning of Article 54 EPC.

4. *Closest prior art, problem and solution - claim 1 of the main request*

4.1 The prior art document closest to claim 1 of the main request is document D1 since this is the only document disclosing two selectable flow paths in a washing machine water softening system salt container, namely one flow path 22 (from the perforated diffuser 15 to the lower port 12) in the lower portion of the salt container 7 and another flow path 21 (from the perforated diffuser 15 to the upper port 9) in the upper portion of the salt container 7.

4.2 The board considers that the system of the document D1 behaves in the following way.

After allowing time for a newly added charge of undissolved salt to dissolve, there will be saturated brine and undissolved salt in the prior art salt container. The undissolved salt will sink and its upper level will depend on the amount of undissolved salt present in the salt container (whereas the upper level of the brine will remain constant).

If the upper port 9 of the salt container is selected, then

- in the first case, when the salt container contains undissolved salt up to the level of the upper port 9, there will be brine and undissolved salt over all the distance from the perforated diffuser 15 to the upper port 9, whereas
- in the second case, when the salt container is almost empty of undissolved salt, then there will only be brine over most of the distance from the perforated diffuser 15 to the upper port 9 so that the brine leaving via the upper port 9 will be weaker than in the first case.

Thus the salt concentration of the brine leaving the salt container of document D1 after following the longer path is dependent on the level of undissolved salt in the salt container. The operator wishes to select the exiting brine's salt concentration in response to the hardness of the water supply (see document D1, column 2, lines 14 to 18) but fails to achieve predetermined different concentrations with the shorter and longer paths, achieving instead a predetermined concentration with the shorter path and a concentration with the longer path which is dependent on the level of undissolved salt in the salt container.

- 4.3 The problem arising from the system disclosed by document D1 is therefore to provide a water softening system in a washing machine which achieves optimal resins regeneration under all conditions.
- 4.4 In the system of the present invention, by locating the plurality of possible inlet to outlet paths in the lowermost zone of the salt container 3, when the longer path 6, 8a, 8b, 14 is selected, then both when the salt container contains a lot of undissolved salt and when the salt container contains only a little undissolved salt, there will be brine and undissolved salt over all the distance from inlet to outlet. Thus the salt concentration of the brine leaving the salt container of the present system after following the longer path will tend to be independent of the level of undissolved salt in the salt container. The operator will achieve predetermined different concentrations with the shorter and longer paths.
- 4.5 The board thus considers the problem arising from the prior art to be solved by the features of claim 1 of the main request, in particular by the features of the characterising portion.
5. *Inventive step*
- 5.1 Once the skilled person has noticed that the dishwasher according to document D1 sometimes achieves poor results, he can be expected to investigate why. He can be expected to look at various factors such as the particular detergent being used, the washing temperature and the washing cycle. He can be expected to include the hardness of the water and the regeneration of the water softener in his investigations because document D1 concentrates on these topics.

The skilled person must first realise that the poor washing is caused by what has happened beforehand, namely a poor regeneration cycle of the water softener. After he realises this, if the poor results (perceived either as poor washing or hard water or poor resin regeneration) were to occur every time that the longer flow path was selected, then he could be expected to realise that he needed to investigate the longer flow path. On the other hand, if the poor results occurred every time when the salt in the container was close to needing to be refilled, then he could be expected to investigate the salt level.

However, even when the longer flow path is selected the poor regeneration does not occur all the time. Similarly the regeneration is not always poor when the salt level is low. The board considers that something beyond the capabilities of the skilled person is needed to realise that it is the combination of longer flow path and low salt level that is the cause.

Thus the analysis of the cause of the poor results sometimes achieved by the dishwasher according to document D1 constitutes part of the inventive step of the present invention.

Only after he realises that he must deal with the combination of longer flow path and low salt level is he in a position to rectify the situation. He might choose to more closely control the salt level in the container. Since neither document D2 nor D3 discloses a plurality of **selectable** paths through the salt, neither could help the skilled person towards the claimed solution. He needs to realise that the conditions in the lowermost zone of the salt container remain largely

unchanged regardless of the salt level in the container. Only then would he be likely to choose to locate both paths in this lowermost zone.

Thus the board considers that, in addition to the inventive step in realising that the cause of the poor results is the aforesaid combination, there is inventive merit in locating both paths in the lowermost zone of the salt container. The present system is advantageous over the system of document D1 for reasons which are not at first apparent.

- 5.2 The examining division argues on page 7, lines 16 to 19 of its decision that both the prior art document D1 and the present application aim to solve the same problem, namely controlling the degree of regeneration of the water softener.

However the board considers that the present invention provides for an optimum control of the water softener regeneration under conditions when the system of document D1 proves inadequate.

- 5.3 The first paragraph of page 8 of the decision alleges that the prior art regeneration system provides the same effect to that obtained by the present invention, namely the variation of the brine's salt concentration, even though in the prior art the longer path is not located in the lower portion of the salt container.

While the board agrees that in both the prior art and the present invention the salt concentration of the brine delivered from the salt container is greater when the longer path is selected, it points out that the ,

effect needed when the longer path is selected is not merely to achieve a greater salt concentration of the delivered brine but also to achieve a **constant** salt concentration even when the salt level varies.

- 5.4 The decision continues on page 8, line 27 to page 9, line 6 that the only difference might be that the brine delivered by the longer path in the present system is more concentrated than that delivered by the longer path in the prior art system since in the prior art system both paths are located in the lower portion of the salt container but that under no circumstances would the brine delivered by the prior art system have the same salt concentration irrespective of which flow path was selected.

The board however sees a further difference, that the brine delivered by the longer path in the present system has a more constant concentration under varying salt levels in the salt container than that delivered by the longer path in the prior art system. The brine delivered by the prior art system would have different salt concentrations dependent not only on which path is selected but also dependent on the salt level in the salt container.

- 5.5 According to page 9, lines 7 to 16 of the decision it is obvious to located all paths in the lower portion of the salt container since this portion has the highest salt concentration, the more so since document D1 states that it provides the same advantages as the claimed water softening system.

However the board considers that what is important is not that this portion of the salt container has the highest salt concentration but that it has a substantially constant composition in order to give a

constant salt concentration even when the salt level varies, see page 5, lines 1 and 2 of the originally filed description of the present application. Document D1 makes no mention of the varying level of salt in the container.

- 5.6 The board cannot see that any combination of the documents available to it would lead to the subject-matter of claim 1 of the main request.
6. The subject-matter of claim 1 of the main request is thus patentable as required by Article 52 EPC. A patent may therefore be granted based on this allowable independent claim and on claims 2 to 10 which are dependent on claim 1.
7. In these circumstances, claim 1 of the auxiliary request need not be examined and there is no need to grant the auxiliary request for oral proceedings.

Order

for these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent in the following version:

claims: claim 1 accompanying the board's communication of 8 August 1996 but whose characterising portion reads:
"characterised in that said means (6-10,12) allow the selection of the desired path or paths among a plurality of possible paths of different lengths (6,8a,8b,8c;7,9a,9b,9c) being located in the lowermost zone of the salt container (3)."

claims 2 to 10 accompanying the board's communication of 8 August 1996

description: pages 1 to 5 accompanying the board's communication of 8 August 1996

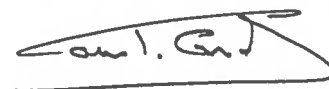
drawings: Figures 1 to 3 of the patent application as originally filed on 17 November 1990

The Registrar:



N. Maslin

The Chairman: —



C. Andries

