



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/249,814	02/16/99	YU	Q 98308-C

JON O. NELSON
BANNER & WITCOFF
TEN SOUTH WACKER DRIVE
SUITE 3000
CHICAGO IL 60606-7407

IM22/1000

EXAMINER

SPEER, T

ART UNIT	PAPER NUMBER
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1775

DATE MAILED:

10/03/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

BEST COPY

Office Action Summary	Application No. 09/249,814	Applicant(s) Yu, et al.	
	Examiner Timothy M. Speer	Group Art Unit 1775	

☒ Responsive to communication(s) filed on Jun 1, 1999

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-55 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-55 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 4

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 1775

DETAILED ACTION

1. *Claim Rejections - 35 USC § 103*
2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if 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. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knauf (U.S. 3,770,468).

Knauf teaches a method of making set gypsum articles and the articles produced by the method wherein a phosphonic acid, as presently claimed, e.g., sodium trimetaphosphate, is incorporated into the gypsum mix (col. 1, lines 65-67, for instance). Knauf fails to teach the concentration of the additive presently claimed. However, where, as here, the prior art teaches the general conditions of a claim, it is not inventive to discover optimum or workable ranges through routine experimentation. In the instant case, to adjust the amount of the additive, a result effective variable, such as to obtain an optimum or workable range would certainly require no more than routine experimentation by one having ordinary skill in the art. Therefore, it is the Examiner's position that the instant claims are *prima facie* obvious over the applied prior art.

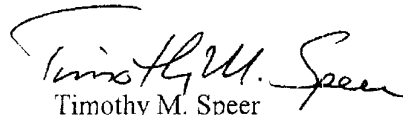
Information Disclosure Statement

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Page 3

Art Unit: 1775

4. The Information Disclosure Statement filed on 06-01-99 has been considered and made of record. A copy of the 1449 initialed and dated by the Examiner is included herewith.
5. Any inquiry concerning this communication should be directed to Timothy M. Speer at telephone number (703) 308-3624.


Timothy M. Speer
Primary Examiner
Art Unit 1775

T.M. Speer/ts
September 30, 2000



PATENT
Attorney Docket No. 202593

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Qiang Yu et al.

Serial No. 09/249,814

Filed: February 16, 1999

Group Art Unit: 1775

Examiner: Timothy M. Speer

For: Gypsum-Containing Product Having
Increased Resistance to Permanent
Deformation And Method And
Composition For Producing It

AMENDMENT

Commissioner For Patents
Washington, D.C. 20231

Dear Sir:

This amendment is responsive to the Office Action mailed October 3, 2000.
Entry of this Amendment and reconsideration of the subject application in view of the
following remarks is respectfully requested.

REMARKS

Claims 1-55, all of the claims pending in the application, stand rejected under
35 U.S.C. §103(a) as being unpatentable over Knauf, U.S. Patent No. 3,770,468
(hereinafter "Knauf"). The Office Action contends that Knauf teaches a method of
making set gypsum articles and the articles produced by the method wherein a
phosphonic acid, such as sodium trimetaphosphate, is incorporated into the gypsum
matrix. The Office Action recognizes that Knauf does not teach the concentration of
additive presently claimed, but contends that the determination of an optimum range
would require no more than routine experimentation by one having ordinary skill in
the art in view of Knauf's teaching of the general condition of the claims. The Office

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In re Application of *Stal*.
Serial No. 09/249,814

Action concludes that the pending claims are *prima facie* obvious over Knauf. The rejection of claims 1-55 is respectfully traversed.

Knauf is directed to a process for treating freshly “burnt plaster of Paris,” that is, plaster of Paris prepared by calcining calcium sulfate dihydrate, with an aqueous solution of a “wetting effect material” to produce a plaster of Paris free of inhomogeniéties, such as calcium sulfate anhydrite III, and free of calcium sulfate dihydrate. The thus prepared plaster of Paris can be mixed, according to Knauf, with water to form a malleable mortar. In this regard, Knauf states, at col. 1, lines 19-34,

It is an object of the invention to treat burnt plaster of Paris in such a way that it can be mixed with water quickly and with complete uniformity and that the result achieved in this way is a malleable mortar that can easily be handled.

The invention consists in a process for the treatment of plaster of Paris in which an aqueous solution of a wetting effect material is mixed with ground, dry plaster of Paris, the amount of water being such that the plaster of Paris remains powdered but that anhydrite III contained in the plaster of Paris is converted to the hemihydrate. The aqueous solution is preferably sprayed onto the finely divided plaster of Paris while it is continuously mixed.

