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Datasheet for the decision of 15 November 2017

Case Number: T 2066/14 - 3.2.01

Application Number: 06725014.2

Publication Number: 1861238

IPC: B60K15/03

Language of the proceedings: EN

Title of invention:
METHOD FOR MANUFACTURING A PLASTIC FUEL TANK AND TANK

Patent Proprietor:
Plastic Omnium Advanced Innovation and Research

Opponent:
Kautex Textron GmbH & Co. KG

Headword:

Relevant legal provisions:
EPC Art. 54(1), 56, 100(a), 100(b), 123(2)

Keyword:
Novelty (product-by-process feature) - main request (no)
Amendments - auxiliary request A - added subject-matter (yes)
Sufficiency of disclosure - (yes)
Inventive step - auxiliary request B (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 2066/14 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 15 November 2017

Appellant I: (Patent Proprietor)	Plastic Omnium Advanced Innovation and Research Rue de Ransbeek, 310 1120 Bruxelles (BE)
Representative:	de la Bigne, Guillaume Michel Marie LLR 11 boulevard de Sébastopol 75001 Paris (FR)
Appellant II: (Opponent)	Kautex Textron GmbH & Co. KG Kautexstr. 52 53229 Bonn (DE)
Representative:	Kierdorf Ritschel Richly Patentanwälte PartG mbB Postfach 100411 51404 Bergisch Gladbach (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 18 August 2014 concerning maintenance of the European Patent No. 1861238 in amended form.**

Composition of the Board:

Chairman	G. Pricolo
Members:	W. Marx
	P. de Heij

Summary of Facts and Submissions

I. The appeals by the patent proprietor (appellant I) and the opponent (appellant II) are directed against the decision of the opposition division to maintain European patent No. 1 861 238 in amended form on the basis of auxiliary request B filed during the oral proceedings.

II. The appellants relied on the following evidence filed during the opposition procedure:
D1: WO 2004/007182 A;
D2: US 5,343,902;
D3: AU 39048/89 B;
D4: GB 1 410 215 A;
D5: DE 299 18 789 U.

Moreover, the appellant II filed with its statement of grounds of appeal the following evidence of the knowledge of the skilled person (in the following it will be referred to as "Dubbel"):
"Dubbel Taschenbuch für den Maschinenbau, 16. Auflage, 1987, chapter E53, para. 3.3.2 (partly - 'Spannbeton')"

III. In its decision the opposition division held that the patent in suit disclosed the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, but that the subject-matter of the independent product claim 7 as granted lacked novelty over the disclosure of document D2. The auxiliary request A filed during the oral proceedings was found not allowable with regard to Article 123(2) EPC. The subject-matter of independent method claim 1 of auxiliary request B (identical to claim 1 of the patent as granted) was considered new over D2 and inventive over a combination of documents

D1 and D3. Further lines of argument starting from document D2 or D4 as closest prior art were disregarded under Article 114(2) EPC.

IV. Oral proceedings before the board took place on 15 November 2017.

The appellant I (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained as granted (main request) or, auxiliary, that the patent be maintained on the basis of auxiliary request A filed before the first instance, or on the basis of auxiliary request B filed before the first instance, or on the basis of one of the auxiliary requests 1 to 8 filed on 5 June 2014.

The appellant II (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

V. Claim 1 as granted is identical to claim 1 of auxiliary request B and reads as follows:

"Method for manufacturing a plastic fuel tank (1) by moulding a parison in which, during the moulding operation, a pipe (3) is attached to the parison at at least two points (2), the said pipe (3) being deformable between these two points (2) by virtue of the presence of at least one bend shaped like an S, V or W, a loop or a corrugation, which bend is stretched during the attachment of the pipe (3) to the parison."

Claim 7 as granted reads as follows:

"Plastic fuel tank (1) comprising a wall defining an internal volume designed to contain fuel, and a pipe

(3) fixed at at least two points (2) to this wall, the part of the pipe (3) lying between these two points (2) being deformable by virtue of the presence of at least one bend shaped like an S, V or W, a loop or a corrugation, which bend is stretched when the pipe (3) is being attached to the parison."

Claims 1 and 7 according to Auxiliary Request A are amended, in comparison to the granted version, by replacing the term " being deformable" by "being springly deformable".

VI. The appellant I (patent proprietor) essentially argued as follows:

(a) Main request

As regards claim 7, in the absence of an explicit disclosure of any deformation of the pipe formed by branches 21 and 23, D2 did not show that the part of the pipe shown in Figure 1 lying between the two points of attachment 33 and 35 was deformable - under normal conditions - by virtue of the presence of at least one bend. The curvature of this part of the pipe was so small that it could not be stretched and so significantly be deformed. In addition the adjacent branches of the venting tube in D2 would collide with each other. Moreover, D2 did not show an S-shaped pipe in Figure 1, but a starlike or V-shaped pipe comprising three branches, in particular in the area of interest in the central region. Figures 4 and 5 only showed one point of attachment and were not relevant. The related description (column 9) mentioned first and second attachment means which did not refer to the same pipe (see column 4: the first attachment means related to the fill vent tube of a breathing system, the second

attachment means to a venting system including a venting tube).

