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D E C I S I O N
of 20 April 2005

Case Number: T 0208/03 - 3.2.5

Application Number: 95305665.2

Publication Number: 0700769

IPC: B29C 47/00

Language of the proceedings: EN

Title of invention:
Process for modifying a polyethylene in an extruder

Patentee:
BP Chemicals Limited, et al

Opponent:
Basell Polyolefine GmbH
Union Carbide Corporation
EXXON Chemical Patents, Inc.

Headword:
-

Relevant legal provisions:
EPC Art. 83

Keyword:
"Sufficiency of disclosure (yes)"

Decisions cited:
G 0009/91

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0208/03 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 20 April 2005

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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 13 December 2002 revoking European patent No. 0700769 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: W. Moser
Members: W. Widmeier
H. M. Schram

Summary of Facts and Submissions

I. The appellant (patent proprietor) lodged an appeal against the decision of the Opposition Division revoking European patent No. 0 700 769.

The Opposition Division held that the invention was not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

II. Oral proceedings were held before the Board of Appeal on 20 April 2005.

III. The appellant requested that the decision under appeal be set aside and that the patent be maintained in its granted version.

Respondents I, II and III (opponents 01, 02 and 03) requested that the appeal be dismissed.

IV. Claim 1 of the patent in suit reads:

"1. Process for improving the bubble stability of a linear polyethylene converted into film by blown extrusion, the polyethylene having a density of 0.900 to 0.970, preferably from 0.932 to 0.965 g/cm^3, a molecular mass distribution such that the ratio of the weight-average molecular mass, Mw, to that based on the number-average, Mn, is from 8 to 40, preferably from 9 to 30, and a value of the loss tangent measured by dynamic rheometry at 190°C at a frequency of 1.5 10^{-2} radians per second, ranging from 1.5 to 3, preferably from 1.6 to 2.5, the process being characterized in that, before its complete melting in an extruder, the

polyethylene is brought into contact with oxygen or a gas mixture containing oxygen, and the polyethylene thus brought into contact is treated thermomechanically in the molten state in the extruder supplying a specific mechanical energy of 0.15 to 0.5, preferably from 0.17 to 0.35 kWh per kilogram of polyethylene, the preliminary bringing into contact and the thermomechanical treatment being combined so that the treatment is conducted to its completion when the value of the loss tangent of the polyethylene has lost from 15 to 70 %, preferably from 20 to 65 % of its initial value before treatment and bringing into contact."

V. The following documents were in particular referred to in the appeal procedure:

E23: J.F. May, "Viscoélasticité des polymères à l'état fondu. Rhéométrie en régime dynamique", pages A 3617-1 to A 3617-3

E25: Three pages of an article about dynamic rheometry (submitted during oral proceedings before the Opposition Division on 27 November 2002)

E26: US-A-6 489 427

E27: ISO Standard 6721-10, First edition, 1997-08-01

E28: DE-C-40 35 196

VI. The appellant argued essentially as follows:

The patent in suit mentions in paragraph [0012] documents E23 and E25 which give a definition and

explain the method of the measurement of the loss tangent of the polyethylene. In addition, the patent in suit refers on page 6, lines 35 and 36, to the measurement device which is to be used for the measurement of the loss tangent. Thus, it is clear for a person skilled in the art how to perform this measurement. Only if there were a deviation from the instructions a person skilled in the art derives from these citations, further details should have been given in the patent in suit. This measurement is general practice so that a person skilled in the art also knows what is to be observed during the measurement in order to achieve a correct result. The parameters respondents I, II and III query are therefore also known to the person skilled in the art. The fact that document E26 mentions more details about the measurement of the loss tangent does not mean that the patent in suit lacks sufficient information in this respect.

When reading the patent in suit, especially paragraph [0020], a person skilled in the art will know what is to be understood by the specific mechanical energy defined in claim 1 of the patent in suit. An expert knows that this energy is the total energy supplied to the polyethylene.