This treatment is to be carried out in the factory directly after manufacture of the plaster of Paris.

Knauf explains that the desired effect of a homogeneous dry plaster free of anhydrite III and calcium dihydrate can be achieved only by treating calcined plaster of Paris with an aqueous solution of a “wetting effect material,” that is, a material which has a wetting effect on anhydrite III. (Col. 1, lines 53-63). Four general classes of compounds are disclosed, but Knauf does not express a preference for any one class of “wetting effect material” (Col. 2, lines 16-24).

Contrary to the contention in the Office Action, Knauf does not teach or suggest making any particular article of set gypsum. Knauf merely discloses a method for treating burnt plaster of Paris to form a dry plaster which remains powdered and in which anhydrite III is converted to calcium sulfate hemihydrate. The only use Knauf teaches for the dry plaster formed by the disclosed process is to make a more easily

In re Application of Y et al.
Serial No. 09/249,814

and uniformly malleable mortar with the addition of water and other additives, such as sand, lime or the like. That is the only problem that Knauf was trying to solve.

Mortar, as is known, is not a set gypsum article. Accordingly, there is nothing in Knauf which discloses, teaches or suggests making any particular set gypsum articles, or set gypsum articles such as those claimed by applicants having certain improved properties, and there is nothing in Knauf which discloses, teaches or suggests any particular set gypsum articles which include a condensed phosphoric acid and/or a condensed phosphate as disclosed and claimed by applicants, including for example, sodium trimetaphosphate and the like.

Further, Knauf does not teach the general conditions of claims 1-55. There is nothing in Knauf which teaches or suggests that condensed phosphoric acids, and/or the condensed phosphates as described and claimed by applicants should be included in specific articles comprising set gypsum in order to enhance the performance characteristics, such as resistance to permanent deformation (i.e., sag resistance or rigidity) and/or strength, of such set gypsum-containing article, or that such condensed phosphoric acids and/or condensed phosphates should be used to make such set gypsum-containing articles.

Moreover, there is nothing in Knauf that teaches or suggests that an accelerator could be used in combination with the condensed phosphoric acids and/or condensed phosphates to provide a set-gypsum containing product having greater strength than it would have in the absence of the accelerator. Further, Knauf does not teach or suggest a method of modifying the shape of a gypsum board.

One of ordinary skill in the art, confronted with the problem of increasing sag resistance or strength of a set gypsum article, would not look to the disclosure of Knauf, wherein one would not find a teaching or even a suggestion of how to solve the problem. Knauf is silent on the effect of his myriad wetting effect materials on the properties of set gypsum matrix-containing articles. Indeed, Knauf never addresses the effect of the wetting effect materials on the properties of set gypsum-containing articles because Knauf does not make such articles, and Knauf never suggests the use of the treated dry plaster of Paris to make any particular set gypsum-containing

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articles having certain properties. Moreover, one skilled in the art would not have been motivated by Knauf to determine optimum or workable ranges of the condensed phosphoric acids and/or the condensed phosphates applicants have taught and claimed because Knauf is completely silent on the use of the treated plaster of Paris to make any particular set gypsum-containing articles and on the effect, if any, the “wetting effect materials” would have on articles comprising set gypsum. And, one skilled in the art would not have been motivated to use an accelerator in combination with the claimed enhancing materials to improve the strength of a set gypsum-containing product. Without the benefit of applicants’ disclosure and the improper use of hindsight, the teachings of Knauf do not offer any guidance whatsoever to one skilled in the art to achieve either the set gypsum products as claimed or the benefits of the claimed invention. Thus, it is respectfully submitted that the present invention would not have been obvious to one skilled in the art in view of Knauf.

Turning now more particularly to the pending claims, applicants submit that each of the various embodiments as set forth in claims 1-55, is patentable over Knauf. Knauf does not teach or suggest the set gypsum-containing articles and methods encompassed by these claims.

Claims 13-31 are directed to a gypsum board having increased sag resistance comprising an interlocking matrix of set gypsum and prepared using an enhancing material selected from the group consisting of condensed phosphoric acids, each of which comprises two or more phosphoric acid units and/or salts or ions of condensed phosphates, as described, and an accelerator. The gypsum board of claims 13-31 are further characterized by having a sag resistance greater than the sag resistance would have been for gypsum board without the enhancing material and by having greater strength than the strength would have been for gypsum board without the accelerator.

