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D E C I S I O N
of 20 September 1995

Case Number: T 0007/93 - 3.2.3

Application Number: 88114794.6

Publication Number: 0306978

IPC: F24H 1/18

Language of the proceedings: EN

Title of invention:
Water heater tank construction

Applicant:
STATE INDUSTRIES, INC.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - (yes) after amendment"

Decisions cited:
-

Catchword:
-

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Case Number: T 0007/93 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 20 September 1995

Appellant: STATE INDUSTRIES, INC.
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Representative: Grünecker, Kinkeldey
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Decision under appeal: **Decision of the Examining Division 073 of the European Patent Office dated 8 May 1992 refusing European patent application No. 88 114 794.6 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. T. Wilson
Members: H. Andrä
L. C. Mancini

Summary of Facts and Submissions

I. European patent application No. 88 114 794.6, filed on 9 September 1988 and published on 15 March 1989, was refused by the decision of the Examining Division dated 8 May 1992.

II. The decision was based on Claims 1 and 2 filed on 29 August 1991.

The reason given for the refusal was that the subject-matter of Claim 1 lacked an inventive step having regard to the prior art disclosed in EP-A-0 126 801 (D1) and in AU-A-500 476 (D2).

III. On 16 July 1992, the Appellant (Applicant) lodged an appeal against this decision paying the appeal fee on the same day. The Statement of Grounds of Appeal was submitted on 7 September 1992 together with a corrected version of Claim 1 according to the main request and a new set of Claims 1 and 2 according to the auxiliary request.

IV. In a communication dated 1 June 1995 the Board set out its provisional opinion that the subject-matter of Claim 1 according to the main request would appear to lack an inventive step or to lack novelty, depending on the interpretation of the wording of the claim, but that the subject-matter of Claims 1 and 2 according to the auxiliary request would not appear to be obvious in the light of the prior art revealed and could therefore form the basis for grant of a patent.

V. With his letter dated 8 August 1995 the Appellant agreed to a text as intended to be granted which comprises Claims 1 and 2 of the auxiliary request dated 7 September 1992, and filed new pages 1, 1a and 2 of the description, filing a new amended page 1 on 1 September 1995. Furthermore, he withdrew his request for oral proceedings.

The Appellant requests the grant of a patent on the basis of the following documents:

Description: page 1, filed on 1 September 1995, pages 1a and 2 filed on 9 August 1995, page 3 as originally filed.

Claims: Claims 1 and 2 dated 7 September 1992 and filed on the same day.

Drawings: sheet 1/1 as originally filed.

Claim 1 reads as follows:

"A water heater tank construction comprised of a tank shell (10) having a tank top member (12) and a tank bottom member (14) mounted therein to provide a water tight space therein, a hot water outlet (52) mounted in the upper portion of said tank shell (10) and a cold water inlet (42) mounted in the lower portion of said tank shell (10), said tank top member (12) having an upwardly extending flange (16) welded to said tank shell (10), at least a portion of the face of said tank top member (12) extending below the level of the uppermost portion of said hot water outlet (52),

characterised in that

said flange (16) has a deformed portion (58) locally limited to the region of said hot water outlet (52) and extending inwardly from said main body of the

flange (16) to provide a space between said shell (10) and said deformed portion (58) and in that said hot water outlet (52) is arranged with at least a portion of said outlet (52) extending into said space provided by said deformed portion (58) of said flange (16) with the face of said tank top member (12) outside said deformed portion (58) being below the level of the uppermost portion of said hot water outlet (52)."

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

Claim 1 is supported essentially by the original Claim 1. The features "...at least a portion of the face of said tank top member (12) extending below the level of the uppermost portion of said hot water outlet (52)..."; "...a deformed portion locally limited to the region of said hot water outlet (52)..."; "...with the face of said tank top member (12) outside said deformed portion (58) being below the level of the uppermost portion of said hot water outlet (52)" according to Claim 1, derive from Figures 1 to 3 of the original drawings (see in particular reference signs 12, 52 and 58 in combination with the appertaining description).

The amendment from "a cold water outlet mounted in lower portion of said tank shell" according to the original Claim 1 to "a cold water inlet (42) mounted in the lower portion of said tank shell (10)" according to present Claim 1 derives from page 3, paragraph 2, and Figure 1 of the original description and drawings, respectively. This amendment constitutes an obvious correction in the sense of Rule 88 EPC and is therefore allowable.

Claim 2 corresponds to the original version of Claim 2.

The amendments to the description concern the adaptation thereof to the claims and the indication of the prior art.

Hence, the Claims 1 and 2, the description and the drawings comply with the requirement of Article 123(2) EPC.

