Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 26 June 2017

Case Number: T 2196/15 - 3.2.05

Application Number: 05731027.8

Publication Number: 1763430

IPC: B29C51/14, B29C51/34

Language of the proceedings: EN

Title of invention:
Process for making a plastic component from self-reinforced thermoplastic material and plastic component produced by this process

Patent Proprietor:
Samsonite IP Holdings S.a.r.l

Opponents:
DON & LOW Limited
COMPOSITE SOLUTIONS s.r.l.

Relevant legal provisions:
EPC 1973 Art. 100(b)
EPC Art. 69
RPBA Art. 13(1)

Keyword:
Claim interpretation
Sufficiency of disclosure (no)
Admissibility of the auxiliary request (no)
Oral submissions of the expert (no)

Decisions cited:
G 0004/95, T 1646/12

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 2196/15 - 3.2.05

D E C I S I O N
of Technical Board of Appeal 3.2.05
of 26 June 2017

Appellant: (Patent Proprietor)	Samsonite IP Holdings S.a.r.l 13-15 Avenue de la Liberté 1931 Luxembourg (LU)
Representative:	J A Kemp 14 South Square Gray's Inn London WC1R 5JJ (GB)
Respondent: (Opponent 1)	DON & LOW Limited Newford Park House Glamis Road Forfar Angus DD8 1FR (GB)
Representative:	David Moreland Marks & Clerk LLP Aurora 120 Bothwell Street Glasgow G2 7JS (GB)
Respondent: (Opponent 2)	COMPOSITE SOLUTIONS s.r.l. via Barbariga, 7 30032 Fiesso d'Artico (VE) (IT)
Representative:	Carlo Susanetto Cantaluppi & Partners S.r.l. Piazzetta Cappellato Pedrocchi, 18 35122 Padova (IT)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 6 November 2015 revoking European patent No. 1763430 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	M. Poock
Members:	O. Randl
	D. Rogers

Summary of Facts and Submissions

I. The appeal of the patent proprietor is directed against the decision of the opposition division revoking European patent No. 1 763 430.

The opposition division had found the subject-matter of all the requests on file not to meet the requirements of Article 83 EPC.

In its decision, the opposition division *inter alia* referred to the following documents:

D1: W. Prosser, P.J. Hine, I.M. Ward, "Investigation into thermoformability of hot compacted polypropylene sheets", Plastic Rubber and Composites, 2000, p. 401-410;

D2: "Self-Reinforced Polypropylene Composites for Automotive Applications, IBEC/ATT Conference, Paris, July 9, 2002";

D3: Ton Peijs, "Composites for recyclability", Materials Today, April 2003, p. 30-35;

D4: I.M. Ward and P.J. Hine, "The science and technology of hot compaction", Polymer, 45 (2004), p. 1413-1427;

D13: Renita S. Jones and Derek E. Riley, "A New Self-Reinforced Polypropylene Composite", paper presented at the 2nd Annual Automotive Composites Conference, Troy, September 12-13, 2002, p. 1-7;

A4: DE 10259883.

During the appeal proceedings, the following documents were filed or referred to by the parties:

DR3 and DR4: Witness Statements of Derek Riley;
A11: Leo Sartor, Declaration in support of the opponent Composite Solutions;
A12: Experimental evidence in support of insufficiency of disclosure
DVP: Declaration of Prof. Ignaas Verpoest;
WoS: Writ of Summons, filed by a third party on 26 May 2010, together with a request to stay the grant proceedings.

II. The oral proceedings before the board took place on 26 June 2017. The board had informed the parties of its preliminary opinion in a communication annexed to the summons.

III. The appellant (patent proprietor) requested the board to set aside the decision under appeal and to maintain the patent upon the basis of the Main Request (patent as granted), or upon the basis of Auxiliary Request 1, filed at the oral proceedings before the board on 26 June 2017.

Respondents 1 and 2 (opponents 1 and 2) requested the board to dismiss the appeal.

IV. Claims 1 of the main request (patent as granted) read (feature references have been added in square brackets):

"[**A**] A process for producing a plastic component, in particular luggage shell, comprising areas of high degree of form change requiring increased deformation work, comprising: b
- [**B1**] providing a lamina (4) of self-reinforced thermoplastic material or [**B2**] a composite body thereof, [**C**] said lamina having edges (8) and a field

portion (3) between the edges (8),
- [**D**] gripping the lamina (4) near its edges (8) by gripping means (31-33),
- [**E**] tensioning the lamina (4) by subjecting same to a predetermined stress and temperature conditioning under consideration of the self-reinforced structure of the lamina (4),
-[**F**] deep-drawing the lamina (4) at least partially towards a shell preform shape, and
- [**G**] finally releasing the component preform shape from the remainder lamina to form the component (1).
characterized in that
[**H**] said gripping means (31-33) are adapted to take all tapes forming the lamina (4) clamped around an entire circumference of the lamina (4) having means for controlling and steering the tension in said tapes, and while deep-drawing the lamina (4) at least partially towards a shell perform [sic] shape controllably moving the lamina edges (8) relative to one another in response to at least one process parameter, tensioning the lamina (4) during the deep-drawing process."

Claim 1 of auxiliary request 1 differs from claim 1 of the main request by the deletion of the expression "plastic component, in particular", by the replacement of the other occurrences of the word "component" by "shell", as well as by the additional features:
"wherein the gripping means comprises pairs of elongated jaws (31, 32) for gripping the edges (8) of the lamina with jaw operating drive units (33) being disposed adjacent the plate-shaped pair of upper and lower jaws (31, 32);
wherein the step of controllably positioning the lamina edges is performed by controllably moving the clamped edges (8) towards one another".

