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**Datasheet for the decision  
of 8 August 2018**

**Case Number:** T 1593/15 - 3.2.07

**Application Number:** 07736654.0

**Publication Number:** 2126203

**IPC:** D21F5/02

**Language of the proceedings:** EN

**Title of invention:**

YANKEE CYLINDER FOR A PAPER PRODUCING MACHINE

**Patent Proprietor:**

Toscotec S.p.A.

**Opponents:**

A. Celli Paper S.P.A.  
PMPoland S.A.  
Voith Patent GmbH  
De Iuliis Macchine S.P.A.

**Headword:**

**Relevant legal provisions:**

EPC Art. 56, 83, 84, 100(a), 100(b), 100(c), 105(1)(a), 123(2)  
EPC R. 103(1)(a), 131(4), 134(1)

**Keyword:**

Intervention of the assumed infringer - admissible (yes)  
Right to be heard - violation (no)  
Substantial procedural violation - (no)  
Reimbursement of appeal fee - (no)  
Fresh ground for opposition introduced in appeal proceedings -  
admitted (no)  
Sufficiency of disclosure - (yes)  
Amendments - added subject-matter (no)  
Inventive step - (yes)

**Decisions cited:**

G 0001/94, G 0001/95, G 0007/95, G 0003/04, G 0003/14,  
R 0005/13, R 0013/13, T 0643/91, T 0898/91

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

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Case Number: T 1593/15 - 3.2.07

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.07**  
**of 8 August 2018**

**Appellant:** A. Celli Paper S.P.A.  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 9 July 2015  
rejecting the oppositions filed against European  
patent No. 2126203 pursuant to Article 101(2)  
EPC**

**Composition of the Board:**

**Chairman** I. Beckedorf  
**Members:** G. Patton  
K. Poalas

## **Summary of Facts and Submissions**

- I. The appellant (opponent I) lodged an appeal within the prescribed period and in the prescribed form against the decision of the Opposition Division rejecting the oppositions and maintaining European patent No. 2 126 203 as granted.

Opponent III likewise lodged an appeal against the decision, which it withdrew by letter of 8 July 2016. Hence, opponent III no longer has the status of appellant but remains a party as of right pursuant to Article 107, second sentence, EPC (T 643/91, not published in OJ EPO, Reasons 1).

Opponent II did not lodge an appeal against the finding in the Opposition Division's decision (Reasons 1) that its opposition was inadmissible pursuant to Article 99(1) and Rule 76(2)(c) EPC. As a consequence, this part of the decision took full legal effect, such that opponent II ceased to be a party to the opposition proceedings and thus ceased to be entitled to be a party to any appeal, pursuant to Article 107 EPC (T 898/91, not published in OJ EPO, Reasons 1.2; see communication of termination of the opposition proceedings dated 6 October 2015).

An admissible notice of intervention was filed on 15 May 2017 by "DE IULIIS MACCHINE S.P.A.", hereafter referred to as the intervener, pursuant to Article 105(1)(a) EPC (see point 1 below).

- II. The oppositions of opponents I and III were directed against the patent as a whole and based on the ground of lack of inventive step under Article 100(a) EPC.

The opposition of opponent II was directed against the patent as a whole and based on the ground of lack of novelty under Article 100(a) EPC. As mentioned above, opponent II's opposition was held inadmissible by the Opposition Division pursuant to Rule 76(2)(c) EPC for lack of substantiation.

A ground for opposition based on Article 100(c) EPC was late-filed by opponents I and III and was not admitted into the proceedings by the Opposition Division for *prima facie* lack of relevance.

The Opposition Division held that none of the grounds for opposition (lack of inventive step) prejudiced the maintenance of the patent as granted, and it therefore rejected the oppositions.

- III. The present case was given accelerated processing in accordance with the requests of the intervener (point VIII and comments on last page of Form 2300 filed with the notice of intervention) and of the appellant (letter dated 9 February 2018), see Supplementary publication 1, OJ EPO 2018, pages 59 and 60.
  
- IV. The Board provided the parties with its preliminary non-binding opinion, annexed to the summons to oral proceedings, that in view of the parties' written submissions the appeal of opponent I would be dismissed and the intervention would be rejected (patent proprietor/respondent's main request). The Board saw no need to provide a preliminary opinion on the respondent's auxiliary request filed by letter of 17 March 2016.
  
- V. During the oral proceedings, which took place on 8 August 2018 in the absence of opponent III in

accordance with Article 15(3) RPBA and Rule 115(2) EPC, the following issues were discussed:

- reimbursement of the appeal fee due to an alleged substantial procedural violation of the appellant's right to be heard by the Opposition Division;
- added subject-matter in claim 1 of the patent as granted;
- sufficiency of disclosure of the invention as defined in claim 1 of the patent as granted;
- admissibility of the appellant's lack of novelty objection; and
- inventive step in respect of the subject-matter of claim 1 of the patent as granted.

