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D E C I S I O N
of 19 July 2002

Case Number: T 1073/00 - 3.2.1
Application Number: 97200950.0
Publication Number: 0802002
IPC: B21D 39/04, F16L 13/14,
F16L 13/16

Language of the proceedings: EN

Title of invention:
Method for sealedly joining a flanged coupling onto a pipeline

Applicant:
Snam S.p.A.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-



Case Number: T 1073/00 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 19 July 2002

Appellant: Snam S.p.A.
Piazza Vanoni, 1
I-20097 San Donato Milanese (Milano) (IT)

Representative: Zanardo, Giovanni
Ing. Barzanò & Zanardo
Milano S. p. A.
Via Borgonuovo 10
I-20121 Milan (IT)

Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 21 June 2000
refusing European patent application
No. 97 200 950.0 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: S. Crane
Members: M. Ceyte
G. Weiss

Summary of Facts and Submissions

I. European patent application No. 97 200 950.0 was refused by the Examining Division with its decision posted on 21 June 2000.

The reason given for the decision was that the subject-matter of claim 1 under consideration lacked inventive step having regard to the state of the art represented by the following published documents:

(D1): US-A-4 593 448

(D3): US-A-4 648 626

(D4): EP-A-0 338 164.

The wording of claim 1 on which the decision is based is as follows:

"A method for sealingly joining a coupling to an underwater pipeline, the coupling having an elastic deformation limit which is greater than that of the pipeline, the coupling having at least one internal recess having therein two half rings formed of a material which collapses under pressure, the method comprising the steps of:

i) positioning the coupling over an end of the pipeline such that the at least one internal recess is positioned around a portion of the pipeline;

ii) creating a sealed chamber within the portion of the pipeline having at least one internal recess therearound:

iii) generating a hydraulic pressure in the sealed chamber to plastically expand the pipeline such that said pipeline enters said at least one recess and collapses the half rings therein, while the coupling is brought to its elastic deformation limit; and

iv) lowering the pressure within the chamber, the elastic return of the coupling creating the seal with the underlying pipeline."

Dependent claims 2 and 3 relate to preferred embodiments of the method according to claim 1.

II. A notice of appeal against this decision was filed on 31 July 2000 and the fee for appeal paid at the same time. The statement of grounds of appeal was received on 11 October 2000.

The appellants (applicants) requested that the decision under appeal be set aside and a patent granted on the basis of the claims refused by the Examining Division. They argued that the documents D3 and D4 did not disclose the hydraulic expansion of a pipeline to join it to a coupling in a manner equivalent to that claimed.

III. In a communication pursuant to Article 110(2) EPC dated 13 September 2001 the Board indicated its provisional opinion that it could see no technical reason why the person skilled in the art should not have recourse to hydraulic expansion of the pipeline end when performing the method disclosed in document D1, which was the closest state of the art. In this respect the Board referred, in addition to documents D3 and D4 relied upon by the Examining Division, to FR-A-2 312 310 (D6).

IV. With a letter received on 3 January 2002 the appellants contested the provisional opinion of the Board and drew distinctions between the method disclosed in document D6 and that claimed. They made an auxiliary request for oral proceedings, which the Board accordingly appointed for 27 June 2002.

With a subsequent letter received on 22 January 2002 the appellants submitted in support of their arguments a declaration of Mr Ferrari Aggradi, one of the named inventors in document D1.

On 17 June 2002 the appellants withdrew their request for oral proceedings.

Reasons for the Decision

1. The appeal complies with the formal requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC. It is therefore admissible.
2. The closest state of the art is represented by document D1 which stems from the present appellants. Its Italian equivalent was referred to in the present application as originally filed.

This document discloses a method for sealingly joining a coupling to an underwater pipeline wherein the coupling has at least one internal recess having therein two half rings formed of a material which collapses under pressure. The coupling is positioned over an end of the pipeline such that the internal recess overlies the pipeline and the pipeline is radially expanded by internal pressure such that it

plastically deforms, entering the recess and collapsing the rings therein. During the radial expansion of the pipeline the coupling is brought up to its elastic limit, which is greater than that of the pipeline, so that on removal of the internal pressure the elastic contraction of the coupling creates a seal with the pipeline. The specific means utilized for generating the internal pressure on the end of the pipeline comprises a rubber plug which is subjected to an axial compressive force to expand it radially.

According to the present application axial compression of the rubber plug in the known method does not however lead to a uniform pressure distribution with the result that penetration of the pipeline into the recesses of the coupling is uneven, resulting in less reliability of the assembly. In order to solve this problem the application proposes expanding the end of the pipeline hydraulically. More specifically, claim 1 sets out that a sealed chamber is created within the relevant end portion of the pipeline, hydraulic pressure to the required level is generated within the sealed chamber and subsequently the hydraulic pressure is lowered, cf features (ii), (iii) and (iv) of the claim.

All of the documents D3, D4 and D6 relate to methods for sealingly joining a coupling to an underwater pipeline wherein the end of the pipeline or an element associated therewith is radially expanded beyond its elastic limit into engagement with the coupling. According to document D6, more particularly, a member carrying axially spaced seals is inserted within the pipeline to form a sealed chamber to which the hydraulic pressure is applied. After the required plastic expansion of the pipeline has been achieved the

pressure is released and the member removed.

For the person skilled in the art it is obvious that the problem of uneven pressure distribution associated with the rubber plug expansion arrangement suggested by document D1 can be overcome by hydraulic expansion of the pipeline in the general manner taught by document D6, since the pressure in the sealed chamber is inherently constant along its axial extent. To replace the rubber plug expansion arrangement of document D1 by the hydraulic expansion technique specified in claim 1 cannot therefore be seen as involving an inventive step (Article 56 EPC).

In this respect the appellants have pointed out that in the method of document D6 the central part of the coupling is also plastically deformed, implying that this has an elastic limit equivalent to that of the pipeline, rather than greater than it, as required by claim 1. As a consequence of this they argue that the deformation of the pipeline can be performed at pressures of the order of 800 bar, whereas according to the Ferrari Aggradi declaration the claimed invention utilized pressures of 1300 bar. Lastly, they contend that the person skilled in the art would have believed that the weld seam in the pipeline constituted a weak point in the sealed system which would prevent hydraulic pressures of this level being obtained.

The Board can find nothing persuasive in this line of argument. In the first place it has to be noted that the patent application contains no indication of the level of hydraulic pressure required. Clearly, this will vary from case to case in dependence on a variety of factors, not just the materials of the pipeline and

the coupling but also their dimensions. Secondly, it is in any case open to the person skilled in the art to take appropriate measures to overcome any sealing problems which may be associated with the weld seam.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

S. Fabiani

S. Crane