As found by the opposition division, the further feature that the bend was stretched during the attachment of the pipe to the parison was not known from D2. This feature led to a reduction in the stress of the pipe following cooling of the tank. D2 (apart from stating in column 11 that the tank was flexible) was silent on whether a residual stress or not was present in the pipe or tank in the cooled state. Depending on the amount of stretching, a residual stress in the pipe of the tank after cooling might, or might not, be present. The range of stress in the pipe and in the tank was a direct consequence of the process of attaching the pipe to the parison. A tank according to claim 7 was therefore a tank in which the presence or absence of residual stress resulted from the process step of stretching the pipe during manufacturing, so the tank was different from a tank which did not result from this stretching step. The tank of Figure 1 of D2 was therefore not conform with the tank of claim 7 of the main request.

As regards claim 1 of the main request, starting from D2 as the closest prior art, it was the object of the invention to provide a method of integrating a pipe during molding a plastic fuel tank without generating deformations following cooling of the tank. There was no reason to consider document D3 which did not show that a pipe was fixed to a tank but to a vehicle's floor and related to the problem of swelling caused by hydrocarbons. Even considering D3, a different solution - a floating attachment - was provided.

(b) Auxiliary request A

Claims 1 and 7 of auxiliary request A complied with Articles 123(2) and 84 EPC. The notion of a spring and its function was well-known and disclosed in the application as filed (page 6, line 29), which also described (page 6, lines 15 ff: "the pipe to be fixed") the function of a spring in relation to the pipe and its characteristics. The term "springly" was the result of a grammatical change from a noun to an adjective, classically meaning "like a spring" or "characteristic of a spring". Moreover, this term had frequently been used in hundreds of patents. Thus, the meaning of "springly" was not ambiguous.

(c) Sufficiency of disclosure

The appellant II did not provide any proof of serious obstacles to the skilled person to reproduce the invention of claim 1 of the main request and auxiliary request B. Admittedly, during its manufacture the parison was hot, plastic and deformable, but the result of the process was described in the patent specification which, as a whole, formed the basis for assessing sufficiency of disclosure. Moreover, the skilled person was familiar with such a manufacturing process (as stated in the contested decision) and knew that the bend was stretched during the attachment of the pipe to the parison. The technical effect was that the pipe was not deformed or almost not deformed when the moulded tank was cooled, as indicated in the patent (column 1, lines 48-51; column 4, lines 34-35), which also meant that the pipe was almost free of tensions. This technical effect was achieved over the full breadth of claim 1. As indicated in the patent specification, the pipe was stretched during fastening

of the pipe to the parison, either by being stretched before (and maintained during attachment) or during the attachment process. An example of the step of attaching the pipe to the parison was described using a core to fix the pipe with its stretched bend to the parison (column 4, lines 40-46; column 5, lines 6-8).

(d) Main request, auxiliary request B - claim 1

Apart from what was already stated above, the feature of claim 1 that the bend was stretched during the attachment of the pipe to the parison was at least not unambiguously disclosed in D2. Deformation of a bend in one plane could also result in a bend in a different plane, i.e. a torsion of the bend, or in a bend having a smaller radius of curvature. Figure 4 only showed one point of attachment to the parison, and Figure 5 only a pipe being displaced perpendicular to its elongation without being stretched (the pipe rotated around the point of attachment to the support ring). The support ring mentioned in D2 (column 8, line 52) only became part of the quick-fit connection 19 (see column 6, line 27). It was not unambiguously derivable that the support ring was attached to the wall of the tank or that it was attached simultaneously with the first attachment point.

A novelty objection over D5 was raised for the first time in appeal proceedings and therefore late filed. Apart from that, D5 did not show method steps for manufacturing a plastic fuel tank. Moreover, D5 did not provide any teaching as regards the dotted zone of the ventilation pipe 13 in Figure 1, so that a bend shaped as defined in claim 1 was not directly and unambiguously disclosed.