For details of the discussions, reference is made to the minutes of the oral proceedings.

The order of the present decision was announced at the end of the oral proceedings.

- VI. The appellant requested:
- that the decision under appeal be set aside,
  - that European patent No. 2 126 203 be revoked and
  - that the appeal fee be reimbursed.

The intervener requested:

- that European patent No. 2 126 203 be revoked.

The respondent requested:

- that the appeal be dismissed,
- that the intervention be rejected and
- that, in setting aside the decision under appeal, the patent be maintained in amended form on the basis of the auxiliary request filed by letter of 17 March 2016.

VII. The wording of claim 1 of the main request (patent as granted) reads as follows:

"A steel-made Yankee cylinder including a cylindrical shell (11) joined to two ends (13, 15), to which are fixed respective support journals (3), wherein the cylindrical shell is joined to each of said ends through a respective circumferential weld bead (C; C1) on the outside of the Yankee cylinder made between opposing surfaces of each end (13,15) and the cylindrical shell (11) respectively, and a corresponding back weld bead (R) on the inside of the Yankee cylinder; and wherein said cylindrical shell (11) has, close to each of its end edges, a portion of cylindrical wall of a thickness gradually increasing from a zone of minimum thickness (S1) to a zone of maximum thickness (S2) in correspondence of which said circumferential weld bead (C; C1) is formed."

In view of the outcome of the present decision, there is no need to give the wording of claim 1 of the auxiliary request.

VIII. The following documents of the opposition proceedings are of relevance for the present decision:

D2: DE 27 07 923 A;

D4: US 4 320 582 A; and

D7: "Australian Standard<sup>TM</sup> - Pressure vessels",  
Standards Australia, AS 1210-1997, 5 July 1997,  
pages 32, 151 and 152.

The following document was filed by the intervener:

E2: Dennis Moss, "Pressure Vessel - Design Manual",



Gulf Professional Publishing, an imprint of Elsevier, Oxford (UK), third edition, 2004, ISBN 0-7506-7740-6, pages 62-67.

- IX. The appellant argued in substance essentially as follows (the arguments are dealt with in more detail in the Reasons):

*Reimbursement of the appeal fee*

The Opposition Division had arbitrarily decided at the oral proceedings that D4 represented the closest prior art and had not allowed the appellant to present its line of argument on inventive step starting from D2. It had not been foreseeable that D4 would be selected as the closest prior art, and so the appellant had prepared its entire line of argument on the basis of D2 as closest prior art. The Opposition Division's behaviour constituted a substantial procedural violation of its right to be heard, and therefore the appeal fee should be reimbursed.

*Article 100(c) EPC*

The expression "corresponding back weld bead" in claim 1 of the patent as granted was not present in the application as originally filed. The only passage in the latter forming the basis for the back weld bead being "in correspondence of" something related to two bevels. The omission of the bevels in claim 1 of the contested patent therefore led to an unallowable intermediate generalisation.

Similarly, the omission of the radial direction of the weld beads and of a location with no welding material in the weld also led to an unallowable intermediate

generalisation. The term "corresponding" was unclear, as it encompassed many interpretations.

*Article 100(b) EPC*

There was no disclosure in the contested patent showing how to obtain the feature of claim 1: a "*portion of cylindrical wall of a thickness gradually increasing from a zone of minimum thickness to a zone of maximum thickness*". Absolutely no values were given for the thicknesses.

The technology for realising this feature did not exist for large cylinders like Yankee cylinders. Furthermore, since the type of paper to be dried was not specified in claim 1, the skilled person did not know how to select the thicknesses of the claimed Yankee cylinder. In particular, the skilled person did not know how to obtain for a given type of paper the desired effects that the Yankee cylinder resisted the applied stresses while the paper was still drying.

In view of the above reasons, the skilled person was not able to carry out the invention.

*Articles 100(a), 54 EPC*

The subject-matter of claim 1 was not novel in view of the disclosure of D2, figure 7.

*Articles 100(a), 56 EPC*

D2 disclosed all the features of claim 1 of the contested patent. Since its disclosure also encompassed Yankee cylinders (feature c)), this feature was

disclosed in D2. The following features of claim 1 were also shown in figure 7 of D2:

d) a corresponding back weld bead on the inside of the cylinder; and

e) the cylindrical shell having, close to each of its end edges, a portion of cylindrical wall of a thickness gradually increasing from a zone of minimum thickness to a zone of maximum thickness in correspondence of which said circumferential weld bead was formed.

Should features d) and e) be considered as distinguishing features, they were to be treated separately for assessing inventive step in respect of the claimed subject-matter, since their respective technical effects had no synergy: feature e) contributed to increasing the strength of the cylinder, while feature d) provided a connection between the parts.

Two objective technical partial problems were then to be derived:

- the first partial problem associated with feature d) was to connect the parts; and
- the second partial problem associated with feature e) was to increase the strength of the cylinder.

