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EX P/IRIE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. 90/011.628.

PATENT NO. SARGENTETAL. ART UNIT 3991.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Office Action in Ex Parte Reexamination

Control No.
90/011,628

Patent Under Reexamination
SARGENT ET AL

Examiner
EVELYN HUANG

Art Unit
3991

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

Responsive to the communication(s) filed on 21 May 2012.

This action is made FINAL.

A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire 1 month(s) from the mailing date of this letter.

Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).

If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENTS) ARE PART OF THIS ACTION:

1. E3 Notice of References Cited by Examiner, PTO-892.
2. £3 Information Disclosure Statement, PTO/SB/08.
3. [Interview Summary, PTO-474.
4. Q _____.

Part IISUMMARY OF ACTION

1a. ~~E~~X] Claims 1-5 are subject to reexamination.

1b. C] Claims _____ are not subject to reexamination.

2. Q Claims _____ have been canceled in the present reexamination proceeding.

3. Q Claims _____ are patentable and/or confirmed.

4. ~~0~~3 Claims 1-5 are rejected.

5. Q Claims _____ are objected to.

6. ~~F~~~] The drawings, filed on _____ are acceptable.

7. n The proposed drawing correction, filed on _____ has been (7a)C] approved (7b)Q disapproved.

8. n Acknowledgment is jnade of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).

a)DAII b)D Some* c)D None of the certified copies have 10

been received. 2CU not been received.

3D been filed in Application No. _____ .

4[~) been filed in reexamination Control No. _____ .

5I~~) been received by the International Bureau in PCT application No. _____ .

* See the attached detailed Office action for a list of the certified copies not received.

9. Q Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11.453O.G. 213.

10. D Other: _____

cc: Requester (if third party requester)

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Reexamination

This is a ***Final Office Action*** in the reexamination proceeding of claims 1 -5 of United States Patent Number 5,672,279 to Sargent issued on 9/30/1997.

Procedural Posture

The request by the Third Party Requester for *ex parte* reexamination was filed on 5/9/2011.

The decision granting the request was mailed on 6/29/2011.

On 8/29/2011, Patent Owner filed the waiver of Patent Owner Statement.

The first non-final office action was mailed on 12/1/2011.

On 2/1/2012, Patent Owner filed the response with the Declaration of Dr. Laren Tolbert (Tolbert Decl.), the Declaration of Mick Williams (Williams Decl.) and the Declaration of Roger Dexter (Dexter Decl.).

A second non-final office action was mailed on 3/21/2012.

On 5/21/2012, Patent Owner filed the. response with the Second Declaration of Dr. Laren Tolbert (2nd Tolbert Decl.), the Second Declaration of Mick Williams (2nd Williams Decl.) and the Second Declaration of Roger Dexter (2nd Dexter Decl.). These declarations have been considered by the examiner and will be further addressed below.

US 5,672,279 is currently the subject of litigation in United States District Court for the Middle District of Florida. Case No. 6:09-CV-00395-ORL-28DAB. The Court has ordered that . the case be stayed pending a final decision of the USPTO of the Reexamination and Appeal. Accordingly, ***the time of response is set for the period of one month*** instead of the usual two months from the date of mailing of this Office Action.

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References Cited by the Third Party Requester

<i>Johnson</i>	US 2250379 (1941-07-22)
<i>Cardwell</i>	US 2485529 (1949-10-18)
<i>Richardson</i>	US 3920566 (1975-11-18)
<i>Gulla</i>	US 3936316 (1976-02-03)
<i>Snyder</i>	US 4372870 (1983-02-08)
<i>Dill</i>	US 4466893 (1984-08-21)
<i>Gallup</i>	US 4537684 (1985-08-27)
<i>Young</i>	US 4673522 (1987-06-16)
<i>Feeney</i>	US 4699663 (1987-10-13)
<i>Sargent I</i>	US 5234466 (1993-08-10)
<i>Ludwig</i>	US 5492629 (1996-02-20)
<i>Erzsebet</i>	HU37811 (1988-04-28)

Claims in US 5,672,279

There are 5 claims in the issued patent. Claim 1 is the only independent claim.

Claim 1. A method to solubilize calcium carbonate in aqueous suspensions or dispersions of calcium carbonate that includes adding to the suspensions or dispersions a sufficient amount of urea hydrochloride to convert the calcium carbonate to a water soluble salt, wherein a molar ratio of urea to hydrochloric acid approximately between 1:4 and 4:1 is used to form urea hydrochloride.

Priority

The 08/233,348 application that was issued as the patent under reexamination was filed on 4/25/1994, which is a

CIP of 08/090,797, filed 7/12/1993, abandoned, which is a

DIV of 07/919,523, filed 7/24/1992, issued as US 5,234,466.

The instantly claimed method to solubilize calcium carbonate in aqueous suspension or dispersions of calcium carbonate with urea hydrochloride is not fully described in 08/090,797 or 07/919,523. As such, the instant effective filing date is 4/25/1994.

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Claim Interpretation

During reexamination, claims are given the broadest reasonable interpretation consistent with the specification and limitations in the specification are not read into the claims. *In re Yamamoto*, 740 F.2d 1569, 222 USPQ 934 (Fed. Cir. 1984).

