

**THIS OPINION WAS NOT WRITTEN FOR PUBLICATION**

The opinion in support of the decision being entered today  
(1) was not written for publication in a law journal and  
(2) is not binding precedent of the Board.

Paper No. 37

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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***Ex parte*** SHOZO WATANABE  
and  
KEITARO KAMEYAMA

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Appeal No. 95-1987  
Application 08/076,475<sup>1</sup>

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HEARD: October 15, 1998

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<sup>1</sup> Application for patent filed June 14, 1993. According to appellants, the application is a continuation of Application 07/533,504, filed June 5, 1990, abandoned.

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Before KIMLIN, JOHN D. SMITH and PAK, *Administrative Patent Judges*.

JOHN D. SMITH, *Administrative Patent Judge*.

**DECISION ON APPEAL**

This is an appeal pursuant to 35 U.S.C. § 134 from the examiner's final rejection of claims 1, 3-7 and 29-34.

Claims 1 and 4 are representative and are reproduced below:

1. A method for vulcanizing and molding a rubber compound comprising the steps of:

providing a mold formed of a single material, said mold cooperating with a pair of electrode plates holding said mold therebetween,

providing a rubber compound having a dielectric loss factor regulated to a value of more than 0.20,

supplying said rubber compound into said mold,

pressurizing said mold and performing dielectric heating under frequency in a range of 10 to 100 MHZ for vulcanizing said rubber compound concurrently with molding thereof to a rubber article having a desired volume, wherein said heating is directly applied to said mold via said electrode plates.

4. The method for molding a rubber compound as set forth in claim 1, wherein said rubber compound includes at

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least one component selected from the group consisting of alkylene glycol, chlorinated rubber and mixtures thereof.

The references of record relied upon by the examiner are:

Smythe et al. (Smythe)	2,966,469	Dec. 27, 1960
Itoh	4,481,159	Nov. 6, 1984
Natori et al. (Natori)	4,776,915	Oct. 11, 1988

A reference cited by the Board is:

**McGraw-Hill Encyclopedia of Science and Technology**, Vol. 4, pages 130, 131, copyright 1971.

The appealed claims stand rejected under 35 U.S.C. § 103 over Itoh in view of Natori and Smythe.

We affirm the rejection as to claims 1, 3, 6, 7, 31, and 32. We reverse the rejection as to claims 4, 5, 29, 30, 33, and 34. We also denominate our affirmance as involving a new rejection under 37 CFR § 1.196(b).

The subject matter on appeal relates to a method for vulcanizing a rubber composition concurrently with molding

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utilizing a "high frequency" dielectric heating technique. In the "**Description of the Prior Art**" section of appellants' specification, at page 3, appellants acknowledge that rubber compounds have been vulcanized using UHF (ultra high frequency) dielectric heating. However, in such processes, appellants indicate that vulcanizing and molding must be carried out separately. According to appellants, the rubber compounds utilized in such prior art processes possess a relatively low dielectric loss factor which necessitates the use of ultra high frequency as predicted by the well-known heating rate equation. Generally see the specification at page 3 and the specification at page 1, line 32, through page 3, line 1.

Appellants' invention involves the preparation of a rubber compound having a dielectric loss factor of more than 0.20 which enables appellants' process to accomplish "high frequency dielectric heating at a frequency less than 100 MHZ." Thus, in an apparent reference to calculations made using the well-known heating rate equation, appellants state in their specification at page 9, lines 33-38, that:

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[t]heoretically, the dielectric constant, the dielectric dissipation factor, and the dielectric loss factor required to accomplish high frequency dielectric heating at a frequency less than 100 MHz are preferably determined at  $\epsilon' = 4.0$ ,  $\tan\delta = 0.05$ , and  $\epsilon'' = 0.20$ , respectively.

Another feature of appellants' invention is the purported discovery that rubber compositions including alkylene glycol and/or chlorinated rubber exhibit the theoretical preferred characteristics regarding the dielectric loss factor. See the specification at page 9, lines 38-44. Separate claims on appeal are directed to this subject matter.

As evidence of obviousness of the claimed invention, the examiner principally relies on Itoh. This reference discloses a process which employs "high frequency" dielectric heating to effect rubber vulcanization within a mold to obtain "burr-free" rubber moldings. See the reference at column 1, lines 21-33. The Itoh process, like the claimed process, therefore involves a procedure which vulcanizes rubber

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compositions concurrently with molding, as contrasted to the prior art processes discussed in appellants' specification.

Itoh also discloses that rubber compounds such as nitrile rubber and neoprene rubber have a high dielectric loss factor and are said to be "self-heating." See the reference at column 2, lines 6 and 7, and lines 62-64. Itoh alternatively discloses that natural rubber, butyl rubber and ethylene-propylene rubber, materials which have a relatively low dielectric loss factor, may be made to be "self-heating" type materials by the addition of polar radical materials such as carbon black, stearic acid, sulfur and zinc oxide. See column 2, lines 64-68 of the reference. At column 1, lines 54-58, Itoh clearly suggests a method for vulcanizing and molding a rubber compound comprising a step of providing a rubber compound having a "large dielectric loss factor" for heating by "high frequency dielectric heating" when supplied to and maintained within a mold. Although Itoh does not expressly disclose a specific value

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of a "large dielectric loss factor" for any rubber composition described in the reference, one of ordinary skill in the art would have understood that "theoretically," the rubber compound should preferably possess a dielectric loss factor of at least 0.20 to permit the use of "high frequency dielectric heating at frequencies less than 100 MHZ." Again, see appellants' admissions in the specification at page 9, lines 34-38, wherein preferred values were apparently calculated based on the well-known heating rate equation.

