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Datasheet for the decision of 3 May 2011

Case Number: T 2451/09 - 3.2.04

Application Number: 00939009.7

Publication Number: 1294248

IPC: A44B 19/32

Language of the proceedings: EN

Title of invention:
Sealing slide fastener with teeth welded onto the tapes which they join

Patentee:
RIRI GROUP S.A.

Opponent:
YKK Corporation

Headword:
-

Relevant legal provisions:
EPC Art. 100(b), 83

Relevant legal provisions (EPC 1973):
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Keyword:
"Disclosure - sufficiency (no)"

Decisions cited:
T 0265/85, T 0063/06

Catchword:
-

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Case Number: T 2451/09 - 3.2.04

D E C I S I O N
of the Technical Board of Appeal 3.2.04
of 3 May 2011

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 2 November 2009 concerning maintenance of European patent No. 1294248 in amended form.**

Composition of the Board:

Chairman: M. Ceyte
Members: A. de Vries
T. Bokor

Summary of Facts and Submissions

I. The Appellant (Opponent) lodged an appeal, received 18 December 2009, against an decision of the Opposition Division posted 2 November 2009 to reject the opposition against European patent No. 1 294 248 and simultaneously paid the appeal fee. The statement of the grounds of appeal was received 1 March 2010.

II. The opposition had been filed against the patent as a whole based among others on Article 100(b) EPC for insufficient disclosure of the invention.

The Opposition Division held that, taking into consideration amendments according to a first auxiliary request, the patent met all requirements of the EPC. It considered the following documents:

D6: Hytrel Production and Application Guide, Du Pont-Toray Co Ltd

D13: Rubber Industry Guide, 4th edition, January 1994, Society of Rubber Industry, Tokyo, Japan, pp. 128-138

D14: English language translation of D13

D15: Expertise - Pro veritate opinion by Prof. Giovanni Camino

III. In the appeal proceedings the Board considered the following further document:

Osen: E. Osen et al.: "Thermoplastic Elastomers (TPE)", Crosslinked Plastics, Kunststoffe Plast Europe, Volume 89 (1999) 10, Carl Hanser Verlag, München

IV. Oral proceedings were held before the Board on the 3 May 2011.

V. The Appellant requests that the decision under appeal be set aside and the patent be revoked in its entirety.

The Respondent (Proprietor) requests as main request that the appeal be dismissed and the patent be maintained in the amended form held allowable in the decision under appeal, or in the alternative, that it be maintained in an amended form on the basis of claims according to a first or second auxiliary request filed with letter of 29 July 2010.

VI. The wording of claim 1 of the requests is as follows:

Main request

"Sealing slide fastener (10) comprising two tapes (1, 2) of elastic material having their edges (1b, 2b) facing each other, which are pressed against each other by the coupling of two sets of aligned teeth (3, 4) caused by the passage of a closing slider (8), wherein each of said tapes (1, 2) consists of two outer layers (le, 2e) and an inner reinforcing layer (7) interposed between the two outer layers and each of said teeth comprises two halves (3a, 3b, 4a, 4b) disposed one on each side of the tapes, characterized in that the halves (3a, 3b, 4a, 4b) of the teeth are injection moulded and applied to the outer layers of both tapes (1, 2) and in that at least the outer layers (le, 2e) of the said two tapes (l, 2) which outer layers (le, 2e) are made of thermoplastic elastomeric material and the halves (3a, 3b, 4a, 4b) of the teeth are welded together chemically, so that the halves adhere by chemical bonding, at the

moment when they are formed by injection-moulding, onto the opposite outer layers of said tapes (l,2)."

First auxiliary request

Claim 1 is as in the main request but adds the following wording after the first characterizing feature (immediately following "applied to the outer layers of both tapes (1, 2)"):

", in which each of the said tapes (1,2), in each area which is enclosed between the said two halves of a tooth, has a hole (5i) capable of permitting the passage of the injection-moulded material forming the tooth (3, 4),"

Second auxiliary request

Claim 1 is as in the first auxiliary request but adds at the end the following wording:
"without leaving pores or holes through which water can penetrate".

VII. The Appellant argued as follows:

On the basis of the information given in the patent and his common general knowledge the skilled person must understand what is meant by the invention's central feature when it refers to "chemical welding" "so that halves adhere by chemical bonding". He must also have enough information to obtain such a weld with chemical bonds. Finally, the information must enable him to detect and measure chemical bonding so that he can

verify whether he has been successful in carrying out the invention or not.

