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17

Aktenzeichen / Case Number / N° du recours : T 148/84

Anmeldenummer / Filing No / N° de la demande : 80 302 552.7

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 023 808

Bezeichnung der Erfindung:
Title of invention:
Titre de l'invention : Nuclear steam generator

Klassifikation / Classification / Classement : F 22 B 37/48

ENTSCHEIDUNG / DECISION

vom / of / du 7 November 1986

Anmelder / Applicant / Demandeur : Westinghouse Electric Corp.

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Art. 56

Kennwort / Keyword / Mot clé : "Inventive step"

Leitsatz / Headnote / Sommaire

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Case Number : T 148/84

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 7 November 1986

Appellant : Westinghouse Electric Corporation
Westinghouse Building, Gateway Centre
Pittsburgh Pennsylvania 15222 (USA)

Representative : van Berlyn, Ronald
23 Centre Heights
London NW3 6JG (GB)

Decision under appeal : **Decision of Examining Division 072 of the European Patent Office dated 7 March 1984 refusing European patent application No. 80 302 552.7 pursuant to Article 97(1) EPC**

Composition of the Board :

Chairman : P. Delbecque
Member : F. Gumbel
Member : P. Ford

Summary of Facts and Submissions

I. European patent application No. 80 302 552.7 filed on 25 July 1980 and published on 11 February 1981 under No. 0 023 808, claiming priority from a prior application in the United States of America of 25 July 1979 was refused by a decision of the Examining Division 072 dated 7 March 1984.

II. The reason given for the refusal was that in view of the prior art disclosed by US-A-3 916 844 and US-A-3 114 353 Claim 1 lacked an inventive step within the meaning of Article 56 EPC.

III. On 11 May 1984 the Appellant lodged an appeal against the decision and submitted the statement of grounds on the same date. The appeal fee was paid on 16 May 1984. The Appellant argued that a person skilled in the art could not deduce the subject-matter from anything disclosed in the art.

The Appellant requested in the notice of appeal that the decision should be set aside and that a patent be granted on the application on which the decision was based.

IV. As a result of objections raised by the Board of appeal during the procedure before the Board, the Appellant submitted on 11 March 1986 a new page 4 (description) and a new page 6 (part of Claim 1) and on 4 September 1986 new pages 1 and 2 (description). He requested furtnermore to revise Claim 2 filed 8 June 1983 by deleting "and within " at line 9 of page 7.

The main claim now reads as follows :

"A nuclear steam generator comprising a vertically oriented housing having a heat exchange tube bundle arranged in its

lower portion for generating steam therein, water droplet separating means arranged in the top portion for separating any water from the steam generated in the lower portion and passing through the upper portion, a steam outlet nozzle (38) arranged in the top portion of the steam generator, an annular feedwater discharge tube arranged in the top portion of said steam generator for supplying feedwater thereto and a water collecting chamber (60) below said separating means (26, 34, 36) for collecting therefrom the water separated from said steam and permitting settling of sludge for removal thereof from said steam generator, the sludge-free liquid being permitted to overflow said chamber for return to the bottom of the steam generator, characterized in that said water collecting chamber (60) is arranged above said heat exchange tube bundle (16) and a perforated baffle (62) extends across said water collecting chamber (60) spaced from the bottom of said chamber (60) so as to avoid turbulence of the water below said baffle and enhance settling of the sludge at the bottom of said chamber (60) and a blow-down pipe (68) is connected to the bottom of said collecting chamber (60) for removal of sludge therefrom, and that said annular feedwater discharge tube is disposed below said water collecting chamber (60) so as to discharge the feed water into the recirculation water overflowing said water collecting chamber (60)."

Reasons for the Decision

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

2. In the Board's view no objection may be raised to the preamble of Claim 1 acknowledging as known a steam generator as disclosed in US-A-3 916 844 to which incidentally the

Appellants already referred in their original application as the relevant prior art from which the invention sets out. The features stated in the prior art part of Claim 1 are, in combination, part of that most pertinent prior art and therefore Rule 29(1)(a) EPC is complied with.

Those features stated in the characterizing portion of Claim 1 differ from the prior art referred to above with respect to the salient features which the Appellants desire to protect in combination with the features of the preamble, thus Rule 29(1)(b) EPC is likewise complied with.

