

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte NORIKO YAGI,
KIYOSHIGE MURAOKA,
YASUHISA MINAGAWA,
and KAZUYUKI NISHIOKA

Appeal 2008-3734
Application 10/829,947
Technology Center 1700

Decided: October 20, 2008

Before EDWARD C. KIMLIN, CATHERINE Q. TIMM, and
JEFFREY T. SMITH, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's
decision rejecting claim 1. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

I. BACKGROUND

The invention relates to a rubber composition, which is suitable for use as an inner liner for a pneumatic tire, comprising a butyl rubber component and an epoxidized natural rubber component. (Spec. 2, ll. 12-25). Claim 1 is illustrative of the subject matter on appeal:

1. A pneumatic tire having an inner liner comprising a rubber composition containing

20 to 100 parts by weight of carbon black and 3 to 20 parts by weight of sodium-bentonite,

based on 100 parts of a rubber component containing 65 to 94 % by weight of at least one rubber selected from the group consisting of butyl rubber, halogenated butyl rubber and rubber obtained by halogenating a copolymer of isomonoolefin having 4 to 7 carbon atoms and p-alkylstyrene; and

6 to 35 % by weight of epoxidized natural rubber having an epoxidization ratio of 5 to 85 % by mol.

Appellants request review of the sole rejection maintained by the Examiner, namely, the rejection of claim 1 under 35 U.S.C. § 103(a) as obvious over Korean patent publication number KR 2003-0030645 (as translated),¹ to Yee et al., published April 18, 2003 (hereinafter “KR ‘645”), in view of U.S. Patent No. 5,576,373, issued November 19, 1996, to Kresge et al. (hereinafter “Kresge”), or alternatively in view of U.S. Patent Application Publication No. US 2005/0027057 A1, published February 3, 2005, to Dias et al. (hereinafter “Dias”), and further in view of Murray,

¹ We refer to the translation of KR ‘645 prepared for the USPTO by the McElroy Translation Company (PTO 07-5948 August 2007), and made of record in the Examiner’s Answer, mailed October 3, 2007.

“*Clays, Survey*,” Kirk-Othmer Encyclopedia of Chemical Technology, John Wiley & Sons, 6, 658-667 (2002)(hereinafter “Murray”)².

II. DISCUSSION

Rejection of claim 1 under 35 U.S.C. § 103

Appellants argue that none of the references teaches the importance of the amount of epoxidized natural rubber in the rubber composition. (App. Br. 6-7). Appellants also argue that “furthermore [in KR ‘645] there is no suggestion that the presence of sodium-bentonite would be effective in the rubber composition for enhancing the properties of air permeability resistance, adhesion strength and rate of decrease in pressure.” (App. Br. 6). Appellants also argue that “Appellants’ specific type of clay, that is, sodium-bentonite, as well as the specific amounts of said clay, that is from 3 to 20 parts by weight is not even remotely suggested in the Dias et al. reference.” (App. Br. 6). Appellants argue that “there is no specific recognition [in the teachings of Kresge] of the desirability of utilizing sodium-bentonite as a preferred clay from the viewpoint of industrial cost and excellent dispersability.” (App. Br. 7). Appellants also argue that Murray does not suggest that clays are “effective with respect to cost and dispersibility when used in conjunction with rubber compositions for inner liners used with pneumatic tires” and that the desirability of compounding sodium bentonite with butyl rubber and also with epoxidized natural rubber is lacking in the teachings of Murray. (App. Br. 7). Rather, according to the Appellants, the

² We refer to the html version of Murray found at <http://www.mrw.interscience.wiley.com/emrw/9780471238966/kirk/article/survdomb.a01/current/html>, and made of record in the Office Communication mailed June 28, 2006.

Examiner is taking bits and pieces from the references to reconstruct Appellants' invention. (App. Br. 7-8).

The Examiner responds that KR '645 teaches an amount of epoxidized rubber that is fully within the range claimed and thus "[s]elections outside the claimed range for the epoxidized natural rubber are therefore not taught by the prior art and not at issue." (Ans. 6). The Examiner also emphasizes his reliance on the secondary references to demonstrate that "the ordinary artisan understands and expects that the inclusion of a layered phyllosilicate clay such as that claimed would provide reduced permeability to an innerliner including a butyl based innerliner such as in KR '645." (Ans. 6). The Examiner also argues that the use of 5 parts of sodium bentonite provided in Appellants' examples is "evidence of the improvement in air permeability resistance from use of a layered clay that would be expected given the teachings of the Kresge et al. and Dias references." (Ans. 7). The Examiner also notes that Appellants' examples do not provide evidence of unexpected results as to the specific amount of sodium bentonite, since the presence of only 5 parts is not commensurate in scope with the 3-20 parts claimed. (Ans. 7). The Examiner also points out the specific teachings of swellable montmorillonite as taught by Kresge and Dias is demonstrated to be essentially sodium bentonite by the teachings of Murray. (Ans. 8).