V. The appellant argued as follows:

(a) Claim interpretation

The characterising part of claim 1 is not particularly clear and needs interpretation. When interpreting the claim, one has to read it as a whole. There is a risk of breaking it down in parts and forgetting the interaction between those parts.

Whether the claim encompasses active and passive embodiments and whether the lamina is woven or not is irrelevant for the claim interpretation, because neither of those terms is used in the claim.

The skilled person reads the patent in context. He has the final product in mind and realises that it is crucial to tension the critical tapes.

The appellant expressed its agreement with the interpretation of claim 1 given in the communication of the board, with one exception: the meaning of the word 'take' in feature H ("to take all tapes forming the lamina ... clamped around an entire circumference of the lamina"). The word 'take' here is used more in the meaning of the word 'carry' rather than 'grip'. It is possible to take things without seizing them directly. Gripping means that are adapted to take all the tapes do not have to grip directly all the tapes. 'Taking' is a more general concept and includes indirect gripping. The patent uses 'take' in this context only twice; everywhere else, the words 'grip' or 'clamp' are used. This suggests that the writer has drawn a distinction by this specific choice of words.

There is more than one circumference; an internal circumference might be a possibility.

The skilled person always has a practical viewpoint; he is not looking at the description to make the claim inconsistent. He has a mind willing to understand. He does not read the claims in isolation but always tries to read them in the light of the description. When doing so, he would note Figure 22, which shows the situation before the lamina is dropped onto the support bars and then gripped by the gripping jaws.

It has to be noted that the gripping jaws of Figure 22 move during the process, within certain boundaries. When they are moved inside to the maximum extent, they will touch, which explains the 45° angle chosen. There is no need to start the process with them touching; they just have to be able to move in and out in a regular way.

There is clamping of tapes all around the circumference, but this does not mean that all tapes are being clamped. Rather, all the tapes are taken clamped around the circumference of the lamina.

The figure filed with the written submission of 26 May 2017 illustrates how it can be achieved to clamp all the tapes although there are gaps in the corners. The self-reinforced materials (SRTC) used in the process of claim 1 undergo shrinkage when heated. When grabbed, instead of shrinking, they tension themselves, even if they are not held

at both ends. Holding the tapes is controlling them.

When asked by the board, the appellant explained that the expression "self-reinforced thermoplastic materials" implied some structural limitations. The tapes do not have to be woven, such as the exemplary 'Curv' and 'Pure' materials. For details, the appellant referred to Paragraph [0035] of the patent.

(b) Sufficiency of disclosure

The respondents unduly play down the content of the common general knowledge of the skilled person. Prof. Verpoest is correct when he states that document D4 is consistent with the common general knowledge of the skilled person. Document D4 is a summary article and not a piece of new research. It presents the current state of the art. The field under consideration was relatively new (first activity in the early nineties) and there were no textbooks on SRTC. Document D4 was the closest thing to a textbook that existed in the field (*cf.* "Case Law of the Boards of Appeal", 8th edition, 2016, sections I.C.2.8.2 and II.C.3.1) The publications cited in the opposition proceedings give a consistent picture of what is needed to deep-draw, and the patent adds to that. References in the patent to other documents, such as the reference to document D3, must not be ignored either. Document D3, page 30, indicates that "[t]he material can be processed using a wide range of composite processing technologies including thermoforming. On page 33 it is explained

that temperature is important for 'Curv' material ("narrow processing window of a few degrees").

The patent contains relevant teaching: paragraph [0025] explains the SRTC as such; these materials have been known for some time. Paragraph [0026] points out that the fact that their matrix melts around the core can promote their deep-drawing capabilities. It has to be noted that there is no precise definition of deep-drawing. Paragraph [0027] mentions that the problem of heat shrinkage has been solved and refers to the temperature of 170° C to which the SRTC lamina have to be heated.

Document D1, page 403, states: "If a larger deformation is required, ... then increasing the temperature to between that of the matrix phase and that of the oriented phase would aid this deformation process by producing some melting of the matrix phase." This is what the skilled person knows when he performs deep-drawing. Document D2, slide 29, presents experimental results in respect of thermoforming and mentions 50% strain (which is a high strain) at 170°C. Document D4, page 1423, notes that "temperature was the most important variable with the forming force falling by 300% when going from 140 to 170 °C" and then proposes two alternative strategies involving postforming at 150°C or at 170°C. Thus several different teachings from different people provide a consistent picture how greater deformations are to be dealt with. All of them point to the temperature. Document D13, page 2, provides another example of a teaching that temperatures

of 165-170°C are suitable for maintaining the orientation of the tapes.

The respondents have not identified any particular parameter or trick needed to put the invention into effect. The respondents only argued that carrying out the invention was difficult because wrinkles or tears would appear. However this argument is based on a non-claimed technical effect (*cf.* "Case Law of the Boards of appeal", 8th edition, 2016, section II.C.2).

Even the paragraph in the patent mentioning difficulties does not establish that it was impossible to deep-draw SRTC. Rather, this passage establishes that it was done, but that the results were not perfect.

The invention consists in using the gripping means to hold and tension the lamina and to controllably move the lamina edges relative to one another to control the tension. The question of sufficiency has to be seen in this context.

The practical implementation is reasonably routine. The description contains sufficient elements on how the gripping means are to be designed. There is nothing startingly new about the process parameters to be used. There is no detailed disclosure of the values of the various process parameters, but the reason is that those values are not difficult for the skilled person to obtain. There is no evidence on file that there is an extremely narrow range for one of the process parameters. Actually, the values will vary relatively widely, depending on the particular cases.

Witness statement DR3, section 10, mentions the lack of disclosure of the 170°C temperature but does not point out any other parameter that would have been impossible for the skilled person to derive. However, the 170°C temperature is mentioned in the patent. The reference to an unnamed customer finding the 'Curv' sheets unprocessable seems to be mere hearsay. In any case, those customers had not read the patent and did not use the gripping means disclosed in the patent.