As to the first point the patent offers no explanation or indication of what is meant by "chemical welding" or "chemical bonds". It is by no means clear that adhesion of tape and teeth must be by covalent bonds as asserted. D14, D15 and Osen offer different explanations of the bonding mechanism between polymers, with D14 and D15 differentiating between primary, covalent and secondary or weak chemical bonds, while Osen stresses molecular entanglement, i.e. physical bonds. The exact cause of adhesion between polymers is thus not clear to the skilled person.

From the patent it can be inferred that the chemical welding and bonds are obtained by injection moulding, but it offers no further detail, e.g. of necessary parameters such as temperature, time, pressure. Only selected combinations of materials will work implying there are other combinations that do not, as also confirmed by table 2 in Osen. It is not apparent which ones do and the patent does not offer any specific example of materials. It merely identifies a broad class, TPE, with a list of synthetic resins. Specification paragraph [0018] even suggests other materials might be suitable. Leaving it to the skilled person to find out which material combinations react and under what process parameters and conditions puts an undue burden on him.

To ascertain whether a product falls within the scope of the invention it is necessary to detect and quantify the chemical bonds in the boundary layer. This would

require complex testing on which the patent is again silent.

The arguments apply to the patent as a whole and remain the same for all requests.

VIII. The Respondent argued as follows:

The skilled person reads the patent with the aim of understanding it and trying to reproduce its teaching. Though "chemical welding" admittedly does not represent standard usage, the patent provides enough information to understand what is meant. Welding means permanent adhesion, which is by means of chemical bonds, see the patent specification, paragraph [0016]. The chemical bonds must be covalent bonds as confirmed by D14 and D15. This is also what is meant by Osen when it mentions grafting reactions in connection with compatibilization of otherwise incompatible polymers and in reference to table 2. In the skilled person's understanding strong bonds are achieved primarily by covalent bonds. Where the patent refers to chemical welding by chemical bonds it thus means strong bonds and the skilled person will understand it thus.

This welding is achieved by conventional injection moulding, that is using normal parameters. Selecting the particular materials to weld is a matter of polymer chemistry. There is no need to specify a particular TPE in the patent as in principle all TPE's can be welded if combined with the right resin. It is common general knowledge, see e.g. Osen, that not all polymers are miscible but that material must be chosen from the same family to weld. This is what the patent teaches but

follows also from Osen, table 2. The skilled person will draw on Osen as common general knowledge if he has any difficulty in deciding which material combinations to use. An example of a TPE resin combination used in production is Hytrel with PBT.

The mere presence of a chemical bond is sufficient to determine that chemical welding has taken place and there is no need to measure the amount. The measurement problems mentioned in D14 are not relevant in this regard as they refer to bonding of rubber not TPE's. Presence can be detected by, for example, the simple technique of IR spectroscopy.

Finally, the burden of proof lies with the Appellant, and he has provided no evidence proving the disclosure is insufficient, only arguments.

Reasons for the Decision

1. The appeal is admissible.

2. Sufficiency of disclosure

2.1 The invention concerns a sealing slide fastener with opposing elastic tapes that are pressed together edgewise by teeth on the tapes that are made to mesh by a slider - basically a zipper. The teeth are formed of two halves on opposite sides of the tapes. The invention's main thrust is towards preventing infiltration of water through holes in the tape that allow the halves to be joined, see the patent specification, paragraph [0005]. To this end the patent

essentially proposes using materials for teeth and tape that can be "welded together chemically", in such a way that when the teeth are injection moulded in position on the tapes, they are welded by chemical bonding", specification paragraph [0006]. Therefore, see claim 1 in any of its versions, the teeth halves are injection moulded onto outer tape layers made of *thermoplastic elastomer (TPE)*, with the teeth halves *"welded together chemically, so that [they] adhere by chemical bonding ... onto the opposite outer layers of [the] tapes"*.

2.2 As acknowledged by the Respondent the expression "welded together chemically" is not standard usage. It does not refer to any particular recognized type of welding. The skilled person - a plastics engineer involved in the manufacture of a plastics fastener with extensive textbook knowledge of plastics - must therefore try to understand the expression from context, that is considering it in conjunction with the further terms of the claims, description and figures, given their usual meaning, and drawing on his common general knowledge if necessary.

2.2.1 "Welding (together)", for example, on its own is a common term in the plastics industry where it denotes the process of "joining pieces of suitable plastics by raising the temperature at the joint so that the pieces are united by fusing or by forging or under pressure", see e.g. Chambers Science and Technology Dictionary, 1988. However, the juxtaposition with "chemically" is unusual; it does not appear elsewhere in the cited or consulted literature. In its usual sense that term will suggest to the skilled person an interaction at

chemical level during welding of the two components, and indeed claim 1 (in all versions) goes on to state that teeth and tapes "adher[e] by chemical bonding". Similar formulations appear in the specification at paragraphs [0006], [0016] and [0017].