We recognize that Itoh does not expressly report a value or define what is meant by the expression "high frequency" dielectric heating. However, we believe this disclosure would have been understood by a person of ordinary skill in the art to be a reference to a frequency range of 2-90 MHZ, the frequency range disclosed by **McGraw-Hill** as a "high frequency" for conventional dielectric heating techniques.

Although Itoh does not expressly describe the relationship between the dielectric loss factor of the rubber material being molded and the frequency range claimed by

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appellants, it is clear from the well-known heating rate equation that the dielectric loss factor of the rubber material being molded and the frequency are interrelated result effective

variables. Thus, we conclude that one of ordinary skill in this art would have found the claimed subject matter regarding the dielectric loss factor values and the frequency range to have been *prima facie* obvious. In coming to this conclusion, we have not ignored the comparative data set forth in Table 2 in the specification at page 9 which indicates that rubber compounds having conventional compositions could not be adequately vulcanized at a frequency of 40 MHZ. However, the specification provides no data regarding comparative examples at frequencies at the high end of the claimed range, i.e., at a value of approximately 100 MHZ.

We recognize that appellants' claims also require the use of a mold "cooperating with a pair of electrode plates holding said mold therebetween," while Itoh utilizes a mold which is simply heated by a conventional dielectric heating

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furnace. See Itoh at column 3, line 7. Thus, Itoh's mold does not require a cooperating pair of electrodes to carry out the dielectric heating process. However, Natori's Figure 13 embodiment describes a mold/cooperating electrode plate arrangement for dielectric heating as called for by the appealed claims. See column 3, lines 43-54 of Natori which suggests that this is also a conventional means for carrying out high frequency dielectric

heating. In lieu of utilizing a conventional dielectric heating furnace, as disclosed in Itoh, it would have been *prima facie* obvious to have utilized a conventional mold/cooperating electrode plate arrangement as disclosed by Natori to effect "high frequency" dielectric heating.

Appellants also emphasize that their claimed method requires "pressurizing" the mold during the process consistent with the disclosure in the specification at page 6, lines 28-35, which indicates that the rubber compound is press molded while being vulcanized. This claimed feature, in our view, is fairly suggested by Itoh's disclosure at column 3, lines 1-6,

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which indicates, in an alternative embodiment, that a fixed quantity of rubber may be placed in a mold cavity and "the separate molds are neatly jointed so that the rubber material may be filled up by compression."

With respect to those claims, separately argued, that call for the use of molds formed of fluorine resins or silicone resins, we note that Itoh contemplates the use of fluororesin mold material (column 1, lines 63-67) while Natori teaches a preference for the use of molds made from, *inter alia*, fluoroplastics and silicone resins.

In light of the foregoing discussion, we affirm the rejection as to appealed claims 1, 3, 6, 7, 31, and 32. However, since our application of the prior art and rationale arguably differs from that of the examiner, and, because we have additionally relied on the *McGraw-Hill* publication, we denominate our affirmance of the rejection of these claims as involving a new rejection under 37 CFR § 1.196(b).

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We reverse the examiner's rejection as applied to appealed claims 4, 5, 29, 30, 33, and 34. These claims additionally require that the rubber compound utilized include at least one component selected from the group consisting of alkylene glycol, chlorinated rubber and mixtures thereof. Suffice it to say that the examiner has provided no objective evidence suggesting the use of these materials in Itoh's rubber compositions. In short, the record is devoid of any suggestion that these materials are "polar radical materials" similar to the carbon black, stearic acid, sulfur and zinc oxide utilized by Itoh.

As a final matter, we point out that we have not relied on the Smythe reference utilized by the examiner in the statement of his rejection, nor have we reviewed the ***Encyclopedia of Polymer Science and Technology*** reference, Persson, Izumi or Selfride, all referred to in the Examiner's Answer.

In summary, the examiner's rejection of claims 1, 3, 6, 7, 31, and 32 is affirmed. However, we denominate our affirmance as involving a new rejection pursuant to 37 CFR §

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1.196(b). The examiner's rejection of claims 4, 5, 29, 30, 33, and 34 is reversed. Hence, the decision of the examiner is affirmed-in-part.

In addition to affirming the examiner's rejection of one or more claims, this decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b) (amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides that "[a] new ground of rejection shall not be considered final for purposes of judicial review."

Regarding any affirmed rejection, 37 CFR § 1.197(b) provides:

(b) Appellant may file a single request for rehearing within two months from the date of the original decision. . . .

37 CFR § 1.196(b) also provides that the appellants, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise

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one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .

(2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

Should the appellants elect to prosecute further before the Primary Examiner pursuant to 37 CFR § 1.196(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If the appellants elect prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should

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be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).           **AFFIRMED-IN-PART 37 CFR 1.196(b)**

	EDWARD C. KIMLIN	)	
	Administrative Patent Judge	)	
		)	
		)	
		)	BOARD OF
PATENT		)	
	JOHN D. SMITH	)	APPEALS AND
	Administrative Patent Judge	)	
INTERFERENCES		)	
		)	
		)	
	CHUNG K. PAK	)	
	Administrative Patent Judge	)	

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