Commercial publication D13, page 2, is all about SRTC. It mentions "extensive trials", which contradicts statement DR3 according to which there were only small-scale academic studies. It should be noted that Mr Riley was one of the authors of document D13. Document D13 paints a different picture than DR3, especially in its concluding section.

There is a lot of evidence (e.g. photographs in documents D4 and D2) that deep-drawn SRTC products were commercially produced.

Witness statement DR4 points out in its section 5 that the determination of the optimum conditions would have been highly onerous even to a skilled practitioner, but this is not relevant, because there is no need to know the optimum conditions in order to carry out the invention. DR4 comprises no evidence that it was impossible to select the relevant parameters. Moreover, the author of document DR4 was not aware of the patent at the priority date. Paragraph 8 of document DR4 states that thermoforming at elevated temperatures was not

understood by skilled practitioners at the beginning of 2003. This contradicts the statement in paragraph 5 according to which it was generally accepted that thermoforming at higher temperatures should involve a single sided female mould and a pressure controlled diaphragm.

Declaration A11 suggests that SRTC as such were not part of the common general knowledge of the skilled person. However, those materials were known as a concept since the 1970s. The declaration is silent on common general knowledge but rather refers to Mr Sartor's personal knowledge. Also, it does not take into account that the patent itself comprises a disclosure in respect of the temperature to be used.

The Writ of Summons, which was drafted in 2010, is not very relevant for determining what was the common general knowledge in 2004. It was filed by an opposing party to the proprietor and, consequently, is a very partisan document, and by no means a court document. Moreover, the technical process referred to is all about slipping, which is another line of research. The collaboration with Lankhorst resulted in a different process to what is claimed in the patent.

The declaration by Prof. Verpoest, in its section 10, explicitly says that no thermoforming parameters other than the temperature are particularly essential for carrying out the invention. They can be readily and easily selected. Reference is also made to document D4. Respondent I unduly ignores paragraphs 9 and 13.

The test results filed by respondent II appear not to be based on the claimed invention. Coil springs are not mentioned in the patent at all.
If anything, the results show that even bars held by springs constitute an improvement over fixed clamping.

In respect of the technical problem solved by the process of claim 1, the patent explains that the problem of heat shrinkage is solved (par. [0027]): moving the edges allows to keep the strips under tension even when heating. The fact that there might be a domain covered by the claim where the invention does not work very well or even does not work at all does not make the claim insufficiently disclosed. The invention leads to a better product, not necessarily a perfect product.

When faced with failure, the skilled person is not at loss how to react. If he observes tearing, he will reduce the tension; if there are wrinkles, he will try to increase it.

The appellant also insisted on the fact that both 'Curv' and 'Pure' composites are polypropylenes (PP; *cf.* paragraphs [0013] and [0024]). The skilled person reads the 170°C teaching in this context.

To summarise on the three objections mentioned in the communication of the board: (1) the skilled person armed with the knowledge of the patent would have been able to carry out the invention; (2) there is no evidence that a method for controllably moving the edges cannot be found;
(3) it is always possible to find strange embodiments that would not work; the skilled person

would not concern itself with such embodiments and would not try to do what cannot be done (e.g. moving the bars inwards when they are already in contact).

(c) Oral submissions by the expert

Claim interpretation is a matter to be dealt with by European patent attorneys and not by laymen in patent law. Therefore, Mr Riley should not be heard on this matter.

It would not be appropriate to hear Mr Riley on how to understand the different documents on file with respect to each other. Doing so would be tantamount to introducing new facts and evidence. There is a special procedure for taking of evidence. Allowing Mr Riley to make oral submissions would deprive the appellant of the opportunity to be heard and to file counter-evidence after having checked the assertions of the expert.

(d) Admissibility of auxiliary request 1

The claimed subject-matter has been defined in a more restrictive way. The invention is now better defined, which reduces the need for completing the disclosure with common general knowledge. The request is based on auxiliary requests that were on file before; therefore, nobody is taken by surprise. The request should be admitted because it constitutes a last chance for the appellant to avoid the revocation of the patent.

VI. Respondent I argued as follows:

(a) Claim interpretation

There is nothing in claim 1 that requires a bar as shown in Figure 22 of the patent.

The boards interpretation of claim 1 is fair, but one cannot disregard the fact that claim 1 speaks of the "entire" circumference.

Claim 1 covers both active and passive embodiments. There is nothing in claim 1 to require the lamina to be woven or the tapes to be at right angles with respect to each other and the device; the tapes could be inclined by 45°. In that case one could easily imagine that some tapes are not clamped if the boards interpretation of "entire circumference" is adopted.

The self-reinforced thermoplastic materials do not have to be woven, nor do the tapes have to be aligned.

(b) Sufficiency of disclosure

Respondent I expressed its agreement with the arguments of respondent II on sufficiency of disclosure and added the following considerations:

Paragraph 14 of the declaration of Prof. Verpoest is not sufficient to establish that the skilled person knew how to carry out the invention. Prof. Verpoest is an expert and not a skilled person such as Mr. Riley and Mr. Sartor.

Paragraph 7 of the declaration deals with making the material, not forming it. Pargraph 8 should not be read together with paragraph 7.

The invention has to be disclosed in such a way that it can be carried out over the whole extent of the claim. The proprietor has not provided experimental evidence in this respect. There is not sufficient information to support the whole breadth of the claim.

The Writ of Summons is not irrelevant. Even in a slip form mould one observes slipping. Both slipping and gripping are encompassed by claim 1.

