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

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Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

Patent_Mail@colpal.com
This is an appeal under 35 U.S.C. § 134(a) involving claims directed to a dentifrice. Examiner rejects the claims as obvious. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.
STATEMENT OF THE CASE

Claims 1, 5–8, 19, and 20 are on appeal, and can be found in the Claims Appendix of the Appeal Brief. Claim 1, the sole independent claim, is representative of the claims on appeal, and reads as follows:

1. A dentifrice comprising chitosan or pharmaceutically acceptable acid addition salt thereof, fluoride ions and an abrasive, for use against erosive tooth demineralization, wherein the dentifrice is a toothpaste comprising a liquid phase and comprising tin dissolved in the liquid phase;
   wherein the chitosan or pharmaceutically acceptable acid addition salt thereof and the fluoride ions are dissolved in the liquid phase; and
   the chitosan comprises unmodified chitosan.

The claims stand rejected as follows:

I. Claims 1, 5–8, 19, and 20 under 35 U.S.C. § 103(a) as unpatentable over Glandorf\(^2\) and Davison.\(^3\) Final Act.\(^4\) 5–8.

II. Claims 1, 5–8, 19, and 20 under 35 U.S.C. § 103(a) as unpatentable over Strand\(^5\) and Davison. Final Act. 8–11.\(^6\)

I. **Obviousness over Glandorf and Davison**

Examiner finds that Glandorf teaches an oral care composition such as toothpaste that contains stannous fluoride ions (a.k.a tin fluoride), water, an abrasive as well as thickening agents. Ans. 2–3. Examiner acknowledges

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\(^2\) Glandorf et al., US 6,350,436 B1, issued Feb. 26, 2002 ("Glandorf").
\(^3\) Davison et al., US 2003/0104020 A1, published June 5, 2003 ("Davison").
\(^4\) Final Office Action mailed February 10, 2016 ("Final Act.”).
\(^5\) Strand et al., US 2009/0136432 A1, published May 28, 2009 ("Strand").
\(^6\) The rejection of claim 1 under 35 U.S.C. 102(b) as being anticipated by Davison was withdrawn in the Notice of Panel Decision from Pre-Appeal Brief Review dated Aug. 3, 2016.
that Glandorf does not disclose chitosan. *Id.* at 3. Examiner relies on the teachings of Davison to formulate toothpaste containing chitosan. *Id.*

Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to formulate Glandorf’s toothpaste with chitosan in order to “provide[] improved general gum and teeth health, treat[] halitosis and gingivitis, statin [sic] reduction and provide[] anti-caries, anti-plaque and anti-calcus benefits in humans or other animal” as taught in Davison. *Id.* at 4.

The issue is: Does the preponderance of evidence of record support Examiner’s conclusion that the combination of Glandorf and Davison renders a dentifrice composition containing chitosan, fluoride, and an abrasive dissolved in a liquid phase obvious?

*Findings of Fact*

FF1. Glandorf discloses a dentifrice containing stannous fluoride (a.k.a tin fluoride). Glandorf’s Example V, second dentifrice table is reproduced below.
Second Dentifrice Composition

