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**Datasheet for the decision
of 16 November 2016**

Case Number: T 2589/12 - 3.2.05

Application Number: 04736111.8

Publication Number: 1631762

IPC: F16L9/12

Language of the proceedings: EN

Title of invention:

Threaded joint for steel pipes

Patent Proprietor:

Nippon Steel & Sumitomo Metal Corporation
VALLOUREC OIL AND GAS FRANCE

Opponent:

Tenaris Connections Limited

Relevant legal provisions:

EPC 1973 Art. 56
EPC Art. 123(2)

Keyword:

Inventive step (no: main request; yes: auxiliary request 3)
Inadmissible extension (yes: auxiliary requests 1 and 2)

Decisions cited:

T 0131/01



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Case Number: T 2589/12 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 16 November 2016

Appellant: Tenaris Connections Limited
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Decision under appeal: **Interlocutory decision of the Opposition**
Division of the European Patent Office posted on
30 October 2012 concerning maintenance of the
European Patent No. 1631762 in amended form.

Composition of the Board:

Chairman	M. Pooock
Members:	O. Randl
	G. Weiss

Summary of Facts and Submissions

- I. The appeal of the opponent aims at setting aside the interlocutory decision of the opposition division on the amended form in which the European patent No. 1 631 762 could be maintained.

The opposition division had found the main request not to comply with the requirements of Article 123(2) EPC. The first auxiliary request was found to fulfill all the requirements of the EPC.

The opposition division had in particular considered the following documents:

O3: CN 2366656 Y;
O4: English translation of document O3;
O5: CA 2 389 216 A1;
O10: US 4,795,200;
O11: US 4,624,488;
O13: GB 1 220 856;
O15: WO 03/048623 A1.

Together with its statement of grounds of appeal, the appellant has filed the document US 2002/0017788, referred to as document O5-bis.

- II. The oral proceedings before the board took place on 16 November 2016.
- III. The appellant (opponent) requested that the decision under appeal be set aside and the patent revoked.

The respondent requested as a main request that the appeal be dismissed or, in the alternative, that the decision under appeal be set aside and that the patent

be maintained in amended form on the basis of claim 1 filed as auxiliary requests 1, 2 and 4 to 9 with the response to the statement setting out the grounds of appeal of 8 July 2013 or as auxiliary request 3 submitted at the oral proceedings or as auxiliary requests 10 and 11 filed with the letter of 14 October 2016. Furthermore, it requested that, if document 05-bis as well the arguments based on this document were admitted into the proceedings, the case be remitted to the opposition division.

IV. Claims on file

Claim 1 of the main request reads (differences with respect to claim 1 as granted are marked and feature references in brackets have been added):

"[1] A threaded joint for steel pipes comprising [2] a pin (1) and [3] a box (2), the pin having [4] a male thread (11), [5] a sealing surface (13), and [6] a shoulder surface (14), the box having [7] a female thread (21), [8] a sealing surface (23), and [9] a shoulder surface (24), [10] the male thread being interengaged with the female thread, [11] the sealing surface of the pin radially interfering with the corresponding sealing surface of the box, and [12] the shoulder surface of the pin being in axial abutment with the corresponding shoulder surface of the box, wherein (i) [13] the shoulder surface of the pin is provided at an end face of the pin, (ii) [14] the sealing surface of the pin is located on a pipe end side near the male thread, (iii) [15] a nose portion (15) is provided on the pin between the sealing surface and the shoulder surface, [16] said nose portion not contacting the portion of the box facing the nose portion of the pin, [17] the shape of the sealing surface of the pin is a tapered surface

resulting from rotation around the joint axis of a straight line inclined relative to the axis, [18] the taper of the sealing surface of the pin is between 5 to 25 degrees and [19] the sealing surface (13) of the pin is disposed radially inwards, as measured from the axis of the pin, of (i) the tangent (61) to the crest of the male thread and the tip of the pin, and (ii) the extension line (62) of the root of the male thread, characterized in that ~~there is~~ [20'] the existence of the taper of the sealing surface of the pin involves on the pin [20] a discontinuity of surface between the sealing surface and an outer surface of said nose portion."

Claim 1 of auxiliary request 1 differs from claim 1 of the main request by the insertion of "any shoulder surface of the pin being formed at an end of the pin," after "corresponding sealing surface of the box,". This additional feature bears reference [21].

Claim 1 of auxiliary request 2 differs from claim 1 of the main request by the replacement of "and a shoulder surface (14)" by "and only one shoulder surface (14)".

Claim 1 of auxiliary request 3 differs from claim 1 of the main request by the insertion of the additional features "in that [22] the threaded joint comprises means for allowing a portion of the male thread (11) located adjacent to the sealing surface (13) to escape from engaging with a female thread (21), in that [23] said means are a circumferential groove (32) provided on the inner surface of the box between the female thread and the sealing surface of the box, and in that [24] the axial length of the circumferential groove (32) measured between the female thread and the sealing surface of the box is between 1.5 to 3.5

pitches of thread" (feature references in brackets have been added by the board).

V. The appellant argued as follows:

(a) Admissibility of document O5-bis

Document O5-bis should be admitted because it explains some critical features of the invention in more detail than document O5. It clarifies some of the functions of some elements disclosed in document O5. Document O5-bis has been filed at the beginning of the appeal proceedings; the patent proprietor has had enough time to study the document. The document was used for a novelty attack; it would have weakened the opponent's case if inventive step arguments had been filed at the same time. This has been acknowledged by the jurisprudence.

(b) Remittal to the first instance

The case should not be remitted because the facts of the case do not justify a remittal.

(c) Main request

Claim 1 of the main request is not novel and in any case not inventive over the disclosure of document O5-bis.

Feature 12: The parts of the joint disclosed in document O5-bis are designed such that one is longer than the other. When assembled, some parts act as springs, which results in the threaded parts remaining in contact, so that the joint will not easily unscrew.