D1 only showed a ventilation line attached to the inside of the half shells before welding (page 13, lines 20-26), which did not require two points of attachment of the pipe to the parison. Moreover, D1 did not show a form of the pipe as claimed and no stretching during the attachment of the pipe. The effect provided by these distinguishing features was to minimise the deformation of the pipe following cooling of the tank, which led to the problem of minimising deformations of a pipe attached to a fuel tank during manufacturing of the tank following cooling of the tank. D3 related to a different problem (swelling of tubes due to chemical interaction with liquids), was not concerned with attaching a pipe to a tank (but to the vehicle's floor) and did not mention any deformation of the floor. Thus, the skilled person would not consider document D3. The tube in D3 was fixed to its support by fastenings which neither interfered with nor prevented the movements of the tube (page 8, paragraph 5), allowing the tube to slide along the fastening (Figures 1 to 3). This teaching was fundamentally different from and contrary to the one of the contested patent, so the skilled person, even if he would consider D3 and combine this document with D1, would not obtain the solution of claim 1.

The citation from "Dubbel" as well as the new lines of argument on inventive step of the subject-matter of claim 1 combining D2 and D3 or D4 and D3 were filed late, not *prima facie* relevant (see discussion of D3) and should not be admitted.

VII. The arguments of the appellant II (opponent) in as far as they are relevant to this decision may be summarised as follows:

(a) Main request - claim 7

A claim formulated as "product-by-process" claim was not new when the product per se was not new. The process step according to claim 7 of stretching the bend during the attachment of the pipe to the parison was not discernible in the final product.
The difference between a plastic fuel tank according to granted claim 7 and tanks known in the prior art did not relate to a concrete spatial/structural arrangement and was only quantitative but not qualitative. The alleged effect of reduced stress following cooling of the tank was unclear and could not delimit the claimed subject-matter from the prior art. The fuel tank according to claim 7 included pipes which were stretched during the attachment of the pipe to the parison and remained stretched after mounting. The claim did not necessarily require a pipe without tensional forces in a cooled state, not even a pipe showing a bend.
The pipe showing an S-shaped bend known from Figure 1 in D2 was flexible (column 11, lines 31-34, relating to all embodiments), i.e. it was not a rigid pipe. An S-shaped bend (in a different plane) was disclosed in Figure 4 for a breathing system and the method described (see columns 8 and 9) was also used to incorporate the venting system (having two points of attachment, see Figure 1) into the fuel tank.

(b) Auxiliary request A

The "spring"-feature introduced in auxiliary request A added matter to claim 1 and claim 7 and was unclear. The "spring"-feature was disclosed in the application as filed only in relation to the form of the bend and

the method, but not in relation to the fuel tank. There was no disclosure of making use of stored spring forces (attaching a pre-tensioned pipe was not feasible without raising a problem under Article 100(b) EPC). According to the contested patent the pipe was at rest when the moulded tank was cooled. Moreover, not only elastic but also plastic deformation was possible.

(c) Sufficiency of disclosure

Claim 1 could be construed in two ways: if it was understood to mean that a step of stretching took place somewhere during the process of manufacturing, irrespective of whether the bend remained stretched, it did not raise a problem under Article 100(b) EPC. However, if the stretching of the bend had to provide a dedicated effect, such as compensating deformations during cooling, then claim 1 was silent in this respect, e.g. as regards the degree of remaining stretching or tension in the pipe. At least, this technical effect was not achieved over the whole range claimed. Claim 1 comprised any non-systematic and non-intentional (or accidental) stretching of the bend, such as a stretching which did not compensate for the shrinkage deformation. During the process of blow moulding, welding of the pipe was possible due to a hot melt parison (see paragraph [0024] of the patent), but there was no sense in stretching a pipe which had to be released before blow moulding. The patent specification did not provide any teaching how to achieve the desired effect, so the invention was insufficiently disclosed, in particular as regards reproducibility over the whole range claimed. Although the statement of grounds of appeal indicated a workable process (page 9: mounting the pipe in the stretched state so that it was free of tensions following shrinkage of the parison), this did

not support the allegation that the invention was reproducible.
In the event that the claimed method was reproducible, then the issue of the technical effect had to be considered in view of the vague wording of the claims. The passage in the contested patent (column 4, lines 33-35) stating that the pipe was preferably at rest did not mean that the pipe was free of tension or that deformation of the pipe was avoided.

(d) Main request, auxiliary request B - claim 1

D2 was novelty-destroying in respect of the subject-matter of claim 1, comprising any accidental stretching of the pipe during mounting within the fuel tank, because Figures 4 and 5 (which could not be seen isolated from Figure 1, see column 8, lines 30-38) necessarily implied the method step of stretching. When deforming a pipe having a bend so that the angle of the the bend was increased, the distance between the distal ends was increased and the pipe lengthened. As described in D2 with regard to Figures 4 and 5, a breathing and a venting system were welded to the parison, which required heat and pressure to achieve molecular interpenetration of both materials. The pipe in the view according to Figures 4 and 5 also had an S-shaped bend and was pressed against the wall of the hot melt parison when closing the mold (column 9, lines 9 ff), which resulted in the bend being stretched. The patent specification encompassed "spider" pipe systems (having several arms, see column 3, lines 37-40) as shown in D2. It was explicitly specified (paragraph [0027]) that "bend" meant any deformation that allowed the pipe to be lengthened when stretched, which in case of a bend implied an increase in the radius of curvature. At least one bend of the pipe in D2 was