None of the specific documents referred to by the appellant corresponds to the common general knowledge of the skilled person comprising all the parameters needed and the relationship between them. It is incumbent on the patent proprietor to either provide examples in the patent or to establish that the skilled person had sufficient knowledge. The only guidance in the patent is the 'magic number' of 170°C. At the priority date, however, most of the work had been done at lower temperatures. In the patent there is no teaching whatsoever concerning the other process parameters. The fact that the prior art refers to experiments that have been carried out does not amount to a teaching enabling the skilled person to carry out the invention.

Page 29 of document D2 does not show anything comparable to the shape of a suitcase and does not provide sufficient guidance to the skilled person.

In response to the appellant's objection that Mr Riley's various statements appeared not to be consistent, respondent I pointed out that paragraph 8 of document DR4 expressed Mr Riley's understanding of the Writ of Summons, whereas paragraph 5 explained why deep drawing of SRTC was not commercially available at the time of filing of the patent. Document D13, of which Mr Riley is a co-author, reports a number of possible uses of self-reinforced PP and mentions trials that were carried out with a number of materials and forming techniques. There is no teaching on the interrelationship of the various parameters.

(c) Oral submissions by the expert

Respondent I asked the board to allow Mr Riley to explain how the skilled person would understand claim 1. That Mr Riley would accompany respondent I had been announced before the oral proceedings.

Respondent I also asked the board to hear Mr Riley on how to understand the specific prior art documents D2, D3, and D4 with respect to each other.

(d) Admissibility of auxiliary request 1

The sufficiency problems of the main request also concern auxiliary request 1. Therefore, the request should not be admitted. The request does not consitute the appellant's last chance, because there are several pending divisional applications.

VII. Respondent II argued as follows:

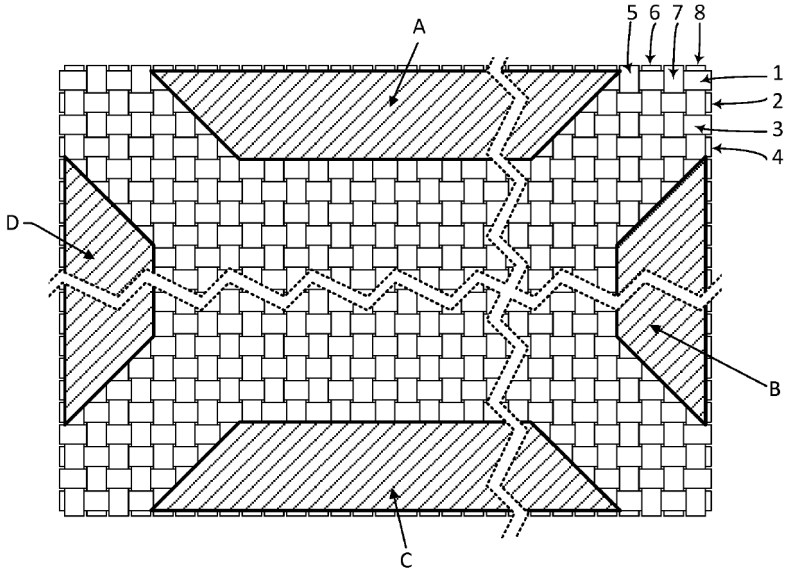
(a) Claim interpretation

Although the word 'take' in feature H could have a more general meaning, in the context of feature H ("take ... clamped") its meaning is equivalent to 'clamp'.

Respondent II expressed disagreement with the interpretation of claim 1 as outlined in the communciation of the board. The expression "around an entire circumference of the lamina" is absolutely clear and does not require any interpretation. "Entire" is to be understood as "with no part left out". The use of the indefinite article is typical for claim language and would not lead the skilled person to a different understanding. The description does not contain any explicit definition that would lead the skilled person to adopting an interpretation different from the most common meaning of "entire circumference". Also, Figure 22 of the patent would not be used by the skilled person looking for clarification, because there is no lamina depicted. Moreover, Figure 22 is not inconsistent with the interpretation of "entire" proposed by respondent II, because the gripping means can be moved so as to grip the lamina all around its circumference.

If an internal circumference is being considered, not all the tapes forming the lamina are clamped, but only those that are inside the internal circumference.

The arrangement depicted in the appellant's submission of 26 May 2017:



is not covered by claim 1 because "said tapes", in which the tension is controlled and steered according to claim 1 correspond to "all tapes forming the lamina" mentioned before. However, tapes 1 to 8 are only taken in one position, which does not allow their tension to be controlled.

(b) Sufficiency of disclosure

The patent itself mentions the difficulties experienced in press-forming self-reinforced thermoplastic mats or sheets that led to the impossibility of moulding in practice (paragraph [0016])

The declaration of Prof. Verpoest is based on documents D1 and D4, which are scientific articles that do not represent the common general knowledge. Also, the personal opinion of Prof. Verpoest is not representative of the knowledge of the skilled

person. He is a very important academic person having knowledge that represents the forefront of the knowledge in the field and, therefore, by far exceeds the knowledge of the average skilled practitioner.

There are many other indicia, especially in the prior art, that thermoforming of SRTC was not part of the common general knowledge, i.e. what the skilled person knows without consulting documents.

Document D4, which deals with hot compacted materials, was published only a few months before the priority date. At the end of its paragraph 8 it is stated that postforming is a matter that still needs to be addressed.

Document D3 presents PP-based composites as strong potential candidates the thermoforming of which is still to be studied.

The declarations filed by the respondents corroborate this picture and show that deep-drawing of SRTC was not part of the common general knowlege of the skilled person at the priority date.

It has to be noted that carrying out the invention means more than simply carrying out the steps of the claimed process; it is also necessary to solve a technical problem and obtain a desired effect. The patent specification does not refer to a problem different from the need of avoiding wrinkles (see paragraphs [0014] and [0022]). In other words, the claimed process is only sufficiently disclosed if the skilled person is provided with a teaching how to obtain a product

without wrinkles, even though this effect is not explicitly stated in the claim. The tests results filed by respondent II show that this is not the case, because both tests failed. The fact that the solution with fixed edges did not work means that 50% of the claimed range does not work, because the same outcome is to be expected for edges moving outwards.

