BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

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A		B		C	X

File Number: T 245/89 - 3.2.4

Application No.: 84 111 780.7

Publication No.: 0 138 147

Title of invention: Citrate ester plasticized PVC blood containers

Classification: A61J 1/00, A61M 5/14

D E C I S I O N
of 16 September 1992

Applicant: Miles Inc.

Headword:

EPC Art. 56

Keyword: "Inventive step"

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 245/89 - 3.2.4

D E C I S I O N
of the Technical Board of Appeal 3.2.4
of 16 September 1992

Appellant : Miles Inc.
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Representative : Dr. K. Dänner
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Decision under appeal : Decision of Examining Division 2.3.05.128 of the European Patent Office dispatched on 28 October 1988 refusing European patent application No. 84 111 780.7 pursuant to Article 97(1) EPC.

Composition of the Board :

Chairman : C. Andries
Members : P. Petti
M. Lewenton

Summary of Facts and Submissions

I. European patent application No. 84 111 780.7, filed on 3 October 1984, was refused by a decision of the Examining Division 2.3.05.128 dispatched on 28 October 1988.

The decision was based on Claims 1 to 10 as originally filed.

II. The reason given for the refusal was that the application was not allowable in view of Article 52(1) EPC since the subject-matter of Claim 1 was not new (Article 54 EPC) and did not involve an inventive step (Article 56 EPC), with respect to document D1.

D1: Chemical Abstracts, Vol. 96, 1982, Columbus, Ohio, USA, J. Stojka et al. "Preparation and properties of citric acid esters as plasticizing agents for PVC", page 31, abstract No. 7480x.

III. The Appellant lodged an appeal against this decision on 1 December 1988, paying the appropriate fee on the same date. The statement of grounds was submitted on 15 February 1989.

The Appellant later filed a German translation (document D2) of the article referred to in document D1.

D2: Chemische Industrie, Vol. 31, Prag 1981
J. Stojka "Herstellung und Eigenschaften von Zitronensäureester als PVC-Weichmacher".

IV. In response to a communication of the Board the Appellant filed on 26 August 1992 a new set of Claims 1 to 8 and amended pages 5 and 7 of the description on the basis of which, together with pages 4 and 6 filed on 20 July 1992, pages 2 and 9 filed on 14 July 1990, the remaining pages of the description and the drawings as originally filed, the grant of a patent was requested. Minor amendments to these documents were agreed by the Appellant in a telephone conversation with the Rapporteur of the Board on 9 September 1992.

V. Independent Claim 1 as filed on 26 August 1992 is worded as follows:

"A blood bag system comprising a flexible blood bag for blood and blood products, the bag being made of plasticized polyvinyl chloride film and having a wall thickness in the range of 0.13 - 0.63 mm, characterized in that the film comprises, on a weight percent basis, 40 - 80% polyvinyl chloride and 20 - 60% citrate ester plasticizer."

Reasons for the Decision

1. The appeal is admissible.

2. Allowability of the amendments

2.1 The present Claim 1 combines essentially the features of original Claims 1, 2 and 8 with the feature that the bag has a wall thickness in the range of 0.13 - 0.63 mm as defined in the original description at page 7, lines 28 and 29. Moreover, present Claim 1 is directed to "a blood bag system comprising a flexible blood bag", while original Claim 1 was directed to "a container". This

amendment can be derived from the whole disclosure, in particular from the original description (page 4, line 34 to page 5, line 1).

2.2 Dependent Claims 2 to 8 correspond to original Claims 3 to 7, 9 and 10.

2.3 The amendments made to the description concern its adaptation to the new set of claims, the reference to the background art and the expression of units of measures in terms of the metric system.

2.4 There are therefore no objections to the amendments under Article 123(2) EPC.

3. Novelty

3.1 Document D1 discloses the use of citric acid esters as plasticizing agents for PVC pastes and films, used especially for sanitary products and in the food industry.

It is however neither indicated nor suggested in this document that a blood bag system comprising a flexible blood bag for blood and blood products is made.

3.2 Document D2 adds to the information given in document D1 the use of the citric acid esters as plasticizing agents not only for PVC films (or sheets) but also for PVC bottles. The whole content of document D2 however does not suggest the use of the plasticizer in a plasticized PVC in the form of blood bag systems comprising a flexible blood bag for blood and blood products.

Furthermore, document D2 discloses a citrate ester plasticized PVC film having a thickness of 2 mm; the bag of the blood bag system according to Claim 1 has a thickness in the range of 0.13 - 0.63 mm.

3.3 The other cited documents either disclose containers for blood and blood products without the claimed plasticizer or were published after the correctly claimed priority date of the present application.

3.4 The subject-matter as set forth in Claim 1, therefore, is to be considered novel within the meaning of Article 54 EPC.

4. Closest prior art

4.1 In the opinion of the Board the commonly known blood bag systems as disclosed in the present application (page 1, lines 11 to 21; page 2, line 4 to 22; and page 4, lines 11 to 19) by referring to documents US-A-4 222 379 (D3) and US-A-4 280 497 (D4) are to be considered as the closest prior art.

In particular, document D4, which explicitly relates to a blood bag having a wall thickness in the range of 0.254 and 0.508 mm, corresponds to the precharacterising portion of Claim 1.

4.2 The Board's opinion is that the PVC plasticizers and their use revealed in documents D1 and D2 are different insofar as they do not disclose blood bag systems. These documents therefore cannot be considered as representing the closest prior art.