stretched during the attachment to the parison (see Figures 4 and 5; column 4, lines 54 ff), since the attachment means penetrated the surface of the parison. Claim 1 did not specify the extent of stretching, nor that a change in length of the pipe occurred.
The subject-matter of claim 1 was even known from Figures 4 and 5 alone, taking into account that the support ring 246 (which remained in the final product) represented a second point of attachment. As explicitly said in D2 (column 8, line 59 ff) the support ring was encapsulated into the body of the fuel tank during blow molding and therefore attached together with the first attachment point. The patent itself comprised variants in which the pipe was fixed indirectly to the parison via an intermediate fixing means.

D5 (cited in the first instance proceedings against novelty of claim 7) showed all the features of claim 1. The venting pipe 13 was manually introduced into the tank through a mounting opening, which implied a form change and a stretching of the pipe. Moreover, a corrugation to compensate for changes in the length of the pipe during mounting was shown in Figure 1.

Disregarding the objection of lack of inventive step over each of documents D2 or D4 in first instance proceedings for being late filed was not justified and amounted to a violation of the right to be heard.

Starting from D2 as the closest prior art and assuming that stretching of the bend during attachment of the pipe to the parison was not known, this feature compensated for the differential shrinkage between the pipe and the wall following cooling of the tank. The claimed solution was to provide a deformation reserve. The person skilled in the art of plastics and fuel

tanks knew document D3 and its teaching to fix a tube in extension. D3 was concerned with absorbing elastically a macroscopic deformation generated by an external physical and/or mechanical stress (page 2, second paragraph) and explicitly referred to changes in tube length through thermal action (page 7). Assuming a 3%-shrinkage of the tank would lead to a pipe hanging down and producing noise. Under these circumstances, the skilled person would provide a deformation reserve in the pipe as proposed in D3, e.g. a loop. Since the tank and its manufacturing process were already defined in D2, such reserve could only be provided in the pipe. Admittedly, D3 related to changes in length of a pipe and not to shrinking of a tank during cooling, but in both cases it was an issue of the relative movement between the tank's attachment points and the pipe. Although D3 did not refer to manufacturing of a tank, it referred to attaching a pipe in a system comprising a fuel tank and therefore also to a manufacturing process. The contested patent did not state that a complete compensation of length changes or stress after cooling was required. Citation "Dubbel" was filed to prove the knowledge of the person skilled in the art that a pre-tension was provided in view of deformations to be expected, which was not limited to construction of bridges using pre-stressed concrete. Pre-tension was also disclosed on page 11 of D2 in connection with the drawings.

With similar reasoning the subject-matter of claim 1 was not inventive starting from D4 or from D1.
It was disputed that D1 showed a pipe attached to the parison at two points, but this was implicitly disclosed by the described insertion of ventilation lines (as known from D1) for pressure equilibration between different volumes within the tank and for

communication with a central vent. This pipe attached between two points was also deformable. D1 did not show the form ("bend shaped as...") and - at least not explicitly - an intentional stretching of the pipe. The problem to be solved was to overcome the problem of differential shrinkage between pipe and tank. Since D1 also contemplated welding of incorporated parts (not molten, possibly of different material) to the hot molten half shells, the skilled person knew about the problem of shrinkage deformation and would try to compensate for it. The solution was given in D3 which addressed the problem of relative changes in length between pipe and tank.

Reasons for the Decision

1. Main request (patent as granted)

1.1 The board concurs with the reasoning given in the contested decision (see points 4.2 to 4.5) that a plastic fuel tank according to claim 7 is not new in view of the disclosure of D2 (Article 54(1) EPC).

1.2 The fuel tank (made of plastic, see column 5, line 68) shown in Figure 1 in D2 comprises a wall defining an internal volume designed to contain fuel (column 6, line 10), and a pipe (venting tube 21 with branch 23) fixed at at least two points (33, 35) to the wall of the plastic fuel tank, which was not contested. It is noted that claim 7 does not require to have an S-shaped pipe, such shape being only specified in relation to the part of the pipe lying between the two points of attachment. This part of the pipe shown in Figure 1 in D2 changes its orientation of curvature in its central

region so that it forms a bend shaped like an S. That finding is not affected by the fact that D2 shows a venting system which comprise three branches in total (venting tube 21 and a further branch 23), as argued by the appellant I.