In view of the failure, there is no teaching in the patent for the skilled person how to go forward. The patent specification only teaches the use of 170°C for SRTC material. Claim 1, however, has no specific limitation to PP or to this temperature.

(c) Admissibility of auxiliary request 1

The amendments do not overcome the objection that the deep-drawing step is insufficiently disclosed. The fundamental problem remains unsolved.

Reasons for the Decision

1. Claim interpretation

Claim 1, and in particular its characterising feature H, is unclear to some extent and requires interpretation.

1.1 Relevance of Article 69 EPC

The appellant criticised the opposition division for having failed to mention or apply Article 69 EPC and its Protocol. Article 69 EPC deals with the extent of

protection conferred by a European patent. As such it is relevant only when compliance with Article 123(3) EPC or matters of patent infringement are to be examined. Consequently, Article 69 EPC is not relevant in the present context and there was no need for the opposition division to refer to this provision.

That being said, patent claims, like any text, have to be interpreted, in particular when their features are not perfectly clear in themselves. In such situations the skilled person will have to refer to the disclosure of the application or the patent, as the case may be, as a whole, including its description and drawings (*cf.* T 1646/12, point 2.1 of the reasons).

1.2 Interpretation of the characterising feature

According to feature H, the claimed process is characterised in that the "gripping means are adapted to take all tapes forming the lamina clamped around an entire circumference of the lamina having means for controlling and steering the tension in said tapes, and while deep-drawing the lamina at least partially towards a shell perform [sic] shape controllably moving the lamina edges relative to one another in response to at least one process parameter, tensioning the lamina during the deep-drawing process".

The syntactical structure of this feature is complex and makes the claim unclear. There are many verbal forms ("... characterised in that said gripping means are adapted to take ... forming ... having means ... controllably moving ... tensioning ...") the subject of which is sometimes ambiguous. In what follows, the board will explain the understanding of this feature it has reached.

1.2.1 Preliminary observations

According to the Oxford English dictionary (OED), a lamina is defined as "a thin plate, scale, layer, or flake". According to features B1 and B2, the lamina of claim 1 is made of self-reinforced thermoplastic material or a composite body thereof.

Feature H defines the gripping means. It has to be borne in mind that, according to feature D, the gripping means grip the lamina near its edges.

The OED defines "grip" as "to grasp or seize firmly or tightly".

The opposed patent does not contain a definition of "tape"; therefore, the term is interpreted along its common meaning, i.e. "a long, narrow, thin and flexible strip" (OED). Accordingly, the lamina of claim 1 is understood to be a thin layer made from strips of self-reinforced thermoplastic or composite material.

1.2.2 "adapted to take all tapes forming the lamina clamped around an entire circumference of the lamina"

(a) "take all tapes ... clamped"

A comparison with the statement in paragraph [0029] of the patent - according to which "a sheet clamping device is used which takes all tapes clamped around the entire circumference ..." (underlining added by the board) - shows that in the context of feature H, the participle "clamped" does not refer to the lamina but that "forming the lamina" was only inserted to further define the tapes.

The question arises what is to be understood by "takes all tapes clamped". In this context the board notes the following:

- The board is not aware of the expression "to take something clamped" having a recognised meaning in the field of the invention. The parties did not refer to such a particular meaning either.
- The OED defines the verb "clamp" as "to make fast with a clamp or clamps" and "to seize or press firmly", respectively. When used according to the second meaning, the verb is a quasi-synonym of the verb "grip".

The appellant argued that one should understand "take all tapes clamped" as "take all tapes that are clamped". It adopted an understanding of the verb "take" according to which tapes that are not clamped but in contact with other tapes the majority of which are clamped are "taken" (see point 7.9 of the statement of grounds of appeal). The appellant understood 'take' to express a more general concept than 'gripping', including indirect seizure. Regardless of whether such an understanding is plausible or not, the board notes that claim 1 requires the gripping means not only to take all tapes, but to take them clamped. The skilled person would understand this to mean that the gripping means have to be adapted to clamp all the tapes forming the lamina.

(b) "around an entire circumference of the lamina"

The expression "adapted to take all tapes [...] clamped around an entire circumference of the lamina" is understood to mean that the gripping means are adapted

to seize the lamina over its whole circumference such that all the tapes forming the lamina are being clamped.

There was some disagreement on whether the gripping means actually seize all tapes. If the above interpretation of the expression "take ... clamped" is adopted, the wording of the claim certainly suggests that all the tapes are seized.

The appellant argued that the description provided a basis for the case where only the "most critical tapes" are clamped, but this case is not expressed in claim 1 as it stands. In the absence of any express definition in the description it is not acceptable to interpret a claim feature that is clear as such ("all tapes") in a way that is contrary to its plain meaning.

The expression "around an entire circumference of the lamina" raises questions because of the use of the indefinite article: does the lamina have more than one entire circumference?

The board has found the appellant's concept of an "internal circumference" unpersuasive. According to the OED, "circumference" designates "the line that forms the encompassing boundary". If this definition is accepted, the circumference of a lamina is unambigously defined and cannot designate any closed curved line on the surface of the lamina.

The skilled person looking for a clarification would consider the teaching of the description and the accompanying drawings. In this context the parties disagreed on whether the skilled person would consider Figure 22, which depicts a gripping device ("gripping

rack" 12) for the press 23 of the apparatus for manufacturing luggage shells of Figure 9.

