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D E C I S I O N
of 18 March 1998

Case Number: T 0176/97 - 3.3.5

Application Number: 91303873.3

Publication Number: 0467505

IPC: C02F 1/469

Language of the proceedings: EN

Title of invention:
Method and apparatus for treating fluid

Patentee:
Ibbott, Jack Kenneth

Opponent:
Ion Enterprises Ltd

Headword:
Ionizing fluid/IBBOTT

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no) - non-functional modification"

Decisions cited:
T 0119/82, T 1027/93

Catchword:
-



Case Number: T 0176/97 - 3.3.5

D E C I S I O N
of the Technical Board of Appeal 3.3.5
of 18 March 1998

Appellant:
(Opponent)

Ion Enterprises Ltd.
Unit 9, Pomeroy Buildings
Grove Trading Estate
Dorchester, DT1 1ST (GB)

Representative:

Harris, Ian Richard
D. Young & Co.
21 New Fetter Lane
London EC4A 1DA (GB)

Respondent:
(Proprietor of the patent)

Ibbott, Jack Kenneth
17-7, Nishiazabu 4-chome
Minato-ku
Tokyo 106 (JP)

Representative:

Charlton, Peter John
Elkington and Fife
Prospect House
8 Pembroke Road
Sevenoaks, Kent TN13 1XR (GB)

Decision under appeal: Interlocutory decision of the Opposition Division of the European Patent Office posted 16 December 1996 concerning the maintenance of European patent No. 0 467 505 in amended form.

Composition of the Board:

Chairman: R. K. Spangenberg
Members: G. J. Wassenaar
J. H. van Moer

Summary of Facts and Submissions

I. The appeal is from the decision of the Opposition Division maintaining European patent No. 0 467 505 in amended form with claims 1 and 21 as filed with a letter dated 15 June 1995 and claims 2 to 20 and 22 to 27 as granted. Claim 1 reads as follows:

"Apparatus for treating electrically conductive fluid, said apparatus comprising:

a positive electrode (1) of electrically conductive material; a negative electrode (2) of electrically conductive material that is spaced apart and electrically isolated from the electrically conductive material of said positive electrode (1), the electrically conductive materials of said electrodes (1,2), having different electrochemical potentials such that when a body of electrically conductive fluid to be treated in the device extends between said electrodes (1,2), an electroconductive connection that develops an electroconductive potential between said electrodes is only established through the body of fluid whereby the fluid is ionized; and an electrical insulator (3) disposed between said positive and said negative electrodes so as to separate the body of fluid into a portion in contact with the positive electrode and a portion in contact with the negative electrode, the electrical insulator extending across any shortest direct path between the spaced apart electrically conductive material of said electrodes (1,2), thereby inhibiting current flow in the body of fluid to be treated by the apparatus by causing the electroconductive connection between said electrodes (1,2) to be established through the body of fluid along a path that extends around said electrical insulator so as to be longer than said any shortest direct path.

II. The Opposition Division considered, inter alia, the following documents:

D2: EP-A-0 267 296

D3: Brochure ION-CLEAN (1989), J.K.Industries, Inc.
Tokyo

D6: Statutory Declaration by Dr. S. Turgoose, dated
30 September 1994

III. In the statement of the grounds of appeal, the Appellant maintained his position that the subject-matter of claim 1 lacked novelty. He further maintained that claim 1 related to no more than an obvious modification of the devices known from D2 and D3.

IV. The Respondent refuted the Appellant's arguments and filed auxiliary requests A to D, dated 23 January 1998. With respect to inventive step, he argued that D2 and D3 contained no pointer towards the use of an additional resistor between the electrodes, and that there was no incentive whatsoever for a skilled person to have considered modifying the known devices in the manner proposed by the patent in suit.

During the oral proceedings held on 17 and 18 March 1998, the Respondent withdrew auxiliary requests A and B. The versions of claim 1 in the remaining auxiliary requests C and D read as follows:

Auxiliary request C:

"Apparatus for treating electrically conductive fluid, said apparatus comprising:

a tubular member (4); a positive electrode (1) of electrically conductive material; a negative electrode (2) of electrically conductive material that is spaced apart and electrically isolated from the electrically conductive material of said positive electrode (1),

the electrically conductive materials of said electrodes (1,2), having different electrochemical potentials such that when a body of electrically conductive fluid to be treated in the device extends between said electrodes (1,2), an electroconductive connection that develops an electroconductive potential between said electrodes is only established through the body of fluid whereby the fluid is ionized; and

an electrical insulator (3) disposed between said positive and said negative electrodes so as to separate the body of fluid into a portion in contact with the positive electrode and a portion in contact with the negative electrode, the electrical insulator extending across each and every shortest direct path between the spaced apart electrically conductive material of said electrodes (1,2), thereby inhibiting current flow in the body of fluid to be treated by the apparatus by causing the electroconductive connection between said electrodes (1,2) to be established through the body of fluid along a path that extends around said electrical insulator so as to be longer than said each and every shortest direct path; the electrodes (1,2) and the electrical insulator (3) all being provided internally of the tubular member (4) and being electrically isolated therefrom."