The specification (col. 2, lines 3-11) recites that:

"It has been discovered that urea hydrochloride is an inexpensive and useful agent for the removal of the build-up of water-insoluble metal salts on surfaces, and the dissolution of water insoluble metal salt dispersions or suspensions....Urea hydrochloride is especially useful in the removal or dissolution of calcium carbonate".

As such, "solubilize calcium carbonate in aqueous suspensions or dispersions of calcium carbonate" as recited in claim 1 is directed to dissolving (solubilizing) calcium carbonate in the aqueous suspension or (aqueous) dispersions, thereby preventing the deposition of insoluble calcium carbonate on the surfaces, as opposed to removal of the deposited calcium carbonate on surfaces.

Response to Arguments

Patent Owner (pages 4-7) submits that the above claim interpretation is incorrect and reiterates its own interpretation that "insoluble particles of calcium carbonate distributed in water or calcium carbonate in a system of two or more distinct phases consisting of finely divided particles dispersed through a bulk substance. Citing 2nd Tolbert Decl. (¶ 5-7), Patent Owner argues that a "dispersion" has the well-known meaning of a system consisting of a disperse phase in a dispersion medium of solid, liquid, or gas, thereby including deposit on surfaces, which is consistent with the disclosure of the specification.

Patent Owner's interpretation relies solely on the extrinsic evidence such as dictionary definitions. It is not supported by the intrinsic evidence presented in the specification and during the prosecution history. There is no dispute that "dispersion" includes dispersion in medium of solid, liquid or gas, as discussed in the Tolbert Decl. However, in view of the disclosure of the specification and the prosecution history, it is clear that the "dispersions" of "aqueous suspensions or dispersions of calcium carbonate" recited in the claims refers to "aqueous

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suspension or aqueous dispersions" and thus does not include solid dispersions as asserted by the Patent Owner.

Patent Owner's claim interpretation is inconsistent with the specification

The phrase "aqueous suspensions or dispersions of calcium carbonate" recited in the claims is understood by one of ordinary skill in the art to mean aqueous suspensions of calcium carbonate or aqueous dispersions of calcium carbonate. This is because regarding "dispersion of calcium carbonate", the specification specifically recites: "A disadvantage of using calcium carbonate is that it is only slightly soluble in water, and thus tends to build up as a deposit on surfaces, or form a dispersion in water-based liquids" (1: 24-27). As such, the dispersion of calcium carbonate is in water-based liquids, as opposed to deposit of calcium carbonate on surfaces.

Further, the Abstract, which is cited by Patent Owner as support for its claim interpretation, in fact recites using urea hydrochloride in at least two distinct methods : (1) "a method to remove the build-up of water-insoluble salts on surfaces", and (2) "a method to lower the solids content of industrial liquids that contain water-insoluble metal salts". Similarly, the specification discloses at least two different methods of using urea hydrochloride: (1) removal of water-insoluble salts on surfaces, and (2) dissolution of water-insoluble salt dispersion or suspensions, which would prevent deposition of calcium carbonate on surfaces (col. 2, lines 3-11). As such, the specification makes clear that calcium carbonate deposit on surfaces is distinct from the aqueous dispersion or suspension of calcium carbonate. The solid dispersion as deposit on surfaces asserted by the Patent Owner thus corresponds to the water-insoluble salts on surfaces of method (1). This is in contrast to the liquids that contain water-insoluble metal salts, or the water-insoluble salt dispersion or suspension of method (2).

The specification describes four specific embodiments (col. 1, lines 56-67) falling within the above two methods. Example 3, directed to the use of urea hydrochloride to clean masonry, corresponds to the fourth embodiment of providing a method for the removal of water-insoluble salt residue from masonry (col. 1, lines 65-67). Example 4, directed to the use of urea hydrochloride to clean boiler scale, corresponds to the first embodiment of providing a method to

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remove the build-up of water insoluble metal salts on surfaces (col. 1, lines 56-58). These two embodiments are in turn encompassed by the removal of water-insoluble salts on surfaces of method (1). In fact, there are no examples for the second and third embodiments (col. 1, lines 59-64) falling within the dissolution of water-insoluble salt dispersion or suspensions of method (2). More specifically, there are no specific examples in the specification for a method to lower the solids content of industrial liquids that contain water-insoluble metal salts (second embodiment), and for a method for the treatment of effluent from paper manufacturing and recycling processes (third embodiment).

As such, while both method (1) and method (2) are described in the specification, the claims as recited are directed only to method (2), the dissolution of the aqueous suspensions or dispersion of calcium carbonate to prevent its deposit on the surface, and do not encompass the removal of deposit on the surfaces of method (1). This is consistent with the prosecution history, as further addressed below.

In response, Patent Owner (page 8), citing the Chicago Manual of Style, argues that "or" in the above cited "tends to build up as a deposit on surfaces, or form a dispersion in water-based liquids" is used in the sense of "in other words" because it is separated by a comma.

Patent Owner unpersuasively argues that "or" means "in other words", thus "to build up a deposit on surfaces" is equivalent to "form a dispersion in water-based liquids". To one of ordinary skill in the art, "building up the solid deposit on a surface" is distinct from "forming a dispersion in water-based liquids". This is especially so when the sentence following the above citation reads: "These residues and dispersions can be a nuisance, or, more importantly, can adversely affect industrial processes or equipment" (1: 27-29). Clearly, the "residues" refers to the solid "deposit on surfaces", such as the water-insoluble salt residue on masonry (1:65-67; Example 3) and "dispersions" refers to "dispersion in water based liquids" in the preceding sentence. As such, contrary to Patent Owner's assertion, building "a deposit on surfaces" is distinct from forming "a dispersion in water-based liquids", as they are in reference to different embodiments and methods disclosed in the specification, as discussed above.

