

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

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROBERT W. MORTON,
JASON J. GISLASON, and
GLENN W. DODWELL

Appeal 2007-0121
Application 10/324,594
Technology Center 1700

Decided: April 30, 2007

Before CHUNG K. PAK, PETER F. KRATZ, and CATHERINE Q. TIMM,
Administrative Patent Judges.

KRATZ, *Administrative Patent Judge.*

DECISION ON APPEAL

This is an appeal from the Examiner's final rejection of claims 1-26, 38 and 39, the only claims that remain pending in this application. We have jurisdiction pursuant to 35 U.S.C. §§ 6 and 134.

The appealed claims are directed to a sorbent composition comprising perlite, zinc oxide and a promoter metal component; a method of making such a sorbent composition; and a desulfurized fluid obtained by contacting a sulfur-containing fluid with a reduced sorbent. The preparation method involves separation and crushing steps in order to obtain selectively crushed expanded perlite particles. The obtained expanded perlite particles are combined with zinc oxide and a promoter metal to form an unreduced sorbent. Claims 1, 18 and 39 are illustrative and reproduced below:

1. A method of making a sorbent composition, said method comprising the steps of:

- (a) separating an initial quantity of uncrushed expanded perlite particles into a large particle portion and a small particle portion;
- (b) crushing said small particle portion to obtain selectively crushed perlite particles having a mean particle size less than the mean particle size of said small particle portion; and
- (c) combining said selectively crushed perlite particles with zinc oxide and a promoter metal to form an unreduced sorbent.

18. A sorbent composition comprising:

perlite;

zinc oxide; and

a reduced-valence promoter metal component,

wherein said perlite has a mean particle size in the range of from about 2 to about 40 microns, wherein less than about 10 weight percent of said perlite has a particle size greater than 75 microns.

39. A desulfurized fluid made by the process comprising the steps of:

- (a) contacting a sulfur-containing fluid with a reduced sorbent in a desulfurization zone under desulfurization conditions sufficient to provide a desulfurized fluid and a sulfur-loaded sorbent, wherein said sorbent comprises perlite, zinc oxide, and a reduced-valence promoter metal component and wherein said perlite has a mean particle size in the range of from about 2 to about 30 microns and wherein less than about 10 weight percent of solid perlite has a particle size greater than 75 microns;
- (b) contacting at least a portion of said sulfur-loaded sorbent with an oxygen-containing regeneration stream in a regeneration zone under regeneration conditions sufficient to provide a regenerated sorbent comprising an oxidized promoter metal component;
- (c) contacting at least a portion of said regenerated sorbent with a hydrogen-containing reducing stream in a reducing zone under reducing conditions sufficient to reduce at least a portion of said oxidized promoter metal component to said reduced-valence promoter metal component, thereby providing said reduced sorbent; and
- (d) recovering a desulfurized fluid.

The Examiner relies on the following prior art references as evidence in rejecting the appealed claims:

Nelson	US 4,721,582	Jan. 26, 1988
Khare	US 6,271,173 B1	Aug. 7, 2001

Claims 1-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nelson. Claims 11-26, 38 and 39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Nelson in view of Khare.

We affirm the Examiner's rejections. Our reasoning follows.

§ 103(a) Rejection over Nelson

Appellants contend that the Examiner has failed to establish a prima facie case of obviousness because Nelson does not teach or suggest all of the limitations of claim 1, particularly the steps of separating and crushing, as recited in steps (a) and (b) of claim 1.¹

The Examiner contends that one of ordinary skill in the art at the time of the invention would have recognized, prima facie, that conventional particle sizing steps, such as classification (separation) and crushing, would obviously be employed as one way of obtaining perlite of a size suitable for forming the desulfurization sorbent composition of Nelson and with a reasonable expectation of success in so doing.

Thus, the principal issue raised in this appeal with respect to the Examiner's first stated rejection is: Would one of ordinary skill in the art have been led, prima facie, to employ solids separation and crushing, as called for in claim 1, in forming the perlite-containing sorbent composition of Nelson, with a reasonable expectation of success in so doing?

We answer that question in the affirmative; hence, we affirm the Examiner's obviousness rejection over Nelson.