The lack of features relating to the bubble stability does not mean that the subject-matter of claim 1 of the patent in suit cannot be carried out. The bubble stability is subject to many influences, and the post- and pre-treatment of the polyethylene may well have an impact on the bubble stability.

The patent in suit, therefore, contains sufficient information for a person skilled in the art for carrying out the method of claim 1.

VII. Respondents I, II and III argued essentially as follows:

The patent in suit does not mention a standard for measuring the loss tangent of the polyethylene. Documents E23 and E25 are only a theoretical background. The only available standard, document E27, is not state of the art because it was published after the priority date of the patent in suit. The earlier standard which is mentioned in document E27 does not refer to the measurement of the loss tangent. At the priority date of the patent in suit, there was no common general knowledge about the measurement of the loss tangent. Although the loss tangent is an inherent property of the polyethylene, the method of measuring this property must be specified in the patent in suit. The measurement of this property is subject to many influences so that the result of the measurement varies significantly with the measurement parameters. Thus, all these parameters must be indicated. Document E27 shows which parameters must be known. The patent in suit indicates only a few of them. Document E26 shows that this measurement is not easy and beyond the common general knowledge of a person skilled in the art.

Claim 1 of the patent in suit defines the specific mechanical energy supplied to the polyethylene in the molten state. However, as admitted by the appellant, the mechanical energy supplied to the polyethylene in the molten state cannot be determined. Paragraph [0020] of the patent in suit refers to a special extruder.

There is a difference between the energy supplied by the extruder and the energy supplied to the extruder. In the extruder many losses which are unknown occur so that one cannot infer the mechanical energy supplied by the extruder to the polyethylene from the electrical energy supplied to the extruder.

The patent in suit does not indicate how the bubble stability is to be improved. Document E28, of which the corresponding A-publication is state of the art, shows which factors influence the bubble stability of the polyethylene, and only one of all these factors is mentioned in the patent in suit. There is no proof that the method of claim 1 of the patent in suit works for all film blowing processes.

It follows from all this that the patent in suit does not contain sufficient information for a person skilled in the art to carry out the method of claim 1.

Reasons for the Decision

1. The decision under appeal was based exclusively on the ground of opposition under Article 100(b) EPC. In the appeal procedure three issues concerning sufficiency of disclosure of the patent in suit have been disputed: whether or not the patent in suit enabled a person skilled in art to measure the loss tangent of the polyethylene; whether or not the patent in suit enabled a person skilled in the art to supply the correct amount of mechanical energy to the polyethylene; and whether or not the patent in suit enabled a person skilled in the art to improve the bubble stability of a

linear polyethylene converted into film by blown extrusion.

1.1 Measurement of the loss tangent

The measurement of the loss tangent of polyethylene by dynamic rheometry was known at the priority date of the patent in suit. This follows from document E23, which reflects some theory of this measurement, and from the very existence of a commercial measurement device for performing this measurement (Rheometrics RMS 800/RDS II ®) which is referred to in the patent in suit (cf. page 6, lines 35 and 36, and page 8, lines 54 and 55). A person skilled in the art working with this measurement device must have known, e.g. from the instruction manual, how to use and how to operate it. The loss tangent of a given sample of polyethylene is an inherent property of this sample. Of course, this property varies with time and temperature and other parameters. However, a person skilled in the art operating a commercial measurement device must have known how to observe these influencing parameters, otherwise it would never have been possible to reasonably use the measurement device. Thus, by indicating the measurement device and the basic parameters, i.e. frequency and temperature (cf. claim 1 of the patent in suit), the patent in suit enables a person skilled in the art to measure the loss tangent of the polyethylene without undue burden, and thus to select a polyethylene which has a loss tangent ranging from 1.5 to 3 and to measure when the loss tangent has reached 15 to 70 % of its initial value as defined in claim 1 of the patent in suit. It is therefore irrelevant whether or not an industrial standard

