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D E C I S I O N
of 4 May 2000

Case Number: T 0663/98 - 3.2.1

Application Number: 89306711.6

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Language of the proceedings: EN

Title of invention:
Packaging method

Patentee:
Sidlaw Flexible Packaging Limited

Opponent:
W. R. Grace & Co.

Headword:
-

Relevant legal provisions:
EPC Art. 56, 83

Keyword:
"Sufficiency of disclosure (yes)"
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0663/98 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 4 May 2000

Appellant: (Proprietor of the patent)
Sidlaw Flexible Packaging Limited
Plumtree Court
London EC4A 4HT (GB)

Representative:
Hogg, Jeffery Keith
Withers & Rogers
Goldings House
2 Hays Lane
London SE1 2HW (GB)

Respondent: (Opponent)
W. R. Grace & Co.
100 Rogers Bridge Road
Duncan, SC 29334 (US)

Representative:
Lawrence, Peter Robin Broughton
GILL JENNINGS & EVERY
Broadgate House
7 Eldon Street
London EC2M 7LH (GB)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 5 May 1998 revoking European patent No. 0 351 115 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane
J. Willems

Summary of Facts and Submissions

I. European patent No. 0 351 115 was granted on 1 March 1995 on the basis of European patent application No. 89 306 711.6.

II. The granted patent was opposed by the present respondents on the grounds that its subject-matter lacked novelty and/or inventive step (Article 100(a) EPC) and of insufficiency of disclosure (Article 100(b) EPC).

In the course of the opposition proceedings special emphasis came to be placed by the respondents on the state of the art according to JP-A-62-235 086 (document D5) and the translation of this document into English (document D5a) filed with their letter dated 8 October 1997. This is the only state of the art document which has played any significant role on appeal.

III. With its decision posted on 5 May 1998 the Opposition Division revoked the patent. It held that the subject-matter of claim 1 under consideration, submitted at the oral proceedings on 25 March 1998, lacked inventive step with respect to document D5a.

The relevant claim 1 reads as follows:

"A method of packaging plant material by enclosing it in a perforate polymeric film to improve the shelf life of the package plant material characterised by selecting a perforate polymeric film having a water vapour transmission rate substantially that inherent to the film and not more than 800g m^{-2} day^{-1} at 25°C and 75% relative humidity and an oxygen transmission rate controlled by the size and/or frequency of the

perforations in the film, the perforations having a mean diameter of up to 100 microns and the frequency of the perforations being from 50 to 1000m^{-2} and the oxygen permeability of the film being not more than 200,000 cm^3 m^{-2} day^{-1} $atmosphere^{-1}$ measured at 25°C and 75% relative humidity such that an atmosphere is maintained within the package that slows the respiration rate of the plant material without becoming anaerobic.

V. A notice of appeal against this decision was filed on 3 July 1998 and the fee for appeal paid at the same time. The appellants (proprietors of the patent) requested that the patent be maintained in the amended form considered by the Opposition Division. The statement of grounds of appeal was filed on 15 September 1998.

VI. Oral proceedings before the Board were held on 4 May 2000.

VII. In support of their request the appellants argued substantially as follows:

The significant contribution made to the art by the claimed invention lay in the recognition of the fact that it was possible, by suitable choice in the first place of the material and thickness of the packaging film and in the second place of the size and/or frequency of the perforations in the film, effectively to provide independent control of its water vapour transmission rate and oxygen transmission rate. In this way the characteristics of the film could be readily adapted to the particular needs of specific types of plant material.

In this context the statements in claim 1 that the water vapour transmission rate was "substantially that inherent to the film" and the oxygen transmission rate

was "controlled by the size and/or frequency of the perforations" accurately stated what was required and adequately recognised the facts that on the one hand the perforations would inevitably have some influence on the water vapour transmission rate and on the other there would inevitably be some transmission of oxygen through the body of the film itself. But these effects had to be considered as marginal to the overall "decoupling" of water vapour and oxygen transmission rates which could be achieved according to the teachings of the invention and as exemplified in the particular description of the patent specification.

The only prior art document now relied upon by the respondents, document D5a, was wholly silent with regard to the basic principle underlying the claimed invention. It related solely to the packaging of one very particular type of plant material, namely mushrooms, and was specifically directed to the solution of a problem arising with the packaging of this material, namely the development of an unpleasant odour in the package. The proposal of the document was to make a perforation in the packaging film having an area related to the packaged weight of mushrooms in order to allow the odour-inducing substances to escape. The questions of loss of moisture from the package and the respiration of the mushrooms were only addressed indirectly and there could be no suggestion that the document taught the advantageous "decoupling" of water vapour and oxygen transmission rates by the provision of this perforation.