At the outset, we note that Appellants disclose that the claimed crushing and separating steps are both performed using any "means known in the art" (Specification 9 and 10). Thus, Appellants acknowledge that

¹ Appellants argue claims 1-17 together as a group. Thus, we select claim 1 as a representative claim for the first stated rejection of claims 1-11. Claims 11-17 will be addressed in our consideration of the Examiner's second stated rejection.

solids separation and crushing means are conventional well known prior art devices and unit operations which are available to one of ordinary skill in the art.²

Turning to the applied Nelson patent, the Examiner has correctly determined that Nelson discloses coating (combining) metal oxides, such as magnesium oxide, calcium oxide, zinc oxide, and copper oxide, onto expanded perlite particles to form a sulfur acceptor material (sorbent). *See* the Answer (p. 3) and the sections of Nelson cited therein. Appellants do not contest the Examiner's determination that Nelson's step of coating the particles of expanded perlite with metal oxides substantially corresponds to step (c) of representative claim 1 but for the arguments pertaining to the requirement of starting with selectively crushed perlite particles. In other words, Appellants' arguments for patentability of the claimed process center on step (a) and step (b).³ *See* the Briefs in their entirety.

Nelson teaches that the expanded perlite particles should be sized similarly to an exfoliated vermiculate particle option, with the particles being no larger than approximately 0.1-0.25 inches in their largest dimension for exemplified fixed bed tests of the sorbent (col. 5, l. 63 – col. 6, l. 25). In addition to such a static or fixed bed, Nelson further discloses that the acceptors (sorbent) can be made for use in a bubbling or fluid

² It is axiomatic that admitted prior art, including prior art found in an Applicants' Specification, may be used in determining the patentability of a claimed invention and that consideration of the prior art cited by the Examiner may include consideration of the admitted prior art found in the Specification. *In re Nomiya*, 509 F.2d 566, 570-571, 184 USPQ 607, 611-612 (CCPA 1975); *In re Davis*, 305 F.2d 501, 503, 134 USPQ 256, 258 (CCPA 1962).

³ Arguments not made in the Briefs are waived. *See* 37 C.F.R. § 41.37(c)(vii) (2006).

motion (fluidized) bed or for use in an entrained bed (col. 3, l. 54 – col. 4, l. 11).

Given these teachings of Nelson and the well known and conventional use of separation and/or crushing equipment in obtaining appropriately sized solids, the Examiner has reasonably determined that it would have been obvious to one of ordinary skill in the art to employ a conventional solids separation step to remove inappropriately larger size particles and a conventional crushing step to reduce the size of expanded perlite particles in Nelson's process for forming a sorbent (Answer 3, 4, and 6-9). This is especially so because Nelson discloses the option of forming sorbents for use in different types of beds (fixed, fluidized, or entrained), as discussed above. In this regard and as evidenced by Nelson's concern with too large a size particle for the fixed bed option, the size of the particles used in forming the sorbent are an intuitively recognizable result effective variable for forming a sorbent. One of ordinary skill in the art would readily recognize that using relatively small particle sizes is particularly important when forming a product sorbent for fluidization or entrainment in a gas, as taught by Nelson. Thus, particle size is a result effective variable that must be taken into account when forming a product sorbent for fluidization or entrainment in a gas. Accordingly, one of ordinary skill in the art would have recognized that Nelson implicitly suggests particle size requirements for the sorbent particles as being result effective for each type of bed for which the sorbent is made. In light of the above, we agree with the Examiner that one of ordinary skill in the art would have been led, prima facie, to use conventional separation and crushing equipment, including

crushing separated smaller particles therewith as one obvious option for sizing the perlite particles in the sorbent making process of Nelson.

According to Appellants, the Examiner has not proffered sufficient evidence to establish the prima facie obviousness of employing separation and crushing steps, as recited in claim 1, in Nelson's sorbent making method (Br. 7). In particular, Appellants maintain that Nelson does not furnish the requisite suggestion and/or teaching that would have led one of ordinary skill in the art to use solids separation followed by crushing for acquiring appropriately sized expanded perlite particles as part of the method of making the sorbent. According to Appellants, such additional steps are unnecessary to Nelson's method and would be costly and time consuming; thus, such steps are contrary to conventional wisdom.