In both cases the skilled person would arrive at the claimed solution in an obvious manner by using his common general knowledge. The claimed subject-matter therefore lacked inventive step.

- X. The intervener argued in substance essentially as follows (the arguments are dealt with in more detail in the Reasons):

*Article 100(c) EPC*

The intervener's arguments on this ground for opposition were essentially the same as those of the appellant.

In addition, the term "corresponding", which had been added to the original wording "back weld bead", led to the new expression "corresponding back weld bead" of claim 1 covering embodiments for which radiographic testing would no longer be possible, contrary to the original disclosure, page 2, line 32, to page 3, line 5. For this reason as well, the requirements of Article 100(c) EPC were not fulfilled.

*Article 100(b) EPC*

The intervener's arguments on this ground for opposition were essentially the same as those of the appellant.

*Articles 100(a), 54 EPC*

The intervener did not raise this ground for opposition.

*Articles 100(a), 56 EPC*

The following features of claim 1 were not disclosed by D4 taken as closest prior art:

a) the cylindrical shell being joined to each of said ends through a respective circumferential weld bead on the outside of the Yankee cylinder made between opposing surfaces of each end and the cylindrical shell respectively, and a corresponding back weld bead on the inside of the Yankee cylinder; and

b) said circumferential weld bead being formed in correspondence with the zone of maximum thickness of the shell.

The technical effects mentioned in the contested patent in association with the distinguishing features had not been proven, so no problem to be solved could be derived.

Faced with the technical problem alleged by the respondent of providing a safer Yankee cylinder, the skilled person would immediately think of replacing the bolted joints of D4 with welded joints in view of the teaching of D4 itself. By doing so, he would arrive at the claimed weld configuration in an obvious manner, and therefore the claimed subject-matter lacked inventive step.

Alternatively, he would consider the teaching of E2 (figure 2.27) and apply it to the Yankee cylinder of D4. By doing so, he would arrive at the claimed weld configuration in an obvious manner, and therefore the claimed subject-matter lacked inventive step for that reason as well.

XI. The respondent argued in substance essentially as follows (the arguments are dealt with in more detail in the Reasons):

*Article 100(c) EPC*

Claim 1 of the patent as granted resulted from the combination of the features of original claims 1, 3 and 10. The term "corresponding" did not add any meaning to this combination of features, and the expression "corresponding back weld bead" did not encompass any meaning other than that depicted in original figures 3, 6, 13A, 13B and 13C, which represented embodiments according to the invention.

The embodiment according to the invention depicted in original figure 13C did not comprise any bevels. Hence, the bevels were not inextricably functionally and/or structurally linked to the claimed weld structure.

This also applied to the other features (radial direction of the weld structure; a location in the weld with no welding material) mentioned by the appellant and the intervener in view of original figures 3, 6 and 13C according to the invention.

*Article 100(b) EPC*

The skilled person was unambiguously able to compute the dimensions of a Yankee cylinder for a given type of paper to be dried. Claim 1 was not limited by the desired technical effects of mechanical resistance and ability to dry.

The technology was available for manufacturing a Yankee cylinder with thickness variation, such as by machining a rolled metal sheet to remove material until it had the desired shape, as described in the contested patent, paragraph 40 and figures 10A and 10B. D4

disclosed a Yankee cylinder with a shell ("outer shell" 13) having tapered profiles corresponding to the feature at stake.

Hence the skilled person was able to carry out the invention as defined in claim 1.

*Articles 100(a), 54 EPC*

The admission of this ground for opposition raised for the first time in appeal proceedings was refused.

*Articles 100(a), 56 EPC*

Starting from D4 as closest prior art and in view of distinguishing features a) and b) as mentioned by the intervener, the objective technical problem to be solved was how to provide a safer Yankee cylinder.

Faced with said problem the skilled person would not arrive at the claimed solution in an obvious manner, since the claimed weld configuration as defined by the combination of features a) and b) was not disclosed in the available cited prior-art documents, nor was it part of the skilled person's common general knowledge.

Features c), d) and e) were to be considered as distinguishing features vis-à-vis D2 taken as closest prior art. Features d) and e) had the synergistic technical effect of increasing the strength of the cylinder. The problem to be solved could then be seen as how to provide a safer construction than that of D2. Since the combination of features d) and e) was not disclosed in or suggested by the available cited prior-art documents, nor was it part of the skilled person's

common general knowledge, inventive step had to be acknowledged for the claimed subject-matter.

## **Reasons for the Decision**

### 1. *Intervention*

Notice of intervention was filed by "DE IULIIS MACCHINE S.P.A.".

As appears from document E1 ("Tribunale Civile Di Napoli - Sezione Specializzata In Materia Di Impresa") filed with the notice of intervention, proceedings for infringement of the contested patent have been instituted in Italy against the intervener (Article 105(1)(a) EPC).

