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D E C I S I O N
of 31 July 2003

Case Number: T 0653/01 - 3.2.5

Application Number: 94304925.4

Publication Number: 0634260

IPC: B29B 17/02

Language of the proceedings: EN

Title of invention:
A method of recycling a used product, and an apparatus for carrying out such method

Patentee:
Hitachi, Ltd.

Opponent:
Bayer AG

Headword:
-

Relevant legal provisions:
EPC Art. 52(2)(c), 54, 56, 83

Keyword:
"Patentable subject-matter in view of Article 52(2)(c) EPC, yes"
"Sufficiency of disclosure, yes"
"Novelty, yes"
"Inventive step, no"

Decisions cited:
-

Catchword:
-

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Case Number: T 0653/01 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 31 July 2003

Appellant: (Proprietor of the patent)
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Respondent: (Opponent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 6 April 2001 revoking European patent No. 0634260 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. 0 634 260.

Opposition had been filed against the patent as a whole based on Article 100(a) EPC (exclusion from patentability, Article 52(2)(c) EPC; lack of novelty, Article 54 EPC; lack of inventive step, Article 56 EPC) and on Article 100(b) EPC.

The Opposition Division held that the subject-matter of the independent claims of the main request and of the auxiliary requests lacked an inventive step.

II. Oral proceedings before the Board of Appeal were held on 31 July 2003. The respondent, who withdrew his auxiliary request for oral proceedings on 25 June 2003, was not represented at the oral proceedings.

III. The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the following documents:

(a) main request: claims 1 to 14 as granted; or

(b) first auxiliary request: claims 1 to 14 filed as auxiliary request 1 on 23 June 2003; or

(c) second auxiliary request: claims 1 to 13 filed as auxiliary request on 15 August 2001.

The respondent (opponent) requested that the appeal be dismissed.

IV. Claim 1 according to the main request reads as follows:

"1. A method of recycling a used product in which the used product is divided (2) into a plurality of components and recycled (7, 8, 11); whereby:
for at least one of said plurality of components, the degree of degradation of at least one material of said at least one of said components is assessed (3, 4) from a range of degradation values; and
the recycling (7, 8, 11) of said at least one of said components is effected by at least one process selected on the basis of said degree of degradation from a plurality of recycling resource producing processes, the plurality of recycling resource producing processes having different methods and different conditions from each other."

Claim 1 according to the first auxiliary request reads as follows:

"1. A method of recycling a used product in which the used product is divided (2) into a plurality of components and recycled (7, 8, 11); whereby
for at least one of said plurality of components, the degree of degradation of at least one material of said at least one of said components is assessed (3, 4) from a range of degradation values;
the components which have had their degree of degradation assessed are divided into grades corresponding to different degrees of degradation, and

the recycling (7, 8, 11) of each said grade of components is effected by a respective process selected on the basis of said degree of degradation from a plurality of recycling resource producing processes, the plurality of recycling resource producing processes having different methods and different conditions from each other."

Claim 1 according to the second auxiliary request reads as follows:

"1. A method of recycling a used product in which the used product is divided (2) into a plurality of components and recycled (7, 8, 11); whereby:
for at least one of said plurality of components, each of the materials forming said at least one of said components is assessed;
the degree of degradation of at least one material of said at least one of said components is assessed (3, 4) from a range of degradation values; and
the recycling (7, 8, 11) of said at least one of said components is effected by at least one process selected on the basis of said degree of degradation from a plurality of recycling resource producing processes, the plurality of recycling resource producing processes having different methods and different conditions from each other."

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

D1: EP-A-0 068 086

D2: EP-A-0 166 899

D4: "Gemischte Kunststoffabfälle stofflich verwerten", Kunststoffe 82 (1992) 1, pages 31 to 36

D11: "The Role of Processing Stabilizers in Recycling of Polyolefins", Drake, W. O., Hofmann, P., Sitek, F., Recycle '91 Fourth Annual International Forum and Exposition, April 3-5, 1991, Davos, Switzerland, pages D1.4 to D1.16

VI. In the written and oral proceedings the appellant argued essentially as follows:

Main request

The method according to claim 1 consists of several steps of technical nature. One of these steps is to assess the degree of degradation of a material, which involves a physical measurement. Thus, the method specified in claim 1 is clearly technical and not a method for performing mental acts. The claimed invention is therefore not excluded from patentability under Article 52(2)(c) EPC.

The patent in suit provides sufficient guidance to a person skilled in the art to carry out the method of claim 1. Figures 7 to 11 in combination with the description, column 6, line 54, to column 7, line 14 give the necessary details so that a person skilled in the art can select an appropriate recycling process. The requirements of Article 83 EPC are therefore fulfilled.