What is claimed is a joint that is made up, i.e. pin and bow are put together. Paragraph [0044] makes a clear statement in this respect. Consequently, in this state the primary and secondary shoulders are in abutment. Claim 1 of document 05-bis defines lengths in its third paragraph, but the fourth paragraph has the feature "when abutting". So the claim does not exclude the embodiment of paragraph [0044].

Paragraph [0044] has been drafted by a U.S. patent attorney and is clear. Its disclosure cannot be ignored.

Feature 20: The existence of discrepancies between description and drawings does not mean that the figures are completely wrong. The feature of discontinuity is clearly disclosed. The dashed lines indicate the borders of surfaces 15 and 16. The discontinuity corresponds to the border of surface 15. Figures 1A and 1B show disassembled parts; the points of contact that exist when the parts are assembled cannot be predicted because there are deformations when the threads are energised.

Consequently, there is at most one distinguishing feature, namely feature 16.

The description does not disclose any technical effect of this feature. The advantage mentioned in paragraph [0019] does not apply because in the state of the art referred to in this paragraph there is no abutment of the nose. Extending the nose may lead to reinforcement, but this is not explained in the patent. So the feature is just a matter of choice among two options. There is no surprising effect; even the effect

of paragraph [0019] was already known at the filing date. No inventive step is involved.

Paragraph [0039] states the effect of the lip length, not the effect of a gap. The stiffness is related to the increase of volume; the non-contact feature is only mentioned "en passant". If a gap is foreseen, however, the volume decreases.

When asked by the board what the skilled person would consider the technical effect of feature 16 to be, the appellant mentioned reduced galling and the creation of space for grease or dirt.

A mere contact is not a seal. The surfaces 13 and 14 are seals; the following part cannot be a seal. It is easier to avoid contact, unless there are further constraints that require a contact. If there is additional contact, the tolerances have to be smaller, which increases costs. Thus the skilled person would be inclined not to have such additional contact.

(d) Auxiliary requests 1 and 2

The appellant expressed its agreement with the preliminary opinion of the board.

(e) Auxiliary request 3

The request should not be admitted because it was presented too late. It could have been filed in response to the communication of the board. By delaying its filing and by replacing an auxiliary request after it had been found to be unallowable (rather than one of the requests still on file), the respondent has not acted in a way that would speed up the proceedings.

Claim 1 does not involve an inventive step. Document O5-bis is considered to be the closest prior art. This document discloses a circumferential groove 7 on the inner surface of the box between the female thread 5 and the sealing surface of the box. The only difference lies in the length of the groove. The particular choice of feature 24 just corresponds to one specific volume of the groove. The skilled person knows that a longer groove will result in increased elasticity and that a shorter groove will have the effect of greater stiffness. It is just a matter of design, depending on how much grease one wishes to store or which box elasticity is desired. Such a choice cannot involve an inventive step.

VI. The respondent argued as follows:

(a) Admissibility of document O5-bis

Document O5-bis and the arguments based thereon should not be admitted. Contrary to the preliminary opinion of the board, document O5-bis is not the U.S. counterpart to document O5, although it claims the same priority. It is a continuation of the PCT application, which is reflected in the different filing dates. This may explain the extra disclosure (eleven paragraphs of description instead of four). It is not more relevant than document O5 and, therefore, it cannot be said to be *prima facie* relevant. The arguments based on O5-bis are totally based on hindsight and, moreover, incorrect.

Admitting the inventive step objection would be procedurally incorrect because there was no

announcement of an inventive step attack in case the novelty attack would fail.

(b) Remittal to the first instance

If document O5-bis is admitted, then the substantive situation has fundamentally changed. In that case remittal would be appropriate. The opponent has now further changed the situation by discussing inventive step with respect to document O5-bis. The opponent has had five years to put forward its arguments, but has waited until one month before the oral proceedings; the patent proprietor has had less than one month to consider the attack. One month is not sufficient to consider the new objections (inventive step when starting from document O5-bis) and find appropriate fall-back positions, possibly including elements from the description.

(c) Main request

(i) Inventive step

The subject-matter of claim 1 differs from the disclosure of document O5-bis by features 12, 16, 20 and 21:

Feature 12: Paragraph [0047] was misunderstood by the board. Paragraphs [0014] and [0015] disclose two pieces of prior art concerning drill joints having two shoulders. Neither clearly discloses abutment with the internal shoulder surface of the box. The primary (external) shoulder is first made up. The last sentence of paragraph [0015] proposes "to make the distance of the box end face from the internal shoulder greater than the distance of the pin end face to the external

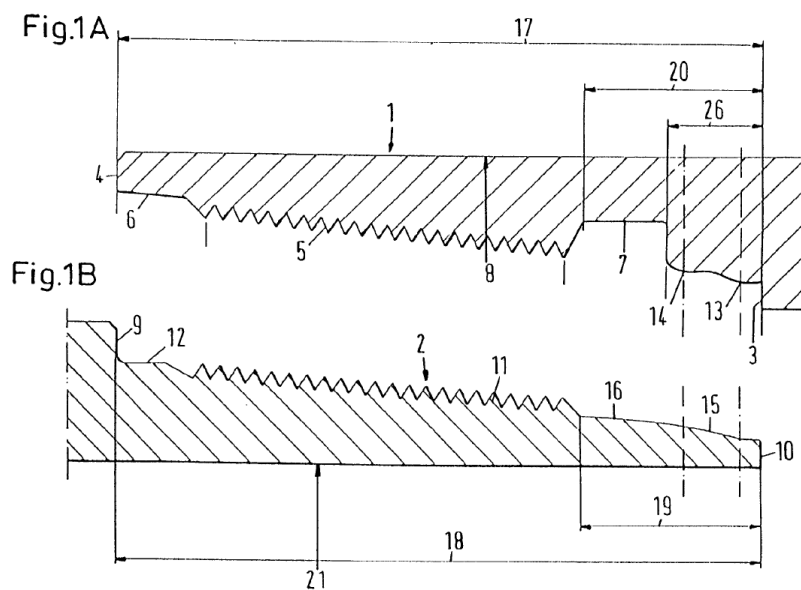
shoulder to thereby realize a gap, when the box end face bears against the external shoulder during threaded connection". Claim 1 also expresses this feature: "... wherein the pin end face is spaced from the external shoulder at a distance which is smaller than a distance between the box end face and the internal shoulder of the box element ...".