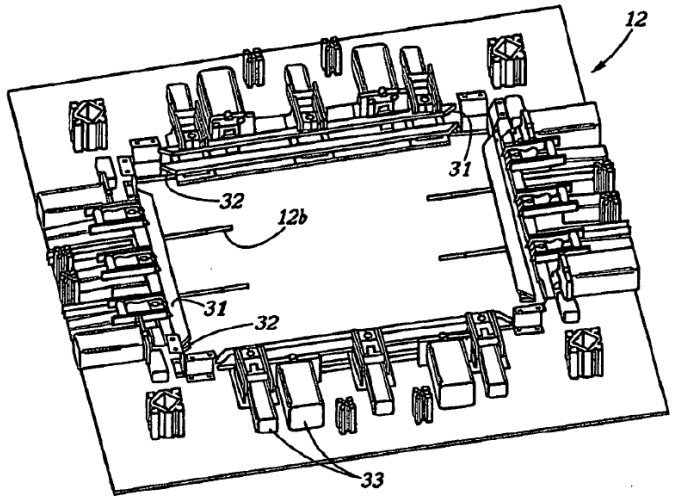


FIG. 22

The board has no doubt that this figure is relevant for the skilled person's understanding of how the gripping means seize the lamina, even though no lamina is depicted.

In the disclosed embodiment the (rectangular) lamina is clamped along all four edges. If the grippings means are to conserve the possibility of controllably moving the edges towards one another (such as required in claim 14 as granted), without there being a preceding outward movement, the corners of the lamina cannot be completely clamped. This is why the skilled person would understand that "clamped around an entire circumference of the lamina" is to be understood such that the lamina is clamped along its entire circumference (no edge is unclamped), allowance being made for short interruptions, in particular at the corners of the lamina. The interruptions may not, however, be such that there are unclamped tapes,

because this would contradict the explicit wording of the claim.

Respondent II's objection that "entire" means "with no part excepted" is not without merit, but the semantic range of the word goes beyond that meaning. According to the OED, the adjective can also mean "including all the essential parts", and this interpretation appears to be appropriate here.

1.2.3 "having means for controlling and steering the tension in said tapes"

The present participle "having" is somewhat alien to the overall syntax of feature H, which is introduced by "... characterized in that said gripping means are adapted ...". In principle, it could refer to the preceding noun, i.e. lamina, but this would not make technical sense: the skilled person would not expect the lamina to have means for controlling and steering the tension in the tapes forming the lamina. The board understands the word to refer to the gripping means. Accordingly, "having" is understood to mean "and have" in the present context. This understanding appears to be in line with the disclosure of paragraph [0029] of the patent, according to which "a sheet clamping device is used which takes all tapes clamped around the entire circumference and provides the opportunity to control and passively or actively steer the tension in the tapes".

1.2.4 "and while deep-drawing the lamina at least partially towards a shell perform [sic] shape controllably moving the lamina edges relative to one another in response to at least one process parameter"

Again, the syntactical insertion of this expression in the characterising portion of claim 1 is obscure. The board understands the word "moving" to refer to the expression "having means for" ("said gripping means ... having means for controlling and steering ... and ... moving ..."). Thus the feature requires the gripping means to have means for controllably moving the lamina edges while process step F is performed.

1.2.5 "tensioning the lamina during the deep-drawing process"

There appear to be two possible ways of understanding this feature. First, the word "tensioning" might also refer to the expression "having means for" ("said gripping means ... having means for controlling and steering ... and ... moving ..., [and] tensioning"). However, in order to reach this conclusion, one has to introduce the conjunction "and", which is absent from the feature. Alternatively, the -ing form may express the effect of the preceding feature ("said gripping means ... having means for ... moving ..., [thereby] tensioning"). This interpretation makes sense, because the tensioning is most easily obtained by moving the lamina edges (*cf.* paragraph [0069]: "... moving the respective and potentially more individualized clamping areas of the sheet actively to imply a certain tension to the reinforcing strands within the sheet material during the molding process"). The board adopts the second interpretation.

1.2.6 Conclusion

The characterising feature of claim 1 as understood by the board characterises the claimed process as follows:

- the gripping means used (in feature D) are adapted to seize the lamina over its (essentially) entire circumference such that all the tapes forming the lamina are being clamped;
- these gripping means also comprise means for controlling and steering the tension in the tapes forming the lamina;
- the gripping means comprise means for controllably moving the lamina edges relative to one another in response to at least one process parameter when the deep-drawing process step (feature F) is being performed; thereby, the lamina is being tensioned during that step.

2. Sufficiency of disclosure

2.1 Legal basis

A European patent can be successfully opposed if it does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100 b) EPC 1973).

2.2 Concrete objections

It is clear from the decision under appeal that most objections were related to "process parameters".

In point 2.2.1 of its decision the opposition division referred to process parameters required for deep-

drawing the lamina of self-reinforced thermoplastic material (feature F of claim 1). The division insisted on the importance of the temperatures for successfully thermoforming highly oriented self reinforced thermoplastic laminae. ["Objection 1"]

Point 2.2.2 of the decision extends the objection to features H3 and H4 and criticises the absence of any indication of how the lamina edges are to be moved in response to a process parameter. ["Objection 2"]

Finally, the opposition division objected that the skilled person would be at loss how to clamp all tapes (feature H1) while obtaining a movement of the lamina edges towards each other (feature H3; claim 14). ["Objection 3"]

2.3 Objection 1

One of the steps of the claimed process requires the lamina to be deep-drawn towards a shell preform shape (feature F). The patent is almost completely silent on the conditions under which this is done. Unless the skilled person knew at the priority date of the patent, as part of his common general knowledge, how this process step can be performed, he is not able to carry out the invention.

Therefore, the question to be answered by the board is whether the skilled person knew how to deep-draw laminae of SRTC at the priority date.