Document D11 is considered to be the closest prior art. The first section "Processing Stability of Polypropylene" of this document does not relate to recycling. It relates to analyzing chemicals in order to evaluate whether materials degrade. The second section "Replacement of Processing Stabilizer" analyzes what happens when stabilizers are added by fixed amounts to artificially degraded materials. Only the third section of document D11 "Recycling of HDPE Bottle Crates" relates to recycling as such. However, only a fixed amount of stabilizer is added. The degree of degradation is not tested prior to recycling. It is assessed after the recycling process. Contrary thereto, in the method according to claim 1, the degree of degradation is assessed, and, depending on the result of this assessment, different recycling processes are selected. The theoretical discourse in the first and second sections of document D11 is not to be seen as an instruction for a person skilled in the art how to perform recycling. Since the ideas and thoughts shown in these sections have not been realized, a skilled person would refrain from transforming these ideas and thoughts into practice.

It follows that in document D11 not only the step of dividing the materials into a plurality of components is missing, there are further differences. Thus, even when combined with document D4, a person skilled in the art will not arrive at the subject-matter of claim 1 of the patent in suit.

Consequently, the method of claim 1 involves an inventive step.

Auxiliary request 1

The feature added to claim 1, that the components which have had their degree of degradation assessed are divided into grades corresponding to different degrees of degradation, is not shown in document D11. There is no teaching in this prior art to classify the components according to different grades of degradation.

Auxiliary request 2

The additional feature in claim 1, to assess each of the materials of the at least one component, is not known from document D11. Document D11 does not relate to multiple material components.

VII. The respondent argued essentially as follows:

Main request

The method of claim 1 is only an instruction for performing a mental act and is therefore excluded from patentability under Article 52(2)(c) EPC.

Claim 1 specifies that the degree of degradation of a material is assessed and that, in accordance with the result of this assessment, a recycling process is selected. However, neither the claims nor the description specify the criteria for selecting an appropriate recycling process. Thus, a person skilled in the art is not able to carry out the method. Therefore the requirements of Article 83 EPC are not met.

Document D11, which constitutes the closest prior art, describes a recycling method in which the depletion of stabilizers is analyzed during processing of polyolefins with a view to adding the missing amount of stabilizer to the polymer to be processed. The same is done in the patent in suit, see Figure 11. Although document D11 is mainly concerned with the recycling of a single component, whereas the method of claim 1 includes the step of dividing a product into several components, document D11 nevertheless also shows the step of dividing the product into a plurality of components. It is clear for a person skilled in the art, especially when reading the section "Mixed Thermoplastic Scrap" of document D11, that mixtures have to be separated before the components of the mixture are analyzed and recycled. Thus, the teaching of document D11 includes the statement that the product to be recycled is divided into its components. Consequently, the method of claim 1 lacks novelty.

If document D11 is to be interpreted in such a manner that the step of dividing the product into a plurality of components is not disclosed, then the method of claim 1 does not involve an inventive step. It is obvious for a person skilled in the art to analyze each component of the material to be recycled and to analyze and to recycle each component in accordance with the instructions given in document D11.

Also a combination of document D1 or document D2 with document D4 leads to the subject-matter of claim 1. Documents D1 and D2 disclose recycling methods in which, on the basis of an analysis of the material, it is decided either to recycle or to scrap the material.

Document D4 discloses a variety of recycling processes among which a person skilled in the art may select an appropriate process for the material assessed as being reusable in the method as disclosed in documents D1 and D2.

Second auxiliary request

The feature added to claim 1 is known from, or at least rendered obvious by, document D11. The examination of each material of a component is a self-evident measure for a person skilled in the art.

The respondent did not comment on the first auxiliary request.

Reasons for the Decision

1. *Article 52(2)(c) EPC*

Although claim 1 of the main request and of the first and second auxiliary requests lists the steps of the method in the form of an instruction, the content of the claim and the effect of the claimed method are technical. The Board is therefore satisfied that the subject-matter of claim 1 (all requests) is not excluded from patentability under Article 52(2)(c) EPC.

2. *Article 83 EPC*

The description of the patent in suit (cf. column 6, line 54 to column 7, line 14) explains that components of a high degree of degradation may be upgraded by

adding a reforming agent after being melted and that this addition of a reforming agent is not necessary for components of a low degree of degradation, and it lists the reforming agents which may be added. Furthermore, Figure 11 of the patent in suit shows three different recycling processes (74, 75, 76), all beginning with a melting process step and ending with a pelletizing process step, which only differ in the number of reforming steps. In combination with the above mentioned part of the description, a person skilled in the art derives from this figure that, depending on the degree of degradation, no reforming process step (no addition of reforming agent), one reforming process step or two reforming process steps are performed between the initial and final recycling process steps. Thus, a person skilled in the art has the necessary criteria for the selection of three different recycling processes.