1.3 The appellant I also contests that the pipe in D2 is under normal conditions deformable by virtue of the presence of the S-shaped bend. The curvature of this bend might be rather small, as argued by appellant I, but the board finds that the subject-matter as defined in claim 7 is broadly defined. Without specifying any amount of stretching or the material of the pipe, the characteristic of being "deformable" as specified in claim 7 merely requires a part of the pipe between the two points of attachment having e.g. a bend shaped like an S (due to the wording "by virtue of the presence of") and a material which shows at least some flexibility (in order to be "deformable"). The disclosure in D2 satisfies both requirements, showing an S-shaped bend in Figure 1 as argued above and explicitly stating (see column 11, lines 31-34) that the fuel tank system is designed to provide enough flexibility thereto to accommodate deformations which may be caused by pressure/vacuum fluctuations and more specifically that the venting tube is made from polyethylene (column 8, line 13). It is also noted that Figure 1 in D2 shows the final product following cooling of the tank, whereas the step of stretching the bend as claimed relates to an earlier manufacturing step, so Figure 1 in D1 is no basis for asserting that branches might collide during stretching of the bend.

1.4 It remains to be discussed whether the process step of stretching the bend during attachment of the pipe to

the parison in product claim 7 can provide a limitation over the product known from D2.

1.4.1 The patent specification describes (column 4, lines 31-35) that the pipe is stretched "by an amount (or to an extent) such that it is preferably at rest (or almost at rest) when the moulded tank is cooled". Reading this passage together with the problem in the prior art (paragraph [0005]: the tank suffers an appreciable amount of shrinkage whereas the parts that were integrated - and only slightly heated - suffer much less shrinkage) and the object of the invention (paragraph [0006]: "integrating a pipe into a plastic fuel tank during its manufacture by moulding, without generating deformations following cooling of the tank"), it can be inferred that the invention seeks to provide an amount of stretching of the pipe (which contracts less during cooling) to compensate for the difference in shrinkage between the fuel tank and the pipe to avoid deformations following cooling of the tank due to internal tensional forces.

However, claim 7 does not specify the amount or extent of stretching of the pipe, so differential shrinkage might not be compensated for completely and tensional forces or stress might still remain in the pipe, as acknowledged by the appellant I. The main argument of the appellant I is that the range of stress remaining in the pipe is different from a tank as known from D2 which does not result from this step of stretching.

1.4.2 A plastic fuel tank in its finished state comprising a pipe fixed to the inside tank wall will have (under constant environmental conditions after cooling) a predetermined shape. Any residual stress e.g. in the pipe does not generate further deformation in this

state of mechanical equilibrium. The remaining stress, i.e. remaining tensile or compressive forces in the pipe or tank wall do not result solely from the process of manufacturing, but depend also on the geometry of the parts (e.g. wall thickness of tank and/or pipe) and characteristics of the materials used (such as rigidity or deformation characteristic, which can be elastic, plastic or viscoelastic). Claim 7 does not contain (apart from the feature "deformable" as discussed above) any further restriction in this respect.

D2 already specifies the materials used, mentioning (column 5, line 68, which was also referred to in the contested decision) a fuel tank made of thermoplastic material, such as polyethylene, i.e. a material which deforms plastically at elevated temperatures. D2 also describes (column 9, lines 30-34, referring to the venting system in Figure 1; bracket 233 relates to bracket 33, see column 8, lines 30-38) that the bracket is welded to the surface of the parison under heat and pressure. Moreover (as stated for all embodiments, see column 11, lines 31-34) enough flexibility is provided to accommodate deformations. Therefore, the range of possibly remaining stress in the pipe known from D2 is smaller than what is encompassed by the broad wording of claim 7. The wording of claim 7 comprises plastic fuel tanks made e.g. of elastomers, in which elastic forces build up during deformation and therefore higher tensile or compressive forces remain in comparison to materials which exhibit (at least in part) viscoelastic or plastic deformation behaviour.

Claim 7 requires also that the bend is stretched when the pipe is being attached to the parison. Since the amount of stretching is not further defined, fuel tanks are encompassed by the wording of claim 7 in which the

bend was only slightly stretched during manufacturing. In comparison to a plastic fuel tank in which the pipe is not stretched during its attachment to the parison, as alleged with regard to D2, this might lead to a slight shift in the remaining stress in the pipe which suffers less shrinkage than the tank following cooling. However, in view of the larger range of possibly remaining stress in the claimed pipe as argued above, the appellant I has not provided convincing arguments that the plastic fuel tank of D2 shows a range of residual stress in the pipe which falls outside the claimed range, as would be required (among other criteria) in order to acknowledge novelty.

1.4.3 In view of the foregoing, the board was not convinced that it is possible to distinguish the broadly defined plastic fuel tank according to claim 7 from the thermoplastic fuel tank as known from D2 on the basis of measurements of the remaining stress in the pipe. No further parameters were addressed by the appellant I which could distinguish the claimed product according to claim 7. Novelty of the subject-matter of claim 7 over D2 has therefore to be denied (Article 54(1) EPC).