Nor could there be found any clear teaching that the oxygen transmission rate was controlled by the perforation so as to avoid anaerobic conditions developing in the package, in the manner presently claimed.

Lastly, each of the particular examples disclosed in document D5a only had a single perforation, which was made in the film after it had been wrapped around the mushrooms, and although there was a general reference in the document to using a plurality of perforations, there was nothing which could suggest making use of packaging film provided with at least 50 perforations m^{-2}, as presently claimed. The clear thrust of document D5a was instead that it was best to use a single perforation per package and to position it in a particular way with respect to the contents.

VIII. The respondents contested the arguments of the appellants and requested that the appeal be dismissed. They argued essentially as follows:

Although the appellants sought to portray the claimed invention more as a method of providing a packaging film having certain characteristics specially adapted to a plant material to be packaged, it had to be remembered that the actual subject-matter of claim 1 was a method of packaging plant material as such, in which method plant material of some description was enclosed in a polymeric packaging film having water vapour and oxygen transmission rates below specified values and provided with perforations in respective broad ranges of size and frequency.

There could be no doubt that document D5a related to a method of packaging plant material as previously discussed. The question of whether this document specifically taught the so-called "decoupling" of the water vapour and oxygen transmission rates, in which the essence of the claimed invention was supposed to reside, was therefore irrelevant to the issue of inventive step. Insofar as the appellants sought to argue that the requirement of claim 1 that the water vapour transmission rate be "substantially that

inherent to the film" meant that the perforations had no substantial effect thereon, then this was clearly inconsistent with various preferred embodiments disclosed in the patent and with the experimental results provided by the appellants themselves. If however the restricted meaning of this term advanced by the appellants were accepted then the patent would be bad for insufficiency of disclosure, since it contained no teachings as to how this requirement should be met over the wide range of size and frequency of perforations claimed. Similar considerations applied to the requirement of the claim that the oxygen transmission rate be "controlled" by the size and/or frequency of the perforations in the film.

Document D5a taught that the atmosphere within the package could be beneficially controlled by providing a perforated film with a perforation area specifically related to the weight of mushrooms. One of the preferred film materials of document D5a corresponded to a preferred film material of the present patent. Furthermore, the perforation area proposed in document D5a corresponded to that used in the embodiments of the patent which were also concerned with packaging mushrooms. It was thus apparent that not only the water vapour and oxygen transmission rates of the known film, but also the effects to be achieved thereby, must be the same as stated in present claim 1. The only distinction of the claimed subject-matter over the prior art resided in the requirement that there be a minimum frequency of perforations of $50m^{-2}$. This lower limit followed however from routine considerations, as indicated clearly in the patent specification itself.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC; it is therefore admissible.

2. *Interpretation of claim 1*

In order to provide a proper basis for the substantive investigation as to whether the claimed invention has been sufficiently disclosed and involves an inventive step it is necessary as a first step to determine the ambit of claim 1. In this context two related aspects of the claim are particularly contentious. These are the respective requirements, each of which was present in claim 1 both as granted and as originally filed, that the water vapour transmission rate be "substantially that inherent to the film" and that the oxygen transmission rate be "controlled" by the size and/or frequency of the perforations in the film.

In a strict sense the relevant passages of the claim considered in isolation could be understood as meaning that the perforations had on the one hand no significant effect on the water vapour transmission rate of the film, but on the other hand determined to all intents and purposes the oxygen transmission rate. It is however clear from the terms of the patent specification that this restricted meaning cannot be the one intended and the appellants, at least at the oral proceedings before the Board, conceded that this was the case.

In particular they recognised that when using an oriented polypropylene film, which has a very low inherent water vapour transmission rate and is one of the preferred packaging films proposed in the patent

specification, then the provision of the perforations in the film could lead to a significant increase, at least in percentage terms, on the overall level of the water vapour transmission rate. Nevertheless they argued that in absolute terms this increase was small so that the perforated film was still one which, compared to the overall available range of packaging films with their different levels of water vapour transmission rate, would be considered by the person skilled in the art as having a water vapour transmission rate substantially equivalent to that of unperforated oriented polypropylene film. Thus taking the whole context of the patent specification and the concessions of the appellants into account the Board concludes that the relevant requirement of claim 1 should be understood as meaning that the basic polymeric packaging film is chosen with respect to its material and thickness so as to give a certain level of water vapour transmission rate appropriate to the nature of the plant material to be packaged and that the contribution of the perforations made in the film to the overall water vapour transmission rate is not of such an order as to make the packaging film no longer suitable for this specific purpose.

