

**Internal distribution code:**

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

**D E C I S I O N**  
**of 13 June 2001**

**Case Number:** T 0528/97 - 3.2.5

**Application Number:** 90306406.1

**Publication Number:** 0415517

**IPC:** B29C 67/14

**Language of the proceedings:** EN

**Title of invention:**

Process and apparatus for impregnating continuous fibre bundle

**Patentee:**

Neste OY

**Opponent:**

LNP Engineering Plastics Inc. a Delaware USA Corporation  
Hoechst AG

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54

**Keyword:**

"Novelty (no)"

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 0528/97 - 3.2.5

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.5**  
**of 13 June 2001**

**Appellant:** Neste OY  
(Proprietor of the patent) Keilaniemi  
SF-02150 Espoo 15 (FI)

**Representative:** Ruffles, Graham Keith  
Marks & Clerk  
57-60 Lincoln's Inn Fields  
London WC2A 3LS (GB)

**Respondent I:** LNP Engineering Plastics Inc.  
(Opponent 01) a Delaware USA Corporation  
475 Creamery Way  
US-Exton, Pennsylvania 19341 (US)

**Representative:** Klitzsch, Gottfried  
Patentanwälte  
Grünecker, Kinkeldey,  
Stockmair & Schwanhäusser  
Anwaltssozietät  
Maximilianstrasse 58  
D-80538 München (DE)

**Respondent II:** Hoechst Aktiengesellschaft  
(Opponent 02) Zentrale Patentabteilung  
Postfach 80 03 20  
D-65926 Frankfurt am Main (DE)

**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 21 March 1997  
revoking European patent No. 0 415 517 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** W. Moser  
**Members:** W. R. Zellhuber  
P. E. Michel

## Summary of Facts and Submissions

I. The appellant (proprietor) lodged an appeal against the decision of the Opposition Division revoking the European patent No. 0 415 517.

II. The Opposition Division held that the ground of opposition pursuant to Article 100(a) EPC (lack of novelty) prejudiced the maintenance of the patent having regard to document

E12: EP-A 0 364 828

III. The appellant requested that the decision under appeal be set aside and the patent be maintained in amended form on the basis of claims 1 and 2 received on 9 July 1997. As an auxiliary request, the appellant further requested oral proceedings. However, this auxiliary request was withdrawn on 21 May 2001.

Respondent I (opponent 01) requested that the appeal be dismissed, because the subject-matter of claim 1 was not novel in view of the prior art as disclosed in document E12. As an auxiliary request, respondent I requested oral proceedings in case the appeal would not be dismissed.

IV. Independent claim 1 according to the single request reads as follows:

"Apparatus for impregnating a continuous fibre bundle or fibre bundles (10) with molten or fluid curing resin in the course of manufacturing fibre-reinforced material, said material comprising one or several fibre bundles (10) encircled by matrix resin, which apparatus

comprises an impregnation chamber (21) containing molten or fluid curing resin, one or several nozzle members (23) with a nozzle aperture (24) for conducting resin into said chamber (21) and members for conducting said fibre bundles (10) across said nozzle aperture (24) characterized in that said chamber (21) further comprises an outlet aperture (25) from which extra resin may freely run out, which causes that the resin running from the nozzle aperture (24) at the higher pressure runs transversely through fibre bundles (10) into molten resin which is in said chamber (24) at a lower pressure."

V. The appellant argued essentially as follows:

A problem in manufacturing impregnated fibre bundles had been that the resin material did not penetrate into the fibre bundles and did thus not encircle all individual fibres. The problem was solved by an apparatus according to claim 1 of the patent in suit, in particular in that the impregnation chamber comprised an outlet aperture from which the resin may freely run out, and in that molten resin, discharged from a nozzle at a higher pressure, ran transversely through a fibre bundle into molten resin at a lower pressure.

The characterizing features of claim 1 of the patent in suit could not be found in document E12. The apparatus disclosed in document E12 was wholly different from the apparatus according to claim 1 of the patent in suit.

In the known apparatus the fibre web was pulled through a narrow flow channel totally filled with resin/fibre bundles, and all the resin which had been added moved

with the fibre web through the flow channel. At the moment of impregnation, there was no discharge of resin from a higher pressure to a lower pressure, because the extruder pressing the resin generated such a pressure that corresponds to the counter-pressure caused by the impregnation channel and the contents thereof.

