

The opinion in support of the decision being entered today is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MARTIN P. BURKE and RICHARD BRYANT

Appeal 2007-3918
Application 10/203,926
Technology Center 1700

Decided: September 26, 2007

Before EDWARD C. KIMLIN, CHUNG K. PAK, and
CHARLES F. WARREN, *Administrative Patent Judges*.

PAK, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1 through 3 and 6 through 14, all of the claims pending in the above-identified application. We have jurisdiction pursuant to 35 U.S.C. § 6.

STATEMENT OF THE CASE

The subject matter on appeal is directed to foam rubbers having expanded microspheres and methods of making the same (Specification 1-2). According to page 7 of the Specification, the microspheres used “preferably have an unexpanded diameter of 5 to 10 um and an expanded diameter of between 300 μm to 1000 μm . . . [at] an expansion temperature of between 120°C and 180°C . . .” Tables 1 through 6 show employing 3 parts by weight of commercially available Expance 092 DU120 microspheres in various rubbers to obtain a void fraction of 35 to 60% (Specification 5 and 8-10). The resulting foam rubbers are said to be “devised primarily for use as acoustic decoupling or insertion loss material for marine applications” (Specification 2 and Br. 7). Further details of the appealed subject matter are recited in representative claims 1 and 13 reproduced below:

1. A foamed rubber, wherein the foamed rubber has a plurality of microvoids comprising microspheres incorporated therein, and wherein the microspheres are expanded during heating and vulcanisation of the rubber such that the volume fraction of the expanded microspheres is 35-80% in the foamed rubber, and the microspheres have an expanded diameter of between 400 μm and 1000 μm .

13. A method of manufacturing a foamed rubber, said method comprising the steps of:

- (i) providing a rubber;
- (ii) incorporating additives;
- (iii) adding and mixing expandable microspheres into the rubber composition; and

(iv) heating the rubber to effect vulcanisation,
wherein there is formed a foamed rubber having a plurality of microvoids comprising expanded microspheres incorporated therein, and wherein the microspheres are expanded during heating and vulcanisation of the rubber, the vulcanisation process being manipulated such that the volume fraction of the expanded microspheres is 35-80% in the foamed rubber, and the microspheres have an expanded diameter of between 400 µm and 1000 µm.

As evidence of unpatentability of the claimed subject matter, the Examiner has relied upon the following references¹:

Haren	US 4,226,911	Oct. 7, 1980
Brennenstuhl	US 5,750,581	May 12, 1998
Mitsuboshi	JP 11130916 A	May 18, 1999
Noguchi	JP 11189682	Jul. 13, 1999
Gehlsen	WO 00/06637	Feb. 10, 2000

The Examiner has rejected the claims on appeal as follows:

1. Claims 13 and 14 under 35 U.S.C. § 112, first paragraph, as failing to provide an enabling disclosure in the Specification for the presently claimed subject matter (Answer 3);
2. Claims 1 through 3, 6, 8, 11, and 12 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Gehlsen and Brennenstuhl (Answer 7);
3. Claims 1, 3, 6, 9, 11, 12, and 14 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Mitsuboshi and Brennenstuhl (Answer 8);
4. Claim 10 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Mitsuboshi and Noguchi (Answer 8); and

¹ Our reference to the published Japanese patent applications is to the corresponding English translations of record.

5. Claim 7 under 35 U.S.C. § 103(a) as unpatentable over the combined disclosures of Mitsuboshi and Haren (Answer 9).

The Appellants appeal from the Examiner's decision rejecting the claims on appeal under 35 U.S.C. § 112, first paragraph, and 35 U.S.C. § 103(a).

PRINCIPLES OF LAW, FACTS, ISSUES, and ANALYSES
ENABLEMENT

It is well established that the Examiner has the “burden of giving reasons, supported by the record as a whole, why the specification is not enabling... Showing that the disclosure entails undue experimentation is part of the PTO’s initial burden . . .” *In re Angstadt*, 537 F.2d 498, 504, 190 USPQ 214, 219 (CCPA 1976). In determining whether any given disclosure would require undue experimentation to make the claimed subject matter, the Examiner must consider the breadth of the claims, the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples, the nature of the invention, the state of the prior art, the relative skill of those in the art, and the predictability of the art. *In re Vaeck*, 947 F.2d 488, 495, 20 USPQ2d 1438, 1444 (Fed. Cir. 1991).

Here, the Examiner contends that the application disclosure does not enable one of ordinary skill in the art to make the subject matter recited in claims 13 and 14 since “it does not tell how to manipulate the vulcanization process in order to obtain the volume fraction of 35-38% [sic., 35-80%]” (Answer 3). The dispositive question is, therefore, whether the Examiner

has demonstrated that the application disclosure, taken together with the state of the prior art, would require undue experimentation to make foam rubbers having the claimed volume fraction of the claimed expanded microspheres. On this record, we answer this question in the negative.