The Board is therefore satisfied that the requirements of Article 83 EPC are fulfilled. This applies to all requests.

3. *Novelty*

None of the prior art documents considered (cf. point V above) discloses that a used product to be recycled is divided into a plurality of components. In particular, the section "Mixed Thermoplastic Scrap" of document D11, considered by the respondent to show this feature, relates to the recycling of mixed commingled plastic material rather than to the separation of such a material into its components and the recycling of at least one of these components. The method of claim 1 of

the main request as well as of claim 1 of the first and second auxiliary requests is therefore novel within the meaning of Article 54 EPC.

4. *Inventive step*

4.1 Main request

Document D11 is considered the closest prior art and is entitled "The Role of Processing Stabilizers in Recycling of Polyolefins"; it was presented on the "Recycle'91 International Forum and Exposition". Consequently, a person skilled in the art will read the whole content of this document in the context of recycling rather than consider the particular sections of the document to represent parts which are independent from each other as suggested by the appellant. Thus, a person skilled in the art will also read the sections "Processing Stability of Polypropylene" and "Replacement of Processing Stabilizer" with the application of recycling of used products in mind. The last paragraph of the first one of these two sections (cf. page D1.7, first full paragraph) summarizes that "This analytical technique serves as an excellent basis for determining the amount of active phosphite remaining and for estimating how much additional stabilizer should be added to meet the demands of the polymer to be reprocessed". Document D11 goes on explaining that "This approach of replacing expended process stabilizer, serves as the basis for assuring the best possible processing and application stability for recycled materials, since it is only necessary to maintain a certain minimum concentration of active species of both components of the processing

stabilizer formulation to maintain excellent molecular weight control during reprocessing. This can be easily assessed by analyzing the amount of phosphite, phosphate and hindered phenol present in the sample to be reprocessed" (cf. the paragraph bridging pages D1.7 and D1.8).

These two passages of document D11 instruct a person skilled in the art to assess the degree of degradation of at least one material of the product to be recycled, and to recycle this material by adding an appropriate amount of stabilizer. This corresponds to the features of claim 1 that for at least one of the plurality of components (the used material consists of) the degree of degradation of at least one material of said at least one of said components is assessed from a range of degradation values, and that the recycling of said at least one of said components is effected by at least one process selected on the basis of said degree of degradation from a plurality of recycling resource producing processes, which have different methods and different conditions from each other. This teaching of document D11 corresponds to the scheme shown in Figure 11 of the patent in suit as an example of the method of claim 1.

The only difference of the method of claim 1, namely that the used product is divided into a plurality of components, is an obvious measure for a person skilled in the art. Document D4 (cf. page 31, first paragraph of the section "Bekannte Wege zum Verwerten gemischter Kunststoffabfälle") shows that it is well-known in the art to separate a used product into its components with a view to recycling it, and to recycle one or all of

the separated components. Thus, when recycling according to the instructions given by document D11, it is obvious to divide at first the used material into its components and then to assess the degree of degradation of at least one material of at least one component.

The Board concludes therefore that the method of claim 1 of the main request does not involve an inventive step.

4.2 First auxiliary request

In addition to claim 1 of the main request, claim 1 of the first auxiliary request comprises the feature that the components which have had their degree of degradation assessed are divided into grades corresponding to different degrees of degradation. However, this feature is also known from document D11 (cf. page D1.7, first full paragraph). Determining the amount of active phosphite remaining and estimating how much additional stabilizer should be added, means nothing else than that, provided that in accordance with document D4 the used product is divided into its components and the components are recycled and that, after the degree of degradation of the component is assessed, the components are assigned to (divided into) different grades corresponding to different degrees of degradation.

Thus, the combination of documents D11 and D4 also renders the method of claim 1 of the first auxiliary request obvious.

4.3 Second auxiliary request

The method of claim 1 of the second auxiliary request differs from the method of claim 1 of the main request by specifying additionally that for at least one of the plurality of components *each* of the materials forming said at least one of said components is assessed. Also this is an obvious measure. If the used product to be recycled consists of a plurality of materials then it is a normal design option for the person skilled in the art to assess each of the materials when using the recycling method disclosed in document D11.

Thus, also the additional feature of the method of claim 1 of the second auxiliary request cannot give rise to an inventive step.

5. Under these circumstances it was not necessary to consider the independent apparatus claim present in each request.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Dainese W. Moser