The notice of intervention was filed on Monday, 15 May 2017, i.e. within three months of the date on which said proceedings were instituted (14 February 2017, Rules 131(4) and 134(1) EPC), together with a written reasoned statement and payment of the opposition fee. Thus, the requirements set out in Rule 89 EPC are fulfilled.

As a consequence, the intervention is admissible and is treated as an opposition (Article 105(2) EPC; see also G 3/04, OJ EPO 2006, 118, in particular Reasons 10 and 11).

The above was the Board's preliminary opinion as set out in the annex to the summons to oral proceedings, point 1.3. It has not been contested by the respondent, either in writing or orally at the oral proceedings; it



is maintained by the Board in deciding the case at hand.

2. *Reimbursement of the appeal fee*

2.1 With the statement setting out its grounds of appeal the appellant argued that a procedural violation had occurred, since it had been prevented by the Opposition Division at the oral proceedings from presenting its line of argument on inventive step starting from D2 as the closest prior art.

For the appellant the minutes of the oral proceedings do not reflect what actually happened, namely that after the Opposition Division had identified D4 exclusively as the closest prior art the appellant had not been allowed to present its case on the basis of D2 as the closest prior art, the Opposition Division having explicitly declared that any argumentation based on D2 as the closest prior art would be ignored. The appellant also requests that the minutes be corrected in order to reflect this.

At the oral proceedings before the Board the appellant further added that there had been no hint in the Opposition Division's communication prior to the oral proceedings that D4 should be selected as the closest prior art. The appellant had then prepared its line of argument on inventive step starting exclusively from D2. Thus it had not been prepared to argue starting from D4, the choice of which as closest prior art amounted to an arbitrary choice of the Opposition Division, as the other parties, including the patent proprietor, considered other documents, in particular D2, to be more suitable. The Opposition Division should then have authorised the appellant to present its case

starting from D2. On that basis the appellant requests reimbursement of the appeal fee.

2.2 The Board cannot share the appellant's view for the following reasons.

It appears from the minutes, point 4, that the Opposition Division applied the problem-solution approach stage by stage, see also the impugned decision, point 3.2. Thus, in view of **an effective and efficient conduct of oral proceedings**, it systematically limited its decision-making process and accordingly the discussion with the parties to the determination of the closest prior art first, before discussing the other aspects of the inventive step of the claimed subject-matter. Such conduct of the oral proceedings was imposed in the present case by the numerous lack of inventive step objections raised by the opponents. The fact that the Opposition Division did not arrive at the same conclusion as the appellant that D2 should be regarded as the closest prior art is a matter of substantive appreciation which can then be contested in appeal. This, however, even if the Opposition Division was wrong in its judgement in respect of the right choice of the closest prior art, cannot represent a procedural violation as such (see for instance R 5/13, not published in OJ EPO, Reasons 15; R 13/13, not published in OJ EPO, Reasons 3 and 10-20, in particular 15).

Furthermore, the Board is of the opinion that it can be derived from the impugned decision, point 3.2.1, that the appellant's arguments were heard, considered and taken into account by the Opposition Division in its assessment in establishing the closest prior art (see also minutes, points 4.4 to 4.9) and evaluating

inventive step for the claimed subject-matter. In this respect, the Opposition Division provided its technical analysis of D2 (disclosures of figures 3 and 7), taking into account the appellant's arguments, see point 3.2.3.1 of the impugned decision. This technical analysis of D2 compared with that of D4, point 3.2.2, in addition to the arguments under point 3.2.1, justifies the reasons for which the Opposition Division selected D4 instead of D2 as the closest prior art. D4 as starting point was one of the options argued by the opponents (see minutes, point 4.3) and so does not amount to an arbitrary choice made by the Opposition Division of its own motion at the oral proceedings, and the appellant cannot be considered to have been taken by surprise. Furthermore, the appellant was given time to prepare its line of argument starting from D4 (minutes, point 4.10). After resumption of the oral proceedings by the Opposition Division, the appellant presented its objections of lack of inventive step starting from D4 (minutes 4.12), and it does not appear from the minutes, nor has it been subsequently alleged in the appeal proceedings, that there was a need for the appellant to be allocated more preparation time in this respect. No such request has been formulated.

In view of the above, the Board considers that the appellant's right to be heard was not violated and so no substantial procedural violation occurred. Thus there is no reason to reimburse the appeal fee and to amend the minutes of the oral proceedings before the Opposition Division (Rule 103(1) (a) EPC; Case Law of the Boards of Appeal, 8th edition 2016, III.B.1 and III.B.2.6).

3. *Article 100(c) EPC*

3.1 The ground for opposition pursuant to Article 100(c) EPC was late-filed in opposition proceedings and was not admitted by the Opposition Division for *prima facie* lack of relevance, see impugned decision, point 3.1.