Each of claims 13-31 is independently patentable over Knauf. Knauf is not directed to a gypsum board, Knauf does not disclose, teach or even suggest gypsum board, making gypsum board or using the plaster of Paris made by its treatment process to make gypsum board. Knauf does not disclose, teach or suggest gypsum board which includes a condensed phosphoric acid or condensed phosphate as

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claimed, the use of such condensed phosphoric acids and phosphates to make gypsum board, that such condensed phosphoric acids and phosphates can be used to make gypsum board in order to affect the sag resistance of the resulting gypsum board, or gypsum board comprising a set gypsum matrix and having the improved sag resistance defined by the claims. Similarly, Knauf does not disclose, teach or suggest that the use of an accelerator in combination with the enhancing materials, or the benefit of including an accelerator, namely, greater strength. Moreover, in view of the Knauf disclosure, there would be no motivation for one of ordinary skill in the art to use the condensed phosphoric acids and condensed phosphates disclosed and claimed by applicants to make gypsum board, to use such phosphoric acids and phosphates to increase the sag resistance of gypsum board, to use the amount of such phosphoric acids and phosphates claimed (claims 14-16), or to use an accelerator to increase strength.

Knauf also does not teach the presence of chloride ions or salts thereof in mixture with a calcium sulfate material. Therefore, the gypsum board of claims 21-23 are independently patentable on this basis as well. Accordingly, it is submitted that each of claims 13-31 is independently patentable over Knauf.

As discussed above, Knauf teaches only a dry plaster useful as mortar. Knauf does not disclose, teach or suggest a method for producing a set gypsum-containing product having increased strength, rigidity and dimensional stability comprising trimetaphosphate ion as claimed in claim 55. Nor does Knauf teach a method for producing a set gypsum-containing product having increased resistance to permanent deformation. Accordingly, each of claims 54 and 55 is independently patentable over Knauf.

Each of claims 32-53 is also independently patentable over Knauf. Each of claims 32-53 is directed to a method for modifying the shape of a gypsum board, which includes the use of at least one chloride salt and one or more enhancing materials, as set forth in the claims. Knauf fails to teach or suggest a method for modifying the shape of a gypsum board as claimed. Accordingly, each of claims 32-53 is separately patentable over Knauf.

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Claims 1-12 are directed to a method for producing a set gypsum-containing product having increased resistance to permanent deformation which includes the use of one or more enhancing materials as described, and an accelerator, wherein the accelerator is included in an amount such that the set gypsum-containing product has greater strength than it would have if the accelerator had not been included. Knauf fails to teach or suggest a method of producing a set gypsum-containing product having increased resistance to permanent deformation comprising the condensed phosphoric acids and/or phosphates and in combination with an accelerator as taught and claimed by applicants, and fails to teach or suggest that such an accelerator could be included in an appropriate amount to thereby increase the strength of the set gypsum-containing product. Additionally, there is nothing in Knauf to suggest the treatment of calcium sulfate material with the concentration of enhancing materials, as in claims 3 and 4. Further, Knauf does not suggest the treatment of a mixture comprising calcium sulfate material and chloride ions or chloride salts, as in claims 10 and 11. Accordingly, each of claims 1-12 is separately patentable over Knauf.

The present invention describes and claims products, compositions and processes which are not disclosed, taught or even suggested by Knauf. The present invention provides set gypsum products with enhanced performance characteristics, such as increased sag resistance and/or strength, not heretofore known and not apparent to those skilled in the art in view of Knauf. Thus, applicants submit that each of claims 1-55 is patentable over Knauf.

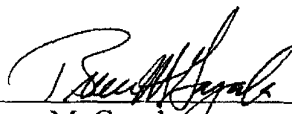
Further, Knauf does not suggest the treatment of a mixture comprising calcium sulfate material and chloride ions or chloride salts thereof with the enhancing materials and an accelerator.

In re Application of Y et al.
Serial No. 09/249,814

In view of the foregoing, reconsideration of the subject application is respectfully requested. Prompt and favorable consideration is earnestly solicited.

Respectfully submitted,

LEYDIG, VOIT & MAYER, LTD.



Bruce M. Gagala
Reg. No. 28,844
Two Prudential Plaza – Suite 4900
Chicago, Illinois 60601
(312) 616-5600

Date: February 2, 2001

In re Application of Y et al.
Serial No. 09/249,814

CERTIFICATE OF MAILING

I hereby certify that this AMENDMENT (along with any attachments) is being sent via first-class mail, postage prepaid, addressed to: Examiner Timothy Spear, Assistant Commissioner For Patents, Washington, D.C. 20231, on February 2, 2001.