Among the parameters to be determined by the skilled person in order to successfully carry out this process step (i.e. to obtain a product having an acceptable surface structure), one may cite the stretching time,

the heating time, the temperature, the clamping force, the pulling force, and the mould temperature. The board finds the statement that only the lamina temperature is materially relevant unpersuasive in view of the complexity of the process. Also, it is not self-evident that the other values were easy for the skilled person to obtain.

The opposition division appears not to have established that deep-drawing of SRTC was unknown at the priority date of the opposed patent. It is, however, notoriously difficult to prove the absence of knowledge. Witness statement DR3 produced by Respondent 1 according to which "at the time of the patent filing self-reinforced thermoplastic (SRTC) were not being commercially deep drawn" (see item 10) is insufficient in this respect. As a matter of fact, there may be various reasons (e.g. cost, need to use existing machinery, ease of realisation, lack of training of the workforce, ...) why something the skilled person would know how to do is not being done commercially.

In response to the communication of the board, the parties have filed various pieces of evidence, which contradict one another to some extent. The board has reached its conclusion based on the principle of free evaluation of evidence. The different pieces of evicence are discussed in what follows:

2.3.1 Declaration of Prof. Ignaas Verpoest

The core statement of Prof. Verpoest, i.e. that deep-drawing was itself part of the common general knowldege at the priority date is based on document D4 and on his own knowledge of the art (see paragraph 13).

As can be seen from paragraph 1 of his declaration, Prof. Verpoest is a highly qualified academic in the field of composite materials. As such, Prof. Verpoest's knowledge and understanding of the matter clearly goes far beyond what may be expected of the person skilled in the art, i.e. an experienced practitioner who has average knowledge and abilities. As a consequence, assertions concerning Prof. Verpoest's personal knowledge of the art at the priority date cannot be used to establish what actually was the common general knowledge of the skilled person at the time.

Prof. Verpoest's statement, therefore, critically relies on the teaching of document D4.

2.3.2 Document D4

Document D4 is a review article on the science and technology of hot compaction, i.e. a process in which oriented polymer tapes are heated so that some of the polymer material melts and forms a continuous matrix in which the lattice of tapes is embedded. The resulting rigid sheet can then be thermoformed.

The respondents have argued that document D4 is a scientific article and, as such, cannot establish the common general knowledge of the skilled person. It is true that common general knowledge does not normally include scientific articles. However, by way of exception, such publications may be considered to be common general knowledge, for instance when a technical field is so new that the technical knowledge is not yet available in textbooks (see "Case Law of the Boards of Appeal", 8th edition, 2016, section I.C.2.8.2). The board finds merit in the appellant's assertion that this is the case here. Therefore, the board is willing

to accept that the review article D4 expresses the common general knowledge of the skilled person in the field of hot compaction at the beginning of the year 2004.

However, the board is unable to accept that based on the knowledge disclosed in document D4 the skilled person would be capable of deep-drawing SRTC. As a matter of fact, document D4 does not dwell on deep-drawing. It mentions that "low molecular weight polymers are often used for ... drawing to high draw ratios" (p. 1417) and refers to die-drawn rods, comparing die-drawing to hot compaction (p. 1420), but deep-drawing as such is not the centre of interest. Thermoforming is discussed only in general terms in the context of the commercial application of hot compacted sheets (p. 1422-1423). The document discloses that temperature is the most important variable for thermoforming and mentions temperatures of 150°C and 170°C, respectively, but in view of the practical complexity of deep-drawing SRTC composites, these pieces of information would not enable the skilled person to successfully deep-draw such composites without carrying out a proper research program. Finally, section 7 of document D4 shows several practical applications, but it does not provide enabling information on how they were obtained.

Therefore, D4 cannot be said to establish that deep-drawing of SRTC was part of the common general knowledge of the skilled person at the priority date.

As a consequence, the board cannot endorse Prof. Verpoest's statement in paragraph 13 of his declaration either.

2.3.3 Document D1

Document D1 presents the results of an investigation into the thermoformability of hot compacted PP sheets. As such it is not suitable for establishing the common general knowledge of the skilled person. Moreover, the disclosure of document D1 in respect of deep drawing appears to be limited to stating that the temperature should be increased to between the (melting) temperature of the matrix phase and that of the oriented phase (see p. 403).

2.3.4 Document D2

The appellant also referred to page 29 of document D2 to establish that the skilled person knew the relevant parameters for deep drawing SRTC. However, document D2, which corresponds to slides presented at a conference in 2002, cannot be said to extablish the common general knowledge of the skilled person. Moreover, the information provided ("170°C - 50% strain") hardly goes beyond what is disclosed in the patent itself.

2.3.5 Document D3

Document D3 is a technical article dealing with recyclability of SRTC and also mentions the possibility of thermoforming. The document as such is not suitable for establishing common general knowledge, but this is irrelevant, because the patent itself, in its paragraph [0007], refers to this document. However, the board is unable to see how document D3 could fill the gap of disclosure in respect of how to deep-draw SRTC. The relevant disclosure of document D3 is limited to the fact that the material can be thermoformed and that the temperature is a critical parameter.

2.3.6 Document D13

Document D13 is a paper presented at an Automotive Composites Conference. Again, the document as such is not suitable for establishing common general knowledge. The documents mentions "extensive trials" (p. 2) but does not provide any details regarding the respective conditions. Possible applications are mentioned as well, but again no details are given. As a whole, the purpose of the document appears to be to attract customers rather than to disclose the relevant knowledge of the authors. This may also account for the fact that document D13 paints a different picture than declaration DR3, as observed by the appellant.

2.3.7 Witness statement DR4 and declaration A11

The declarations by Mr Riley and Mr Sartor have been filed by the respondents and seek to establish that deep-drawing of SRTC was not part of the common general knowledge of the skilled person at the priority date. The intrinsic weakness of such declarations consists in the fact that absence of common knowledge is difficult to prove on the basis of individual cases.