Paragraph [0047] states that "The external shoulder 9 of the pin element 2 forms the primary shoulder which is first activated when the tool joint is torqued up." No gap is mentioned. In all the documents showing embodiments with external and internal shoulders, there is never contact with the internal shoulder.

The disclosure of paragraph [0044] is unclear. The conjunction "whereas" normally indicates something different, but here the same result is being asserted.

Feature 16: the respondent agrees with the preliminary opinion of the board in this respect.

Features 20 and 20': the jurisprudence (T 906/97) considers that a feature can only be said to have been disclosed by a drawing if the description suggests that this feature was actually meant to correspond to a technical feature rather than being the expression of the draughtsman's artistic freedom. There is no description at all of an extra portion. Such joints are, however, always very well designed, especially in this region. Moreover, there are other discrepancies between the description and the drawings, such as the "straight conical surface" 15 (paragraph [0046]) not being straight in Figure 1B. So the draughtsman has exercised some of his artistic freedom.



Paragraph [0046] also states that the surface 15 has a steep inclination, preferably at 1:4 (7.1°), and the surface 16 has a flatter inclination, preferably at 1:6 (4.8°). The actually measured values are different (12.5° and 8.5° , respectively). Paragraph [0035] gives a preferred range with a maximum value of 1:3, i.e. 9.7° . So in this key feature, the draughtsman has not taken care to draw what is described and has enjoyed some degrees of freedom. The board has taken the dashed-dotted lines in Figure 1B as the limits of the sealing surface 15, but this is not actually the case. When looking at Figures 1A and 1B together, one can see that the lines are marking the apexes of the bulged surfaces 13 and 14, which have to contact with surface 15. Surface 15, therefore, has to be longer. Alternatively, it could be argued that the embodiment shown is an embodiment with a rounded (rather than a flat) sealing surface and differs from the embodiment described in the description, in which case not all features are disclosed in combination.

The technical effect of a distinguishing feature does not have to be disclosed in the patent; it is sufficient if the effect is derivable. Paragraph [0019] explains that the absence of contact will increase the stiffness. Indeed, no contact means that there is a larger sealing force at the seal. Paragraph [0039] makes clear that the sealing concerns external pressure.

In the embodiment of Figure 5 of the patent, the sealing against external pressure is obtained in the contact zone between box and pin just under reference number 50. A large reaction force is needed there. If there was no nose portion (length 45), there would be less material to resist the force between the two sealing surfaces (considering the whole assembly is annular).

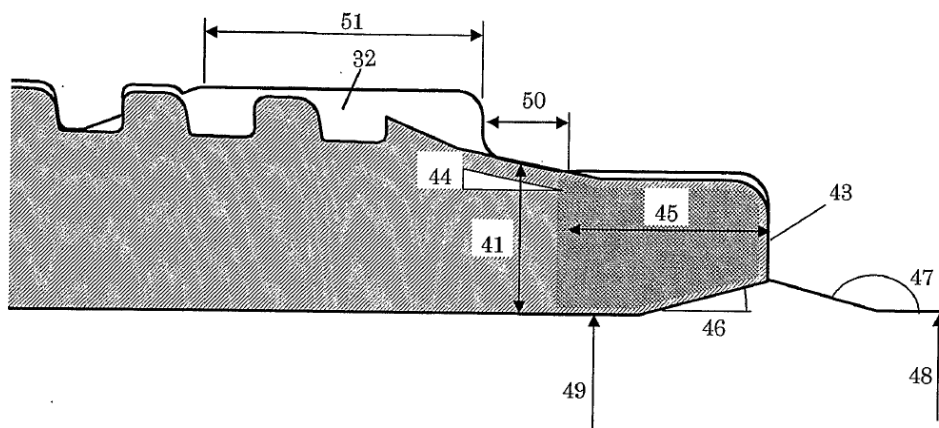


Fig. 5

If there was contact between the box and the nose portion, the stiffness would be reduced because part of the elasticity of that portion would be working against the reaction force of the box. So by having no contact, the force between the sealing surfaces is increased.

If there was internal pressure, the force of fluid would be on the nose from inside. The force of the fluid itself would increase the sealing.

Starting from document O5-bis, not even the problem is obvious. The document deals with drill pipes (paragraphs [0004] and [0013]; *cf.* the taper of the threaded portion) and is not a suitable starting point. In drill pipes the external pressure is not a problem. As a matter of fact, paragraphs [0005] to [0010] talk about internal pressure.

If nevertheless one were to start from document O5-bis, the objective technical problem would be to increase the resistance to external pressure.

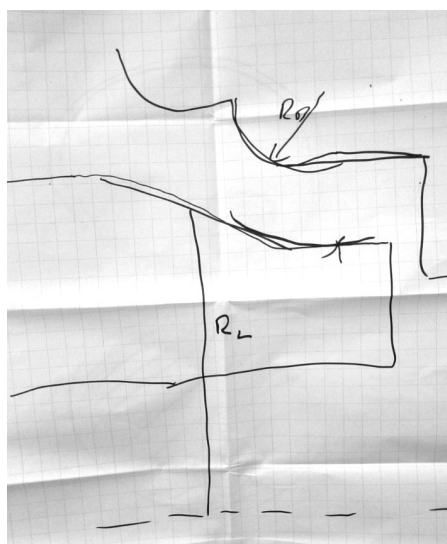
The opponent itself admitted that it would not be obvious to reduce the volume of the pin; this teaches against non-contact.