However, since this ground for opposition was raised again by the intervener, it is admitted into the appeal proceedings in view of G 1/94, OJ EPO 1994, 787, Reasons 13, and G 3/04, *supra*, Reasons 10 (see also Case Law of the Boards of Appeal, *supra*, IV.C.3.2.2).

3.2 The appellant argued that the expression "corresponding back weld bead" in claim 1 of the patent as granted was not present in the application as originally filed and in particular that the term "corresponding" had been introduced during the examination phase in order to distinguish the claimed subject-matter from the prior art, in particular D2. For the appellant, the only basis in the application as originally filed for the back weld bead being "in correspondence of" something was on page 5, lines 31-33, i.e. disclosed in combination with two bevels formed on the opposing circular edges 25F that guide the formation of the back weld itself; this was clear from the original figures, in particular figures 3 and 6. Without bevels the weld with the two weld beads specified in claim 1 would not be feasible, and so the bevels were essential features, functionally and structurally linked with the claimed weld configuration. Hence, the omission of the bevels in claim 1 of the contested patent should be seen as leading to an unallowable intermediate generalisation.

In addition, the intervener argued that the radial direction of the weld beads and the fact that the weld

presented a location with no welding material (shell and ends being in contact, see 25F in figure 3) should also be included in claim 1 in order firstly to clarify the unclear term "corresponding" and secondly to avoid a further unallowable intermediate generalisation. The term "corresponding" was unclear in view of its different possible interpretations derivable from figures 3, 6, 13A, 13B and 13C, which represented embodiments according to the invention.

- 3.3 The Board cannot follow this view, since the passage of the original description, page 5, lines 31-33, does not necessarily form a basis for the introduction of "corresponding" in claim 1 of the contested patent.

Furthermore, the above-mentioned passage of the original description only discloses that the back weld bead **can be** provided in correspondence of two bevels, meaning that the combination of features is not mandatory. As also conceded by the opponent and the intervener at the oral proceedings, original figure 13C according to the invention does not comprise bevels. Hence, it is clear that bevels are not essential for carrying out the invention, i.e. not inextricably functionally and/or structurally linked to the claimed weld configuration.

Similarly, original figures 3 and 6 present two distinct embodiments according to the invention, one with a radial weld structure (figure 3) and one with a longitudinal weld structure (figure 6). Hence, the Board fails to see why the radial direction, or any other direction, should be inextricably functionally and/or structurally linked to the claimed weld configuration. This also applies to a location in the

weld with no welding material (see for instance figure 13C).

In fact, as put forward by the respondent at the oral proceedings, claim 1 of the patent as granted results from the combination of the features of original claims 1, 3 and 10. The term "back" of the back weld bead already specifies that the weld bead is located directly opposite the outer weld bead inside the shell. The term "corresponding" which has been introduced does not add any meaning to this combination of features, as it merely emphasises the fact that there are two ends joining the shell, one on the right-hand side and another on the left-hand side of the shell. Each of the two ends is joined to the shell by a weld structure comprising a circumferential outer weld bead and an inner back weld bead on the "corresponding" side of the shell. No new teaching is provided to the skilled reader by the addition of the term "corresponding". The Board concurs with the respondent and the impugned decision, point 3.1, that "corresponding back weld bead" does not encompass any meaning other than that depicted in original figures 3, 6, 13A, 13B and 13C according to the invention.

In this respect the Board, while not following the intervener's view on lack of clarity, emphasises that as the main request concerns the patent as granted, compliance with the requirements of clarity (Article 84 EPC) cannot be examined (G 3/14, OJ EPO 2015, A102).

- 3.4 The intervener argued in its written submissions that in the description of the application as originally filed, on page 2, line 32, to page 3, line 5, the outer weld bead and the back weld bead were arranged in such a way as to allow radiographic testing, i.e. not

necessarily meaning directly opposite each other. The term "corresponding" which has been added to the original wording "back weld bead" means that the new expression "corresponding back weld bead" of claim 1 could now cover embodiments for which this result (to allow radiographic testing) would no longer be achieved, contrary to the original disclosure. Hence, for that reason too the requirements of Article 123(2) EPC should be regarded as not being fulfilled.

- 3.5 The Board cannot follow the intervener's view for the reasons already given under point 3.3 above, antepenultimate paragraph.

Furthermore, original claim 3, which specifies that the circumferential weld comprises a weld bead on the outside of the Yankee cylinder and a back weld bead on the inside of the Yankee cylinder, does not refer to such a result to be achieved. Finally, the relative position of the weld bead and the back weld bead for allowing radiographic testing in said passage of the original description is explicitly mentioned as being "preferable", i.e. not mandatory, contrary to what the intervener tries to suggest.

- 3.6 In view of the above, the objections raised on the basis of Article 100(c) EPC do not prejudice the maintenance of the patent as granted.