As correctly pointed out by the Appellants at pages 12 and 13 of the Brief, the Specification at page 6 describes that a delay action accelerator and a retarder can assist the expansion of microspheres in a rubber during vulcanization of the rubber. Noguchi relied upon by the Examiner at page 5 of the Answer also indicates that a retarder and a heating temperature employed during vulcanization of the rubber can assist the expansion of microspheres (Noguchi 6-7). Implicit in the description provided in the Specification and/or Noguchi is that manipulation of the vulcanization process affects the sizes of the microspheres in the rubber, i.e., the volume fraction of the expanded microspheres in the rubber. More importantly, however, we find that the Specification at page 5 expressly states that “[b]y manipulating the vulcanisation process, void fractions of 35-60% can be obtained.” The Examiner has not proffered any acceptable evidence or reasoning to doubt the accuracy of this statement. *In re Marzocchi*, 439 F.2d 220, 223-24, 169 USPQ 367, 369-70 (CCPA 1971) (“it is incumbent upon the Patent Office . . . to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement”). Indeed, claims 1 and 6, which according to the Examiner meet the enablement requirement of 35 U.S.C. § 112, first paragraph, also state that the expansion of microspheres during heating and

vulcanization of the rubber causes the claimed volume fraction of the expanded microspheres in the rubber.

Accordingly, based on the Appellants' arguments at pages 12 and 13 of the Brief and above, we determine that the Examiner has not established a prima facie case of unpatentability based on lack of an enabling disclosure in the application disclosure for the subject matter recited in claims 13 and 14 within the meaning of 35 U.S.C. § 112, first paragraph.

OBVIOUSNESS

Under 35 U.S.C. § 103, the factual inquiry into obviousness requires a determination of: (1) the scope and content of the prior art; (2) the differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations (e.g., unexpected results). *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18, 148 USPQ 459, 467(1966). “[A]nalysis [of whether the subject matter of a claim would be obvious] need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1740-41, 82 USPQ2d 1385, 1396 (2007) quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336-37 (Fed. Cir. 2006); see also *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1361, 80 USPQ2d 1641, 1645 (Fed. Cir. 2006)(“The motivation need not be found in the references sought to be combined, but

may be found in any number of sources, including common knowledge, the prior art as a whole, or the nature of the problem itself.”); *In re Bozek*, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969)(“Having established that this knowledge was in the art, the examiner could then properly rely, as put forth by the solicitor, on a conclusion of obviousness ‘from common knowledge and common sense of the person of ordinary skill in the art without any specific hint or suggestion in a particular reference.’”).

Claims 1 through 3, 6, 8, 11 and 12 based on Gehlsen and Brennenstuhl.

As evidence of obviousness of the subject matter defined by claims 1 through 3, 6, 8, 11, and 12 under 35 U.S.C. § 103, the Examiner has relied on the combined disclosures of Gehlsen and Brennenstuhl.² The Examiner has found, and the Appellants have not disputed, that:

[Gehlsen] discloses a composition comprising rubber mixed with microcapsules and a method of making the composition comprising the steps of mixing the rubber and the unexpanded microcapsules and heating to expand the microcapsules.

(*Compare Answer 7 with Br. 14*). Indeed, we observe that Gehlsen teaches that “[t]he polymer foam preferably includes a plurality of expandable polymeric microspheres” (Gehlsen 4:29-30). We find that Gehlsen teaches that the polymeric foam can be made of adhesive or non-adhesive materials (Gehlsen 7:12-13, and 2:12-20). We find that Gehlsen teaches that “[t]he particular resin is selected based upon the desired properties of the final foam-containing article” (Gehlsen 11:8-9). We find that Gehlsen teaches

² The Appellants have not supplied any *substantive* arguments for the separate patentability of any specific claims. See, e.g., Br. 13-20. Therefore, for purposes of this rejection, we focus our discussion on independent claim 1 only pursuant to 37 C.F.R. § 41.37(c)(1)(vii)(2006).

examples of suitable expandable polymeric microspheres as commercially available expandable polymeric microspheres, including those “available from Akzo-Nobel under the designation ‘Expancel 551,’ ‘Expancel 461,’ and ‘Expancel 091’” (Gehlsen 14:15-21). We find that Gehlsen teaches at least partially expanding one or more expandable polymeric microspheres in a polymer composition during extrusion (Gehlsen 5:6-17). We find that Gehlsen exemplifies the extrusion temperature from 82 to 121°C (pp. 26-50). We find that Gehlsen teaches that the foam can be further heated (e.g., 193°C) to cause further microsphere expansion (pp. 8, 36 and 37). We find that substantial evidence supports the Examiner’s finding at page 7 of the Answer that the polymeric composition taught by Gehlsen is vulcanized (i.e., cross-linked) (*see, e.g.*, Gehlsen 3:26-32, 4:28, and 6:28-31). We find that Gehlsen teaches “[a]ny crosslinking [vulcanization] should not significantly inhibit or prevent the foam from expanding to the degree desired” (Gehlsen 3:28-29).

The dispositive question is, therefore, whether Gehlsen and Brennenstuhl would have suggested employing the claimed volume fraction and diameter of the expanded microspheres in the rubber foam within the meaning of 35 U.S.C. § 103. On this record, we answer this question in the affirmative.