The surface of the nose is not described as a separate surface in document O5-bis. The sealing surface extends from the end of the pin to sealing surface 16. Having contact with the sealing surface is in conformity with the description. The tip portion is part of the surface 15.

O5-bis describes a prior art joint having an unthreaded portion close to the external shoulder and another unthreaded portion close to the internal shoulder, which is shorter (see paragraph [0015]). The invention of document O5-bis reverses the proportions: the unthreaded portion close to the internal shoulder is at least twice as long as the unthreaded portion close to the external shoulder (see claim 1, 6th paragraph). The whole point of the invention in document O5-bis is to

increase the length of the lips at the end of the pin. This causes problems, because the nose portion can flex. This is the reason for bulge 14: it is a support contact. Bulge 13 is the seal. Then, to have further support, there is support contact between the bulge 13 and the end portion. This contact does not have to be sealing contact.

The two shoulder portions function quite differently. The external shoulder is much longer and can hold a greater force. At the inside, one wants to avoid deformation, which suggests the use of a nose portion that is as thick as possible, which means having contact. The equations of paragraphs [0023] and [0024] relate the radius of the sealing contact surface R_D (radius in cross section) to the radius of the support-forming contact surface R_S (axial radius) and the average radius of the axis R_L . Considering the dimensions of typical drill pipes the radius R_D is very large, which results in increased contact.



Drawing made by the respondent's representative during the oral proceedings

(d) First auxiliary request

The amendment does not teach that more than one shoulder surface may be provided at the end of the pin any more than the original claim which referred to a shoulder surface of the pin being "provided at the end face of the pin". The newly added phrase does not state that a further shoulder surface is present or may be present any more than claim 1 as originally granted (and as filed) limits the claim to the case of only one shoulder surface being present at the end of a pin.

It is necessary to consider the passage on page 10, lines 2-10 of the application as published, which directly and unambiguously discloses a pin member having more than one shoulder surface at its end. The description of Figures 1-5 on page 10 is applicable to all embodiments that follow. Therefore, what is disclosed would be directly and unambiguously understood by the skilled person to apply to all threaded joints of the present invention. Thereby no subject-matter has been added even if the amendment to claim 1 of the 1st Auxiliary Request discloses for the first time multiple shoulder surfaces at the end of the pin.

Finally, claim 18 makes it clear that the provision of "a second series of shoulder surfaces... at an end portion of the box" are an optional feature. This therefore discloses directly and unambiguously that the threaded joint for steel pipes according to claim 1 may only have shoulder surfaces at the end of the pin, as is explicitly claimed in claim 1.

(e) Auxiliary request 2

The features explained in relation to Figures 1 and 5 on page 10 apply to all embodiments of the patent. Original claim 1 directly and unambiguously discloses only one shoulder surface in that it does not use the "at least one" language. Claim 20 as filed makes the presence of a second series of shoulder surfaces at the end portion of the box clearly an optional feature.

(f) Auxiliary request 3

The request should be admitted because it is a reaction to a new argument (inventive step objection based on document O5-bis).

Figure 5 shows groove 32. The corresponding threads of the pin are not engaged. As explained in the first paragraph of page 14 of the original application, the effect of these threads is to increase the stiffness of the pin (more material). If the axial length of the groove is too large, the sealability is reduced (page 14, lines 15-16) because the box becomes more elastic.

In O5-bis, the groove has exactly the opposite purpose of increasing the elasticity (paragraphs [0019] and [0020]). So there are two differences: the groove 7 is not suitable for allowing a portion of the main thread to escape from engaging with a female thread (the last thread of the pin is exactly below the last thread of the box; there is no disengagement when the box and the pin are in abutment); moreover the groove is significantly longer than 1.5 to 3.5 pitches of thread.

The appellant has not provided any motivation for increasing the stiffness of the joint. O5-bis is all about decreasing stiffness. Why would the skilled person increase the stiffness as much as to come to a maximum of 3.5 thread pitches?

Reasons for the Decision

1. Applicable law

The application on which the opposed patent is based was filed on 4 June 2004. According to Article 7 of the Act revising the EPC of 29 November 2000 (OJ EPO 2007, Special edition No. 4, 217) and the Decision of the Administrative Council of 28 June 2001 on the transitional provisions under Article 7 of the Act revising the EPC of 29 November 2000 (OJ EPO 2007, Special edition No. 4, 219), Article 56 EPC 1973 applies in the present case.

2. Admissibility of document O5-bis and the arguments based thereon

Document O5 had been cited in the notice of opposition filed by the appellant, whereas document O5-bis was filed for the first time with the statement of grounds of appeal.

Document O5-bis is a U.S. application filed as a continuation (and not a continuation-in-part) of a PCT application, on entry into the U.S. national phase. Document O5 is the Canadian application based on the same PCT application. Therefore, documents O5 and O5-bis undoubtedly belong to the same patent family.

Document O5-bis could have been filed before the opposition division. However, there was no clear incentive to do so because the appellant was of the opinion that the disclosure of document O5 as such was sufficient for establishing a lack of novelty. The verdict of the opposition division made clear that the division had reached a different conclusion.

Therefore, the board considers that the filing of document O5-bis is a reaction to the discussion during the oral proceedings before the opposition division and to the decision taken by the opposition division.

When looking for documents strengthening its case, the opponent could reasonably be led to examine more closely the U.S. counterpart to the Canadian application O5. This is because under U.S. law there are specific requirements (such as the requirement to disclose the "best mode") which sometimes lead applicants to supply additional pieces of information related to the invention.