February 2, 2001
Date

Barbara M. Lyons



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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/249,814 02/16/99 YU

Q 98308-C

EXAMINER

IM52/0629

JON O. NELSON
BANNER & WITCOFF
TEN SOUTH WACKER DRIVE
SUITE 3000
CHICAGO IL 60606-7407

YOUNG, B

ART UNIT

PAPER NUMBER

1775

DATE MAILED:

06/29/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/249,814

Applicant(s)

Yu et al.

Examiner
Bryant Young

Art Unit
1775



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Feb 6, 2001
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 35 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-55 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirements.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 20) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-31 and 54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 (lines 1-2) and 54 (lines 1-2) contain the phrase "a set gypsum-containing product having increased resistance to permanent deformation". This limitation is based on unrecited comparisons; therefore the scope of the claim and those dependent therefrom is indefinite.

Claim 13 (line 1) contains the phrase "a gypsum board having increased sag resistance". This limitation is based on unrecited comparisons; therefore the scope of the claim and those dependent therefrom is indefinite.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1775

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if 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. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugahara (US 4,126,599).

Sugahara teaches a method for producing a gypsum-containing product (e.g., see col. 2, lines 7-52). The structures of gypsum are formed by hydrating and hardening calcium sulfates capable of being hardened by the hydration reaction, such as different types of calcium sulfate hemihydrate (col. 3, lines 30-38).

According to Sugahara certain process modifying or property enhancing additives, such as accelerators, retarders, weight reducing fillers, etc. may be added to the product slurry that forms the gypsum-containing product at known mixing ratios (col. 7, 50-53), and that the source of the gypsum may be from the by-product of a phosphoric acid process (col. 4, lines 34-44). Known reinforcers may also be incorporated in the composition of the gypsum-containing product that include wool and fibers of cellulose (pre-gelatinized starch), polyvinyl alcohol, polyesters, polyamides, polyolefins (col. 24-, lines 49), volcanic ashe and foamed perlite (i.e., perlite particles) (col. 7, lines 35-37), and polymerized water-soluble ethylenically unsaturated monomers (i.e., aqueous foam materials) (col. 7, line 66-col. 8, line 15). In addition, vinyl trimethyl ammonium chloride (chloride ions) may used (col. 8, lines 10-15).

The hard-shaped structure of gypsum-containing product, according to Sugahara, is also treated with an aqueous solution of a hardening agent of the phosphoric acid-type (col. 4, lines 4-

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33), or its water soluble salt (i.e., phosphoric acid salt) (col. 8, lines 59- 65). The water-soluble phosphoric acid salt is represented by the formula $M^1(M^2)_2 PO_4$, wherein M^1 stands for an alkali metal (sodium) and M^2 stands for hydrogen (col. 9, lines 1-11). The present claims are drawn to a method that includes, for example, condensed phosphoric acids or sodium trimetaphosphate, which are derived from phosphoric acids. Therefore, it is the Examiner's position that one of ordinary skill in the art would employ, for example, condensed phosphoric acids or sodium trimetaphosphate, since the reference suggests the use of phosphoric acid type materials (col. 4, lines 4-33).

Sugahara further discloses that the gypsum-containing product may be shaped into a wall material, a tile, a ceiling material, a sheet, a paving material, etc. (col. 8, lines 37-38).

With respect to the phrase "the enhancing material or materials having been included in the mixture in an amount and manner such that the set gypsum-containing product has greater resistance to permanent deformation than it would have if the enhancing material had not been included in the mixture" (e.g., see claim 1) or "the enhancing material or materials having been included in the mixture in an amount and manner such that the set gypsum board has greater sag resistance than it would have if the enhancing material had not been included in the mixture" (e.g., see claim 13), it has been held that where the general conditions of a claim are disclosed in the prior art it is not inventive to discover optimum or workable ranges by routine experimentation. See MPEP 2144.05. In the instant case, discovering optimum or workable

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ranges, with respect to the amount or manner of including an enhancing material, would require no more than routine experimentation by one having ordinary skill in the art.

Likewise, it is the Examiner's position that it would require no more than routine experimentation by one having ordinary skill in the art to optimize the claimed concentrations of the enhancing materials, as claimed (e.g., see claims 2-4).

Therefore, these claims are *prima facie* obvious over the prior art.