We are not persuaded by those arguments for reasons expressed above and in the Answer. As Appellants acknowledge in their Specification and as discussed above, it is conventional to employ separation and crushing means for classification (size separation) of solids and production of particularly desired solids sizes. Thus, it was not necessary for the Examiner to cite to any other reference, such as an engineering handbook or encyclopedia to establish these facts concerning the well known availability of conventional solids size reducing and classification (separation) equipment, as well as techniques for using such.

Moreover, we are confident that one of ordinary skill in the art would have recognized that appropriately small sized perlite particles are required when the sorbent is being made for a fluidized or entrained bed desulfurization process as Nelson describes as an option. Hence, the use of conventional separation and crushing means to obtain such smaller sizes

would have been suggested by this disclosure and would have been well within the skill level of an ordinarily skilled artisan. This skill level is also evidenced by Appellants' acknowledgements that any conventional separation means and that any conventional crushing means can be used to obtain the required selectively crushed perlite particles.

As for Appellants' reference to Exhibit A, said to be attached to an amendment dated October 27, 2005, we note that Appellants' Brief does not include a copy of such an Exhibit and provide a statement setting forth where in the record that evidence was entered in the record by the Examiner as part of an Evidence Appendix, as is required. *See* 37 C.F.R. § 41.37(c)(ix) (2006). Indeed, Appellants state "None" in describing the evidence being relied upon in the Evidence Appendix. Thus, given Appellants Evidence Appendix statement, this evidence is not properly before us for our consideration.⁴

In any event, we note that Appellants' Specification discloses that expanded perlite is commercially available in small sizes, including sizes that Appellants' find useful in the claimed invention. *See* Examples 1 and 2 of the Specification, particularly the disclosure of the commercially available HarborliteTM 205 perlite used in Example 1. However, that disclosure of the commercial availability of expanded perlite in a given size

⁴ In any event, we note that any showing that expanded perlite is commercially available in sizes corresponding to the largest dimension of the perlite for a fixed bed as used in the Examples of Nelson does not militate against the use of conventional separation and crushing steps in obtaining such sized perlite. Moreover, as we discuss in this Decision, Nelson also teaches forming sorbents for use in fluidized and entrained beds, which would obviously encompass the use of much smaller sized expanded perlite particles in forming the sorbent.

does not militate against the use of conventional separation and conventional crushing steps as a way of obtaining expanded perlite of the desired size, as seemingly argued (Br. 9 and Reply Br. 4). Indeed, Appellants appear to argue against the use of conventional separation and crushing steps as if impractical for Nelson while championing the same steps for their invention. In effect, Appellants seemingly argue against the practicality or feasibility of their own claimed invention, which requires such separation and crushing steps. Suffice it to say that one of ordinary skill in the art is presumed to be possessed of sufficient skill to recognize that conventional size classification (separation) and conventional crushing means were an available option for use in the manner claimed as an available alternative for making expanded perlite particles of a size suitable for making sorbents useful in a sorbent bed of Nelson. Appellants have not established that the process of representative claim 1 is attended by anything but expected results. It follows that we sustain the Examiner's obviousness rejection of claims 1-11 over Nelson, on this record.

§ 103(a) Rejection over Nelson and Khare

Claims 11-17 and 38

Appellants present no specific arguments against the rejection of claims 11-17 and 38 over Nelson and Khare. Rather, Appellants base their arguments for claims 11-17 on the arguments made against the rejection of claim 1 over Nelson alone. Also, no specific arguments are made against the Examiner's rejection of product-by-process claim 38. We select claim 11 as representative claim for this claim grouping. Claim 11 is dependent on claim 1 and Appellants do not argue against the Examiner's additional

application of Khare against this claim. In light of the above, particularly our determination in favor of the Examiner's obviousness position as to claim 1, we shall affirm the Examiner's rejection of claims 11-17 and 38 over Nelson and Khare.

Claims 18-26

Appellants argue these claims together as a group. Thus, we select claim 18 as the representative claim.

Claim 18 is drawn to a sorbent composition, which sorbent composition includes a perlite of a specified mean particle size and a reduced-valence promoter metal component.