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Patent Owner (pages 8-9) argues that the quoted "or form a dispersion in water-based liquids" is one of the few places in the specification where "dispersion" is used without "suspension", where elsewhere "suspension or dispersion" is used without any limiting language. The above quoted language does not describe the dispersion as "aqueous" and the specification does not require "dispersions" to be aqueous.

The specification explains that "CaCO₃ used in paper manufacture and recycling enters the effluent of the plant as a suspended solid that raises the pH of the water and causes the water to appear chalky..... hydrochloride is added to the water to dissolve the calcium carbonate, removing the dispersion..." (1:29-36). Here, suspension and dispersion are used interchangeably as the calcium carbonate is suspended or dispersed in water. The specification further recites "dissolution of or to "dissolve" water-insoluble metal salt "dispersions or suspensions", in contrast to "removal" or to "remove" the build-up of water-insoluble metal salts on the surfaces (2:1-6; 21-25). As such, one of ordinary skill in the art would have considered "aqueous suspension or dispersion" to mean "aqueous suspension or aqueous dispersion".

In fact, "aqueous" in "aqueous suspension or dispersion" as recited in the instant claims first appeared in the amended claims during the prosecution of the application that became the issued patent. Indeed, it is not specifically recited in the specification, the Abstract or the original claims. The claims were amended to overcome the 112 (2) rejection and art rejections, as further discussed below.

Patent Owner's claim interpretation is inconsistent with the prosecution history.

During the prosecution of the application that became the instant '279 patent, the phrase "remove undesirable solids comprising water-insoluble metal salt" in the original claims has been replaced by the instant "solubilize calcium carbonate in aqueous suspensions or dispersions of calcium carbonate" to distinguish over the prior art, Young. The response filed on 10/13/1995 at pages 7-9 argued that:

"Young does not disclose or suggest using the compositions to remove solids from suspensions or dispersions of water-insoluble salts. As amended, claims 14-23 require that the salt to be dissolved is in an aqueous suspension or dispersion.

There are several problems associated with precipitated salts. When they are lodged in conduits, they can stop the flow of liquids through the conduit. This problem was

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addressed by Young. However, dispersions and suspensions of these salts cause different problems, as discussed in the specification on page 2, lines 1-15. For example, if the effluent of the plant contains dispersions or suspensions of calcium carbonate, it cannot be disposed of in publicly owned treatment facilities because of its solids content and pH.

The invention as now claimed provides a method to lower the solids content of industrial liquids that contain calcium carbonate, and to treat the effluent from paper manufacturing and recycling processes. These problems, or the solutions for these problems, are not addressed or even suggested by Young. Accordingly, the rejection under Section 102(b) should be withdrawn.

Indeed, claimed invention represents a significant improvement over Young. Young presumes the presence of solids that have obstructed a conduit. The claimed method is a preventive measure that removes calcium carbonate in dispersions or suspensions before they could even obstruct a conduit...."

Clearly, to distinguish from the prior art, the "solid dispersion of calcium carbonate as deposit on surfaces" as presently asserted by the Patent Owner has been excluded from the "aqueous suspension or dispersion of calcium carbonate" recited in the claims under reexamination.

In response to the above examiner's comments, Patent Owner (pages 10-13) submits that the claims were amended in response to 112 second paragraph rejection. The arguments distinguishing the Young reference did not exclude any subject matter from the customary meaning of "dispersion", especially when Young only taught removing obstructions in conduit using urea-sulfuric acid and could not have anticipated the instant claims.

The original claim 1 recites: "A method to remove undesirable solids comprising water-insoluble metal salt that includes treating the solids with a sufficient amount of urea hydrochloride to convert the water insoluble salt to a water soluble salt."

In response to the 112 (2) rejection that it is unclear "what solids are removed from and what type of treating step is used to remove them", the claims were amended to limit the "undesirable solids" to "calcium carbonate", "the method of removing them" to "adding urea hydrochloride", and the solids are removed from "aqueous suspensions or dispersions of the calcium salts" (10/13/1995 response to office action, page 5). The response then discussed how the anticipation over Young was overcome by this amendment, as discussed above.

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Patent Owner argues that Young only describes urea-sulfuric acid and thus does not anticipate the instant claims drawn to urea-HCl. This argument is irrelevant to the present issue of claim interpretation, and cannot negate the statements in the 10/13/95 response regarding the meaning of the amended claims requiring that "the salt to be dissolved is in an aqueous suspension or dispersion". Notably, the response stated that "The invention as now claimed provides a method to lower the solids content of industrial liquids that contain calcium carbonate, and to treat the effluent from paper manufacturing and recycling processes." These are the second and third embodiments described in col. 1, lines 59-64, which are encompassed by method (2). Further, the statement "The claimed method is a preventive measure that removes calcium carbonate in dispersions or suspensions before they could even obstruct a conduit" clearly indicates that the claims are directed only to dissolving the calcium carbonate aqueous suspensions or dispersions of method (2) and does not include the removal of calcium carbonate deposit on the surfaces of method (1).