Furthermore, with regard to the requirement that the oxygen transmission rate be "controlled" by the size and/or frequency of the perforations the appellants could not dispute that the patent specification envisaged the use of polymeric materials for the packaging film, in particular polyethylene, which had a relatively high inherent oxygen permeability, and that the contribution of the perforations to the overall oxygen transmission rate could indeed by lower than that inherent to the film material. In the light of

this they argued that "control" of the oxygen transmission rate extended to situations in which the inherent permeability was adapted to specific needs by the provision of perforations and in the opinion of the Board this is an appropriate basis on which to proceed.

3. *Sufficiency of disclosure*

In view of the interpretation to be given to the terms of claim 1 as explained above the objections of the respondents to insufficiency of disclosure, which are based almost wholly on the impossibility of providing a polymeric packaging film meeting the requirements of the claim considered in a strict sense, lose their force and need not be dealt with in any great detail. There can be no doubt that the patent specification discloses several workable examples of a method of packaging plant material, which examples involve the use of a variety of different polymeric packaging films having the characteristics defined in present claim 1 and achieve the effect stated there. In the circumstances of the present case the Board is of the opinion that this constitutes a sufficiently clear and complete disclosure for enabling the person skilled in the art to carry out the claimed invention as required by Article 83 EPC.

4. *Inventive step*

With regard to the issue of inventive step the appellants have concentrated their attention on whether document D5a can be considered as teaching the person skilled in the art how effectively to "decouple" the water vapour and oxygen transmission rates of the packaging film, but in the opinion of the Board this is not determinative. Of more importance, as the respondents correctly argue, is to investigate whether this prior art document discloses as a matter of

substance a method of packaging plant material to improve its shelf life in which the plant material is enclosed in a perforated polymeric film having the water vapour and oxygen transmission rates as specified in present claim 1, where these rates are respectively "substantially that inherent to the film" and controlled by the size and/or frequency of the perforations" as explained in point 2 above. If this is the case then it will be necessary to turn to the frequency of the perforations as specifically taught by the prior art document and whether it was obvious to modify this frequency such that it lay within the range of 50 to 1000m^{-2} stated in the claim.

According to claim 1 of document D5a it is proposed to pack mushrooms in a polymeric film having one or more perforations the open area of which is related to the packed weight of the mushrooms. More specifically the open area should, for each 500g of mushrooms by equal to the area of a circular perforation with a diameter of 0.1 mm to 5.0 mm. As explained in general terms in the right-hand column of page 2 and the left-hand column of page 3 the main purpose of the perforation or perforations in the film is to allow the escape of volatile odour-inducing substances (eg alcohol and acetal); the open area in the film should on the other hand not be so large as to cause excessive moisture loss and to prevent adequate control of the oxygen concentration in the package.

According to the last paragraph of the right hand column of page 3 the water vapour permeability of the film is most preferably less than or equal to 100g m^{-2} day^{-1}. One preferred film material is of polyethylene with a water vapour permeability of 70g m^{-2} day^{-1}, see the right-hand column of page 5. This same film material is stated there to have an oxygen permeability of 13 000cm^3 m^{-2} day^{-1}. These figures relate to the

inherent characteristics of the unperforated film material. In order to make a comparison with the claimed invention it is necessary to investigate what effect the provision of perforations in the film material will have on those permeability characteristics.

To this end the Opposition Division made a series of calculations on a variety of assumptions. The general appropriateness of these assumptions and correctness of the resulting calculations is not under challenge. On the basis of its calculations the Opposition Division came to the conclusion that the water vapour and oxygen transmission rates of the perforated film lay within the respective limits set in claim 1, which given that these limits are both of least an order of magnitude greater than the inherent values for the film material in question does not seem in any way unreasonable. Referring for instance to Example 4 of the present patent specification, which also relates to the packaging of mushrooms, it was assumed that the area of polyethylene film required for packaging the 150 g of mushrooms in Example 1 of document D5a was 0.07 m^2. With the single 0.2 mm diameter perforation of Example 1(2)(2) of D5a that equates to a perforation area of 0.44 mm^2 which lies well within the range disclosed in Example 4 of the patent specification as being suitable for packaging mushrooms (the corresponding values for films (L) and (M) are 0.56 mm^2 per m^2 and 0.27 mm^2 per m^2).