2.2.2 The particular type of chemical bond - whether covalent, ionic or hydrogen, primary or secondary, strong or weak - is not specified in the patent. Nor will it be apparent to the skilled person from his common knowledge whether a particular bond type is meant and which one, as all are known to play roles in polymer chemistry. All he has is the information that the bond must result in teeth and tapes welding.

2.2.3 Giving the terms their normal meaning the skilled person, who is trying to make technical sense of the patent's teaching, will therefore infer the meaning of this defining feature of the invention as *welding together of the materials during injection moulding in a way that they interact to form chemical bonds*.

2.2.4 With the above understanding complemented with common general knowledge in the field he must then be able to choose appropriate tooth and tape materials as well as the necessary conditions to produce the requisite chemical bond during injection-moulding, if he is to be able to successfully put the invention into practice. Though the patent does not provide any specific examples of combinations of materials, it does instruct him, see claim 1, to use TPE's for the tape outer layer, and, see patent specification paragraph [0015], one of a list of synthetic resin groups for the teeth. This

information offers an obvious starting point in determining which materials to choose.

2.3 In the light of the common general knowledge in the field it becomes clear that the skilled person faces a daunting task. For one, it shows that TPE's form a large class of elastomeric materials, which vary widely in their ability to weld with selected resins, see table 2 on page 58 of Osen. More importantly, it emerges from the common general knowledge, that it is not yet fully understood how elastomers adhere, whether the mechanism involved is purely physical or chemical in nature, let alone which materials produce a chemical bond and by what means.

2.3.1 D13/D14 is a textbook treatise on adherence of rubbers. It focuses on the role of primary (covalent or ionic) chemical bonds in adherence, discussing a variety of different models with varying degrees of primary and secondary (weak) bonds interacting in a diffusive boundary layer, see D14, 6th and 7th pages, figure 12-6. A purely mechanical model of molecular entanglement is also briefly mentioned, D14, 3rd page, top in reference to Vorotskii. Though the role of primary bonds is underlined, the final paragraph on page 10 of D14 makes clear that the various models are tentative and that research is ongoing. In fact, D14 on page 8, under figure 12-7, states that it is not yet possible to quantify the primary bond. The Board notes that the models in D13/D14 are not specific to rubber but apply to the broader class of elastomers, to which TPE's belong. In figure 12-6, for example, the terms "rubber" and "elastomer" appear side by side, while throughout the text the terms are interchanged frequently. The

skilled person, who is trying to understand the patent's teaching, will thus also draw on this textbook knowledge.

2.3.2 The view in D13/D14, which stresses the role of primary bonding, conflicts with that of Osen, a paper published 5 years later and which presents an overview of TPE's and their properties, and with which the average plastic practitioner will also be familiar. Osen considers physical interdiffusion and molecular entanglement to be the predominant mechanism in the adhesion in TPEs, see the paragraph bridging pages 57 and 58 ("bonding ... is based almost entirely on diffusion ... The resulting molecular entanglement can provide high bond strength"). Where it mentions "grafting reactions", same paragraph, final sentence, it does not refer to a chemical adhesion mechanism. Instead, it explains how normally non-miscible polymers can be made compatible and thus miscible by changing the chemistry of the individual molecules. Grafting normally refers to side chains being added to a main chain of a given polymer molecule, not cross-linking between molecules as suggested by the Respondent. The basic mechanism by which such "compatibilized" polymers weld according to Osen is still that of interdiffusion or physical entanglement.

2.3.3 D13/D14 and Osen thus offer opposing views of how elastomers, in particular TPEs might bond. Nor does the expert opinion D15 offer a more conclusive view. At best it suggests that some materials may adhere physically (by entanglement), others chemically, either by strong, primary covalent bonds or by or weak or secondary hydrogen bonds, see point 1. None of the

models is substantiated by empirical proof. The tentative formulation in point 3 ("*In principle* ... *could* adhere ... *could* create ... could abstract ... *could* be accelerated ..."; emphasis added) indeed suggests that Prof. Camino's interpretation of chemical welding is based on conjecture rather than fact, and that he differentiates between hypothetical models, not empirically proven mechanisms.

