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Aktenzeichen / Case Number / N° du recours : T 184/82

Anmeldenummer / Filing No / N° de la demande : 79301891.2

Publikations-Nr. / Publication No / N° de la publication : 0009377

Bezeichnung der Erfindung: Thermoformed shaped articles of poly
Title of invention: (p-methylstyrene) and process for their
Titre de l'invention : production, adaptable for use as food
containers

ENTSCHEIDUNG / DECISION

vom / of / du 4 January 1984

Anmelder/Patentinhaber:
Applicant/Proprietor of the patent: Mobil Oil Corporation
Demandeur/Titulaire du brevet :

Stichwort / Headword / Référence : "Poly (p-methylstyrene) articles/Mobil"

EPÜ / EPC / CBE Art.52(1) and 56 EPC

"Restatement of the problem", "Inventive step"

Leitsatz / Headnote / Sommaire

"Technical success at a general level can replace failure at a more specific level when assessing the effect of the invention provided the skilled man could recognise the effect in a broader sense as implied or related to the problem which may have been initially formulated. An appropriate restatement of the problem based on a less ambitious goal is permissible in accordance with an earlier decision of the Board ("Carbonless copying paper/Bayer", T 01/80").

Europäisches
Patentamt

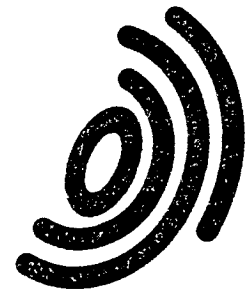
Beschwerdekammern

European Patent
Office

Boards of Appeal

Office européen
des brevets

Chambres de recours



Case Number: T 184 / 82

DECISION
of the Technical Board of Appeal 3.3.1
of 4 January 1984

Appellant: Mobil Oil Corporation
150 East 42nd Street
New York, New York 10017
U S A

Representative: Cooper, John Anthony
Mobil Court
3 Clements Inn
London WC2A 2EB
Great Britain

Decision under appeal: Decision of Examining Division 013 of the European Patent
Office dated 14 July 1982 refusing European patent
application No 79301891.2 pursuant to Article 97(1)
EPC

Composition of the Board:

Chairman: D. Cadman
Member: G. Szabo
Member: L. Gotti Porcinari

Summary of Facts and Submissions

- I. European patent application 79 301 891.2 filed on 14 September 1979 and published on 2 April 1980 with publication number 9377 claiming priority of the prior applications of 18 September and 16 November 1978 (US-943 416 and 961 353), was refused by the decision of the Examining Division 013 of the European Patent Office dated 14 July 1982. The decision was based on claims 1 to 7. The main claim was worded as follows:

"A thermoformed shaped article of unitary or laminar structure consisting of or containing at least one layer of a p-methylstyrene homopolymer or of a copolymer thereof with from 1 to 10 weight percent of a conjugated diene, irradiated with between 300 and 700 kGy of ionizing radiation."

- II. The reason given for the refusal was that the subject-matter of claim 1 did not involve an inventive step. The cited publication, US-2 989 452, disclosed the irradiation of mixtures of polystyrene and of a derivative thereof which has an aliphatic substituent attached to an aryl nucleus. The properties with regard to heat and solvent resistance were improved in view of the cross-linking effected by the irradiation. Small amounts of the derivative were sufficient for the purpose and the aliphatic-substituted materials include p-methylstyrene units. The teaching of the document suggested for the skilled man that it would be worthwhile to try the irradiation of the known poly(p-methylstyrene) containers to improve their properties.

III. The applicants lodged an appeal against the decision of 14 July 1982 on 26 August 1982 with payment of the fee, and filed a statement setting out the grounds of appeal on 15 November 1982.

IV. In reply to the objections of the Board the appellant submitted further arguments and amended one of the subsidiary claims. The grounds for the appeal and some of the relevant submissions are essentially as follows:

- a) The cited US specification is basically concerned with the improvement of polystyrene-containing compositions and recommends the incorporation of no more than 75% of a crosslinking polymer. The increase of the latter component would not have been desirable and 100% thereof would have been inconsistent with the object of the invention described in the same document. The skilled man had no reason to depart from the disclosure.
- b) The cited art covers a great number of crosslinking monomers. The specific disclosure is limited and there is no reason to single out any of the compounds from the speculative lists of possibilities. The use of polyvinyl toluene (PVT) as a mixture of poly-methylstyrenes in one of the examples in combination of polystyrene is given no more emphasis than that associated with other examples. Any use of the unblended PVT would have been unsuitable for the purpose.
- c) Although references to various poly-methylstyrenes in US-A-2 893 877 suggests that polystyrene may be well replaced in food packaging materials by such mater-

ials, there is no indication that irradiation would selectively improve poly(para-methylstyrene). Evidence submitted with the appeal statement should support the unexpected superiority of the choice. Since the "hot bacon" test is unreliable and the cited art "contains no qualitative or quantitative data which would be necessary to enable the applicants to compare the materials of the invention with the prior art materials under the terms of the prior art" the standard tests to be used should be those for softening points (Vicat) and solubility (in toluene, at room temperature).

- V. The appellants requested that the decision under appeal be set aside and the patent be granted. A refund of the appeal fee under Rule 67 EPC was also requested.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC, and is therefore admissible.
2. There can be no formal objection to the claims submitted by the applicant with the letter of 30 March 1982 and by the appellant with letter of 13 September 1983, since all features of the claims find support in the application as filed.
3. The problem with which he claimed articles were originally concerned was the need to have containers for food which would resist hot fats. The articles according to the claims should have therefore been capable of holding fat, e.g. in the form of bacon, when exposed to heat in a microwave oven and be substantially undamaged by the

treatment. It was suggested that this was achieved by shaping the material consisting of or containing at least 90% poly(p-methylstyrene) irradiated with a certain dose of ionising radiation. The examples of the specification rely appropriately on tests with bacon in a microwave oven to demonstrate the effect and show dramatic differences depending on the constitution of the container and on whether or not the same was irradiated. The appellant however, has rejected the idea of comparative tests with the relevant state of the art on the same basis and stated that the "hot bacon test ... cannot be relied upon to yield reproducible results" in view of the variability of bacon. Instead, they wished simply to use standard tests for some relevant properties, such as heat resilience (i.e. Vicat temperature) and solubility in toluene, as these were allegedly correlated with the properties upon which they "relied for the invention".

4. It has already been well established through a number of decisions of the Board of Appeal that the statement of the problem, and the associated effect which follows from the use of the claimed invention, is an essential aspect of the assessment of the inventive step (cf. "Carbonless copying paper/Bayer" T 01/80, OJ (EPO) 7/1981, p. 206). The nature of the problem should be determined on the basis of objective criteria. This requires the assessment of the technical success vis-à-vis the state of the closest art (cf. "Aryloxybenzaldehydes/Shell" T 20/81, OJ (EPO) 6/1982, p. 217). Since the technical effect provided by the invention must represent a result, which is testable and as such reproducible, the admission on behalf of the appellant that the hot bacon test is unreliable casts doubt on the general validity of the corresponding statements in the specifi-

cation and examples, which suggest that the specific problem has been successfully solved by the invention.

5. Nevertheless, the person skilled in the relevant art would have recognised that the original problem was not unrelated to the more general aim of improving the heat and solvent resistance of materials for containers, since contact with hot bacon probably also means durability at elevated temperatures and better hydrophobic characteristics. Thus improvements in these respects could still be construed as being embraced by the generalised teaching of the original disclosure, and unexpected capabilities may be accepted as indicative of the inventive step even if the more ambitious goals have not been fully or reliably achieved. It was suggested in an earlier decision by the Board that a restatement of the problem may be possible during the course of an appeal (Ibid, T 01/80) under certain circumstances. It is now the opinion of the Board that success at a more general level could replace failure at a specific level regarding the effect of the invention, provided the skilled man could recognise the same as implied or related to the problem initially suggested.

6. The problem of improving the heat and solvent resistance of polymers, including mixtures and copolymers, was generally known and also particularly investigated with regard to polystyrene and its derivatives. According to the disclosure of the cited US-A-2 989 452 alkyl-substituted derivatives of polystyrene readily lend themselves to irradiation and to consequent crosslinking, and that their properties improve as expected in this respect, whilst polystyrene itself requires very high doses to

achieve the same effect. The document demonstrates the result of such treatment with a mixture or combination of both types of materials. Apparently even the simplest of such derivatives, i.e. polymethylstyrene, provides susceptibility to crosslinking by irradiation. In fact, the larger the alkyl substituent is the more points for crosslinking become available (cf. column 2, lines 27-36). This is also confirmed by the comparison of the Examples with each other in the cited art (e.g. Example II, which relies on PVT, a mixture of methylstyrene derivatives, represents the maximum of an added homologue and the highest dosage of irradiation, save for Example IX in which only 6% of ethylstyrene with more exposure to irradiation was employed).