The conclusion of the Opposition Division is also supported by experimental data submitted by the appellants with their letter of 21 October 1999 in connection to the related case T 190/98 and referred to by the parties in the oral proceedings on the present case. From this data it can be seen that the provision of 88 perforations m^{-2} with a diameter of 90 μm,

equivalent to a perforation area of 0.55 mm^2 per m^2, increases the water vapour permeability of a 25 μm polyethylene film by only 4g m^{-2} day^{-1} and the oxygen permeability by 18 400 cm^3 m^{-2} day^{-1}.

Lastly, mention should be made of the fact that the conditions under which the water vapour transmission rate and oxygen permeability are measured and stated in present claim 1 (ie at 25°C and 75% relative humidity) whereas this is not the case in document D5a. Given that these are the standard conditions under which such measurements are made, coupled with the wide separation of the values which can be derived from document D5a and the limits specified in claim 1, it is apparent that this difference cannot undermine in any fashion the conclusion that the prior art document discloses a perforated polymeric film with water vapour and oxygen transmission rates as required by the claim.

It is also apparent from the preceding discussion that the water vapour transmission rate of this film is "substantially that inherent to the film" and the oxygen transmission rate is "controlled by the size and/or frequency of the perforations" in the sense discussed in point 2 above. In particular, taking again Example 1(2)(2) as a basis, it can be seen from the above figures that the perforation will on the one hand only have a marginal effect on the water vapour transmission rate and on the other approximately double the oxygen transmission rate. Furthermore the Board is of the opinion, although as already indicated above it does not see this as being of crucial importance to the question of inventive step, that the person skilled in the art would implicitly recognise what has come to be termed the "decoupling" effect from what is said in document D5a. In particular, when reference is made in the left-hand column of page 3 of the document to the "conflicting requirements" of controlling the oxygen

concentration in the package and preventing the evaporation of moisture and to meeting these requirements by providing a perforation or perforations of a specific open area, then the logical conclusion can only be that the perforation(s) will have a significant effect on the oxygen transmission rate without having such an effect on the water vapour transmission rate. Lastly the Board is also of the opinion that document D5a will be understood by the person skilled in the art ,in the light of his knowledge concerning the behaviour of mushrooms, as implicitly teaching the technical effect stated at the end of present claim 1 namely that an atmosphere is maintained with the package that slows the respiration rate of the plant material without becoming anaerobic, see in particular paragraph 2 of the right-hand column of page 3.

In view of the above and having regard to the fact that document D5a discloses the use of perforations of a diameter of 0.1 mm (100 microns) corresponding to the upper limit stated in claim 1, it is apparent that the only feature whch distinguishes the subject-matter of the claim from this state of the art is the requirement that the frequency of the perforations is from 50 to 1000 m^{-2}. Referring again to the Example 1(2)(2) of document D5a this has a single perforation of 0.2 mm diameter in a piece of film with an assured area of 0.07 m^{-2}, which equates to a frequency of approximately 14 perforations m^{-2}. The document contains however numerous references to providing a plurality of perforations, see for example the last paragraph of the right-hand column of page 4, where it is emphasised that it is the total open area of all the perforations which is of importance. It is also stated in paragraph 2 of the left-hand column of page 5 that a relatively small perforation is preferred for preventing the entry of dust, insects, water etc into

the package. Taking that into account it would be obvious for the person skilled in the art to replace the single 0.2 mm diameter perforation by for example four 0.1 mm diameter perforations of the same total open area, resulting in a frequency of approximately 56 perforation m^{-2}, ie within the range claimed. So doing would also obviate the need for placing a single perforation at a specific location as mentioned in paragraph 3 of the left-hand column of page 5. In this context the Board cannot agree with the assertion of the appellants that the skilled person would understand this passage as actively encouraging the use of a single perforation in preference to a plurality of perforations.

It must also be noted that the Examples of document D5a are of a more of less experimental nature concerned with demonstrating the relationship between the open area and the effect on the mushrooms, with the single perforation being made in the film of the wrapped package. On a larger commercial scale it would be obvious for the person skilled in the art to provide sufficient perforations in the film before it is wrapped around the plant material to be packaged. In order to ensure that the piece of the film associated with any one package has at least one perforation a certain minimum frequency will be required, which is stated in the paragraph bridging columns 3 and 3 of the patent specification to be 50. This is a routine consideration for the person skilled in the art which does not require the exercise of any inventive skill or judgement.

The Board therefore has come to the conclusion that the subject-matter of claim 1 lacks inventive step (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

S. Fabiani F. Gumbel