2.4 In view of these conflicting adhesion models, none of which has been verified, the skilled person would at the priority date not have known with any certainty from his common general knowledge how elastomers, and in particular TPEs, adhere. He would have been unable to say whether they adhere by physical entanglement or by any of a number of chemical bonding mechanisms, or, indeed whether some materials adhere physically, while others adhere chemically, much less *which* ones and under *which* conditions. This lack of knowledge might lead him to try and determine whether and which materials bond chemically, and possibly under which conditions. Given that hitherto none of the proposed models has been proven - and indeed concrete proof regarding the role of chemical bonding has remained forthcoming during opposition and appeal procedures - , the skilled person would then need to invest a great deal of effort in merely proving that chemical bonds are responsible. Starting from the information given in the patent, he would have to do so for a large number of possible combinations of different TPE's and listed resins. Finally, he might not even be rewarded for his efforts, as he might find that adhesion is purely physical as posited by Osen.

2.5 In the Board's view the effort involved goes far beyond that, say, of routine trial and error. It amounts to an extensive research programme that puts undue burden on the skilled person in his attempts to put the invention into practice, and which may not even lead to success. Following established jurisprudence, that for an invention to be sufficiently disclosed if the disclosure is reproducible without undue burden, see the Case Law of the Boards of Appeal, 6th Edition, 2010, II.A.4.2 and the case law cited therein, e.g. T 0265/85 (OJ 1988, 336), the Board can but conclude that the invention is not sufficiently clearly and completely disclosed in the sense of Articles 100(b) and 83 EPC. This fundamental flaw of the patent is a result of the speculative nature of a central, defining feature of the invention. It is not remedied by any of the amendments to the claims formulated in the main, first or second auxiliary requests.

2.6 This speculative nature of a central defining feature of the invention naturally also means that the skilled person is not able to ascertain that he has indeed successfully carried out the invention. The requirement of sufficiency necessarily implies that he must be able to do so. The Respondent's assertions to the contrary, for example his mention of IR spectrometry as a means of determining that the weld is formed by chemical bonds, are unsubstantiated and thus without merit. This confirms the Board's finding of insufficiency.

2.7 The assertion that where the skilled person reads welding by chemical bonds as synonymous with strong adhesion assumes that when there is strong adhesion it is due to (primary, covalent) chemical bonds. This

assumption is again based on speculation as to the nature of the bond rather than substantiated fact. Nor has the Respondent provided any evidence that the sole example he cites, Hytrel with PBT, which is known to adhere well, see D6, page 18, adheres by chemical bonding. In this conjunction the Board also notes that the Respondent has previously, in examination (see the reply of March 1st 2005, the paragraph bridging pages 4 and 5), argued that the main mechanism of chemical bonding was in fact "molecular interdiffusion", as posited by Osen.

2.8 Equally speculative is the assertion that all TPE's weld chemically under the right conditions so that specifying TPE would by itself be sufficient. Not only is this assertion unsubstantiated, it also conflicts with table 2 of Osen showing specific combinations of TPE´s and thermoplastics that weld well and others that do not. Even if it were so, it would again be left entirely to the skilled person to work out what those conditions, for which the patent provides no information, might be.

2.9 Finally, though it is true that the Appellant carries the burden of proof that an invention is insufficiently disclosed, there is no requirement that that proof take any particular form or that it conclusively demonstrate that adequate information is lacking in the patent. The latter requirement, proving that something is missing, would set a high standard indeed. The departure point for assessing sufficiency of disclosure is the *legal presumption* that a granted patent is sufficiently clear and complete, see in particular T 0063/06, reasons 3. It is incumbent on an opponent to

prove that that presumption is invalid. This depends on the strength of the presumption, normally determined by the amount of detail given in the patent on how to put the invention into practice. In the present case the information in the patent is scant, providing little or no practical detail regarding a central defining feature, which could have been illustrated by a single specific material combination. It therefore suffices when the Appellant-Opponent on the basis of arguments and/or documentary evidence is able to raise serious doubts with the Board regarding the feasibility of this feature for it to find the disclosure insufficient.

In the present case the Appellant-Opponent's arguments based on D13/D14 have indeed raised such doubts, which the Respondent's counterarguments and mention of Osen have been unable to dispel.

3. The Board concludes that the invention is not disclosed sufficiently clearly and completely for it to be successfully carried out by the skilled person, Article 100(b) and 83 EPC. As the patent, taking into considerations the amendments proposed in all of the requests, fails to meet this fundamental requirement of the EPC, the Board must revoke the patent pursuant to Article 101(3)(b) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar The Chairman

G. Magouliotis M. Ceyte