That the amended claims are directed only to method (2) and exclude method (1) is further made clear by the cancellation of original dependent claims 4-7 that respectively recite that the undesirable solids of claim 1 are on surfaces exposed to hard water, on masonry or cement, in boiler scale and on a pool surface. In the 1/19/1996 final office action (page 2), the Examiner rejected claims 4-7 under 112 (4) as being in improper dependent form for failing to further limit the subject matter of the amended claim 1 "drawn to aqueous suspensions and dispersions of calcium carbonate which do not appear to be on the surfaces...". In the 6/5/1996 response (page 4), claims 4-7 were cancelled by the Patent Owner without further comments other than to "partially moot the Examiner's rejection". As such, throughout prosecution of the application that became the issued patent, the "aqueous suspensions or dispersions of calcium carbonate" were interpreted by both the Examiner and the Patent Owner to be exclusive of solid deposit of calcium carbonate on surfaces.

Accordingly, the disclosure of the specification and the prosecution history has made clear that "dispersions of calcium carbonate" in "aqueous suspensions or dispersions of calcium carbonate" refer only to aqueous dispersions of calcium carbonate. As such, the claimed method

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is directed to solubilizing calcium carbonate in aqueous suspensions or (aqueous) dispersions of calcium carbonate, and do not encompass the method to remove deposit of calcium carbonate on surfaces as presently asserted by the Patent Owner.

Claim Rejection - 35 USC § 103

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.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Patentee's admission of prior art (1:15-39) and Dill.

Claim 1. A method to solubilize calcium carbonate in aqueous suspensions or dispersions of calcium carbonate that includes adding the suspensions or dispersions a sufficient amount of urea hydrochloride to convert the calcium carbonate to a water soluble salt, wherein a molar ratio of urea to hydrochloric acid approximately between 1:4 and 4:1 is used to form urea hydrochloride.

At the time of the invention, the typical process for removing suspended calcium carbonate in the aqueous effluent of paper manufacturing process was adding HCl to the water to dissolve the calcium carbonate dispersed therein; it was also well-known that HCl was a gas that could corrode equipment and was noxious to humans, as admitted by the Patentee in the specification (col. 1, lines 15-39).

The instant claims use urea-HCl instead of the conventional HCl to solubilize calcium carbonate in aqueous suspension or dispersions of calcium carbonate.

However, the advantageous use of urea-HCl over HCl to dissolve calcium carbonate was known at the time of the invention. Particularly, Dill teaches that urea - HCl has excellent

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limestone (calcium carbonate) dissolving efficiency (col. 4, lines 39-67, Example II), and with reduced release of corrosive fumes of HCl (col. 6, line 66 to col. 7, line 15, Example VII). The ratio of HCl to urea in the urea-HCl used ranges about 5:1 to about 1:5, which encompasses the ratio of 2:1 recited in claim 3. The most preferred ratio is 1:1 (col. 2, lines 12-16; col. 7, claim 4), which is the same ratio recited in instant claim 4, and is within the ratio of 1:4 to 4:1 as recited in claim 1.

Accordingly, it would have been obvious for one of ordinary skill in the art to use urea-HCl instead of the customary HCl to dissolve the calcium carbonate in aqueous suspension or dispersions, and to arrive at the invention of instant claims 1,3 and 4. There would have been a reasonable expectation of success in dissolving the calcium carbonate in the aqueous suspension or dispersion without the undesirable fumes and corrosion resulting from the use of HCl alone. This is especially so in view of the known advantages of urea-HCl described by Dill (col. 6, line 66 to col. 7, line 15, Example VII).

Claims 2 and 5, dependent from claim 1, further recite that the calcium carbonate is in paper manufacturing process water and in paper recycling process water respectively.

As admitted by the Patentee in the specification (col. 1, lines 15-39), at the time of the invention, calcium carbonate was often used or produced in industrial processes, such as in paper production and recycling. Because of the very slight solubility of calcium carbonate in water, dispersions of calcium carbonate are formed in water-based liquids.

Response to Arguments

Patent Owner (response, pages 16-19) argues that Dill, concerned only with extending the viscous stability of a composition used in treating subterranean formations (Abstract), is non-analogous art. It is not directed to the claimed method of dissolving calcium carbonate for reasons detailed below.

On the contrary, the instant claims are directed to the use of urea-HCl to solubilize calcium carbonate. Dill is also directed to dissolving calcium carbonate (limestone) with urea-

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HC1. Dill is thus analogous art and is highly relevant to the instant claims. The arguments of Patent Owner are unpersuasive as detailed below.

a. Patent Owner (pages 16-17) submits that Dill never discloses the identity of any of the materials of the subterranean formation and does not claim dissolution of subterranean material (2nd Tolbert Decl.