5. Problem and Solution

5.1 The commonly known plasticized PVC used for blood bags normally contains either tri-2-ethylhexyltrimellitate (TOTM) or di-2-ethylhexylphthalate (DEHP) as plasticizers. It has now been found that considerable amounts of DEHP are leached from the blood bag walls by the blood plasma when blood or red cells are stored for periods of time. On the other hand it has been theorised that due to the presence of DEHP, hemolysis of the red cells was inhibited or in any way decreased.

With respect to the storage of blood platelets, a problem of decreasing pH is known. The pH drop of stored concentrates is significantly less for thin walled containers. However, thicker walls are necessary in the process of obtaining platelet concentrates since the bags are subjected to high speed centrifugation and since they must be resistant to rupturing, especially at very low temperatures.

5.2 From the description it follows that the technical problem to be solved consists not only in finding a single, acceptable material for blood bags, which can be used for all parts of a multiple blood bag system and which would have all desirable features of existing blood bag systems, be steam sterilisable and free of DEHP, but the material should also have properties which are not detrimental to the components of the blood; particularly the decrease of the viability of platelets upon storage as well as undue hemolysis of red cells should be avoided.

5.3 The problem is solved by the features mentioned in Claim 1, particularly by the use of a citrate ester as a plasticizer. Indeed, the results of the examples given in the description indicate that the citrate ester

plasticized PVC improves the platelet aerobic metabolism, and the strength to withstand low temperatures with respect to known TOTM plasticized PVC and that it performs at least as well as known DEHP plasticized PVC preventing hemolysis of red blood cells.

6. Inventive step

6.1 Documents D1 and D2, compare citric acid esters on the one hand and DEHP on the other as PVC plasticizers to be used in films used for sanitary products and in the food industry (document D1) and for packaging food products (document D2). Attention is also drawn to the use of these films for packaging purposes for medical products (document D2). Document D2 states that the comparison study of the citric acid ester plasticizer has been made not to replace DEHP but to check if the new plasticizer can be used in fields where DEHP is not suitable for hygienic or other reasons, as for example in sheets for food and medical products packaging. To this end, a number of characteristics of the resulting citrate ester and DEHP plasticized PVC products are compared, e.g. viscosity, tensile strength, elasticity, hardness, frost-resistance and migration and extraction of the plasticizer from the plasticized PVC.

According to the Board however a skilled person cannot find in either document D1 or document D2 an indication or a suggestion that a citrate ester is an appropriate plasticizer for PVC products which are in contact with blood or blood products.

Indeed there is not the slightest suggestion or link to blood or blood conservation, so that no hint is given to the citrate ester plasticizer on the one hand, and hemolysis of red cells and platelets conservation on the other.

Furthermore, the advantages obtained by the claimed solution (with respect to hemolysis platelet aerobic metabolism, O_2 permeability and low temperature brittleness) are also not suggested in both documents. Indeed, even if in Table III (document D2) the extraction of the different plasticizers from their plasticized PVC has been compared, it becomes clear that this extraction depends on the contacting fluid, so that also in this respect no information is given towards the advantage or disadvantage of the extraction when using citrate esters in contact with blood or blood products. Furthermore, frost-resistancy does not seem to be improved (Table II, document D2).

Therefore, although documents D1 and D2 make a link, in very general terms, between different plasticizers (citric acid esters and DEHP), their content is, according to the Board, insufficient to suggest to a person skilled in the art that, by using the citric acid esters as a plasticizer instead of DEHP or TOTM, a solution is found to the above-indicated problems, i.e. a unique material for all parts of a multiple blood bag system, avoiding thereby a decrease of the platelets' viability as well as undue hemolysis of the red cells.

6.2 Moreover, document D2 relates to a film having a thickness of 2 mm. This feature appears to be inconsistent with the thickness range of 0.13 - 0.63 mm as defined in Claim 1. This incompatibility in the disclosed thickness of the film makes it unlikely that the skilled person concerned with the technical problem solved by the invention would turn to document D2.

6.3 None of the other cited documents published before the priority date of the present application relates to citrate ester as a plasticizer for PVC products, so that a skilled person could not be guided by their teachings towards the claimed solution.

6.4 The subject-matter as set forth in Claim 1 therefore involves an inventive step within the meaning of Article 56 EPC.

7. The subject-matter of Claim 1 is therefore patentable within the meaning of Article 52 EPC, so that based on this allowable Claim 1 and dependent Claims 2 to 8, which concern preferred embodiments of the blood bag system according to Claim 1, the modified description and the originally filed drawings, a patent may be granted.

Order

For these reasons, it is decided that:

1. The decision of the first instance is set aside.

2. The case is remitted to the first instance with the order to grant a patent on the basis of the following documents:

Claims: Claims 1 to 8 filed on 26 August 1992, with the amendments to Claims 7 and 8 agreed by telephone on 9 September 1992.

Description: Pages 1, 3, 8 and 10 to 13 as originally filed with the amendments to page 13 as agreed by telephone on 9 September 1992;
pages 2 and 9 filed on 14 July 1990 with the amendments to page 9 as agreed by telephone on 9 September 1992;
pages 4 and 6 filed on 20 July 1992 with the amendments to page 4 as agreed by telephone on 9 September 1992;
pages 5 and 7 filed on 26 August 1992.

Drawings: sheet 1/1 as originally filed.

The Registrar: The Chairman:

N. Maslin C. Andries