Auxiliary request D:

"Apparatus for treating electrically conductive fluid, said apparatus comprising:

a positive electrode (1) of electrically conductive material; a negative electrode (2) of electrically conductive material that is spaced apart and electrically isolated from the electrically conductive material of said positive electrode (1),

the electrically conductive materials of said electrodes (1,2), having different electrochemical potentials such that when a body of electrically conductive fluid to be treated in the device extends between said electrodes (1,2), an electroconductive connection that develops an electroconductive potential between said electrodes is only established through the body of fluid whereby the fluid is ionized; and an electrical insulator (3) disposed between said positive and said negative electrodes so as to separate the body of fluid into a portion in contact with the positive electrode and a portion in contact with the negative electrode, the electrical insulator extending across any shortest direct path between the spaced apart electrically conductive material of said electrodes (1,2), thereby inhibiting current flow in the body of fluid to be treated by the apparatus by causing the electroconductive connection between said electrodes (1,2) to be established through the body of fluid along a path that extends around said electrical insulator so as to be longer than said any shortest direct path;

wherein said electrical insulator (3) extends longitudinally beyond respective ends of said positive and said negative electrodes (1,2) in the apparatus;

wherein both of said electrodes (1,2) and said electrical insulator (3) are tubular, said electrical insulator (3) being interposed between a radially innermost one of the tubular electrodes (1) and a radially outermost one of the tubular electrodes (2); and

wherein said electrical insulator (3) is spaced radially inwardly of the radially outermost one of said electrodes (2) and is disposed around and in contact with the radially innermost one of said electrodes (1)."

- V. - 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 (main request), or auxiliarily, that the decision under appeal be set aside and the patent be maintained on the basis of:

- First auxiliary request:

claims 1 and 21 submitted as auxiliary request C with a letter of 23 January 1998; claims 2 to 20 and 22 to 27 as granted.

- Second auxiliary request:

claims 1 to 3 submitted as auxiliary request D with a letter of 23 January 1998.

At the end of the oral proceedings the decision was announced.

Reasons for the Decision

1. The appeal is admissible.
2. The amendments fulfil the requirements of Article 123(2) and (3) EPC.
3. In the Board's judgement none of the documents on file discloses in combination all the features of any of the present claims so that novelty is accepted. Although this was contested by the Appellant, there is no need to give reasons for this finding, since, for the reasons given below, the Respondent's requests failed on another ground.
4. *Inventive step (main request)*
 - 4.1 The Board considers that D2 represents the closest state of the art. This finding was not contested by the parties.

D2 discloses a device for treating an electroconductive fluid comprising a positive electrode spaced apart and electrically isolated from a negative electrode, the electrodes having different electrochemical potentials (pages 12 to 14 and Figure 5). According to the patent in suit the apparatus of the invention prevents the precipitation of dissolved solids even in a fluid having a high dissolved solid content and a high conductivity, and prevents the formation of scale in a piping system and removes previously deposited scale therein (column 3, line 47 to column 4, line 8). Such properties are, however, also postulated for the apparatus according to D2 (see page 3, last paragraph, page 14, lines 1 to 10 and page 16, last paragraph). The Respondent has not provided evidence that the apparatus according to present claim 1 has any

advantages over the apparatus according to D2. Under these circumstances the Board regards the technical problem underlying the invention as being the provision of an alternative apparatus for treating electrically conductive fluid suitable for the reduction and/or prevention of scale.

The patent in suit proposes to solve this problem essentially by inserting an electrical insulator into the space between the two electrodes of the device according to D2.

The Appellant has not questioned the scale removing or preventing properties of the claimed apparatus. The Board therefore accepts that the above-mentioned problem is thereby solved.

- 4.2 It remains to be decided whether the modifications according to present claim 1 with respect to the known device disclosed in D2 are obvious to a person skilled in the art.

The apparatus according to present claim 1 differs from the device disclosed in D2 in that an electrical insulator is disposed between the two electrodes to separate the body of fluid into a portion in contact with the positive electrode and a portion in contact with the negative electrode such that the electrical insulator extends beyond any shortest direct path between the electrodes.

According to the Respondent, the introduction of such an insulator has the effect that the electrical resistance between the electrodes is increased, which further reduces the current between the electrodes.