On the contrary, Dill (3: 28-34) specifically recites that "the acid is introduced into the subterranean formation whereby the calcareous rock in the formation is dissolved thereby increasing the permeability, and permitting better flow of fluids through the formation." According to Webster's II New Riverside University Dictionary, "calcareous" means "made up of, having or typical of calcium carbonate, calcium or limestone". Dill further examines the "limestone dissolving efficiency" of the urea-HCl composition (Example II). To one of ordinary skill in the art, limestone is an alternative term for calcium carbonate, which is consistent with the disclosure of the instant specification (1:20-24) that calcium carbonate "is alternatively referred to as chalk, calcite, marble, limestone and whiting".

b. Patent Owner (response, pages 17-18) argues that in addition to HCl, Dill teaches the use of other acids such as hydrofluoric acid, formic acid and acetic acid, which are inadequate in solubilizing calcium carbonate (1st Tolbert Decl. 3, 20; Table 1; 2nd Tolbert Decl. 12).

Dill (1:48-64) includes urea in the acidizing composition to address both the problem of thickening agents instability and the problem of corrosive fumes associated therewith. That the alternative acids may not be as effective as HCl in dissolving limestone does not negate Dill's clear teaching that urea-HCl has an excellent limestone dissolving efficiency (4:66-68). An alternative embodiment is not teaching away. *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141 (Fed. Cir. 2004).

c. Patent Owner (response, page 18) contends that Dill (2:6-11) teaches that if HCl is used, a precipitate will form when it reacts with limestone, indicating that there is no dissolution of calcium carbonate (2nd Tolbert Decl.

The cited passage of Dill (2:6-11) states:

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"If hydrochloric acid is the acid composition used to carry out the invention, a hydrochloric acid strength of greater than 35 percent by weight of acid has been found not to be particularly desirable as a precipitate will form when the hydrochloric acid-urea composition reacts with limestone."

As such, when hydrochloric acid strength is less than 35 percent by weight, there would be no formation of precipitate. Dill only uses urea-HCl having hydrochloric acid strength less than 35%. Excellent limestone (calcium carbonate) dissolving efficiency is shown at 15% and 23.6% acid strength (Dill, Example II). The use of hydrochloric acid strength of greater than 35% by weight where precipitate forms is outside the scope of Dill's invention.

d. Patent Owner (response, pages 18-19) argues that Dill's Example II is a bench top experiment performed at extreme temperature using a particular crystalline form of calcium carbonate and thus fails to suggest the claimed method of solubilizing calcium carbonate in aqueous suspensions or dispersions (2nd Tolbert Decl. \13)

The claims as recited do not specify the form of calcium carbonate or the conditions, such as temperature and pressure under which the process is to be performed. As such, the claimed method encompasses any form of calcium carbonate, any temperature and pressure, including Dill's temperatures and pressure described in Example II. As further discussed below, the dissolution of the limestone is the result of the well-known reaction of urea-HCl with the water-insoluble calcium carbonate to form the water-soluble calcium chloride. While the rates may be different, the same reaction occurs for any form of calcium carbonate, including the crystalline calcium carbonate, at the temperatures and pressure described in Example II as well as at room temperature and atmospheric pressure (Example VII). Indeed, the rates of the reaction can be observed visually (7: 9-16). One of ordinary skill in the art understands that the chemical reaction of urea-HCl with calcium carbonate leading to the solubilization of calcium carbonate is the same regardless of whether the calcium carbonate is in an aqueous suspension/dispersion in industrial streams or as a solid limestone of subterranean formation.

Patent Owner (response, pages 19-23) argues that claims 1-5 are not obvious over Dill in combination with Admitted prior art, as Dill does not expressly teach conversion of

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calcium carbonate (in any form) to a water-soluble salt. That claim limitation also is not necessarily inherent in the method of Dill (2nd Tolbert Decl.

To one of ordinary skill in the art, it is general knowledge that calcium carbonate dissolves in acid, such as HCl, with evolution of carbon dioxide. Calcium carbonate (limestone), which is water-insoluble, reacts with HCl to form calcium chloride, which is water-soluble (Condensed Chemical Dictionary, 7th Edition, 1966, pages 162 and 163). This is evident in the well-known, typical use of HCl to dissolve the calcium carbonate dispersed or suspended in effluent of paper manufacture, as admitted by the Patentee in the specification (1:29-36). The acidity of HCl is maintained in urea-HCl (Dill, Example I). The use of urea-HCl instead of HCl thus would also result in the dissolution of calcium carbonate (limestone) by converting the water-insoluble calcium carbonate to the water-soluble calcium chloride. The rate of the reaction is slower with urea-HCl than HCl alone, so is the evolution of corrosive fumes (Dill, Example VII). Therefore, although Dill only describes dissolving limestone without specifying the conversion of calcium carbonate to a water-soluble salt as recited in the instant claims, the addition of a solution of urea-HCl to calcium carbonate (limestone) would predictably produce calcium chloride, which is a water-soluble salt.

At the time of the invention, the use of HCl to dissolve calcium carbonate in aqueous suspensions or dispersions was well known in the art. The advantages of using urea-HCl over HCl alone in dissolving calcium carbonate was also known, as specifically described by Dill. As such, one of ordinary skill in the art would be motivated to use urea-HCl instead of the customary HCl to dissolve calcium carbonate in aqueous suspensions or dispersions.

Patent Owner (response, page 23) asserts that Dill never discloses the amount of urea-HCl used to convert calcium carbonate to a water soluble salt. In fact, Dill teaches compositions that contain little or no water, the conversion to a water-soluble salt is thus irrelevant to Dill.