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Formula 1</th>
<th>Formula 2</th>
<th>Formula 3</th>
<th>Formula 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyoxyethylene</td>
<td>—</td>
<td>0.200</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Water</td>
<td>—</td>
<td>49.158</td>
<td>3.750</td>
<td>18.100</td>
</tr>
<tr>
<td>Flavor</td>
<td>0.500</td>
<td>1.300</td>
<td>1.200</td>
<td>1.100</td>
</tr>
<tr>
<td>FD&amp;C Blue #1 Dye Sol’n</td>
<td>0.300</td>
<td>0.300</td>
<td>0.100</td>
<td>0.500</td>
</tr>
<tr>
<td>Glycerin</td>
<td>90.485</td>
<td>22.000</td>
<td>77.310</td>
<td>24.240</td>
</tr>
<tr>
<td>Polyethylene Glycol</td>
<td>6.000</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>PEG 40 Hydrogenated Castor Oil</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>6.000</td>
</tr>
<tr>
<td>Poloxamer 407</td>
<td>—</td>
<td>17.500</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sodium Lauryl Sulfate(a)</td>
<td>—</td>
<td>2.500</td>
<td>4.500</td>
<td>5.400</td>
</tr>
<tr>
<td>Silica</td>
<td>—</td>
<td>—</td>
<td>10.000</td>
<td>20.000</td>
</tr>
<tr>
<td>Sodium Gluconate</td>
<td>—</td>
<td>2.760</td>
<td>—</td>
<td>0.560</td>
</tr>
<tr>
<td>Anhydrous Citric Acid</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.531</td>
</tr>
<tr>
<td>Sodium Citrate</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2.657</td>
</tr>
<tr>
<td>Stannous Fluoride</td>
<td>0.995</td>
<td>1.062</td>
<td>0.940</td>
<td>0.940</td>
</tr>
<tr>
<td>Stannous Chloride</td>
<td>1.420</td>
<td>1.320</td>
<td>—</td>
<td>0.560</td>
</tr>
<tr>
<td>Stannous Sulfate</td>
<td>—</td>
<td>—</td>
<td>0.760</td>
<td>—</td>
</tr>
<tr>
<td>Sodium Hydroxide(b)</td>
<td>—</td>
<td>0.700</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sodium Saccharia</td>
<td>—</td>
<td>0.400</td>
<td>0.300</td>
<td>0.400</td>
</tr>
<tr>
<td>Sodium Fluoride</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sorbitol</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>16.941</td>
</tr>
<tr>
<td>Tetrasodium Pyrophosphate</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.500</td>
</tr>
<tr>
<td>Xanthan Gum</td>
<td>0.300</td>
<td>0.800</td>
<td>0.600</td>
<td>1.100</td>
</tr>
<tr>
<td>Hydroxyethyl Cellulose</td>
<td>—</td>
<td>—</td>
<td>0.600</td>
<td>0.500</td>
</tr>
</tbody>
</table>

(a)27.9% solution
(b)50% solution

Glandorf 12:35–60 (Example V).

FF2. Glandorf teaches that the water content in the dentifrice can be anywhere from 5% to about 70%. Glandorf 5:1–2; see Ans. 2.

FF3. Glandorf teaches inorganic polyphosphates salts such as tetrapolyphosphate and hexametaphosphate, among others. Glandorf 4:19–21. “The amount of polyphosphate required is an effective
amount which will reduce the staining of [the teeth with] the stannous.” *Id.* at 4:38–39.

FF4. Example 12 of Davison, reproduced below, shows a dentifrice composition containing chitosan.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Wt. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>62.277</td>
</tr>
<tr>
<td>Sodium Chlorite</td>
<td>2.750</td>
</tr>
<tr>
<td>Sodium Fluoride</td>
<td>0.243</td>
</tr>
<tr>
<td>Chitosan</td>
<td>1.00</td>
</tr>
<tr>
<td>Hydrated Silica</td>
<td>25.000</td>
</tr>
<tr>
<td>Xanthan Gum</td>
<td>0.600</td>
</tr>
<tr>
<td>Carbomer 956¹</td>
<td>0.200</td>
</tr>
<tr>
<td>Sodium alkyl sulfate (27.9% Sol’n)</td>
<td>4.00</td>
</tr>
<tr>
<td>Sodium Saccharin</td>
<td>1.00</td>
</tr>
<tr>
<td>Flavor</td>
<td>1.800</td>
</tr>
<tr>
<td>Sodium Hydroxide Sol’n</td>
<td></td>
</tr>
<tr>
<td>(50% Sol’n)</td>
<td></td>
</tr>
</tbody>
</table>

Total 100.00

¹Available from B. F. Goodrich.