Response to Arguments

5. Applicant's arguments with respect to claims 1-55 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. Any inquiry to this communication or earlier communications from the Examiner should be directed to Deborah Jones at (703) 308-3822. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.


bly

June 27, 2001


DEBORAH JONES
SUPERVISOR/INVENTOR EXAMINER

Notice of References Cited	Applicant/Patent Yu et al.	Inventor/Control No. 09/249,814	
	Examiner Bryant Young	Art Unit 1775	Page 1 of 1

U.S. PATENT DOCUMENTS					
*		Document Number Country Code-Number-Kind Code	Date MM-YYYY ¹	Name	Classification ²
X	A	4,126,599	11/1978	Sugahara et al.	260 42.13
	B				
	C				
	D				
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FOREIGN PATENT DOCUMENTS					
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NON-PATENT DOCUMENTS		
*		Include, as applicable: Author, Title, Date, Publisher, Edition or Volume, Pertinent Pages
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#10/RMS
PATENT
Attorney Docket No. 202593
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R/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Qiang Yu et al.

Group Art Unit: 1775

Serial No. 09/249,814

Examiner: B. Young

Filed: February 16, 1999

For: Gypsum-Containing Product Having
Increased Resistance to Permanent
Deformation And Method And
Composition For Producing It

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MAY 16 2002

OFFICE OF PETITIONS

RESPONSE TO OFFICE ACTION

Commissioner For Patents
Washington, D.C. 20231

Dear Sir:

This amendment is responsive to the Office Action mailed June 29, 2001. Applicants have petitioned to revive the application pursuant to 37 C.F.R. §1.137(b), and have paid the appropriate extension and petition fees. Entry of this Amendment and reconsideration of the subject application in view of the following remarks is respectfully requested.

AMENDMENTS

IN THE CLAIMS:

Replace the indicated claims with:

1. (Amended) A method for producing a set gypsum-containing product comprising

forming a mixture of calcined gypsum, water, an accelerator, and one or more enhancing materials chosen from the group consisting of: condensed phosphoric acids, each of which comprises 2 or more phosphoric acid units; and salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units, and

maintaining the mixture under conditions sufficient for the calcined gypsum to form an interlocking matrix of set gypsum,

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01 FC:102
02 FC:103

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the enhancing material or materials having been included in the mixture in an amount such that the set gypsum-containing product has greater resistance to permanent deformation than it would have if the enhancing material had not been included in the mixture. ^{Insert 61}

the accelerator having been included in an amount such that the set gypsum-containing product has greater strength than it would have if the accelerator had not been included in the mixture.

2. (Amended) The method of claim 1, wherein the concentration of the enhancing material in the mixture is from about 0.004 to about 2.0 percent by weight, based on the weight of the calcined gypsum.

3. (Amended) The method of claim 1, wherein the concentration of the enhancing material in the mixture is from about 0.04 to about 0.16 percent by weight, based on the weight of the calcined gypsum.

4. (Amended) The method of claim 1, wherein the concentration of the enhancing material in the mixture is about 0.08 percent by weight, based on the weight of the calcined gypsum.

7. (Amended) The method of claim 1, wherein the calcined gypsum comprises one or more of: calcium sulfate anhydrite; calcium sulfate hemihydrate; or ions of calcium and sulfate.

8. (Amended) The method of claim 1, wherein the calcined gypsum comprises calcium sulfate hemihydrate.

10. (Amended) The method of claim 1, wherein the mixture further comprises at least 0.015 weight percent (based on the weight of calcined gypsum in the mixture) of chloride ions or salts thereof.

12. (Amended) The method of claim 1, wherein the mixture comprises 0.02-1.5 weight percent (based on the weight of calcined gypsum in the mixture) of chloride ions or salts thereof.

13. (Amended) A gypsum board comprising a core of material sandwiched between cover sheets, wherein the core comprises an interlocking matrix of set gypsum, and the board has been prepared by a method comprising:

forming or depositing a mixture between the cover sheets, wherein the mixture comprises a calcined gypsum, water, an accelerator, and one or more enhancing materials chosen from the group consisting of: condensed phosphoric

acids, each of which comprises 2 or more phosphoric acid units; and salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units, and maintaining the mixture under conditions sufficient for the calcined gypsum to form the interlocking matrix of set gypsum,

the enhancing material or materials having been included in the mixture in an amount such that the gypsum board has greater sag resistance than it would have if the enhancing material had not been included in the mixture,

the board having a sag resistance as determined according to ASTM C473-95 of less than about 0.1 inch per two foot length of said board,

the accelerator having been included in an amount such that the gypsum board has greater strength than it would have if the accelerator had not been included in the mixture.