Incidentally, a document can be *prima facie* relevant without necessarily being more relevant than another document on file: relevance is an absolute rather than a relative criterion.

Having considered these circumstances, the board is unable to see an abuse of proceedings in the belated filing of document O5-bis.

Consequently, the board has decided to admit document O5-bis and the arguments based thereon.

3. Remittal to the opposition division

The admission of late-filed documents by a board of appeal may justify the remittal of the case to the opposition division, in order to offer two degrees of jurisdiction to the parties. However, under the EPC there is no absolute right to having all matters raised by two successive instances, and there may be good reasons not to remit a case.

Although more detailed in its disclosure, document O5-bis is very close to document O5, which has been examined by the opposition division. Its admission appears not to create a significantly different substantive situation and does not jeopardise the respondent's right to a fair trial.

The opponent would have weakened its case had it filed an inventive step objection (where differences have to be stated) based on a document which it considered to destroy the novelty of the claimed subject-matter (see decision T 131/01, point 3.1 of the reasons, OJ EPO 2003, 115).

A remittal, possibly followed by a fresh appeal, would probably have delayed the final decision by several years.

Having considered all the above, and in view of the duration of the grant and opposition proceedings so far (the application was filed in 2004) and of the right of the public to have a final decision on the merits of the case within a reasonable delay, the board has reached the conclusion that a remittal is not appropriate in the present case. Therefore, the respondent's request for a remittal is dismissed.

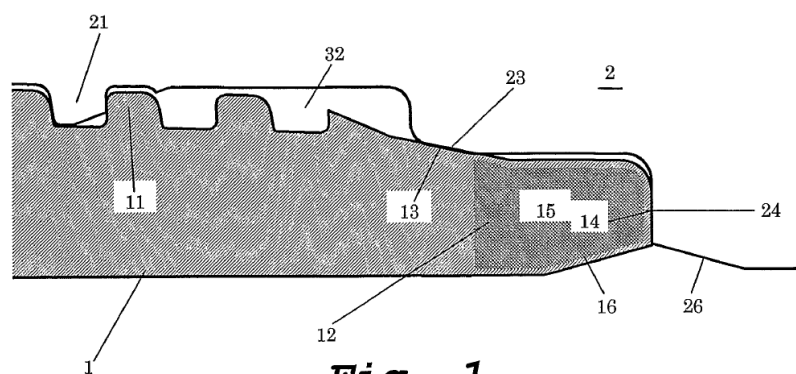
4. Main request

4.1 Claim interpretation: "nose portion"

Apart from its anatomical meaning, the term "nose" is often used to designate "a prominent or projecting part" or "the point or extremity of something" (Oxford English Dictionary).

The opposed patent does not define the term "nose portion" but contains several elements that may help clarify its meaning:

- the reference to a "nose portion of the lip" (paragraph [0057]) indicates that anatomical analogies should not be overstressed;
- in paragraph [0041] of the opposed patent it is said that the portion 15 (i.e. the end portion of the pin) of Figure 1 is referred to as nose portion:



- in paragraph [0081] of the opposed patent "nose portion" is used as a synonym of "tip of the pin".

The skilled person considering these elements of disclosure would, therefore, reach the understanding

that "nose portion" of the pin refers to the axial end or tip of the pin.

The question arises how this understanding can match with the feature according to which the "nose portion is provided on the pin between the sealing surface and the shoulder surface". As all the embodiments of the opposed patent have pins in which the shoulder surface delimits the tip of the pin and cannot be separated from it, this feature is understood to mean that the nose portion extends between the sealing surface and the shoulder surface.

4.2 Novelty over document O5-bis

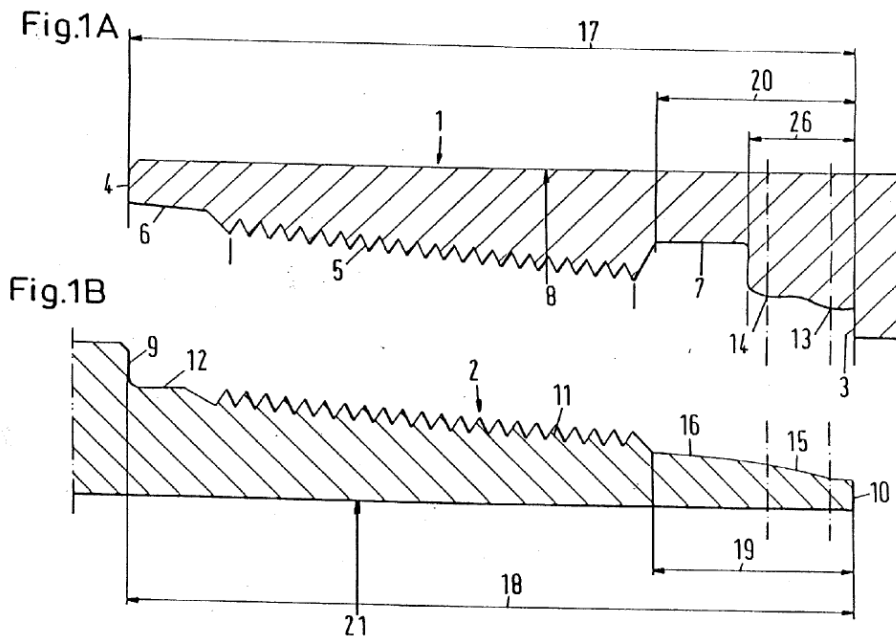
It was undisputed that document O5-bis discloses features 1 to 11, 13-15, and 17-19 as defined above, point IV.).

There was, however, disagreement as to whether the document discloses features 12, 16, and 20+20'.

4.2.1 Feature 12

According to this feature the shoulder surface of the pin is in axial abutment with the corresponding shoulder surface of the box.

Document O5-bis shows both a pin 2 (Figure 1B) and a box 1 (Figure 1A) in an unassembled state.