On the contrary, Dill teaches the urea to acid ratio of about 5: 1 to 1 :5, which encompasses the claimed range of 1 :4 to 4:1 . The most preferred molar weight ratio is 1 :1 In Examples I and II, the urea-HCl solution is prepared from 35% HCl, which is an aqueous solution. In Example VII, a chip of the Iceland Spar is placed in 100 ml solution containing 44.2

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ml 31.45 % HCl and 29.88 gram urea-HCl composition. While Dill does not specify water, it is understood by one of ordinary skill in the art that water customarily makes up the remainder of the urea-HCl solution. In this example, the rate of the reaction between urea-HCl and calcium carbonate (Iceland Spar chip) leading to the conversion to water-soluble salt (calcium chloride) can be observed visually. Dill specifically describes dissolving limestone (calcium carbonate) with urea-HCl, indicating that the amount of urea-HCl used must be sufficient to convert the calcium carbonate to its water-soluble calcium chloride. Even so, the claims or the specification do not describe the amount of urea-HCl to be used in the method. Patent Owner's argument therefore does not commensurate with the scope of the claims.

Secondary Considerations

Commercial Success

a. Patent Owner's sales data is insufficient to show commercial success

Patent Owner (Response, pages 30-31) submits that commercial success is evidenced by the sales data that over 64,000,000 pounds of urea-HCl products sold from 1997 to present (1st Williams Decl. ^ 16; Exs. 5-6). Patent Owner admits that the chemical composition urea -HCl is not patented and is easily made by combining the commodity chemicals urea and HCl (2nd Williams Decl. ^ 8; 2nd Tolbert Decl. ^14). The average incremental profit is \$2.13 per gallon, or nearly 150 percent (2nd Williams Decl. ^ 9; Exhibit D, Trial Ex. 273). This profit is representative of the higher value that Patent Owner's method of use introduced to the urea -HCl market (2nd Williams Decl. ^ 8; Trial Testimony of R. Richard Sargent, Ex. E). Patent Owner's more expensive urea-HCl products replace the much cheaper HCl for solubilizing suspensions and dispersions of calcium carbonate (Exhibit D, Trial Ex. 273). This, together with Patent Owner's demonstrated ability to sell its urea-HCl products for use in the patented method at a price higher than market prices than urea-HCl sold for other uses are evidence of commercial success.

Patent Owner has sold a total of 64,000,000 pounds of urea-HCl from 1997 to present. There is an incremental profit of \$ 2.13 per gallon, or 150 percent. The incremental profit is the difference between the cost price of the raw materials (urea and HCl) from the sale price of the product (urea-HCl). As such, the incremental profit as presented by the Patent Owner is not very meaningful, and provides little evidence of commercial success. This is especially so as Patent Owner admits that the urea-HCl composition used in the claimed method is not patented

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and is not proprietary to any entity. While it may be easily prepared by a chemist from the common and rather inexpensive urea and HCl as argued by the Patent Owner, an average consumer who has little or no chemical background cannot or may not be willing to do so, and would rather pay a much higher price for the ready-made urea-HCl.

Patent Owner asserts that its urea-HCl products for use in the patented method are sold at a market price higher than urea-HCl sold for other uses (2nd Williams Decl. ^[8). However, this statement is not supported by objective evidence. Particularly, Patent Owner only describes the separate prices of urea and HCl and the prices of Patent Owner's urea-HCl (2nd Williams Decl. ^ 9; Exhibit D, Trial Ex. 273). The "urea-HCl sold for other uses" and its market prices have not been described.

That the more expensive urea-HCl replaces the cheaper HCl for solubilizing calcium carbonate by itself is no evidence of commercial success. To one of ordinary skill in the art, it is obvious that urea-HCl, which is made from urea and HCl, would be more expensive than HCl.

As such, Patent Owner's data provides little evidence of commercial success.

b. No Nexus of commercial success and the claimed invention

Even if the 64,000,000 pounds of urea-HCl sold with an incremental profit of 150% were evidence of commercial success, there was no showing of any nexus between the claimed invention and evidence of commercial success. *In re Huang*, 100 F.3d 135, 40 USPQ2d 1685 (Fed. Cir. 1996). Particularly, the claims are directed to a method of solubilizing calcium carbonate in aqueous suspensions or dispersions by adding urea-HCl to suspensions or dispersions of calcium carbonate. However, there are many uses of urea-HCl besides the claimed method, such as removing calcium carbonate deposit on surfaces, adjusting the pH of textile treatment baths, acidizing (activation) of petroleum wells, boiler scale removal, food processing, pickling and metal cleaning, starting material for organic synthesis etc. (instant specification, col. 3, lines 9-39). As such, it is unclear what portion of the 64,000,000 pounds of urea-HCl sold is attributed to the claimed method.

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Patent Owner submits that the urea-HCl products (Novoc A-CL) having the claimed features are marketed by demonstrating the ability of urea-HCl to solubilize calcium carbonate in suspension or dispersions (1st Williams Decl. 1ffl 12-13). However, the cited Williams Decl. only describes dropping the Novoc A-CL onto a piece of concrete or placing a piece of concrete in the bowl to initiate the reaction of urea-HCl with calcium carbonate in the concrete. Clearly, the concrete is not an aqueous suspension or dispersion of calcium carbonate as recited in the claims.