14. (Amended) The gypsum board of claim 13, wherein the concentration of the enhancing material in the mixture is from about 0.004 to about 2.0 percent by weight, based on the weight of the calcined gypsum.

15. (Amended) The gypsum board of claim 13, wherein the concentration of the enhancing material in the mixture is from about 0.04 to about 0.16 percent by weight, based on the weight of the calcined gypsum.

16. (Amended) The gypsum board of claim 13, wherein the concentration of the enhancing material in the mixture is from about 0.08 percent by weight, based on the weight of the calcined gypsum.

18. (Amended) The gypsum board of claim 13, wherein the calcined gypsum comprises one or more of: calcium sulfate anhydrite; calcium sulfate hemihydrate; or ions of calcium and sulfate.

19. (Amended) The gypsum board of claim 13, wherein the calcined gypsum comprises calcium sulfate hemihydrate.

21. (Amended) The gypsum board of claim 13, wherein the mixture further comprises at least 0.015 weight percent (based on the weight of calcined gypsum in the mixture) of chloride ions or salts thereof.

23 22. (Amended) The gypsum board of claim 13, wherein the mixture comprises 0.02-1.5 weight percent (based on the weight of calcined gypsum in the mixture) of chloride ions or salts thereof.

A7 25. (Amended) The gypsum board of claim 24, wherein the concentration of the pregelatinized starch in the mixture is from about 0.08 to about 0.5 percent by weight, based on the weight of the calcined gypsum.

26. (Amended) The gypsum board of claim 24, wherein the concentration of the pregelatinized starch in the mixture is from about 0.16 to about 0.4 percent by weight, based on the weight of the calcined gypsum.

27. (Amended) The gypsum board of claim 24, wherein the concentration of the pregelatinized starch in the mixture is from about 0.3 percent by weight, based on the weight of the calcined gypsum.

54. (Amended) A method for producing a set gypsum-containing product comprising:

A8 forming a mixture of a calcined gypsum water, and one or more enhancing materials chosen from the group consisting of: condensed phosphoric acids, each of which comprises 2 or more phosphoric acid units; and salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units, and

maintaining the mixture under conditions sufficient for the calcined gypsum to form a set gypsum material,

the enhancing material or materials having been included in the mixture in an amount such that the set gypsum formed has greater resistance to permanent deformation than it would have if the enhancing material had not been included in the mixture. ^{Insert 62}

Please cancel claim 55 without prejudice.

Please add the following new claims:

~~55~~ 56. (New) A method for producing a set gypsum-containing product comprising

A9 forming a mixture of calcined gypsum, water, and one or more enhancing materials chosen from the group consisting of: condensed phosphoric acids, each of which comprises 2 or more phosphoric acid units; and salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units, and

maintaining the mixture under conditions sufficient for the calcined gypsum to form an interlocking matrix of set gypsum,

the enhancing material or materials having been included in the mixture in an amount such that the set gypsum-containing product has greater resistance to

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permanent deformation than it would have if the enhancing material had not been included in the mixture ^{INSERT B3}

⁵⁶ ~~57~~. (New) The method of claim ⁵⁵ ~~56~~ wherein said mixture includes an accelerator.

⁵⁷ ~~58~~. (New) The method of claim ⁵⁵ ~~56~~ wherein said enhancing material is a trimetaphosphate.

⁵⁸ ~~59~~. (New) A composition comprising a mixture of: calcined gypsum, water and one or more enhancing materials selected from the group consisting of: condensed phosphoric acids, each of which comprises 2 or more phosphoric acid units; and salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units, wherein when said mixture is cast in the form of 1/2 inch gypsum board, said board has a sag resistance, as determined according to ASTM C473-95, of less than about 0.1 inch per two foot length of said board.

⁵⁹ ~~60~~. (New) The composition of claim ⁵⁸ ~~59~~ wherein said composition includes an accelerator.

⁶⁰ ~~61~~. (New) The composition of claim ⁵⁸ ~~59~~ wherein said enhancing material is a trimetaphosphate.

REMARKS

Claims 1-32 and 54 have been amended so as to obviate the rejection of those claims as indefinite under 35 U.S.C. §112, second paragraph. Applicants respectfully disagree that the phrase "a set gypsum-containing product having increased resistance to permanent deformation" in independent claims 1 and 54 and the phrase "a gypsum board having increased sag resistance" in independent claim 13 renders the claims indefinite. Nevertheless, in order to expedite prosecution on the merits, those phrases have been removed from the claims.