4.3 Such a reduction of the current can only be considered if it can be established that in the device according to Figure 5 of D2 an electric current flows between the two electrodes. This was contested by the Appellant, who submitted that no current exists between the electrodes, as testified by Dr. S. Turgoose (D6). In the Board's judgment, the finding in D6 is consistent with common general knowledge. In the devices according to D2 as well as according to the patent in suit, the positive electrode is preferably a carbon electrode (see D2, page 11, last paragraph and the description of the patent in suit, column 9, lines 50 to 53), which is, apart from the connection through the electrically conductive fluid, electrically insulated from the negative electrode, which is preferably made of aluminium. A carbon electrode is substantially inert in water, the only fluid in which scale formation plays a role, so that, even if an electrochemical potential difference may be measurable between the two electrodes, this difference cannot cause the flow of an electric current between the isolated electrodes. Electrical currents may be generated by the galvanic cells formed through the not excluded electrical contact of the aluminium electrode with other metallic parts of the apparatus or the pipe line in which the apparatus is located. These currents will, however, not be limited by an electrical insulator between the aluminium and the carbon electrode.

4.4 It follows from the above considerations that, in the absence of any proof for the alleged influence of the said electrical insulator on scale reduction or on any other technically relevant property of the device, the Board can only consider the addition of the said electrical insulator to the device according to D2 as a modification which at best has no technical function, and may even be technically disadvantageous.

A technical disadvantage caused by the introduction of the electrical insulator can be seen in the more complicated construction and in the obstruction of the water flow. Such disadvantageous modifications do not involve an inventive step, if the skilled person could clearly predict these disadvantages and was right in his assessment thereof, and if, as is the case here, these predictable disadvantages were not compensated by any unexpected technical advantage (see T 119/82, OJ EPO, 1984, 217). In this situation the Respondent's submission that a skilled person would have had no incentive to consider the modification is no indication of an inventive step.

Similar considerations apply to technically non-functional modifications.

The Board is aware of decision T 1027/93 of 11 November 1994 (not published in OJ EPO), in which another Board observed (obiter) that the EPC does not require that an invention, to be patentable, must entail any useful effect, and that the apparent futility of a given *modus operandi* could rather be said to render it completely non-obvious.

In this respect, the Board wants to emphasize that the notion of "non-obviousness" is related to the concept of "invention". The concept of "invention" implies a technical character. This follows directly from the wording of Article 56 EPC, wherein the expressions "invention" and "obvious" are linked with "state of the art" and "a person skilled in the art" (see also Schulte, Patentgesetz mit EPÜ, 5th edition, pages 12 to 13). In the Board's judgment, technically non-functional modifications are therefore irrelevant to inventive step, even if the skilled person would never think of such a modification. A parallel can be drawn here with a new design based on a known technical

concept. That new design might be a surprise and thus "not obvious" for professional designers. Nevertheless if the modifications have no technical relevance and are, from a technical point of view, arbitrary, the new design is not patentable and does not involve an inventive step within the meaning of Article 56 EPC. In the present case the device according to claim 1 is considered to be no more than an arbitrary modification of the design of the device according to D2 which does not involve an inventive step within the meaning of Article 56 EPC.

5. *Inventive step (first auxiliary request)*

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the electrodes and the electrical insulator between them are provided within a tubular member and are electrically isolated therefrom. With respect to this claim D3 is considered to represent the closest prior art. D3 discloses a device for scale control comprising a positive carbon electrode and a negative aluminium electrode. The positive electrode is formed by a carbon rod which is supported longitudinally with the aluminium negative electrode by moulded teflon members. The aluminium and longitudinally supported carbon are contained in an outer steel casing with a layer of insulation between the aluminium and the steel casing (see the page with the heading FUNDAMENTALS OF ION-CLEAN). The ION-CLEAN devices according to D3 can thus be regarded as further developments of the apparatus according to D2, in which the aluminium electrode is insulated from the casing. Present claim 1 differs therefrom only by the presence of the additional insulator between the two electrodes. The present situation is therefore quite similar to that considered in point 4.3 above, so that there is again no evidence that the insulator has any technical

effect. Thus, for substantially the same reasons as given above under point 4.4, the provision of an apparatus according to present claim 1 does not involve an inventive step.

6. *Inventive step (second auxiliary request)*

Claim 1 of the second auxiliary request differs from claim 1 of the main request essentially by the requirement that the electrodes and the electrical insulator between them are tubular. Since the negative electrode in the apparatus according to D2 is also tubular, the apparatus according to claim 1 of the second auxiliary request differs from the apparatus disclosed by D2 only by the use of a tubular central electrode and a tubular electrical insulator in contact therewith. Here again, no technically relevant effects have been made credible for such a modification, so that it must be considered as an obvious alternative for the same reasons as given above under points 4.3 and 4.4.


7. Thus the Respondent's requests all contain at least one claim which lacks an inventive step, so that neither of them can form the basis for the maintenance of the patent. Consequently, the patent has to be revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:



S. Hue

The Chairman:



R. Spangenberg