3. *Novelty*

Among the two documents, EP-A-0 126 801 (D1) and AU-A-500 476 (D2), cited in the search report, (D2) reflects the nearest prior art. It describes the features according to the precharacterising portion of Claim 1.

The known water heater tank construction comprises an essentially cylindrical tank shell having a tank top member (10) and a tank bottom member (9) to provide a water tight space. The tank top member (10) is curved into the tank interior to form a rotationally symmetric concave member and has an upwardly extending flange being parallel to the shell over its entire circumference. The location of the hot water outlet opening (13) is shown in Figures 2 and 3 as being essentially flush with the radially inner portion of the top member with only the innermost portion of the top member extending below the level of the uppermost portion of the hot water outlet.

Claim 1 differs from this known water heater tank by the combination of features contained in the characterising portion of the claim.

It follows from the foregoing that the subject-matter of Claim 1 is novel. Since novelty of the claimed subject-matter was not at issue in the proceedings before the first instance, no further explanation in this respect is necessary.

4. *Inventive step*

4.1 In the water heater tank construction known from (D2) a relatively large portion of the tank top member and the tank side wall is not covered by the water, see in particular the circumferential portion of the top member and the adjacent side wall in Figures 2 and 3. The relatively large air space above the tank water level may cause corrosion problems to occur.

The inherent problem of the invention is therefore seen in improving the known water heater tank such that the susceptibility to internal corrosion is reduced.

4.2 The features according to the characterising portion of Claim 1 that the flange (16) has a deformed portion (58) locally limited to the region of said hot water outlet (52) and extending inwardly from said main body of the flange (16) to provide a space between said shell (10) and said deformed portion (58) provides for a space in a circumferentially restricted raised position of the tank into which the water level can rise. The raised water level is arrived at by safe-guarding that the face of the tank top member outside the deformed portion (58) is below the level of the uppermost portion of the hot water outlet (52) and that at least a portion of the outlet extends into the space provided by the deformed portion, according to the further features of the characterising portion of Claim 1.

Thus, only the upper part of the space formed by the locally limited deformed portion of the flange and the corresponding portion of the shell is above the water level and thus exposed to air so that corrosion of the tank interior is markedly reduced as compared to the situation prevailing in the water heater tank known from (D2).

4.3 The nearest prior art according to (D2) deals with the problem of inducing mixing of the cold water with the hot water in a water heater tank so as to disperse the steep temperature gradient at the interfaces (see page 4, last paragraph). (D2) does not tackle the problem of reducing internal corrosion of the water heater tank.

As already outlined in above section 3, (D2) comprises a tank top member which is curved into the tank interior to form a rotationally symmetric concave member. Thus, an air space about the whole circumference of the tank top member and a large area of the tank top member is provided and the upper tank side wall is exposed to air and therefore susceptible to corrosion.

Having regard not only to the underlying problem but also to its solution, this known construction cannot, therefore, suggest a water heater tank arrangement according to Claim 1, that is, in particular, an arrangement comprising a deformed portion of the top member flange which is locally limited to the region of the hot water outlet with the face of the top member outside the deformed portion being below the level of the uppermost portion of the hot water outlet.

4.4 (D1) also referred to in the contested decision envisages as its object to provide a water heater construction which is more effective in reducing adverse

accumulations of scale than prior art constructions. In order to achieve this object, an agitator assembly is provided to produce a swirling action in the bottom portion of the tank, the swirling action being effective to cause solid materials to be maintained in suspension in the water so that at least a portion of such materials will be carried out the hot water outlet means.

No hint of the problem of reducing the internal corrosion of the tank is provided. Having regard to the structural configuration of this known water heater tank, the face of the tank top member (12; Figure 1) extends exclusively above the level of the uppermost portion of the hot water outlet (23; Figure 1) so that the disadvantage caused by a large air space above the water level in view of internal corrosion is present in this construction even to a greater extent that in the construction according to (D2).

Thus, (D1) is more remote from the subject-matter of Claim 1 than (D2) and cannot, taken either individually or in combination with (D2), lead the skilled person in an obvious manner to the subject-matter of Claim 1.

4.5 Hence, it is considered that an inventive activity was required in order to arrive at the claimed water heater tank construction. The subject-matter of Claim 1 thus meets the requirement of Article 56 EPC and the claim is allowable under Article 52(1) EPC.

5. Claim 2 which represents a preferred embodiment of the water heater tank of Claim 1 and is dependent thereupon is likewise allowable.

6. The description complies with Rule 27(1) EPC and does not give rise to any objections.

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 based on the documents set out under section V above.

The Registrar: The Chairman:

N. Maslin C. T. Wilson