The 1st Dexter Decl. only describes rapid growth with the urea-HCl products for solubilizing calcium carbonate scale that formed on equipment (^ 4, 8, 12). Within two years, the sales topped 1 million pounds (^7). The Dexter Decl. also does not mention using the urea-HCl products for solubilizing calcium carbonate in aqueous suspensions or dispersions as recited in the instant claims.

In response to the above examiner's comments, Patent Owner (Response, pages 32-35) submits that a nexus between the commercial success and the claimed invention has been established. Patent Owner 's demonstration of putting concrete into a solution of urea-HCl allows the carbon dioxide to effervesce, dislodge and suspend small pieces of calcium carbonate in the liquid water (2nd Williams Decl. 1H15-6). Thus, it shows urea-HCl solubilizes calcium carbonate in a solid dispersion and in aqueous suspensions. The same applies to the use of the urea-HCl products sold by Crews Chemical to solubilize calcium carbonate scales (2nd Dexter Decl.

As discussed above, the addition of urea-HCl solution to concrete (1st and 2nd Williams Decl.) or scales (1st and 2nd Dexter Decl.) is clearly outside the scope of the instant claims. Patent Owner, however, argues that they are within the scope of the instant claims, citing the 2nd Tolbert Decl. (1J10), 2nd Williams Decl. (*i5-7), the Dexter Decl. (^4), and the testimony of Dr. Kimberly Kurtis (Ex. C). More specifically, Patent Owner submits that when urea-HCl solution (Novoc) is added to a piece of concrete or calcium carbonate scales, the carbon dioxide released from the initial reaction of urea-HCl with calcium carbonate in the concrete or scales causes small pieces of concrete or scales to break off to form a suspension in the aqueous solution of urea-HCl. The calcium carbonate in the aqueous suspension continues to react with urea-HCl (2nd Williams Decl. ^6; 2nd Dexter Decl. ^4). Urea-HCl thus reacts with calcium carbonate in solid suspension as well as in aqueous suspensions, even according to the narrow claim

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interpretation of the examiner. This argument of the Patent Owner is unpersuasive. First, this concept is not described in the specification. Second, having the broken-off pieces of concrete or scales forming a suspension in the urea-HCl solution is different from the claimed method step of adding urea-HCl to the aqueous suspensions or dispersions of calcium carbonate. In other words, the step in the claimed method requires the act of adding urea-HCl to an aqueous suspension or dispersion of calcium carbonate that is already there, and is thus distinct from forming a suspension or dispersions of small pieces of calcium carbonate-containing concrete or scales in the urea-HCl solution; although these two steps may be obvious variation of one another and both lead to solubilization of calcium carbonate in the suspension. A method claim is defined by the step recited in the body of the claim, and not by the outcome of the method step(s). Clearly, the use of urea-HCl on concrete or scales does not include the step of adding urea-HCl to the aqueous suspensions or dispersion of calcium carbonate as recited in the instant claims, especially when there is no written description of such in the specification. As such, Patent Owner's showing is outside the scope of the instant claims.

Notably, Dill adds the urea-HCl to a chip of limestone (Example VII) instead of Patent Owner's concrete or scales. According to Patent Owner's present arguments, the carbon dioxide released from the initial reaction of urea-HCl with calcium carbonate (limestone) would cause smaller pieces of the limestone to break off, thereby forming a suspension in the aqueous solution of urea-HCl. The calcium carbonate in the aqueous suspension then continues to react with urea-HCl. Dill's use of urea-HCl to dissolve limestone would also be within the scope of the instant claims and thus anticipatory to the instant claims.

Patent Owner argues that its urea-HCl products have been sold through distributors servicing the Household, Industrial, and Institutional (HI&I) market, the paper industry, the concrete industry, and the marine market and sell products containing urea-HCl for removing calcium carbonate suspensions and dispersions in the form of deposits on household and industrial surfaces, from paper process streams and equipment, in the form of wet or dry concrete, and in the form of scale (2TM Williams Decl. *⁹⁻¹⁰). It is highly likely that all the 64,000,000 pounds of urea-HCl can be attributed to the claimed method.*

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Here, Patent Owner continues the argument that the use of urea-HCl to remove calcium carbonate deposit on surfaces is within the scope of the instant claims that the sales of 64,000,000 pounds of urea-HCl can be attributed to the claimed method. However, as discussed supra, the instant claims do not encompass the method of using urea-HCl to remove calcium carbonate deposit on surfaces, such as on surfaces exposed to hard water, on masonry or cement, in boiler scale and on a pool surface, as described in the original claims 4-7 that have been cancelled during the prosecution of the patent. The use of urea-HCl to dissolve aqueous suspension or dispersions of calcium carbonate from paper process streams falls within the scope of the claims, but it is only one use among the many listed by Mr. Williams (2nd Williams Decl. f9). As such, it is likely that most of the 64,000,000 pounds urea-HCl cannot be attributed to the claimed invention.

Accordingly, the showing of commercial success is not commensurate in scope with the claimed invention, and there is no nexus between the claimed invention and the evidence, if any, of commercial success.

Copying by Others

Patent Owner (Response, page 35) submits that its urea-HCl products have been copied by others in the industry (1st Williams Decl. \ 14-15; Exs 3-4).