Method claims 1-12 and 54 have been amended to point out that the method is for making a set gypsum product using calcined gypsum. Accordingly, the amended claims point out that the method is for a pre-set treatment, that is, the enhancing material is added to the mixture from which the set gypsum product is made and that mixture comprises calcined gypsum before the calcined gypsum has absorbed water to form calcium sulfate dihydrate, or set gypsum.

Claim 55 has been canceled without prejudice.

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Claims 1-55 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Sugahara* U.S. 4, 126, 599. The Office contends it would have been obvious to one of ordinary skill to "discover optimum or workable ranges" of the enhancing materials discovered by applicants in view of the Office's contention that the general conditions of applicants' claims are disclosed in the prior art. This rejection is respectfully traversed.

Sugahara describes a water-resistant shaped structure of set gypsum comprising (a) calcium sulfate dihydrate which is formed by hardening of calcium sulfate capable of the hydration reaction, (b) a calcium type filler and (c) a water-insoluble or hardly water-soluble salt of a polybasic acid having a specified second stage dissociation constant. The calcium type filler is included to fill the pores or spaces among the set gypsum. Water can be added to the calcined gypsum mixture. (Col. 7, ll. 3-8).

Sugahara also discloses that the polybasic acid, such as phosphoric acid or oxalic acid is added to the set gypsum, not to the calcined gypsum mixture that is used to make the shaped article. Thus, *Sugahara* discloses that the resulting admixture, that is, the mixture of "water-hardenable calcium sulfate" or calcined gypsum, and the calcium type filler, is first shaped and hardened, and thereafter "the resulting hardened shaped structure is treated with an aqueous solution of a hardening agent of the phosphoric acid or oxalic acid." Col. 4, lines 4-18. See also, col. 8, lines 59-67.

The invention of claims 1-12 and 54, and newly added claims 56-58 is for a method of producing a set gypsum-containing product which includes forming a mixture of calcined gypsum and an enhancing material as described such that the set gypsum-containing product exhibits improved resistance to permanent deformation. The inventive method of claims 1-12, 54 and 56-58 differs materially from the disclosure of *Sugahara*. In the inventive method, the enhancing material is added to the mixture comprising calcined gypsum. In contrast, in *Sugahara*, the polybasic acid is not added to the calcined gypsum mixture used to form the set gypsum product. *Sugahara* only teaches applying a solution of polybasic acid to the hardened set gypsum product. *Sugahara* does not teach or suggest adding the enhancing material to the mixture comprising calcined gypsum. Indeed, *Sugahara* teaches away from the claimed method by teaching only that the polybasic acid

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should be added instead to the hardened, shaped set gypsum product. Moreover, one skilled in the art would not be motivated by Sugahara to use the polybasic acid with calcined gypsum as in the claimed method. Therefore, applicants submit that claims 1-12 and 54 would not have been obvious to one of ordinary skill in the art in view of Sugahara.

Applicants also submit that claims 13-31 are independently patentable over Sugahara. Claims 13-31 are directed to gypsum board characterized by an improved sag resistance. The improved sag resistance is achieved by adding enhancing materials to the mixture of calcined gypsum from which the gypsum board is made. Sugahara does not teach or suggest adding the polybasic acid to a mixture of calcined gypsum to make gypsum board, nor does Sugahara teach or suggest a gypsum board with improved sag resistance. Therefore, the invention of claims 13-31 is patentable over Sugahara.

Claims 32-53 are also independently patentable over Sugahara. Claims 32-53 are directed to a method of producing a shaped gypsum board which includes the use of a chloride salt. Sugahara is completely silent about the use of a chloride salt to assist in the preparation of shaped gypsum board. Moreover, Sugahara provides no motivation to one skilled in the art to use a chloride salt for any purpose. Therefore, claims 32-53 would not have been obvious to one of ordinary skill in the art in view of Sugahara.

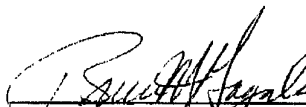
Newly added claims 59-61 are also independently patentable over Sugahara because Sugahara does not disclose, teach or suggest a composition comprising calcined gypsum and an enhancing material as described, which, when cast as ½ inch board will have the stated sag resistance.

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In view of the foregoing, reconsideration of the subject application is respectfully requested. Prompt and favorable consideration is earnestly solicited.

Respectfully submitted,

LEYDIG, VOIT & MAYER, LTD.