4. *Article 100(b) EPC*

- 4.1 The ground for opposition based on Article 100(b) EPC was raised for the first time by the intervener. Consequently, the ground is admitted into the appeal proceedings in view of G 1/94, *supra*, Reasons 13, and

G 3/04, *supra*, Reasons 10 (see also Case Law of the Boards of Appeal, *supra*, IV.C.3.2.2).

- 4.2 In its written submissions, the intervener argued that there was no example or hint in the contested patent showing how to obtain the feature of claim 1: a "*portion of cylindrical wall of a thickness gradually increasing from a zone of minimum thickness to a zone of maximum thickness*". For this reason, the skilled person would not be able to carry out the invention.

At the oral proceedings, the appellant further argued on the same line that, although the feature at stake could be carried out for small cylinders, it had not been proven that the technology would exist for large cylinders like Yankee cylinders. Furthermore, since the type of paper to be dried was not specified in claim 1, the skilled person would not know how to select the said minimum and maximum thicknesses for the claimed Yankee cylinder. In particular, the skilled person would not know how to obtain for a given type of paper the desired properties of the Yankee cylinder resisting the applied load while the paper was still drying.

- 4.3 The Board cannot share this view for the following reasons given by the respondent.

The skilled person is a mechanical engineer in the technical field of paper-making and is unambiguously able to compute the necessary dimensions of a Yankee cylinder for a given type of paper to be dried, in particular in order to reach a compromise between the desired properties of mechanical resistance (thickness of the shell to be high enough) and thermal efficiency (thickness of the shell to be low enough).



That no value is disclosed in the granted patent for the thicknesses of the tapered profile of claim 1 merely relates to the fact that the feature at stake is broad. This does not necessarily imply, as suggested by the appellant, that it cannot be carried out by the skilled person.

The above-mentioned desired properties are not specified in claim 1, so the feature at stake cannot be seen as being limited by them. Hence, whether or not they are actually obtained in an optimised manner does not influence the issue of sufficiency of disclosure that is currently under discussion.

The skilled person is unambiguously aware of techniques for obtaining thickness variation by starting from a rolled metal sheet which is for instance machined to remove material until it has the desired shape. That such techniques could be complicated and expensive in case of large cylinders like Yankee cylinders does not prevent the skilled person from being able to perform the invention (see also contested patent, paragraph 40 and figures 10A and 10B).

Finally, document D4 discloses a Yankee cylinder with a shell ("outer shell" 13) having such tapered profiles corresponding to the feature at stake.

Hence, the Board considers that the skilled person will unambiguously be able to carry out the feature at stake.

4.4 In view of the above, the objections raised on the basis of Article 100(b) EPC do not prejudice the maintenance of the patent as granted.

5. *Articles 100(a), 54(1) EPC*

In opposition proceedings the ground for opposition of lack of novelty based on Articles 100(a) and 54(1) EPC was raised by opponent II only. Since its opposition was found inadmissible, this ground for opposition did not form part of the legal framework of the opposition proceedings and, hence, was not dealt with in the impugned decision (see minutes of the oral proceedings, point 4, and also point I above).

The intervener has not raised this ground for opposition.

The appellant raised an objection of lack of novelty in the subject-matter of claim 1 vis-à-vis the disclosure of D2, figure 7, for the first time in appeal proceedings. Since the respondent at the oral proceedings before the Board explicitly refused the admission of this fresh ground for opposition into the appeal proceedings, it is not admitted into the appeal proceedings (G 1/95, OJ EPO 1996, 615, and G 7/95, OJ EPO 1996, 626).

6. *Articles 100(a), 56 EPC*

The appellant considers that the subject-matter of claim 1 lacks inventive step starting from figure 7 of D2 as the closest prior art in view of the teaching of D2 alone and taking into account the skilled person's common general knowledge.

The appellant explicitly stated at the oral proceedings that it no longer relied on document D7 for inventive step, and so the lack of inventive step objection starting from figure 7 of D2 as the closest prior art

in combination with the teaching of document D7 submitted in writing was no longer pursued.

The intervener considers that the subject-matter of claim 1 lacks inventive step in view of:

- the teaching of D4 alone, taking into account the skilled person's common general knowledge; and
- D4 as the closest prior art in combination with the teaching of document E2.

6.1 Starting from document D4 (impugned decision, point 3.2)

6.1.1 Disclosure of document D4

Document D4 discloses a steel-made Yankee cylinder ("Yankee Dryer") including a cylindrical shell ("outer shell" 13) joined to two ends ("pair of opposed heads" 10, 12), to which are fixed respective support journals ("tubular journals or trunnions" 16, 17), and wherein said cylindrical shell 13 has, close to each of its end edges, a portion of cylindrical wall of a thickness gradually increasing from a zone of minimum thickness ("rings" 28) to a zone of maximum thickness (column 1, lines 10-13; column 2, line 42, to column 3, line 20; figure 1).