2. Auxiliary request A

2.1 The amendment in independent claims 1 and 7 of the auxiliary request A, i.e. replacement of the term "deformable" by "springly deformable" in comparison to the patent as granted, does not comply with the requirements of Article 123(2) EPC.

2.2 The only basis for the amendment, which now specifies a (part of a) pipe being springly deformable between the two points of attachment, is the following passage of the application as filed (page 6, lines 15-32):

"According to the invention, the pipe to be fixed is deformable between its two points of attachment to the tank by virtue of the presence of at least one bend. ... One variant ... is to make at least one bend shaped like an S,... in the desired region. This makes a sort of spring in the pipe, which is stretched during fastening of the pipe to the parison by an amount (or to an extent) such that it is preferably at rest (or almost at rest) when the moulded tank is cooled."

2.3 The notion of a spring is well-known to the skilled person. However, the board finds that the application as filed does not clearly and unambiguously disclose that the S-shaped region of the pipe shows the typical elastic characteristic of a spring, as required when giving the word "springly deformable" a reasonable meaning. The term "springly" would be understood by the skilled person as relating to the function of a spring, which in a compressed or stretched state is characterised by built-in forces so that the spring returns to its former rest state when released. However, the wording "makes a sort of spring" in the original disclosure leaves open whether the S-shaped bend really has elastic properties, or whether it only has a shape or form which somehow resembles a spring so that it merely elongates during fastening of the pipe to the parison. Without further details given in the application as filed concerning the material of the pipe and the process parameters used (e.g. amount of stretching or temperature), stretching of plastic materials can also result in plastic deformation. The application as filed only states on page 6, lines 3-14, that the pipe according to the invention "can be made of any material appropriate to its function" and that "the main component of this pipe is generally plastic".

2.4 Therefore, the board concludes that specifying a pipe which is "springly deformable" introduces a characteristic of the pipe, namely an elastic property, which is not directly and unambiguously derivable from the application as filed.

3. Auxiliary Request B

3.1 Sufficiency of disclosure (Articles 100(b) and 83 EPC)

3.1.1 According to the established case law, sufficiency of disclosure must be assessed on the basis of the application/specification as a whole, including the description and claims, and not on the claims alone. The skilled person may even use his common general knowledge to supplement the information contained in the application or correct errors. Moreover, a reasonable amount of trial and error, without undue burden, is permissible when it comes to sufficiency of disclosure. The mere fact that a claim is broad is not itself a ground for considering non-compliance with Article 100(b) EPC. Doubts as to a claim's reproducibility over the entire scope have to be substantiated by verifiable facts.

Lack of clarity, if present at all, is not open to an objection under Article 84 EPC in the present case, since it is not caused by the amendments made but relates to features already present in claim 1 as granted (see G 3/14).

3.1.2 The appellant I alleges insufficiency of disclosure with regard to the feature in claim 1 according to which the bend is stretched during the attachment of the pipe to the parison. In the patent specification

(see column 4, lines 39 ff), the whole manufacturing process of blow moulding and fixing the pipe to the parison is described, in particular (column 5, lines 6-8) that a core is used "to fix the pipe (with its stretched bend) to the parison", as illustrated in Figure 3 (see column 6, lines 39-41: "...pipe as it appears in the stretched state, on the core used to fix it to the tank"). It is also stated (column 5, lines 10-11) that using a core to fix parts to the parison which is to be inserted between the mould impression is known from the prior art. Therefore, the board finds that at least one way of putting the invention into practice is disclosed. In fact, the appellant II does not object per se to a step of stretching the bend during attachment of the pipe to the parison under Article 100(b) EPC, as long as it was not associated with the desired effect of reducing deformations following cooling of the tank.

3.1.3 The appellant II questions whether welding a stretched pipe to a hot melt parison - and releasing the pipe before performing the step of blow moulding - provided the desired effect. Thereby, the appellant II seems to suggest that the hot melt parison could not withstand the forces exerted on the tank wall by a pipe having been stretched prior to its attachment to the parison. In particular, the appellant II alleges that the patent specification does not provide any teaching on how to achieve the desired effect of compensating for shrinkage deformation during cooling.

However, the patent specification not only describes that the mould is opened to withdraw the core before performing a final step of blow moulding (column 4, lines 48-51), but also that prior to fixing the pipe to the parison the latter is pressed against the walls of

the mould (column 4, lines 40-44). Thus, the mould already provides some support for the tank wall until the final step of blow moulding is performed. Moreover, the patent specification refers to other known techniques that can be used instead of welding in this context, such as rivet punching (column 3, lines 56 ff), thereby addressing the knowledge of the person skilled in the art of blow moulding.