In paragraph 5 of his witness statement DR4, Mr Riley declares that beyond few small scale laboratory controlled experiments he was not aware of any instances of SRTC being deep-drawn either commercially or otherwise. He refers to parts that had been produced as demonstration parts at temperatures around 155-160°C, but that they had been found unsatisfactory (because of wrinkling). According to Mr Riley, it was accepted that certain measures would have to be taken (in particular, using a single sided

female mould in combination with a pressure controlled diaphragm) if thermoforming at higher temperatures was to be attempted. The author formally contests that the method described in the patent (matched moulds with a melted matrix) was sufficiently recognised or understood at the priority date and that the determination of the optimum conditions or actions would have been highly onerous to a skilled practitioner.

The board does not consider paragraph 8 of the declaration to contradict the assertions of paragraph 5: paragraph 8 asserts that the process could not have been conducted by the skilled person without undertaking research, whereas paragraph 5 expresses the view that it was generally accepted that the skilled person attempting thermoforming at high temperatures would envisage a certain approach.

It has to be noted that the question of whether the invention is sufficiently disclosed is independent of whether the determination of the optimum conditions was difficult or not. Also, the fact that the skilled person would have chosen a different path than the patent does not establish beyond doubt that he would not have known how to carry out the teaching of the patent. In the eyes of the board, the most relevant assertion of the witness statement DR4 is that deep-drawing of SRTC was by no means an established technology at the priority date and that carrying out this process step would have involved research.

As far as declaration A11 is concerned, strictly speaking, this statement only establishes that Mr Sartor did not know how to deep-draw SRTC at the priority date. This does not mean, however, that this

piece of evidence is irrelevant. At the priority date, Mr Sartor was working in product development; he appears to have been in a situation closer to the (fictitional) average skilled person than Prof. Verpoest. Therefore, his assertion that he did not possess the relevant knowledge at that time constitutes an element of evidence that should not be ignored.

2.3.8 Writ of Summons

This document is of relatively little value for the present case because it merely contains assertions on behalf of a third party (Lankhorst Pure Composites) that have no probative value. At best the document suggests that information related to thermoforming of 'Curv' and 'Pure' materials was being handled as confidential information between that party and the patent proprietor.

2.3.9 Test results A12

This document is also of relatively little probative value because the experiments were conducted by one of the respondents (who had an interest in seeing the trials fail) and because the precise conditions are unknown.

2.4 Conclusion

Considering all the evidence on file, the board has reached the conclusion that the appellant has not been able to establish that deep-drawing SRTC materials was part of the common general knowledge of the relevant skilled person at the priority date of the opposed patent.

Thermoforming of SRTC was a relatively fresh topic at the priority date. Some research efforts had already been carried out and some companies appear to have had the relevant knowledge to obtain useful results. However, the overall picture is that this knowledge and know-how had not so far penetrated into the public domain and were still being developed within collaborations governed by confidentiality agreements. The technology cannot be said to have been part of the common general knowledge of the average skilled practitioner.

Therefore, the skilled person trying to carry out the invention, based on the teaching of the patent and his common general knowledge, would have been at a loss as regards how to carry out the step according to feature F. Consequently, the objection under Article 100 b) EPC 1973 is founded.

The board having found objection 1 to be founded, it is not necessary to dwell on objections 2 and 3.

As the invention is not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, the requirements of Article 100(b) EPC are not met. As a consequence, the board cannot maintain the patent as granted; the appellant's main request has to be dismissed.

3. Admissibility of auxiliary request 1

Claim 1 of auxiliary request 1 differs from claim 1 of the main request by additional features defining the gripping means and the step of controllably positioning the lamina edges. Feature F as such is unchanged.

Therefore, the auxiliary request cannot overcome the objection that the patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. As a consequence, the board considers the request to be unallowable and has decided to exercise its discretion under Article 13(1) RPBA by not admitting the request into the proceedings.

4. Oral submissions by the expert

In the course of the oral proceedings before the board, respondent II requested its expert, Mr Riley, to be allowed to make oral submissions on the interpretation of claim 1 and on the way in which several documents of the state of the art were to be understood with respect to each other.

According to decision G 4/95 of the Enlarged Board of appeal (OJ EPO 1996, 412), during oral proceedings under Article 116 EPC in the context of opposition appeal proceedings, a person accompanying the professional representative of a party may be allowed to make oral submissions on specific legal or technical issues on behalf of that party, otherwise than under Article 117 EPC, in addition to the complete presentation of the party's case by the professional representative. The Enlarged Board of appeal invited the boards to take account of the following criteria when exercising their discretion to allow the making of oral submissions by an accompanying person:

- the professional representative should request permission for such oral submissions to be made; the request should state the name and qualifications of the accompanying person, and

should specify the subject-matter of the proposed oral submissions;

- the request should be made sufficiently in advance of the oral proceedings so that all opposing parties are able properly to prepare themselves in relation to the proposed oral submissions;
- a request which is made at the oral proceedings should in the absence of exceptional circumstances be refused, unless each opposing party agrees to the making of the oral submissions requested.

In the present case the professional representative of respondent II had announced that Mr Riley would be present at the oral proceedings but had not requested permission for oral submissions to be made in advance of the oral proceedings. The request was only made at the oral proceedings. The board cannot see any exceptional circumstances justifying so late a request. Moreover, the appellant objected to the oral submissions. The board finds merit in the appellant's assertion that hearing the expert at the oral proceedings would lead to a situation where the appellant would be deprived of the possibility to provide suitable counter-evidence.

Considering all the above, the board has decided to refuse the request for oral submissions to be made by Mr Riley.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Meyfarth M. Poock

Decision electronically authenticated