However, more than the mere fact of copying is necessary to make that action significant because copying may be attributable to other factors, such as lack of concern for patent property or contempt for the patentee's ability to enforce the patent. *Cable Electric Products, Inc. v. Genmark, Inc.*, 770 F2d. 1015 (Fed. Cir. 1985). The Court has also noted "that a showing of copying is only equivocal evidence of non-obviousness in the absence of more compelling objective indicia of other secondary considerations." *Echolochem Inc. v. Southern California Edison Co.* 227 F3d 1361 (Fed. Cir. 2000); *Geo. M. Martin Co. v. Alliance Machine Systems International LLC*, 618 F3d 1294 (Fed. Cir. 2010). In the instant case, as discussed above and further below, there are no compelling objective indicia of other secondary considerations.

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Unexpected Results

Patent Owner (Response, pages. 36-37) argues that while there may be many bases, particular urea, that will reduce the fuming of HCl, the unexpected result was the ability of urea to reduce fuming of HCl while maintaining its ability to solubilize calcium carbonate, which was not known in the art (2nd Tolbert Decl. ^15; Ex. 4).

Without presenting any objective evidence, Dr. Tolbert (^15) merely states that he has read the Moss Declaration (Ex. 4), has also "experienced that urea hydrochloride has unique non-fuming properties", and agrees that "the unique aspect of the combination of concentrated hydrochloric acid rests in the absence of fuming combined with the ability to dissolve calcium carbonate". The Moss Declaration, submitted during the prosecution of the patent, addressed prior art different from that of the present proceeding. Further, the showing of Mr. Moss on the fuming effect of urea-HCl or HCl on a piece of moistened pH paper is outside the scope of the instant claims, which are directed to the use of urea-HCl to solubilize calcium carbonate in aqueous suspensions or dispersions. Indeed, the unexpected results asserted by Dr. Tolbert are not accompanied by any objective evidence. Even if valid comparative data were presented, such results would be totally expected by one of ordinary skill in the art. This is because at the time of the invention, urea-HCl was known to maintain its ability to dissolve calcium carbonate (limestone) by converting it to a water-soluble salt while reducing the corrosive fuming of HCl (Dill, Examples II and VII), as discussed above.

For the reasons set forth above, the secondary considerations presented by the Patent Owner fail to outweigh the finding of obviousness.

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Impact of Findings in Concurrent Litigation

Citing In re Baxter Int 7, Inc., -where the Court states that "the PTO ideally should not arrive a different conclusion " than the final Court decision, Patent Owner suggests that the Patent Office should not arrive at a different conclusion than that of the District Court (Response, page 37).

However, right after the statement that "the PTO ideally should not arrive at a different conclusion", the Court in Baxter at 1933 states that:

"However, the fact is that Congress has provided for a reexamination system that permits challenges to patents by third parties, even those who have lost in prior judicial proceedings. Usually one would expect that any such reexamination, such as the one before us, would raise new issues..... the Director apparently found that a substantial new question of patentability had been raised and the examiner was then entitled to conduct a reexamination on the new art presented and her search of the prior art..... Finally, we could not conclude that the PTO was barred from conducting the reexamination of the '434 patent because of the final judgment \n*Fresenius* without overruling *Ethicon* and *Swanson*, which we cannot do...."

Indeed, the PTO in reexamination proceedings and the court system in District Court patent infringement actions "take different approaches in determining validity and on the same evidence could quite correctly come to different conclusions." *Swanson*, 540 F.3d at 1377 (quoting *Ethicon*, 849 F.2d at 1428). This is especially so because in the instant case, new issues are raised by Dill in combination with Patentee's admission of prior art; different portions of Dill are relied upon for the rejections in this reexamination proceeding.

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Conclusion

Claims 1-5 are under reexamination. Claims 1-5 are rejected.

THIS ACTION IS MADE FINAL.

A shortened statutory period for response to this action is set to expire ***one month*** from the mailing date of this action.

Extensions of time under 37 CFR 1.136(a) do not apply in reexamination proceedings.

The provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Further, in 35 U.S.C. 305 and in 37 CFR 1.550(a), it is required that reexamination proceedings "will be conducted with special dispatch within the Office."

Extensions of time in reexamination proceedings are provided for in 37 CFR 1.550(c).

A request for extension of time must be filed on or before the day on which a response to this action is due, and it must be accompanied by the petition fee set forth in 37 CFR 1.17(g). The mere filing of a request will not effect any extension of time. An extension of time will be granted only for sufficient cause, and for a reasonable time specified.

The filing of a timely first response to this final rejection will be construed as including a request to extend the shortened statutory period for an additional month, which will be granted even if previous extensions have been granted. In no event however, will the statutory period for response expire later than SIX MONTHS from the mailing date of the final action. See MPEP § 2265.

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Future Amendment

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j), must be formally presented pursuant to 37 CFR 1.52(a) and (b), and must contain any fees required by 37CFR 1.20(c).

Submission of any amendments, affidavits or declarations, or other documents as evidence of patentability after this Final Office action will be governed by the requirements of 37 CFR 1.116, which will be strictly enforced.

Ongoing Duty to Disclose

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 5,672,279 throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding.

Future Correspondence

. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evelyn Huang whose telephone number is 571-272-0686. The examiner can normally be reached on Tuesday-Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 571-273-9900.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EEC) at 866-217-9197 (toll-free).

All correspondence relating to this ex parte reexamination proceeding should be directed:

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