The penultimate sentence of paragraph [0044] of document O5-bis states: "When the tool joint is sufficiently torqued up, the external shoulder 9, as primary shoulder, abuts the box end face 4, whereas the pin nose section 29 [should read 19] is received by the box base section 20, with the internal shoulder 3, as secondary shoulder, abutting the pin end face 10."

The disclosure of this passage is clear: when pin and box are connected and sufficient torque is applied, the box end is in abutment with the external shoulder 9 and the pin end is in abutment with the internal shoulder.

The board cannot endorse the argument of the respondent according to which the conjunction "whereas" makes the passage unclear. It is quite clear that the drafter first presents what happens at the box end face and then turns to the pin end face. The adversative conjunction expresses this contrast.

Neither paragraph [0014] nor claim 1 contradict the assertion of paragraph [0044]. The distances 17 and 21 being what they are, it is clear that when the pin is screwed into the box, one of the ends abuts first, whereas a gap remains at the other end. This gap disappears when the screwing is continued.

This understanding also fits with paragraph [0047], the language of which ("first activated", "primary shoulder") suggests that that in the end both shoulders are activated.

Thus the board has reached the conclusion that document O5-bis discloses feature 12.

4.2.2 Feature 16

This feature requires the nose portion of the pin not to contact the portion of the box facing it.

No clear conclusion can be drawn from Figures 1A and 1B of document O5-bis. It is possible, but not certain that an assembly of the pin 2 and the box 1 would lead to a contact between contact surface 13 and the nose portion of the pin. However, there is no direct and unambiguous disclosure that there is no contact.

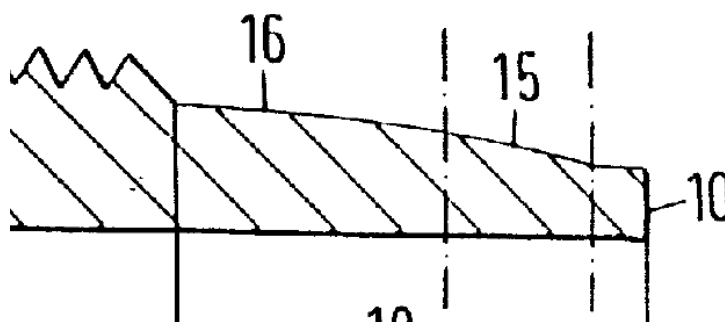
Therefore, the board has reached the conclusion that document O5-bis does not unambiguously disclose feature 16.

4.2.3 Features 20+20'

According to this combination of features the existence of the taper of the sealing surface of the pin involves on the pin a discontinuity of surface between the

sealing surface and an outer surface of said nose portion.

Figure 1B of document O5-bis discloses the existence of a discontinuous transition from the tapered surface 15 to the nose portion of the pin:



Detail of Figure 1B of document O5-bis

The contrary arguments based on the artistic freedom of the draughtsman have not persuaded the board. It would have been easier for the draughtsman to extend the slope of surface 15 until the end of the pin. There are, however, good technical reasons not to provide such an extension, because this would result in the tip having a smaller diameter and, therefore, a reduced rigidity.

The fact that the dashed-dotted line intersects the pin at the very point of transition from the conical part of the pin to its cylindrical part appears not to be fortuitous. The board was not persuaded by the respondent's argument that the dashed-dotted line only indicated the axial position of the apexes of the box. As a matter of fact, references 13 and 14 do not indicate apexes but contact surfaces; it is not obvious that the intersection between the dashed-dotted lines and those surfaces occurs at the apexes of the latter.

Incidentally, the board cannot confirm the assertion of the respondent according to which the slopes of surfaces 15 and 16 shown in Figure 1B contrast with the angular values given in the description. The slope of surface 15 measured from the drawings (about 12.1°) is within the ranges specified in paragraph [0035], i.e. between 18.4° (1:3) and 11.3° (1:5).

It is true that the "straight conical surface" 15 appears not to be completely straight in Figure 1B, but this cannot alter the fact that the skilled person would note the discontinuity between the surface 15 and the cylindrical tip of the pin and understand why it is technically meaningful.

Thus the board has reached the conclusion that document O5-bis discloses features 20 and 20'.

4.2.4 Conclusion

Claim 1 is novel over document O5-bis because this document does not clearly and unambiguously disclose feature 16.

4.3 Inventive step

4.3.1 Admissibility of the objection based on document O5-bis

The board has admitted the line of attack based on document O5-bis, which is state of the art within the meaning of Article 54(2) EPC 1973 and which had been cited as being novelty-destructive. The appellant's novelty objection was almost successful: only one feature was found not to be directly and unambiguously disclosed. In such a situation it appears to be both

legitimate and reasonable to examine whether the sole distinguishing feature involves an inventive step.

4.3.2 Starting point

The board considers document O5-bis to be a promising starting point. The document belongs to the same technical field and discloses all features of claim 1 but one.

Claim 1 as it stands encompasses drill pipes. Therefore, the board cannot endorse the respondent's argument that document O5-bis is unsuitable as starting point.

As the board reaches the conclusion that the subject-matter of claim 1 is not inventive over the disclosure of document O5-bis, it is not necessary to consider other possible starting points.

4.3.3 Differences

As has been shown above (see point 4.2), Claim 1 differs from the disclosure of document O5-bis by feature 16, i.e. in that the nose portion of the pin does not contact the portion of the box facing it. Document O5-bis has no clear teaching on whether there is contact or not.

4.3.4 Obviousness

The board has reached the conclusion that the above mentioned distinguishing feature cannot establish an inventive step, for the following reason:

When trying to implement the teaching of document O5-bis, the skilled person would see the need to ensure good sealing contact between the box and the pin, i.e. between the contact surfaces 13 and 14 on the one hand and the conical surfaces 15 and 16 on the other hand. In order to reach this goal, the skilled person would see the need to avoid any further contact between box and pin that could lead to the above mentioned sealing contact being compromised or disturbed. The most straightforward way of answering that need would be to provide a (possibly small) gap between the nose portion of the pin and the portion of the box facing it. When proceeding along that way, the skilled person would reach a solution that is encompassed by claim 1.