*Id.* ¶213.

FF5. Davison discloses that chitosan has many benefits in oral care composition such as toothpaste gels and mouth rinses. Benefits include:

- improvement of general gum and teeth health,
- treatment of halitosis and gingivitis,
- stain reduction,
- and for providing anti-caries, anti-plaque and anti-calculus
benefits, in humans or other animals. It has been found that
the chitosan compositions used herein have improved
effect on the inhibition of cariogenic bacteria such as
Streptococcus mutans[;] this effect combined with its pH
buffering capacity make the chitosan compositions very
effective in prevention of dental caries.

Davison ¶ 117. One aspect of Davison’s invention is “the use of the
chitosan compositions for in situ film formation on a substrate to
provide surface protection, surface modification, [and] anti-bacterial
properties.” Id. ¶ 170.

FF6. Davison teaches optional agent(s) to be used in place of or in
combination with a pyrophosphate salt, these agents include
polyacrylates and polyphosphates (e.g., tripolyphosphate;
hexametaphosphate). Id. ¶ 159.

Principle of Law

“If the claim extends to what is obvious, it is invalid under § 103.”

Analysis

We generally agree with and adopt Examiner’s findings of fact,
reasoning on scope and content of the prior art, and conclusions set out in
the Final Office Action, Advisory Action,7 and Examiner’s Answer. Any
findings of fact set forth above (Findings of Fact) are provided only to
highlight certain evidence. We address Appellants’ arguments below.

Appellants contend that the combination of references lacks a
reasonable expectation of success. “Hydroxyethyl cellulose is a neutral
polysaccharide, and thus differs considerably from chitosan . . . [a charged

polysaccharide]. The substitution of a charged polysaccharide for an uncharged polysaccharide is obviously significant, . . . [and there is no teaching] that such a substitution would be successful.” Appeal Br. 6 (emphasis omitted); see Reply Br. 2.

We are not persuaded by Appellants’ contention that there is a lack of reasonable expectation of success when adding a charged molecule into the toothpaste composition. Glandorf teaches that the tetrasodium phosphate shown in the dentifrice of formula 4 could reasonably be replaced with another polyphosphate such as hexametaphosphate. See FF1 and FF3. Glandorf teaches the inclusion of inorganic phosphates such as hexametaphosphate in their compositions containing stannous ions. FF3. As explained by Examiner, Davison discloses the use of polyphosphates that can be used in compositions containing chitosan. Ans. 7; FF6. Indeed, Davison teaches that optional agents can be used in place of pyrophosphate salt and these agents include polyacrylates and polyphosphates such as, for example, hexametaphosphate. FF6. Therefore, we agree with Examiner’s position that Davison reasonably supports the inclusion of a polyphosphate in combination with a chitosan without deleterious effect.

Examiner recognizes that, while Davison may not “specifically name . . . [a] longer linear polyphosphate, Davison does contemplate polyphosphates in general.” Ans. 8. Because Davison contemplates phosphates as well as polyacrylates, both of which are charged molecules, in combination with chitosan, one of skill in the art would not be led away from using charged molecules in conjunction with chitosan. See Ans. 8. Therefore, we do not agree with Appellants’ contention that there is no
reasonable expectation of success in the combination proposed by the Examiner.

Appellants contend that “[i]t may be expected that the chitosan would form complexes with the polyphosphate, and perhaps [form] a precipitate.” Appeal Br. 5; Reply Br. 2.

We are also not persuaded by this argument because it is not supported by evidence. Arguments of counsel cannot take the place of evidence in the record. In re Schulze, 346 F.2d 600, 602 (CCPA 1965); In re Geisler, 116 F.3d 1465, 1470 (Fed. Cir. 1997) (“An assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of obviousness.”).

Appellants contend that neither Glandorf nor Davison discuss that the compositions can be used to prevent tooth erosion. Appeal Br. 7.

