

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 15

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte AJAY K. GARG  
and  
MICHAEL D. KAVANAUGH

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Appeal No. 2000-0119  
Application 08/785,711

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ON BRIEF

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Before FRANKFORT, STAAB, and NASE, Administrative Patent Judges.  
FRANKFORT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 8, 9, 11, 13 and 14. Claim 10, the only

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other claim remaining in the application, has been identified by the examiner as containing allowable subject matter and is indicated to be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims. Claims 1 through 7 and 12 have been canceled.

Appellants' invention is directed to a process for the production of fragmented ceramic that is comminuted via an explosive expansion of a fluid (e.g., liquid nitrogen) impregnated into the pores of the ceramic material. More particularly, on page 2 of the specification, appellants describe a preferred process as comprising

immersing a porous ceramic material in a liquid that is gaseous at normal temperatures and pressures for a time sufficient for the pores of the ceramic material to be at least partially occupied by the liquid, then removing the particles from the liquid and then rapidly exposing them to conditions of temperature and/or pressure at which the liquid is a gas. This generates the required internal pressures essentially instantaneously and causes fragmentation of the particles.

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Independent claim 8 is representative of the subject matter on appeal and reads as follows:

8. A process for the production [of] fragmented ceramic which comprises:

- a) impregnating a porous ceramic material having a porosity of from 10 to 80% by volume with a fluid such that the pores of the ceramic are at least partially occupied by the fluid; and
- b) causing the fluid to expand rapidly without chemical change such that the expansion causes fragmentation of the ceramic material.

The prior art references relied upon by the examiner in rejecting the appealed claims are:

Rosinski	3,715,983	Feb. 13, 1973
Grube et al. (Grube)	4,540,467	Sep. 10, 1985

In addition to the foregoing, this merits panel of the Board has relied upon the following prior art reference in a new ground of rejection entered under 37 CFR § 1.196(b):

Gilbert C. Robinson, "The Relationship Between Pore Structure and Durability of Brick," 63 Ceramic Bulletin, no. 2, 295-300 (1984)

Claims 8, 9, 11, 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Rosinski in view of Grube.

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Rather than attempt to reiterate the examiner's full commentary with regard to the above-noted rejection and the conflicting viewpoints advanced by the examiner and appellants regarding the rejection, we make reference to the examiner's answer (Paper No. 14, mailed March 15, 1999) for the reasoning in support of the rejection, and to appellants' amended brief (Paper No. 13, filed January 22, 1999) for the arguments thereagainst.

#### OPINION

In reaching our decision in this appeal, we have given careful consideration to appellants' specification and claims, to the applied prior art references, and to the respective positions articulated by appellants and the examiner. As a consequence of our review, we have made the determinations which follow.

In the examiner's rejection of claims 8, 9, 11, 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Rosinski in view of Grube, the examiner has found that Rosinski discloses impregnating a porous ceramic material with a fluid (e.g., nitro-glycerin) such that the pores of the ceramic material are at

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least partially occupied by the fluid, and selecting the ceramic material from alumina, alumina precursors, and silica precursors. What the examiner finds missing from Rosinski with regard to independent claim 8 on appeal is any teaching of causing the fluid in the pores to rapidly expand "without a chemical change" and specific optimum or workable ranges for porosity volumes. To account for the above-noted differences between appellants' claimed subject matter and Rosinski, the examiner looks to Grube, urging that this patent teaches a process for fragmenting a material wherein a fluid trapped in pores of the material rapidly expands without a chemical change (Abstract, lines 14-19) and the fluid undergoes a phase change from a liquid to a gas (Abstract, lines 14-19). From the collective teachings of the two applied references, the examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of appellants' invention to provide the comminuting process of Rosinski with an expanding fluid without a chemical change in view of Grube so as to provide a safer and more controllable comminuting process. With regard to the remaining claims and limitations subject to this ground of rejection, the examiner

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merely points out that where general conditions are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation, and then concludes that all such limitations would have been obvious since Rosinski and Grube set forth the general conditions of expanding a liquid into a gaseous state in order to comminute a ceramic into fragments.

Appellants assert in their amended brief (Paper No. 13) that the combination of Rosinski and Grube proposed by the examiner cannot be made without hindsight and that the examiner is using an improper "obvious to try" approach in proposing such combination. More particularly, appellants point out that an important goal of Rosinski is to produce fragmented ceramic materials that are "essentially colloidal in dimension, or essentially micron to colloidal in size" (col. 2, lines 44-49) and that the process in Rosinski is said to provide "a unique measure of control over those properties of porous solids having influence on adsorptive and catalytic effectiveness" (col. 2, lines 27-30). Appellants then urge that such control and

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fineness of comminution are of paramount importance to Rosinski and that any modification of his process should do nothing to compromise those objectives. Looking to Grube, appellants contend that this patent is directed to very crude operations, like municipal waste fragmentation and mold core removal from castings, that are very different from the demanding process concerns of Rosinski where extremely finely divided colloidal sized fragmentation particles are desired. Based on the crude nature and scale of the fragmentation process taught in Grube, appellants contend that one of ordinary skill in the art would not have been motivated to look to such a reference if seeking to improve upon Rosinski's process.