None of the arguments presented by the respondent invalidates the above reasoning. There may be reasons why the skilled person would wish to have further support contact, but he would consider the necessity to preserve good sealing to be of overriding importance. It may also be true that the skilled person would want to have the nose portion as thick as possible in order to increase its resistance against deformation, but this only means that he would make the gap as thin as possible. It should be noted that the fact that a gap is provided does not necessarily lead to a reduced stiffness of the pin, because the gap can also be obtained by a modification of the box.

4.3.5 Conclusion

The subject-matter of claim 1 does not involve an inventive step within the meaning of Article 56 EPC 1973.

The main request has to be dismissed.

5. Auxiliary request 1

Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that "any shoulder surface of the pin [is] formed at an end of the pin".

5.1 Claim interpretation

5.1.1 "any shoulder surface"

According to the Oxford English Dictionary, "any" is used to refer to an unspecified number or quantity of a thing or things, no matter how much or how many. Thus the feature is understood to mean that, regardless of the number of shoulder surfaces of the pin (one or more), all of them are formed at an end of the pin.

5.1.2 "end of the pin"

The expression "end of the pin" has to be distinguished from the expression "end face of the pin" used in claim 1 of the main request. The board is of the opinion that the skilled person would understand that, in the context of a pin for threaded joints for steel pipes, the expression designates the axial end of the pin which is in abutment with the box when pin and box are interengaged. See, for instance, paragraph [0007] of the opposed patent: "... an unthreaded portion 12 called a lip ... located at the end of the pin 1 ..." in connection with Figure 1.

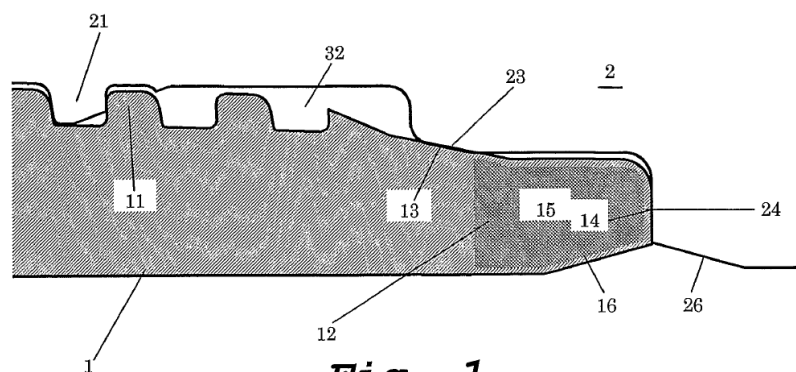


Fig. 1

5.2 Basis for the amendment

The feature as such is not explicitly disclosed in the original application.

Original claim 1 requires the pin of the claimed joint to have "a shoulder surface" (*cf.* feature 6). It then requires that "the shoulder surface of the pin is provided at the end face of the pin" (*cf.* feature 13). The wording of the claim does not exclude that the pin has more than one shoulder surface, but it does not suggest it either (as it would have, had the expression "at least one shoulder surface" been used). The amendment introducing the notion of "any shoulder surface" modifies the situation in that it suggests the existence of more than one shoulder surface.

Page 10, lines 2-10 of the original application is different in that it refers to "at least one shoulder surface 14". This part of the description corresponds to Figures 1 and 5. It unambiguously teaches that "the shoulder surface 14 ... [is] formed on the end of a pipe". However, the embodiments shown in Figures 1 and 5 clearly have pins in which there is only one shoulder surface at the end of the pin. The other end of the pin is not shown. If the pin depicted has

several shoulder surfaces, the other shoulder surfaces must be provided elsewhere than at the end of the pin. Thus this part of the description does not provide sufficient support for the amendment under consideration either.

Page 16, lines 7-19 of the original application explains that "in the preceding description" an embodiment with a shoulder surface "on the lip at the end of a pin" was described. The description then refers to Figures 8 and 9 which exemplify that embodiments are possible in which a second series of shoulder surfaces 33 are provided.

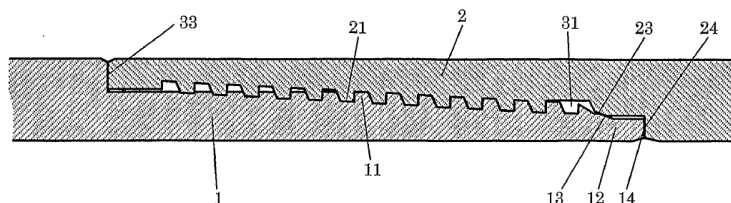


Fig. 8

However, the shoulder surface 33 is not at the end of the pin 1 within the meaning of the opposed patent (see point 5.1). In other words, in the only embodiment with two shoulder surfaces the second series of shoulder surfaces 33 is not provided at the end of the pin.

Claim 20 of the original application requires the joint to be provided with "a second series of shoulder surfaces at an end portion of the box". This disclosure, however, does not allow to draw any conclusions on the number and location of the shoulder surfaces of the pin.

Considering all the above, the board has reached the conclusion that the feature according to which any shoulder surface of the pin is formed at an end of the pin is not directly and unambiguously disclosed in the original application. Consequently, the amendment does not comply with the requirements of Article 123(2) EPC.

As a consequence, auxiliary request 1 has to be dismissed.

6. Auxiliary request 2

Claim 1 of auxiliary request 2 differs from claim 1 of the main request in that the pin has only one shoulder surface.