We are not persuaded. Glandorf teaches dentifrice compositions containing fluoride. FF1–FF3. Similarly, Davison teaches dentifrice compositions such as toothpaste and gels that also contain fluoride. FF4. “[F]luoride, . . . is used against erosion.” Ans. 9. Davison discloses that chitosan has many benefits in toothpaste compositions. FF5. Specifically, chitosan can help improve gum and teeth health as well as have anti-caries effect. FF5.

Examiner interprets the limitation “for use against erosive tooth demineralization” as an intended use limitation. Ans. 9. These limitations represent either method steps or intended uses that are embedded in a composition claim. In interpreting these limitations, we, therefore, treat them as imposing functional requirements, but the case law does not support
requiring the prior art to perform a method step recited in a product claim. 

*See In re Dilnot, 300 F.2d 945, 950 (1962)* (“The addition of a method step in a product claim, which product is not patentably distinguishable from the prior art, cannot impart patentability to the old product.”). Examiner is also not relying on the use of the compositions as providing the motivation to include chitosan disclosed in Davison (FF4–FF6) in Glandorf’s dentifrice. FF1–FF3. Here, Examiner finds motivation in Davison to add chitosan into a composition for treating teeth because the chitosan composition without anything else is already effective at preventing dental caries. *See* Ans. 3.

Appellants contend that the data in the Specification, especially comparison of “Entry 2 (comprising tin and fluoride) with those of Entry 3 (comprising tin, fluoride and chitosan)” shows that the compositions containing chitosan have improved demineralization properties. Appeal Br. 7; Reply Br. 4.

We are not persuaded that the evidence in the Specification shows unexpected results. We agree with Examiner’s position that the evidence relied on by Appellants is not sufficient to overcome the prima facie case. *See* Ans. 10 (“the numbers for Entry 2 and Entry 3 appear to be close to the same”). Here, the comparative toothpaste formulations disclosed in the Specification do not show improved demineralization values that would lead us to conclude that the results are unexpected. The examples show a reduction in demineralization from 31.6% for Entry 2 and 27.8% for Entry 3. We agree with the Examiner that these numbers appear to not show a “differen[ce] in kind” sufficient to establish unexpected results. *See In re Harris, 409 F.3d 1339, 1344 (2005) (quoting In re Huang, 100 F.3d 135, 139 (Fed. Cir. 1996) (holding that claimed ranges must “produce a new and
unexpected result which is different in kind and not merely in degree from results of the prior art").

We conclude that the evidence cited by Examiner supports a prima facie case of obviousness with respect to claim 1, and Appellants have not provided sufficient rebuttal evidence that outweighs the evidence supporting the Examiner’s conclusion of obviousness. As Appellants do not argue the claims separately, claims 5–8, 19, and 20 fall with claim 1. 37 C.F.R. § 41.37 (c)(1)(iv).

II. Obviousness over Strand and Davison

Examiner finds that Strand teaches an oral care composition such as toothpaste that contains a fluoride source, an abrasive agent, a chelating agent, and water. Ans. 4–5. Examiner acknowledges that Strand does not disclose chitosan. Id. at 5. Examiner relies on the teachings of Davison to include chitosan into the formulation of Strand. Id.

Examiner concludes that it would have been or obvious to one of ordinary skill in the art at the time the invention was made to formulate Strand’s toothpaste with chitosan in order to “provide[] improved general gum and teeth health, treat[] halitosis and gingivitis, statin [sic] reduction and provide[] anti-caries, anti-plaque and anti-calculus benefits in humans or other animal” as taught in Davison. Id. at 5.

The issue is: Does the preponderance of evidence of record support Examiner’s conclusion that the combination of Strand and Davison renders a dentifrice composition containing chitosan, fluoride, and an abrasive dissolved in a liquid phase obvious?
Strand ¶ 54

FF8. Strand teaches thickening agents or binders such as hydroxyethyl cellulose (HEC) or carrageenan. See Strand ¶ 45.