(document E27) dealing with the measurement of the loss tangent by dynamic rheometry and listing the parameters to be observed before and during the measurement was available only after the priority date of the patent in suit. It is therefore also irrelevant that document E26, which was also published after the priority date of the patent in suit, shows more details about this measurement. If, for some reason, there existed any doubt about the reliability of the measurement result achieved on the basis of the patent in suit, this would not have been an obstacle for carrying out the process of claim 1 of the patent in suit. Rather, this would have been a matter to be considered under lack of clarity (Article 84 EPC), because reliability problems would make it then more difficult to compare polyethylene extrusion processes and to judge whether or not a process falls under the patent in suit. However, lack of clarity is not a ground of opposition (Article 100 EPC) and cannot therefore be dealt with in opposition appeal proceedings as long as the patent in suit remains unamended (cf. decision G 9/91, OJ EPO 1993, 408; point 18, last sentence, of the Reasons).

Document E25 was submitted by the appellant during oral proceedings before the Opposition Division in support of his arguments. However, this document does neither bear a title nor a publication date so that the Board has no evidence that it constitutes prior art according to Article 54(2) EPC and that it corresponds to the document referred to on page 3, lines 31 and 32, of the patent in suit. This document was therefore disregarded. However, even if taken into account, document E25 would not have changed the Board's conclusion on this issue.

1.2 Specific mechanical energy

Claim 1 of the patent in suit defines that "the polyethylene … is treated thermomechanically in the molten state in the extruder supplying a specific mechanical energy of 0.15 to 0.5, preferably 0.17 to 0.35 kWh per kilogram of polyethylene". This definition appears to be ambiguous in so far as it may mean that this specific mechanical energy is supplied to the molten polyethylene, or that this energy is supplied to the polyethylene in total. However, a person skilled in the art will immediately recognise that it would be difficult, if not impossible, to determine which amount of energy is supplied only to the molten polyethylene. Thus, even from claim 1 alone, the skilled person will come to the conclusion that this definition shall mean the energy which is supplied to the polyethylene in total (solid and molten state). This conclusion is confirmed by paragraph [0020] of the patent in suit, which gives a clear and unambiguous definition of the specific mechanical energy and how it can be calculated. It is therefore not impossible for a person skilled in the art to calculate and to adjust the specific mechanical energy, and to run also this part of the process of claim 1 of the patent in suit. The doubts about the ambiguous definition in claim 1 are to be considered to be a lack of clarity. Since with the disclosure of the patent in suit as a whole, together with common general knowledge, a person skilled in the art is able to overcome these doubts, there is no obstacle to carrying out the corresponding steps of the process according to claim 1.

1.3 Improving the bubble stability

Claim 1 of the patent in suit relates to a "process for improving the bubble stability of a linear polyethylene converted into film by blown extrusion". The features specified in the claim are related to the melting process of the polyethylene in an extruder, rather than to the blown extrusion process. The product directly obtained by the claimed process is therefore the molten polyethylene which later is to be converted into a film, rather than the improved film itself. Thus, the title of the claim may be confusing. However, this does not mean that the claimed process has nothing to do with bubble stability, and that a person skilled in the art cannot carry out the claimed process. The preparatory treatment of the polyethylene, before being converted into a film by blown extrusion, may well influence the bubble stability of the polyethylene when it is converted into a film (cf. paragraph [0001] of the patent in suit). If the title of this claim appears to give rise to confusion, then this would again be a lack of clarity, rather than a lack of disclosure. Whatever document E28 may show about further influences on bubble stability does not contradict the fact that the preparatory melting process of the polyethylene can improve the bubble stability of the polyethylene. Anyway, document E28 does not constitute prior art according to Article 54(2) EPC and has therefore to be disregarded. The corresponding A-publication has not been introduced into the opposition appeal proceedings by respondents I, II and III.

2. The Board is therefore satisfied that none of the three issues under dispute constitutes an obstacle to carrying out the process of claim 1 of the patent in suit. The subject-matter of claim 1 is thus disclosed sufficiently clear and complete for it to be carried out by a person skilled in the art. The patent in suit therefore meets the requirement of Article 83 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Opposition Division for further prosecution.

The Registrar: The Chairman:

M. Dainese W. Moser