The patent specification also contains a clear teaching with regard to the amount of stretching to be provided (column 4, lines 34-35: "such that it is preferably at rest (or almost at rest) when the moulded tank is cooled"), which is specified by the result to be achieved. In the context of the whole disclosure, this means (irrespective of whether still some stress remains in the pipe) that no deformation should be generated following cooling of the tank due to the effect of differential shrinkage between the pipe and the tank. The board was not convinced that it amounts to an undue burden of trial and error to arrive, depending on the parts and the materials used, at an amount of stretching of the pipe's bend which avoids deformations following cooling of the tank completely or at least to a large extent.

According to the established case law of the Boards of Appeal, objecting for lack of sufficiency of disclosure presupposes that there are serious doubts substantiated by verifiable facts, which appellant II has failed to provide. Therefore, the board cannot find that the invention as disclosed in the contested patent was not reproducible, taking into account the common general knowledge of the skilled person in the field of moulding.

3.1.4 Finally, the appellant II contests reproducibility of the claimed invention over the whole range claimed, since compensation of deformations during cooling of the tank was not achieved over the whole range claimed.

However, claim 1 as it stands is not directed to a dedicated effect or defines a result to be achieved, but comprises an intentional step in the manufacturing of a plastic fuel tank, namely stretching a bend during the attachment of the pipe to the parison. The patent specification clearly describes the problem during post-moulding cooling of a tank which - other than the pipe attached to it - suffers an appreciable amount of shrinkage. Therefore, any stretching of the pipe during attachment to the parison can help in this respect and thus compensates at least to some extent for the differential shrinkage between pipe and tank. This basic inventive idea is specified in claim 1. The fact that deformations during cooling might not be avoided completely, or that a certain degree of stress might remain in the pipe, is a matter of the broadness of the subject-matter defined by claim 1.

However, the fact that the subject-matter defined in claim 1 is very broad (and comprises any non-systematic and accidental stretching, as argued by appellant II) is an issue to be considered in the assessment of the patentability of the claimed subject-matter of claim 1. The board cannot see concrete grounds for concluding that the invention cannot be carried out within the whole range claimed.

3.1.5 In view of the foregoing, the board concludes that the invention is disclosed in a manner sufficiently clear and complete for it to be carried out by a skilled

person and that the requirements of Article 100(b) EPC are fulfilled.

3.2 Novelty (Article 54(1) EPC)

3.2.1 The subject-matter of claim 1 is new over the disclosure of documents D2 and D5 (Article 54(1) EPC).

3.2.2 D2 also shows (see e.g. Figures 4 and 5) a method for manufacturing the plastic fuel tank discussed above (see point 1) with regard to Figure 1 (explicitly stated in column 8, lines 30-38). However, D2 does not disclose directly and unambiguously a step of stretching an S-shaped bend (as shown in Figure 1) during the attachment of the pipe to parison.

Figures 4 and 5 illustrate an embodiment referring to Figure 1, and the pipe (205) shown in these figures corresponds to the fill vent tube (5) (see column 8, lines 30-38), which represents a straight line in Figure 1. The fill vent tube (205) is attached to the parison via bracket (233) which corresponds to bracket (33) of the venting system (21, 23) in Figure 1. Since the fill vent tube thus shares the attachment bracket with the venting system, Figures 4 and 5 seem to relate to an embodiment referred to in the description (see column 9, lines 20-24: "first attachment bracket preferably performs the function of the first and second attachment bracket"; or column 5, lines 26-29) in which both the fill vent tube and the venting system have one bracket in common, i.e. an embodiment deviating from the one disclosed in Figure 1. However, no information is derivable from Figures 4, 5 with regard to the venting system (21, 23) and the second point of attachment (35) shown in Figure 1, i.e. whether the S-shaped bend of Figure 1 is maintained in

the modified embodiment and how the three branches of the venting system are arranged spatially in the side view of Figures 4 and 5, since the venting system is not depicted in these figures. Moreover, the isometric view in Figure 1 only shows a venting system indicated by dotted lines, which does not allow to derive any clear information on its three-dimensional arrangement within the fuel tank.

The board follows the interpretation of appellant II that the term "bend is stretched" implies an increase in the radius of curvature and lengthening of the pipe between its distal ends. However, even assuming that the S-shaped bend known from Figure 1 is maintained in the venting system in Figures 4 and 5, no conclusion can be drawn on how the S-shaped bend would deform during assembly when attaching the venting system to the parison, in particular whether the radius of curvature of the S-shaped bend would increase.

Therefore, the board cannot follow the view of appellant II that Figures 1, 4 and 5 taken together imply a method step of stretching a bend of a pipe as required by claim 1.