FF9. Strand teaches that the dentifrice composition contains from about 20% to about 65% water. Id. ¶ 38.

FF10. Strand discloses fluoride ions including stannous fluoride at a concentration from 0.01% to 0.35% (100 to 3500ppm). Id. ¶ 23.
Analysis

We generally agree with and adopt the Examiner’s findings of fact, reasoning on scope and content of the prior art, and conclusions set out in the Final Office Action, Advisory Action, and Examiner’s Answer. Any findings of fact set forth above (Findings of Fact) are provided only to highlight certain evidence. We address Appellants’ arguments below.

Appellants contend that the combination of references lacks a reasonable expectation of success. Appellants contend that “carrageenan is a sulfated polysaccharide, and thus bears a negative charge at physiological pH,” while chitosan is of opposite charge. Appeal Br. 6; see Reply Br. 6. “Thus, even considering the Strand Examples, those of skill in the art would not have a reasonable expectation of success that combining the Davison chitosan with the Strand compositions would preserve function.” Reply Br. 6.

Examiner is not relying on substitution of one component for another in Strand’s composition, but instead is suggesting the addition of Davison’s chitosan for its beneficial qualities into Strand’s composition. As Examiner points out, Strand’s examples do not use linear polyphosphates. Ans. 12 Therefore, the inclusion of chitosan into any of the compositions in the examples would not defeat the purpose of Strand’s composition. See Ans. 12.

Appellants contend that the examples provided in Strand utilize phytate which is a saturated cyclic acid having six phosphate groups. Reply Br. 5, see Strand ¶ 29.

We are not persuaded. Even though not all the examples in Strand are polyphosphate-free as asserted by Examiner, at least one of the examples
does not contain phytic acid. See Ans. 12; see Strand ¶ 54 (Table composition D). Because “Davison discloses that polyphosphates may be used in compositions comprising chitosan,” there is a reasonable expectation that the inclusion of chitosan into Strand’s compositions, including even those containing phytate, would not have any detrimental effect. Ans. 12.

Appellants contend that neither Strand nor Davison discuss that the compositions can be used to prevent tooth erosion. Appeal Br. 7.

We are not persuaded, as Examiner points out “Strand discloses that stannous ions reduce coronal and root dental caries and erosion.” Ans. 14; see Strand ¶ 2.

Appellants contend that the data in the Specification shows unexpected results, especially when comparing “the claimed invention (Entry 3) with the closest prior art (Entry 2 comprising tin and fluoride).” Appeal Br. 9–10.

We are not persuaded that the evidence in the Specification shows unexpected results. We agree with Examiner’s position that the evidence relied on by Appellants is not sufficient to overcome the prima facie case. See Ans. 14–15 (“the numbers for Entry 2 and Entry 3 appear to be close to the same”). The examples show a reduction in demineralization from 31.6% for Entry 2 and 27.8% for Entry 3. We agree with the Examiner that these numbers do not show a “differen[ce] in kind” sufficient to establish unexpected results. See Harris, 409 F.3d at 1344.

We conclude that the evidence cited by the Examiner supports a prima facie case of obviousness with respect to claim 1, and Appellants have not provided sufficient rebuttal evidence that outweighs the evidence supporting the Examiner’s conclusion of obviousness. As Appellants do not argue the
claims separately, claims 5–8, 19, and 20 fall with claim 1. 37 C.F.R. § 41.37 (c)(1)(iv).

SUMMARY

We affirm the rejection of claims 1, 5–8, 19, and 20 under 35 U.S.C. § 103(a) as unpatentable over Glandorf and Davison.

We affirm the rejection of claims 1, 5–8, 19, and 20 under 35 U.S.C. § 103(a) as unpatentable over Strand and Davison.

TIME PERIOD FOR RESPONSE

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

AFFIRMED