6.1.2 Distinguishing features

Hence, since in D4 the connection between the shell 13 and the ends 10, 12 is made by bolted joints, the following features of claim 1 are not disclosed by D4, as also explicitly agreed by the intervener at the oral proceedings (see intervener's notice of intervention, point 2.2; impugned decision, point 3.2.2):

a) the cylindrical shell is joined to each of said ends through a respective circumferential weld bead on the outside of the Yankee cylinder made between opposing surfaces of each end and the cylindrical shell respectively, and a corresponding back weld bead on the inside of the Yankee cylinder; and

b) said circumferential weld bead is formed in correspondence with the zone of maximum thickness of the shell.

6.1.3 Technical effect(s) - objective technical problem(s)

The Board concurs with the impugned decision, point 3.2.2, that technical effects associated with distinguishing features a) and b) as discussed in the contested patent, paragraphs 12 and 27, can be seen as providing a simple and safe construction (contested patent, paragraphs 10 and 38).

Consequently, contrary to the intervener's view an objective technical problem can be derived on this basis.

The intervener considers that the technical effects have not been proven in the contested patent and so no problem to be solved can be derived. This allegation, however, amounts to reversing the burden of proof, which in the present case lies entirely with the intervener. In fact, the intervener has not provided any evidence to support its allegations of lack of technical effect(s).

The Board can however to some extent follow the intervener's view that in some circumstances it could be more complex to join the shell to the two ends by

welding, since it would require further machining to smoothen the outer surface of the Yankee cylinder. It remains, nevertheless, that the distinguishing features, as convincingly explained in the contested patent, are associated with a safer Yankee cylinder in comparison with bolt connections.

The objective technical problem to be solved can then be formulated as how to provide a safer Yankee cylinder than that of D4.

#### 6.1.4 Inventiveness

##### *D4 alone*

If, as alleged by the intervener, the skilled person were in an obvious manner to consider replacing the bolted joints of D4 with welded joints in view of the disclosure in column 4, lines 5-10 and 35-38, leaving aside the question of why he would do so for the external shell of the Yankee cylinder, the Board shares the respondent's view that he would still not arrive at the claimed subject-matter in an obvious manner, since in D4 the rings 28 have an inverted "L" shape, such that he would first have to modify the disclosure of D4 in order to come up with distinguishing feature a). The intervener's mere allegation at the oral proceedings that it would be obvious for the skilled person to make such modifications cannot convince the Board in the absence of any evidence and/or convincing arguments.

##### *D4 combined with E2*

As mentioned by the respondent, it is also questionable whether the skilled person would consider the teaching of E2 for its combination with that of D4, since D4

concerns Yankee dryers which rotate and to which a press roll or a press shoe is applied, while such dynamic loads do not seem to be considered in the disclosure of E2.

In any case, should the skilled person envisage applying the teaching of E2 (figure 2.27) to the Yankee cylinder of D4, assuming that the part with increasing thickness from  $t_s$  to  $t_f$  (flange) would belong to the shell instead of the head/end ("flat head with shortened collar" as argued by the intervener), which is highly questionable in view of the fact that  $t_f$  in fact relates to the head/end contrary to the intervener's view as discussed at the oral proceedings (see page 62, right-hand column, last line), he would still, as already mentioned, have to modify the teaching of D4 with respect to the inverted "L" shape of the rings 28. Again, the intervener's mere allegation at the oral proceedings that it would be obvious for the skilled person to make such modifications cannot convince the Board in the absence of any evidence and/or convincing arguments.

Furthermore, the fact that, as put forward by the intervener, back weld beads are known and usual does not necessarily imply that the skilled person would apply such back weld beads to the Yankee cylinder known from D4. In particular, the intervener's view that such back weld beads are compulsory for Yankee cylinders cannot be followed by the Board, since this teaching is not derivable from E2. In addition, such back weld beads are neither disclosed nor suggested in D4 for the welds connecting the rings 28 with the shell 13, i.e. in the case of the shell of a Yankee cylinder.

As conceded by the appellant at the oral proceedings, the skilled person willing to apply full-penetration welding would have the choice among several solutions provided in the Pressure Vessel Code with its safety instructions (see D4, column 4, lines 64-68), i.e. not only back weld beads. However, no reasons were provided as to why the skilled person would, i.e. not only "could", have selected the claimed solution of back weld beads among the available possible solutions.

6.1.5 As a consequence of the above, starting from D4 the skilled person would not arrive at the claimed subject-matter in an obvious manner.

6.2 Starting from figure 7 of D2

6.2.1 Disclosure of document D2

Document D2, figure 7, discloses a steel-made ("aus Edelstahl") dryer cylinder ("Trockenzylinder") including a cylindrical shell ("Zylindermantel" 1) joined to two ends ("Deckel" 2 and "Übergangsstück" 5), to which are fixed respective support journals (implicit from the figure), wherein the cylindrical shell 1 is joined to each of said ends 2, 5 through a respective circumferential weld bead ("Schweißnaht" 3) on the outside of the cylinder made between opposing surfaces of each end 2, 5 and the cylindrical shell 1 respectively (page 3, first paragraph; page 4, first complete paragraph).