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Date: May 14, 2002

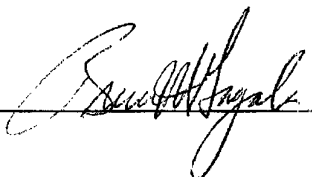
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CERTIFICATE OF MAILING

I hereby certify that this RESPONSE TO OFFICE ACTION (along with any attachments) is being sent via first-class mail, postage prepaid, addressed to:
Examiner B. Young, Assistant Commissioner For Patents, Washington, D.C. 20231,
on May 14, 2002.

Date

May 14, 2002



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Notice of Allowability	Application No.	Applicant(s)	
	09/249,814	YU ET AL.	
	Examiner Jennifer McNeil	Art Unit 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--
All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

- ☒ This communication is responsive to 04/07/03.
- ☒ The allowed claim(s) is/are 1-54 and 56-61.
- ☒ The drawings filed on 16 February 1999 are accepted by the Examiner.
- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - ☐ All
 - ☐ Some*
 - ☐ None of the:
 - ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

- ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 - ☐ The translation of the foreign language provisional application has been received.
- ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE**

- ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
- ☐ CORRECTED DRAWINGS must be submitted.
 - ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - ☐ hereto or 2) ☐ to Paper No. _____.
 - ☐ including changes required by the proposed drawing correction filed _____, which has been approved by the Examiner.
 - ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the top margin (not the back) of each sheet. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

- ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1 ☐ Notice of References Cited (PTO-892)	2 ☐ Notice of Informal Patent Application (PTO-152)
3 ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	4 ☒ Interview Summary (PTO-413), Paper No. <u>17</u> .
5 ☐ Information Disclosure Statements (PTO-1449), Paper No. _____.	6 ☒ Examiner's Amendment/Comment
7 ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	8 ☒ Examiner's Statement of Reasons for Allowance
	9 ☐ Other

Deborah Jones
DEBORAH JONES
PROSORY PATENT EXAMINER

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Art Unit: 1775

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EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Bruce Gagala on April 25, 2003.

The application has been amended as follows:

IN THE CLAIMS:

Claim 1, line 12, after "mixture," insert the following:

-- such that when the mixture is cast in the form of $\frac{1}{8}$ inch gypsum board, said board has a sag resistance, as determined according to ASTM C473-95, of less than about 0.1 inch per two foot length of said board, --.

Claim 13, line 5, after "gypsum" insert --,-- (comma).

Claim 43, line 5, after "applying to", delete "a", and insert therefor, --the--.

Claim 54, line 12, after "mixture", insert the following:

--, such that when the mixture is cast in the form of $\frac{1}{8}$ inch gypsum board, said board has a sag resistance, as determined according to ASTM C473-95, of less than about 0.1 inch per two foot length of said board --.

Claim 56, line 12, after "mixture", insert the following:

--, such that when the mixture is cast in the form of $\frac{1}{8}$ inch gypsum board, said board has a sag resistance, as determined according to ASTM C473-95, of less than about 0.1 inch per two foot length of said board --.

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The following is an examiner's statement of reasons for allowance: The prior art of record does not teach or render obvious a gypsum board comprising a core of material sandwiched between cover sheets, wherein the core comprises an interlocking matrix of set gypsum, and the board has been prepared by a method comprising: forming or depositing a mixture between the cover sheets, wherein the mixture comprises a calcined gypsum, water, an accelerator, and one or more enhancing materials chosen from the group consisting of: condensed phosphoric acids, each of which comprise two or more phosphoric acid units; and salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units, and maintaining the mixture under conditions sufficient for the calcined gypsum to form the interlocking matrix of set gypsum, the enhancing material or materials having been included in the mixture in an amount such that the gypsum board has greater sag resistance than it would have if the enhancing material had not been included in the mixture, said board having a sag resistance as determined according to ASTM C473-95 of less than about 0.1 inch per two foot length of said board, the accelerator having been included in an amount such that the gypsum board has greater strength than it would have if the accelerator had not been included in the mixture.

Applicant's terminal disclaimer is proper and overcomes the double patenting rejection.

The prior art of record does not specifically address the addition of the enhancing materials to a gypsum board mixture, where the enhancing material is selected from condensed phosphoric acids, salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units, and where the addition of the enhancing material is in an amount such that the board formed from such a mixture has a specific sag resistance.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."



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Art Unit: 1775

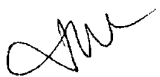
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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer McNeil whose telephone number is 703-305-0553. The examiner can normally be reached on Monday through Friday, 9:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 703-308-3822. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



JCM
April 25, 2003

Jennifer McNeil
Examiner
Art Unit 1775



DEBORAH JONES
SUPERVISORY PATENT EXAMINER

B