Page 10, lines 2-10, of the original application states that in the threaded joints depicted in Figures 1 and 5 "[t]he pin member 1 has ... at least one shoulder surface 14 formed on the end portion of a pipe" (emphasis by the board). The board is satisfied that this also discloses the case where there is precisely one shoulder surface. However, this feature is only disclosed for this particular embodiment (Figures 1 and 5).

The respondent has not persuaded the board that this feature was disclosed in combination with all the other features of claim 1. The embodiments of Figures 6-10 are distinct embodiments; the application cannot be said to directly and unambiguously disclose any combination of features taken from different embodiments.

The respondent has referred to "[a]ll of the embodiments except for the Figure 8 embodiment" as

having only one shoulder surface, but, as a matter of fact, Figures 5 to 7 show only part of the pin. Figure 9 shows an embodiment having a second shoulder surface. Figure 10 is a very particular embodiment in which the pin end has been subjected to swaging to reduce both the pipe diameter at the end and increase the wall thickness of the pin lip. It is no suitable basis for the general teaching that a pin according to the invention may have only one shoulder surface. Therefore, the Figures appear not to be a sufficient basis for the amendment.

Original claim 1 only requires the pin to have "a shoulder surface"; this abstract language does not allow to draw any conclusion on the number of shoulder surfaces.

Original claim 20 deals with shoulder surfaces of the box and is silent on the pin. As can be seen from Figure 10, for instance, the number of shoulder surfaces of the pin does not necessarily correspond to the number of shoulder surfaces of the box.

Arguably the original application discloses the feature according to which the pin has only one shoulder surface at an end of the pin, but there is no direct and unambiguous disclosure that the pin has only one shoulder surface, regardless of its location.

Considering all the above, the board has reached the conclusion that the feature according to which the pin has only one shoulder surface is not directly and unambiguously disclosed in the original application. Consequently, the amendment does not comply with the requirements of Article 123(2) EPC.

As a consequence, auxiliary request 2 has to be dismissed.

7. Auxiliary request 3

Claim 1 of auxiliary request 3 differs from claim 1 of the main request in that:

- the threaded joint comprises means for allowing a portion of the male thread located adjacent to the sealing surface to escape from engaging with a female thread (feature 22);
- those means consist in a circumferential groove provided on the inner surface of the box between the female thread and the sealing surface of the box (feature 23);
- the axial length of the circumferential groove measured between the female thread and the sealing surface of the box is between 1.5 to 3.5 pitches of thread (feature 24).

7.1 Admissibility

Claim 1 of auxiliary request 3 is identical with claim 1 of auxiliary request 11, which had been filed before the oral proceedings, except that one feature has been deleted. Thus the appellant could not be surprised by the additional features, all the more as they were also part of claim 1 of several auxiliary requests filed before the oral proceedings. Having considered all these aspects, the board has decided to admit auxiliary request 3 into the proceedings.

7.2 Claim interpretation

Feature 22 requires means for allowing a portion of the male thread located adjacent to the sealing surface to

escape from engaging with a female thread. According to the established practice of the EPO, "means for" is understood to mean "means suitable for". Moreover, the board interprets feature 22 such that it *inter alia* requires the male thread to have a portion located adjacent to the sealing surface. The Oxford English dictionary defines "adjacent" as "next to or very near something else; neighbouring; bordering, contiguous; adjoining". This understanding also corresponds to what is depicted in Figures 1 and 5.

7.3 Inventive step

7.3.1 Closest prior art

Document O5-bis is considered to be the the closest prior art.

7.3.2 Differences

The box 1 of Figure 1A of document O5-bis comprises a circumferential groove 7 provided on the inner surface of the box between the female thread 5 and the sealing surface 13,14 of the box. Thus feature 23 is disclosed in document O5-bis.

The male thread 11 of pin 2 does not have any portion that is adjacent to the portions of surfaces 15 and 16 that act as sealing surface (see point 7.2).

When the box 1 and the pin 2 are assembled to form the joint, the male thread 11 cannot extend into the groove by more than one thread pitch. Further advancement into the groove is made impossible by the abutment of the shoulder surfaces 3 and 9. Thus no significant portion of the male thread 11 can be said to escape from

engaging with the female thread within the meaning of feature 22. Also, the length of the groove 7 clearly exceeds 3.5 pitches of thread.

7.3.3 Technical effect

The main technical effect of the distinguishing features is to increase the stiffness of the pin without compromising the sealing contact.

The corresponding objective technical problem is to obtain this effect.

7.3.4 Obviousness

What remains to be examined is whether the skilled person starting from document O5-bis and wishing to increase the stiffness of the pin without compromising the sealing contact would, based on the state of the art and his common general knowledge, find a solution encompassed by claim 1.

The appellant has based his argumentation on the assertion that for the skilled person providing the distinguishing features was a mere matter of design. The board does not find this argumentation persuasive. In particular, it is not apparent to the board why the skilled person would choose the axial length of the circumferential groove to be between 1.5 to 3.5 pitches of thread and the male thread to have a portion located adjacent to the sealing surface, where the risk of interference with the sealing contact is greatest. The mere assertion of routine choice cannot replace a conclusive demonstration of why the skilled person would be led to the particular choice of the invention.

Thus the board has reached the conclusion that the appellant has not established that the subject-matter of claim 1 is obvious to a person skilled in the art and that, as a consequence, the invention shall be considered as involving an inventive step within the meaning of Article 56 EPC 1973.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside
2. The case is remitted to the department of first instance with the order to maintain the patent as amended in the following version:
 - claims 1 to 15 submitted during the oral proceedings as auxiliary request 3;
 - description:
pages 2, 3, 5, 8 to 11 of the patent specification;
pages 4, 6 and 7 submitted during the oral proceedings;
 - drawings: figures 1 to 15 of the patent specification.

The Registrar:

The Chairman:



D. Meyfarth

M. Poock

Decision electronically authenticated