The effective description contains the proper acknowledgement of the pertinent background art and states the technical problem and its solution in a comprehensive manner. Thus it meets the requirements of Rule 27(1)(c) and (d). Furthermore, the contents of the new Claims 1 to 3 do not go beyond the content of the application as filed. The requirements of Article 123(2) EPC are therefore also met. Consequently, the application is formally in conformity with the requirements of the Convention.

3. The examination as to whether the device according to Claim 1 is disclosed in any other of the documents uncovered by the search report leads to the conclusion that concurrent with the impugned decision the subject-matter of Claim 1 is novel.

4. In the device of the same kind known from US-A-3 916 844 the incoming feed water of low concentration of suspended solids is received in a settling chamber also receiving returning carry-over water of high concentration of such solids, which leads to a dilution upon mixing with the incoming water.

By means of such an arrangement the settling of the solids is disturbed by the incoming water. Also the large quantities of feed water to be mixed with the carry-over water is a serious disadvantage because of its resulting relatively low concentration of suspended solid material.

Therefore the technical problem to be solved underlying the present application resides in the provision of an efficient sludge collecting and removal structure avoiding the settling of sludge around the bottom ends of the heat exchange tubes of the stem generator. The solution to this problem is based on the idea of making use of a chamber merely collecting liquid separated from the steam containing a high proportion of solid materials.

4.1 The features by which the generator according to Claim 1 of the European application differs from the generator according to the closest state of the art as described in US-A-3 916 844 are that:

- the collecting chamber is arranged above the heat exchange bundle,

- the collecting chamber is provided with a perforated baffle extending across that chamber and spaced from its bottom,

- a blow-down pipe is connected to the bottom of the collecting chamber,

- the annular feed water discharge tube is disposed below the water collecting chamber.

4.2 There is no indication in US-A-3 916 844 nor in any other of the uncovered documents, pointing to the above-

mentioned idea leading to the solution proposed by the European application.

4.2.1 Although in US-A-3 114 353 the feature that the collecting chamber is arranged above the heat exchange bundle is disclosed per se, this is done in a different context; namely with a system wnere the feedwater is discharged together with the recirculating water through a discharge opening in the bottom of the collecting chamber. Since this arrangement apparently would be inappropriate for collecting sludge in the chamber, the skilled man is not likely to deduce any suggestion regarding the solution to the existing problem from that document.

4.4.2 The perforated vertical baffle plate demarcating the settling chamber on one side according to US-A-3 916 844 can in no way be compared with the perforated baffle plate extending across the settling chamber and spaced from the bottom, thereby creating a settling space where the recirculating secondary feed water, coming from the separators, enters and where the particulate material is permitted to settle without being disturbed. None of the other documents upheld during the examination even mentions the use of a perforated baffle plate.

4.2.3 Also the disposition of the blow-down pipe for eliminating the settled particulate material contributes to the solution of the problem. None of the cited documents discloses an evacuation of the particulate material from such an undisturbed part of the collection chamber for best removal of the sludge.

4.2.4 The disposition of the feed water discharge tubes below the water collecting chamber, which is disposed above the heat exchange bundle, also contributes to the solution of the mentioned problem by preventing the fresh incoming secondary water from mixing with the secondary water separated from the steam. In this context it is to be stated that in none of the cited documents is an indication given that the particulate loaded secondary feeding water should be kept separate from the fresh secondary feeding water.

5. As none of the cited documents deals with a steam generator of the kind stated in Claim 1 or suggests a construction of such a steam generator, Claim 1 is allowable under the terms of Art. 52(1) and Art. 56 EPC. Claims 2 and 3 depending from Claim 1 are then equally allowable.

6. The current version of the description and the drawings have been brought in conformity with the amended claims. The amendments meet the formal requirements of the Convention.

Order

For these reasons,
it is decided that:

1. The decision of the Examining Division of 7 March 1984 is set aside.

2. The case is remitted to the first instance with the order to grant a European patent on the basis of:

Claim 1 composed of page 6 received on 11 March 1986 and lines 1 and 2 of page 7 received on 8 June 1983;
Claims 2 and 3 (page 7) received on 8 June 1983 with the correction in Claim 2 applied for on 4 September 1986, deleting "and within" at line 9 of that page 7.

The description : pages 1 and 2 received on 4 September 1986
page 2a received on 8 June 1983
original pages 3 and 5
page 4 received on 11 March 1986

Original drawing sheet 1/1

The Registrar — The Chairman

B A Norman — P. Delbecque