The issue on appeal arising from the contentions of Appellants and the Examiner is: have the Appellants demonstrated that the Examiner reversibly erred in determining that the subject matter of claim 1 would have been obvious over the teachings of KR '645, Dias or Kresge, and Murray? We answer this question in the negative.

The evidence of record supports the following Findings of Fact (FF):

1. KR '645 teaches a rubber composition that includes 70-90 parts per hundred of rubber ("phr") of halogenated butyl rubber and 10-30 phr of epoxidized natural rubber having an epoxy content of 10-40 mol%. (KR '645, 4).

2. KR '645 also teaches the use of carbon black "within the known additional quantity ranges," for example, at 60 weight parts of carbon black. (KR '645, 5).

3. KR '645 teaches "a composition of rubber for tire inner liner with improved adhesiveness to adjacent rubber and improved resistance against air leakage." (KR '645, 3).

4. Dias teaches a composite that is "useful as air barriers, such as used in producing innerliners for motor vehicles" such as for "truck tires, bus tires, passenger automobile, motorcycle tires, off the road tires, and the like." (Dias, ¶ 107).

5. Dias teaches that the composite can include a first rubber component, which can be a halogenated butyl rubber, and a second rubber component, which can be natural rubber. (Dias, ¶¶ 32, 43, 56 and 62).

6. Dias also teaches the use of "at least one swellable clay" which can be "natural or synthetic phyllosilicates, particularly smectic clays such as montmorillonite" and can contain "exchangeable cations such as Na⁺." (Dias, ¶ 45).

7. Dias particularly teaches that the clay can be "[m]ontmorillonite clay with Na counter ions." (Dias, ¶ 109, Table 1).

8. Dias teaches that the clay can be added in an amount that "is sufficient to develop an improvement in the mechanical properties or barrier

properties of the nanocomposite, for example, tensile strength or oxygen permeability,” such as in an amount from 1 to 30 phr, preferably from 5 to 20 phr. (Dias, ¶ 53).

9. Kresge also teaches a rubber composition “useful for the manufacture of tire innerliners and inner tubes,” which “comprise various rubbers and mixtures of these rubbers containing silicate clay platelets.” (Kresge, col. 1, ll. 8-12).

10. Kresge teaches that “[e]xamples of the layered silicates which may be used in the practice of the invention are various clay minerals including smectic clay, minerals such as montmorillonite,” among others. (Kresge, col. 2, ll. 56-58).

11. Kresge teaches that “[t]he addition of clays to rubber is well-known in the art. Clays have been added to rubber compositions to improve their strength.” (Kresge, col. 1, ll. 31-33).

12. Kresge teaches that the rubber composition may include a general purpose rubber, such as a halogenated butyl rubber, in an amount between 1 and 50 phr. (Kresge, col. 1, ll. 18-21 and 47-48; col. 4, ll. 42-46).

13. Kresge teaches that the rubber composition may also include natural rubber. (Kresge, col. 3, l. 54 and col. 4, l. 41).

14. Kresge also teaches that “the platelets form a[n] air barrier preventing the diffusion of air through the rubber of the innerliner.” (Kresge, col. 2, ll. 5-7).

15. Kresge teaches the use of the clay material in an amount of 1 to 50 phr, preferably 2 to 30 phr. (Kresge, col. 2, ll. 34-42).

16. Murray teaches that “[b]entonite is the rock in which these smectic minerals are usually the dominant constituent. The term bentonite

. . . is the term used today to describe the industrial minerals in which a sodium or calcium montmorillonite is the major mineral constituent.”

(Murray, § 1.2, ¶ 1).

17. Murray also teaches that “[b]entonites in which the smectic sodium montmorillonite is the major mineral component normally have a high swelling capacity.” (Murray, § 1.2, ¶ 2).

“Section 103 forbids issuance of a patent when ‘the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.’” *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 127 S. Ct. at 1734 (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”).

Recently, in *KSR*, the Supreme Court set aside any “rigid” application of the teaching, suggestion, motivation (“TSM”) test, advising that: “A person of ordinary skill is also a person of ordinary creativity, not an automaton.” *KSR*, 127 S. Ct. at 1742. The Supreme Court clarified that “it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does,” but that “the analysis need not seek out precise

teachings [in the prior art] directed to the specific subject matter of the challenged claim.” *Id.* at 1741.

It is well settled that “[t]he significance of evidence that a problem was known in the prior art is, of course, that knowledge of a problem provides a reason or motivation for workers in the art to apply their skill to its solution.” *In re Nomiya*, 509 F.2d 566, 572 (CCPA 1975); *see also*, *KSR*, 127 S. Ct. at 1742 (“[A]ny need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.”). “As long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor.” *In re Beattie*, 974 F.2d 1309, 1312 (Fed. Cir. 1992).