Appellants do not contest the Examiner's determination that it would have been obvious to one of ordinary skill in the art to use the reduced valence promoter of Khare in the sorbent of Nelson. Rather, Appellants contest the Examiner's obviousness rejection of representative claim 18 based on the assertion that the combined teachings of Nelson and Khare would not have suggested use of perlite particles of the size claimed. Appellants contend that Nelson does not recognize that the perlite particle size is a result effective parameter that should be optimized for use in the sorbent.

The Examiner, on the other hand, contends that the claimed perlite particle sizes would have been arrived at by one of ordinary skill in the art by optimization; that is, by determining the workable and/or effective particle sizes of the perlite to be used in forming the sorbent through routine experimentation.

Hence, the issue raised for our review with respect to representative claim 18 is: Whether it would have been obvious for one of ordinary skill in

the art to optimize or determine the workable particle sizes for the perlite particles used in forming the sorbent of Nelson and, in so doing, arrive at the claimed perlite particle sizes?

We answer that question in the affirmative for reasons stated below and in the Answer. Consequently, we shall affirm the Examiner's obviousness rejection of claims 18-26 over Nelson in view of Khare.

In particular, we again note that Nelson discloses that the sorbent can be made for use in a fixed, fluidized (fluid motion), or entrained bed desulfurizer. As such and for reasons discussed in our consideration of the Examiner's rejection of claim 1, one of ordinary skill in the art would have recognized in Nelson, a teaching as to the result effectiveness of particle sizes of the sorbent and, in turn, the perlite particles which make up a significant part of the sorbent. Furthermore, we are satisfied that the totality of the evidence before us reasonably suggests that one of ordinary skill in the art would arrive at the use of a workable size range for the perlite particles, including particles of a size as required by claim 18 for making the sorbent of Nelson appropriate for subsequent fluidization or entrainment of the sorbent. *See In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980); *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). After all, it is well settled that skill and not the converse is expected of an ordinarily skilled artisan. *See In re Sovish*, 769 F.2d 738, 742-743, 226 USPQ 771, 774 (Fed. Cir. 1985).

Consequently, we shall affirm the Examiner's obviousness rejection of claims 18-26 and 38 over Nelson and Khare.

Claim 39

Claim 39 is directed to a desulfurized fluid described by a process by which the desulfurized fluid is obtained. Claim 39 does not require that the desulfurized fluid possess any particular sulfur level or that the desulfurized fluid have any particular composition.

Both of the applied references disclose a sorbent that can be used for desulfurizing fluids. Nelson discloses that the solid sorbent thereof is useful in treating gaseous fluid to remove, *inter alia*, sulfur oxides, hydrogen sulfide, and/or carbonyl sulfide therefrom (col. 1, ll. 14-24). Thus, Nelson teaches the formation of a desulfurized gas/fluid. Khare discloses that the sorbent disclosed therein can be used for removing sulfur from diesel fuel or cracked gasoline (col. 1, ll. 6-13). Khare furnishes an Example wherein a desulfurized cracked gasoline is formed by treatment with a sorbent (Example 1).

Given the above-noted disclosures of Nelson and Khare, we agree with the Examiner that the applied references furnish sufficient teachings to render claim 39 at least *prima facie* obvious. After all, whether a rejection is under 35 U.S.C. § 102 or § 103, when Appellants' product and that of the prior art appear to be identical or substantially identical, the burden shifts to Appellants to provide evidence that the prior art product does not necessarily or inherently possess the relied upon characteristics of Appellants' claimed product. *See In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980); *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-434 (CCPA 1977); *In re Fessmann*, 489 F.2d 742, 745, 180 USPQ 324, 326 (CCPA 1974). The reason is that the Patent and Trademark Office is not able to manufacture and compare products. *See Best*, 562 F.2d at 1255, 195 USPQ at 434. This burden shifting is especially appropriate here where appealed

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claim 39 is in a product-by-process format and the prior art product desulfurized fluid appears to be either identical with or only slightly different than the claim 39 product. *See In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

On this record, we affirm the Examiner's obviousness rejection of claim 39.

CONCLUSION

The decision of the Examiner to reject claims 1-11 under 35 U.S.C. § 103(a) as being unpatentable over Nelson; and to reject claims 11-26, 38 and 39 under 35 U.S.C. § 103(a) as being unpatentable over Nelson in view of Khare is affirmed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2006).

AFFIRMED

tf/lr

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