Having carefully reviewed the collective teachings of Rosinski and Grube, we find ourselves in agreement with appellants' view that there is no motivation or suggestion in the applied references for attempting to combine crude mold core removal and municipal waste fragmentation teachings like those of Grube with the much more controlled and precise fragmentation process of Rosinski where it is important that the fragmentation

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process yield extremely finely divided ceramic particles that are "essentially colloidal in dimension, or essentially micron to colloidal in size" (col. 2, lines 44-49). In our view, the teachings of the references relied upon by the examiner, when considered as a whole, would have led one of ordinary skill in the art away from attempting any such modification of the process in Rosinski. Thus, we will not sustain the examiner's rejection of claims 8, 9, 11, 13 and 14 under 35 U.S.C. § 103(a).

It follows from the foregoing that the decision of the examiner is REVERSED.

However, pursuant to our authority under 37 CFR § 1.196(b), we enter the following new ground of rejection against claims 8, 9 and 13.

Claims 8, 9 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combined teachings of Grube and the Robinson article. In addition to the mold core removal and municipal waste fragmentation processes of Grube

mentioned above, we note that this patent also specifically discloses a process for fragmentation of "construction materials, e.g., concrete, wall board, timber and other materials which are porous" (col. 3, lines 28-31). In this process the porous construction materials are impregnated with a fluid (e.g., water) such that the pores of the material are at least partially occupied by the fluid, and subjected to a heating step in a pressure vessel whereby a suitable temperature and pressure are achieved such that the moisture or liquid carried in the pores will rapidly turn to steam or vapor when the pressure in the vessel is rapidly reduced by quickly opening an unloading means at the bottom of the pressure vessel. The sudden release of pressure causes the moisture in the pores of the construction material to change to steam and a certain portion of the liquid in the material to flash to vapor in accordance with thermodynamic laws, thereby resulting in a rapid expansion within the porous material that will rupture the material into tiny fragments. Grube notes (col. 6, lines 12-14) that by fragmenting the more porous elements, the resulting comminuted construction

materials will form a more dense packing when disposed in land fill operations.

It is our opinion that one of ordinary skill in the art at the time of appellants' invention would have immediately recognized that other porous construction materials like those mentioned in Grube would typically include brick and mortar waste materials that are normally disposed of in land fill operations. Moreover, we find that the ordinarily skilled artisan would have recognized that brick is a porous "ceramic"<sup>1</sup> material and that brick has a porosity of from 10 to 80% by volume and, more particularly, a porosity of from 20 to 50% by volume. In that regard, we note that the Robinson article shows various bricks having porosity in appellants' claimed ranges. See particularly, the "soft molded" bricks of Figure 2 in Robinson, the Riggs Hall bricks of Figure 1, and the Froberg House bricks of Figure 3. The Robinson article also notes in reference to Figure 1 that the

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<sup>1</sup> Webster's New Collegiate Dictionary, 9th Ed., 1985, defines the term "ceramic," when used as an adjective, as "of or relating to the manufacture of any product (as earthenware, porcelain, or brick) made essentially from a nonmetallic mineral (as clay) by firing at a high temperature."

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bricks marked Birmingham, Texas and Nashville "have a high porosity of about 32%" (page 296, col. 2).

Based on the foregoing, we consider that it would have been obvious to one of ordinary skill in the art at the time of appellants' invention to dispose of porous "ceramic" construction materials, such as brick, using the method set forth in Grube, so as to achieve the advantage described in Grube, i.e, fragmentation and comminution of such waste construction materials so that they will form a more dense packing when disposed in land fill operations. Thus, appellants' method as set forth in claims 8, 9 and 13 on appeal would have been obvious within the meaning of 35 U.S.C. § 103, based on the collective teachings of Grube and the Robinson article.

Other patents of record, e.g., U.S. Patent No. 4,313,737 to Massey et al., disclose explosive expansion fragmentation of porous materials without the use of chemical reactions, which processes are capable of producing "a suspension of micron sized solid particles in vapor" (col. 9, lines 30-32).

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In addition, U.S. Patent No. 4,764,357 to Sherif et al. discloses micro-"explosive" chemical deagglomeration (MED) of sol-gel derived metal oxides, such as alumina, baria, silica, and mixtures thereof, by explosive expansion fragmentation of such porous materials without the use of chemical reactions.

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b). 37 CFR § 1.196(b) provides that, "[a] new ground of rejection shall not be considered final for purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (§ 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. . . .

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

No time period for taking any subsequent action in con-  
nection with this appeal may be extended under 37 CFR § 1.136(a).

REVERSED, 37 CFR § 1.196(b)

CHARLES E. FRANKFORT	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
LAWRENCE J. STAAB	)	
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
	)	
JEFFREY V. NASE	)	
Administrative Patent Judge	)	

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