It is true that a routine variable change sometimes causes an unexpected effect. In such a situation, the claimed subject matter will be unobvious under the law if Appellants present a showing of criticality of the range for unexpected beneficial results. *See In re Boesch*, 617 F.2d 272, 276 (CCPA 1980); *see also In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990). (“the applicant must show that the particular range is *critical*, generally by showing that the claimed range achieves unexpected results relative to the prior art range.”). However, Appellants must demonstrate why the differences between the claimed invention and the prior art would result in a different function or give unexpected results. *In re Rice*, 341 F.2d 309, 314 (CCPA 1965) (“Appellants have failed to show that the change [in the claimed invention] as compared to [the reference], result in a difference in function or give unexpected results.”).

Applying the preceding legal principles to the Factual Findings in the record of this appeal, we determine that the Examiner has established a prima facie case of obviousness.

We find that KR '645 teaches the use of carbon black, halogenated butyl rubber and epoxidized natural rubber, having an epoxy concentration that falls within the claimed epoxy concentration. (FF 1 and 2). Further, the carbon black, halogenated butyl rubber and epoxidized natural rubber are all taught by KR '645 in amounts that falls within the range of amounts claimed. (FF 1 and 2).

We also find that Dias and Kresge teach the use of montmorillonite clay in combination with a halogenated butyl rubber composition, which may also include natural rubber. (FF 5, 6, 9, 10, 12, and 13). Dias teaches that the montmorillonite is preferably added in an amount that falls within the range of amount of sodium bentonite claimed (FF 8), and Kresge teaches that the montmorillonite is preferably added in an amount that overlaps the range of amount of sodium bentonite claimed. (FF 15). Dias exemplifies a clay that is swellable sodium montmorillonite. (FF 6 and 7). We also agree with the Examiner that Murray provides sufficient evidence that swellable montmorillonite is substantially the same as sodium bentonite, since montmorillonite is the major component of bentonite, and the sodium form is swellable. (FF 16 and 17).

KR '645, Dias and Kresge all teach rubber compositions for inner liners for tires. (FF 3, 4, 9, and 14). Thus, we determine that the improvement to air permeability that are shown by Appellants by the addition of sodium bentonite are no more than would be expected by one of ordinary skill in the art based on the benefits to air permeability and

improved strength suggested by Dias and Kresge. (FF 8, 11, and 14). It is not necessary that the Examiner establish that all of the improvements and/or benefits, such as in cost and dispersibility, that are disclosed by Appellants be found in the prior art in order to establish a prima facie case of obviousness. Rather, that the Examiner established at least one rationale as to why one of ordinary skill in the art would have been motivated to add the sodium bentonite taught by Dias and Kresge to the rubber composition taught by KR '645 is sufficient for a finding of obviousness. *Beattie*, 974 F.2d at 1312. The Examiner's rationale is particularly sufficient if, as in this case, the addition of sodium bentonite addresses at least one of the same problems addressed by Appellants, i.e. air permeability. *In re Nomiya*, 509 F.2d at 572; *KSR*, 127 S. Ct. at 1742. Therefore, we determine that the Examiner has established a prima facie case of obviousness of the claimed invention.

We do not find Appellants' arguments regarding the "importance" of the precise concentrations of components to be sufficient evidence of criticality based on unexpected results from which to overcome the prima facie case of obviousness established by the Examiner. *Boesch*, 617 F.2d at 276; *Woodruff*, 919 F.2d at 1578. Since the teachings of the prior art do not differ from the concentrations claimed, but rather fall squarely within the ranges claimed (FF 1, 2 and 8), the fact that the invention is successful when the components are utilized within the claimed ranges is not unexpected. *In re Rice*, 341 F.2d at 314.

As such, we determine that Appellants have not demonstrated that the Examiner reversibly erred in determining that the subject matter of

claim 1 would have been obvious over the teachings of KR '645, Dias or Kresge, and Murray.

New Matter Objection to the Amendments to the Specification

Appellants request our review of the Examiner's objection to amendments made to the Specification on the grounds of new matter (App. Br. 11-12). We do not have proper jurisdiction to make a determination on this issue. The amendments to the Specification do not affect the claims or the Examiner's rejections based thereon. Therefore, the Examiner's objection is properly addressed by way of petition. *See Manual of Patent Examining Procedure*, § 608.04(c) (8th Ed., Rev. 5, August 2006) ("Where the new matter is confined to amendments to the specification, review of the examiner's requirement for cancellation is by way of petition. But where the alleged new matter is introduced into or affects the claims, thus necessitating their rejection on this ground, the question becomes an appealable one, and should not be considered on petition even though that new matter has been introduced into the specification also.") Further, our decision rendered above is not affected by the outcome of this issue since we find that Appellants' examples, despite the particular values within the tables, do not provide sufficient evidence that the results obtained are unexpected, as discussed above.

III. CONCLUSION

Based on the totality of record, including due consideration of the Appellants' arguments, we determine that the preponderance of evidence weighs most heavily in favor of obviousness within the meaning of 35 U.S.C. § 103. Accordingly, we sustain the Examiner's rejection of claim 1.

Appeal 2008-3734
Application 10/829,947

IV. DECISION

The decision of the Examiner is affirmed.

V. TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal maybe extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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