6.2.2 Distinguishing features

The Board is not convinced by the appellant's view that, because a Yankee cylinder would be only for a particular use of a dryer cylinder, the dryer cylinder

of D2 would be a Yankee cylinder. In fact, it cannot be ruled out that this particular use ("steam-heated drying cylinder for use in drying pulp or paper", see the appellant's statement of the grounds, point 4.2.1, page 11) would entail specific structural requirements, not to be found on any dryer cylinder. In this respect, opponent III mentioned in its letter dated 27 October 2015, first paragraphs of points IV.2 and IV.3, that **a Yankee cylinder differs from a dryer cylinder as disclosed in D2** in that it is larger. Hence, a skilled person would not derive directly and unambiguously that the dryer cylinder of D2 is a Yankee cylinder (see also impugned decision, point 3.2.1).

At the oral proceedings, the appellant, while still considering that this feature was encompassed by the disclosure of D2 and to be understood by the skilled person as disclosed therein, conceded that a Yankee cylinder was a **specific** dryer in the present technical field, while D2 referred to dryers in general, that being a **generic** term covering several types of dryer used in the paper-making industry. The appellant could not point to any passage in D2 where a Yankee cylinder was disclosed.

For the above reasons, the Board is of the opinion that D2 does not disclose a Yankee cylinder.

The Board also follows the respondent's view (see reply to the appellant's statement of grounds, pages 3 to 5) that figure 7 of D2 does not disclose the following features of claim 1:

a corresponding back weld bead on the inside of the cylinder; and



wherein said cylindrical shell has, close to each of its end edges, a portion of cylindrical wall of a thickness gradually increasing from a zone of minimum thickness to a zone of maximum thickness in correspondence of which said circumferential weld bead is formed.

Indeed, contrary to the appellant's view, there is no hint in figure 7 towards a "corresponding back weld bead" opposite weld bead 3. Figure 7 is **schematic** and, even enlarged (see statement of grounds, page 10), cannot support this view in the absence, as conceded by the appellant at the oral proceedings, of any hint of this in the text of D2. The same applies to the thickness variation of the shell 1.

As a result of the above, the distinguishing features of claim 1 over the disclosure of D2, figure 7, are the following:

- c) a Yankee cylinder;
- d) a corresponding back weld bead on the inside of the cylinder; and
- e) the cylindrical shell has, close to each of its end edges, a portion of cylindrical wall of a thickness gradually increasing from a zone of minimum thickness to a zone of maximum thickness in correspondence of which said circumferential weld bead is formed.

### 6.2.3 Technical effect(s) - objective technical problem(s)

Contrary to the appellant's view, the Board is of the opinion that distinguishing features d) and e) have synergy in their respective effects.

It is unambiguous, as also conceded by the appellant at the oral proceedings, that an increase in thickness (feature e) towards the weld structure improves the overall strength of the final construction.

Similarly, providing a back weld bead (feature d)) contributes to the increase in the strength of the weld bond between the shell and the ends in comparison with a weld configuration in which it is absent, i.e. in which there is only the outer circumferential weld bead. Hence, the technical effect associated with this feature cannot be considered, as alleged by the appellant, to merely provide a connection between the parts. Its effect of increasing the bond strength is considered to have a synergy with that of the tapered profile defined by distinguishing feature e).

Hence, the appellant's argument that two objective technical partial problems should be defined, one for each of distinguishing features d) and e), cannot be followed.

In view of the discussion under point 6.1.3 above, the objective technical problem can be seen as how to provide a safer construction than that of D2.

### 6.2.4 Inventiveness

Contrary to the appellant's view, D2 does not disclose or even suggest at least the above distinguishing

feature e) (see respondent's reply to the appellant's statement of grounds of appeal, pages 4 and 5). This is also true of the available cited prior-art documents, including D7. Indeed, in the figures on page 152 of D7 cited by the appellant at the oral proceedings, the shell has a constant thickness  $t_s$ . Furthermore, in the absence of evidence and/or convincing arguments, the combination of distinguishing features d) and e) cannot be considered to belong to the skilled person's common general knowledge in the technical field of dryers for paper-making.

As a consequence, starting from D2, more particularly from figure 7 of D2, the skilled person would not arrive at the claimed subject-matter in an obvious manner.

The Board notes that, in view of the outcome on inventive step on the basis of distinguishing features d) and e), a discussion of distinguishing feature c) is irrelevant.

7. *Auxiliary request*

In view of the above, there is no need to discuss the respondent's auxiliary request in the present decision.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



G. Nachtigall

I. Beckedorf

Decision electronically authenticated