3.2.3 The appellant II also argues lack of novelty over D2 in view of Figures 4 and 5 alone, alleging that the support ring (246) represented a second point of attachment for the fill vent tube (205) depicted in these figures. In the side view according to Figures 4 and 5, the fill vent tube (205) shows a somewhat S-shaped bend. However, it is not directly and unambiguously derivable from Figure 5 that the pipe (205) is lengthened between its distal ends or that the radius of curvature of the S-shaped bend increases during the process step of closing the mold which

forces the bracket to penetrate the parison. Since Figure 5 only indicates a movement of the bracket in the horizontal direction and therefore perpendicular to the elongation of the pipe, the bend might even be compressed, or the pipe as a whole might only rotate around its lower point of attachment without changing its shape.

3.2.4 As regards the allegation of lack of novelty over D5, the board concurs with the opinion given in the contested decision that D5 does not directly and unambiguously show a bend shaped like a corrugation. The structure consisting of the dotted circumferential lines shown in Figure 1 in D5 at the position of reference numeral 16 is not further described in D5 so that it cannot be said whether it represents a corrugation or something else.

3.2.5 Therefore, the board finds that neither document D2 nor document D5 are novelty-destroying to the subject-matter of claim 1.

3.3 Inventive step (Article 56 EPC)

3.3.1 The subject-matter of claim 1 involves an inventive step, irrespective of whether document D2, D4 or D1 is taken as the appropriate starting point, so that the requirements of Article 56 EPC are fulfilled.

3.3.2 D2 does not disclose a method step of stretching the bend of the pipe during attachment to the parison, as argued already above.

This distinguishing feature over D2 is provided in order to take into account the different amounts of shrinkage during post-moulding cooling when integrating

a pipe (which is only slightly heated) into a plastic fuel tank during its manufacture by moulding (i.e. to a hot melt parison). Since the degree of stretching of the bend is not further specified, the technical effect provided is only a reduction in (not necessarily the elimination of) the deformations and/or tensions following cooling of the tank, which takes into account (but not necessarily compensates completely for) the differential shrinkage between pipe and tank following cooling of the tank.

The problem to be solved may be seen in providing an improved method for manufacturing a plastic fuel tank by moulding a parison and attaching a pipe at at least two points during the moulding operation, which takes into account the phenomenon of differential shrinkage following cooling of the tank.

3.3.3 Since none of the documents referred to by appellant II relates to a method for manufacturing a plastic fuel tank by moulding or addresses problems in this respect, the board finds that there is already no motivation for the skilled person to consult documents such as D3 or "Dubbel" and to consider applying their teaching in an obvious manner to the manufacturing method of D2.

Providing a deformation reserve to account for changes in relative length between two parts or materials might be known to the skilled person, as demonstrated by D3 or "Dubbel". However, as argued by the appellant II further above in the context of its objection under Article 100(b) EPC, there was no sense in merely stretching a pipe which had to be released before blow moulding. In fact, specific means have to be provided (see above: the patent specification mentions that a core is used "to fix the pipe (with its stretched bend)

to the parison") so that this knowledge can be applied successfully in the method for manufacturing a plastic fuel tank by moulding a parison and attaching a pipe to the parison at at least two points, as known from D2. Therefore, it is not considered obvious to merely apply the knowledge of providing a deformation reserve - without further consideration - when it comes to attaching a pipe to a hot melt parison.

Document D3 might teach to fix a pipe in extension and might even mention changes in tube length through thermal action, as argued by appellant II. However, the whole teaching of D3 was concerned with the problem of deformation of a tube (which was attached to a vehicle's floor) in operation of the vehicle due to swelling of the tube caused by hydrocarbons. The board cannot see how the solution taught by D3, i.e. to floatingly attach a tube in the form of a loop to the (stable) vehicle's floor, could be applied without further modification or considerations in the blow moulding process of D2.

3.4 Document D4 does not show more than D2 (as admitted by the appellant II in its grounds of appeal, see page 20, last paragraph), so starting from document D4 as the closest prior art the same reasoning as given above in view of D2 applies.

3.5 Finally, a further line of argument was presented starting from document D1 as the closest prior art. Irrespective of whether further features might be missing in D1, again at least the distinguishing feature of stretching the bend during attachment of the pipe to the parison is not known. Therefore, with the same reasoning as above, the board takes the view that

it is not obvious to arrive at the solution as specified in claim 1.

3.6 Considering all the lines of argument brought forward by the appellant II with respect to novelty and inventive step, including lines of argument which have been disregarded by the opposition division or which have been presented for the first time in appeal proceedings, the board finds that the subject-matter of the sole independent claim 1 according to auxiliary request B is new and involves and inventive step (Articles 54(1) and 56 EPC).

4. In view of the foregoing, the issue of admissibility of new lines of arguments or late-filed evidence does not need to be addressed.

Order

For these reasons it is decided that:

The appeals are dismissed.

The Registrar: The Chairman:

A. Vottner G. Pricolo

Decision electronically authenticated