Therefore, the subject-matter of claim 1 according to the single request was novel within the meaning of Article 54 EPC, with regard to the cited prior art.

VI. Respondent I argued essentially as follows:

Document E12 was directed to an extrusion impregnating apparatus comprising a wave-shaped impregnation chamber, a nozzle member arranged to contact the fibre bundle in perpendicular direction, means for conducting the fibre bundles across the nozzle member and an outlet aperture from which extra resin may freely run out. Accordingly, resin running out from the nozzle could only run transversely through the fibre bundle and it was somewhat self-evident that the pressure at the nozzle aperture was higher than in the chamber because otherwise the resin would not flow into the chamber.

Therefore, all features of claim 1 of the patent in suit were already known from document E12, and the subject-matter of claim 1 according to the single request was not novel within the meaning of Article 54 EPC.

## Reasons for the Decision

### *Novelty*

1. Document E12, cf. in particular page 2, lines 1 to 4 and 32 to 42, and Figure 1, discloses an apparatus for impregnating a continuous fibre bundle comprising
  - an impregnation chamber in the form of a narrow undulating channel containing molten resin;
  - a nozzle aperture 8;
  - members 8, 9, 11 for conducting the fibre bundle across the nozzle aperture, (cf. Figure 2), and
  - an outlet aperture 10 from which extra resin may run out.

The resin is injected into the chamber via the nozzle aperture and penetrates the fibre bundle, partly pushing away the gaseous phase, cf. page 2, lines 32 to 34 of document E12.

2. Document E12 does not explicitly mention that extra resin may **freely** run out from the outlet aperture, which causes the resin, running from the nozzle aperture **at a higher pressure**, to run **transversely through fibre bundles** into molten resin which is in said chamber **at a lower pressure**.
3. However, the Board comes to the conclusion that these features are implicitly disclosed in document E12 for the following reasons:

(i) Document E12 uses the term "overflow" ("Überlauf") through which extra resin may run out. As overflows, in general, are not provided with any restrictions, and document E12 does not comprise any indication that restrictions should be foreseen, the Board concludes that the apparatus disclosed in document E12 comprises an outlet aperture from which extra resin may **freely** run out.

(ii) According to page 2, lines 37 to 42 of document E12, the resin is injected into the impregnation chamber and flows from the injection nozzle aperture along the channel towards the outlet aperture which shows that there is a pressure gradient within the impregnation chamber between the nozzle aperture and the outlet aperture of the impregnation chamber.

Accordingly, the resin runs from the nozzle aperture **at a higher pressure** into an area of the chamber with molten resin **at a lower pressure**.

(iii) Document E12 explicitly discloses that the resin penetrates the fibre bundle ("wird ... durchdrungen") and flows through the fibre bundle ("wird ... durchflutet") whereby broken fibres are washed away ("ausgespült werden"). This occurs, in particular, when the impregnation chamber comprises an overflow, cf. page 2, lines 37 to 42.

As the molten resin is injected into the



impregnation chamber from the nozzle aperture, and the fibre bundle is conducted under tension across that nozzle aperture, cf. document E12, page 2, line 34, the molten resin runs **transversely through the fibre bundle.**

- (iv) Moreover, on the way downstream, the fibre bundle comes alternately into contact with the upper and the lower spreading elements 9 arranged within the channel, and, as there is a flow of resin through the channel, the resin intersects the path of the fibre bundles. Accordingly, also in these areas the molten resin runs **transversely through the fibre bundle.**

From the above, the Board concludes that, in an apparatus as disclosed in document E12, the molten resin runs from the nozzle aperture, where it is at a higher pressure, transversely through the fibre bundle into an area of the chamber where the molten resin is at a lower pressure.

4. Consequently, document E12 discloses an apparatus wherein the impregnation chamber comprises an outlet aperture from which extra resin may freely run out, which causes the resin, running from the nozzle aperture at a higher pressure, to run transversely through fibre bundles into molten resin which is in said chamber at a lower pressure.

Therefore, the subject-matter of claim 1 according to the single request is not novel within the meaning of Article 54 EPC with regard to the prior art as disclosed in document E12.

5. Since the appellant withdrew its auxiliary request for oral proceedings (cf. point III above), oral proceedings could be dispensed with.

## **Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

M. Dainese

W. Moser