As indicated *supra* and in the Answer, Gehlsen, like the Appellants, teaches employing commercially available expandable polymeric microspheres capable of having the claimed expanded diameter as explained by Brennenstuhl and/or the Appellants. The amount of expandable polymeric microspheres employed in Gehlsen embraces those exemplified in

the Appellants' Specification (capable of forming the claimed void fraction of the expanded microspheres). *Compare* Gehlsen, page 14, lines 22-26, with Tables 1-6 at pages 5 and 8 through 10 of the Specification. The amount of expandable polymeric microspheres and the type of resin employed are based upon the desired properties of the foam product (see Gehlsen 11:8-9 and 14:22-23). The microspheres are expanded to desired sizes so that the resulting foam can expand to fit into a given space (Gehlsen 3:13-25 and 10:13-21). In other words, we find that Gehlsen not only teaches the resin and expandable microspheres capable of forming the claimed void fraction and diameter of the expanded microspheres, but also teaches that such fraction and diameter are recognized result-effective variables. Accordingly, we determine that it is well within the ambit of one of ordinary skill in the art to determine workable or optimum void fraction and diameter of the expanded microspheres, such as those claimed, for given utilities. *In re Peterson*, 315 F.3d 1325, 1329, 65 USPQ2d 1379, 1382 (Fed. Cir. 2003); *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

Accordingly, based on the factual findings set forth in the Answer and above, we determine that the preponderance of evidence weighs most heavily in favor of obviousness of the subject matter defined by claims 1 through 3, 6, 8, 11, and 12 within the meaning of 35 U.S.C. § 103.³

³ It appears that the product recited in claim 14 is identical or substantially identical to the one recited in rejected claim 1.

Claims 1, 3, 6, 9, 11, 12, and 14 based on Mitsuboshi and Brennenstuhl.

As evidence of obviousness of the subject matter defined by claims 1, 3, 6, 9, 11, 12, and 14 under 35 U.S.C. § 103, the Examiner has relied on the combined disclosures of Mitsuboshi and Brennenstuhl.⁴ We find that Mitsuboshi teaches mixing, *inter alia*, rubbers, such as natural rubber and polybutadiene rubber, expanded microspheres (microcapsule expanded by heat-treatment at 120 to 200°C), a foaming agent, and a vulcanizing agent and vulcanizing the mixture to form a foam having a volume fraction of expanded microspheres in the range of 5 to 80% (¶¶ [0012] to [0018]). As indicated *supra*, the Appellants have acknowledged that commercially available expandable microspheres are expanded to the claimed diameter upon being subject to the temperature taught by Mitsuboshi. Moreover, as explained by Brennenstuhl and the Specification, it is conventional to expand commercially available expandable microspheres to obtain expanded microspheres having the claimed diameter. Thus, we concur with the Examiner that Mitsuboshi, as explained by Brennenstuhl and the Appellants, would have taught or suggested the claimed foam rubber having the claimed volume fraction and diameter of the expanded microspheres within the meaning of 35 U.S.C. § 103,

⁴ The Appellants have stated that “[t]he rejection of these claims may be treated as two groups (i.e., a first group consisting of claims 1, 3, 6, and 11-12, and a second group consisting of claims 9 and 14).” See Br. 20. Therefore, for purposes of this rejection, we focus our discussion on independent claims 1 and 14 only pursuant to 37 C.F.R. § 41.37(c)(1)(vii) (2004).

In reaching this conclusion, we recognize that Mitsuboshi does not mention the process limitations recited in claims 1 and 14 by which the claimed foam rubber is made. However, as indicated in *In re Thorpe*, 777 F.2d 695, 697, 227 USPQ 964, 965-66 (Fed. Cir. 1985):

The patentability of a product does not depend on its method of production....If the product in a product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process... [Citation omitted.]

It is incumbent upon the Appellants to show that the claimed process limitations would have rendered the claimed foam rubber patentably different from the foam rubber of the type described in Mitsuboshi.

Compare In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977). However, the Appellants have proffered no such evidence.

Accordingly, based on the factual findings set forth in the Answer and above, we determine that the preponderance of evidence weighs most heavily in favor of obviousness of the subject matter defined by claims 1, 3, 6, 9, 11, 12, and 14 within the meaning of 35 U.S.C. § 103.

Claims 7 and 10 based on Mitsuboshi and Haren and Mitsuboshi and Noguchi, respectively

We find that Mitsuboshi teaches against using the method as recited in claims 7 and 10 (¶ [0022]). Accordingly, we concur with the Appellants that the preponderance of evidence weighs most heavily in favor of nonobviousness of the subject matter recited in claims 7 and 10 within the meaning of 35 U.S.C. § 103.⁵

⁵ In the event of further prosecution of the claimed subject matter, the Examiner is advised to determine whether Gehlsen, together with Haren and

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ORDER

In view of the forgoing, the decision of the Examiner is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED-IN-PART

clj

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Noguchi, affects the patentability of the subject matter defined by claims 7, 10. and 13.