7. It also appears from the prior art that the polyalkylstyrene component acts independently on its own, being solely responsible for the crosslinked structure of the product. Polystyrene, on the other hand, plays the role of the inert filler in this respect, whether present in admixture or as a co-polymer component. It is stated that small amounts of efficient alkyl or alkenyl groups can achieve the desired crosslinking effect, which implies that too much of them could produce undesirable rigidity. The matter of the additive and the proportion of the components is one of efficiency and economy (column 3, lines 35-43). It is, therefore, not altogether unexpected that the least reactive variant, polymethylstyrene, may only achieve its greatest degree of crosslinking in high concentration or in a pure form in the absence of the diluting effect of the inert polystyrene in the system. The claimed compositions may, nevertheless, contain up to 10% conjugated diene, since it was well known that such components also increase impact strength and heat resistance.

8. The disclosure in the closest state of the art established a wide scope for choice and the manner according to which properties depend upon structure. There was no reason or prejudice against the extrapolation of the results beyond the suggested 75% proportion of the added poly(alkyl-styrene) component and to predict what the result would be after irradiation. The skilled person can recognise the implications of a document beyond its limits by using information which is commonly available, otherwise mere novelty would always also imply an inventive step. The cited document can be recognised as a starting point for the modifications represented by the subject-matter claimed in the present case, since both disclosures are concerned with the improvement of heat and solvent resistance of compositions containing the same kind of polymers.
9. It has been argued on behalf of the appellant that the particular choice of poly(para-methylstyrene) was an unexpected selection in view of the variety of other derivatives and of the equal emphasis laid upon those other possibilities by cited document. In particular, that the mentioning of all three, i.e. the ortho-, meta-, and para-isomers represented no indication of the particular advantages of the use of the para-isomer over the exemplified mixture of the isomers in the state of the art. The comparative experiments submitted in the proceedings showed the results of the Vicat-tests and of solubility measurements with toluene at room temperatures. It is, however, apparent that the Vicat-values are slightly higher after irradiation in all instances without any distinctions related to isomerism. Although the solubilities in toluene were significantly reduced in compari-

son to the initial values whenever methylstyrene was involved, the difference between the isomer mixture (PVT) and the pure para-substituted material (PPMS) was too small to be significant in view of the task. Since only the relative changes in solubility were tabulated, the actual final solubility relevant to any claim for improvement remained undisclosed in spite of an express request from the Board to reveal the real position. No effective selection vis-à-vis the isomers suggested in the state of the art has, therefore, been shown, let alone it being proven that the unblended PVT is "totally unsuitable" for the alleged purposes.

10. In view of the above, the departure of the prior art represented by the claimed subject-matter is no more than what the known problem and the cited art already implied, i.e. that an appropriate degree of crosslinking would necessarily result in better heat resistance and a reduction of solubility for the polymer. No surprising effect is associated with the requirement of using at least 90% methyl-substituted polystyrene in the mixture, since the increase of the crosslinking ingredient had its predictable consequences. The exclusive choice of a para-methyl group instead of a less exposed meta-methyl group of the PVT used in the state of the art might have resulted in an improved efficiency in this respect but the effect was marginal, if anything, and well within the scope of fluctuations caused by small variations in the proportions of the reactants or other processing conditions. The outcome of such simple optimisation effort within a very narrow range of choice and in a direction of least resistance, i.e. some expectation on the basis of a possible argument about reactivity, cannot justify patentability on grounds of a non-obvious

"selection". This is particularly so when no new quality is discovered in association with the choice and the degree of improvement is insignificant. The appellants presented no evidence or arguments which could cast doubt on the correctness of the rejection of the application by the Examining Division on grounds of lack of inventive step according to Article 56 for the main claim.

11. Product claims 2 and 4 are dependent on claim 1, and claims 5 to 7 are process claims for the preparation of such product. There are no auxiliary requests from the appellants to consider them separately, and it has been admitted that none of them introduces a feature which would impart patentability to the subject-matter of the main claim.

Order

It is decided that

The appeal against the Decision of the Examining Division of the European Patent Office dated 14 July 1982 is rejected.

Registrar:

Chairman:

J. 186e

D. C. Curran