

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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WORLD BOTTLING CAP, LLC,  
Petitioner,

v.

CROWN PACKAGING TECHNOLOGY, INC.,  
Patent Owner.

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Case IPR2015-01651  
Patent 8,550,271 B2

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Before WILLIAM V. SAINDON, STACEY G. WHITE, and  
JON B. TORNQUIST, *Administrative Patent Judges*.

SAINDON, *Administrative Patent Judge*.

DECISION  
Institution of *Inter Partes* Review  
*37 C.F.R. § 42.108*

## I. INTRODUCTION

Petitioner requests an *inter partes* review of all claims (1–20) of U.S. Patent No. 8,550,271 B2 (Ex. 1001, “the ’271 patent”). Paper 1 (“Pet.”). Patent Owner filed a Preliminary Response to the Petition. Paper 5 (“Prelim. Resp.”).

We have jurisdiction under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” Upon consideration of the Petition, the exhibits cited therein, and Patent Owner’s Preliminary Response, we institute an *inter partes* review on all challenged claims.

Our factual findings and conclusions at this stage of the proceeding are based on the evidentiary record developed thus far. This is not a final decision as to the patentability of claims for which *inter partes* review is instituted. Our final decision will be based on the record as fully developed during trial.

### A. Related Matters

Petitioner represents that it knows of no related matters currently pending. Pet. 1; *see also* Paper 4, 1 (Patent Owner affirming that there are no related matters pending). Petitioner notes that its previous petition challenging the ’271 patent was denied. Pet. 1–2; *see World Bottling Cap, LLC v. Crown Packaging Tech., LLC*, Case IPR2015-00296 (PTAB May 14, 2015) (Paper 6) (Decision Denying Institution).

### *B. The '271 Patent*

The '271 patent describes a bottle cap, also known as a crown cap. The '271 patent describes the invention as a crown cap that is made with thinner and harder steel compared to conventional crown caps. Ex. 1001, 4:63–65, 5:34–38. The '271 patent describes conventional crown caps as formed from T4 tinplate<sup>1</sup> having a thickness of 0.21 mm to 0.23 mm and an average hardness of 61 on the 30T hardness scale.<sup>2</sup> *Id.* at 4:52–58. The '271 patent describes the invention, in contrast, as formed from steel having a thickness of 0.16 mm to 0.18 mm and an average hardness of greater than 62 on the 30T scale. *Id.* at 4:58–65, 5:6–9. Reducing the amount of steel used purportedly provides the benefit of lower carbon emissions, such as from cooling that material (when aggregated over the billions of caps produced each year). *Id.* at 5:34–38.

### *C. Illustrative Claim*

Petitioner challenges each claim of the '271 patent. Claims 1, 12, and 20 are independent. Independent claim 1 is reproduced below.

1. A lightweight crown cap for application to a glass beverage bottle, comprising:
  - a shell formed of a material comprising steel having an average hardness of greater than 62 on the 30T scale, the shell including:
    - a peripheral skirt having, flutes downwardly depending therefrom, the flutes are capable of

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<sup>1</sup> “Tinplate” is tin-plated steel. *See* Ex. 1001, 4:49–58. “T4” denotes a particular temper for the steel. *See* Ex. 1007 ¶¶ 16, 26.

<sup>2</sup> The Rockwell 30T scale is used to measure the hardness of various steels. *See* Ex. 1007 ¶¶ 16–17.

being crimped to affix the crown cap to a bottle;  
and  
a round panel integrally formed with the skirt, the panel including at least one recessed circular groove that has its center approximately at the longitudinal center of the panel; and a liner located on the underside of the panel.

*D. Prior Art and Asserted Grounds*

Petitioner asserts that claims 1–20 of the '271 patent are unpatentable over the following grounds:

<b>References</b>	<b>Basis</b>	<b>Claims Challenged</b>
Frishman <sup>3</sup> and Industrial Heating <sup>4</sup>	§103	1–4, 10, 12–15, and 17–20
Frishman, Industrial Heating, and Wagner <sup>5</sup>	§103	11 and 16
Industrial Heating and Wagner	§103	1–4 and 10–20
Frishman, Industrial Heating, Mumford, <sup>6</sup> and U.S. Steel <sup>7</sup>	§103	5–9

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<sup>3</sup> U.S. Patent No. 8,061,544 B2, issued Nov. 22, 2011, published Aug. 9, 2007, continuation-in-part of application No. PCT/US2006/002421 (filed on Jan. 24, 2006), provisional application No. 60/758,725 (filed on Jan. 14, 2006) (Ex. 1003).

<sup>4</sup> *Continuous Annealing of Strip Steel at Dominion Foundries & Steel, Ltd.*, XVIII INDUSTRIAL HEATING 564–570 (March, 1951) (“Industrial Heating”) (Ex. 1004).

<sup>5</sup> U.S. Patent No. 2,233,904, issued Mar. 4, 1941 (Ex. 1005).

<sup>6</sup> U.S. Patent No. 3,152,711, issued Oct. 13, 1964 (Ex. 1006).

<sup>7</sup> Production Catalogue, U.S. Steel (Slovakia) (2005) (archive copy dated May 2, 2006) (originally at <http://www.usske.sk/products/cat/tin-mill/index.html#mechanical>) (retrieved from the Internet Archive Wayback Machine) (Ex. 1012).

References	Basis	Claims Challenged
Industrial Heating, Wagner, Mumford, and U.S. Steel	§103	5–9

Petitioner also relies on the testimony of Mr. George K. Crochiere (Ex. 1007).

## II. ANALYSIS

### A. Claim Construction

We interpret the claims of an unexpired patent using the broadest reasonable interpretation in light of the specification of the patent. 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1278 (Fed. Cir. 2015), *cert. granted sub nom. Cuozzo Speed Techs. LLC v. Lee*, 72016 WL 205946 (U.S. Jan. 15, 2016) (No. 15-446). Under the broadest reasonable interpretation standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

Independent claims 1 and 12 recite a “[crown] shell formed of a material comprising steel having an average hardness of greater than 62 on the 30T scale.” Independent claim 20 includes a similar limitation, but recites “metal” instead of “material.” Petitioner asserts that “average hardness” is “the reported hardness value regardless of +/- variations” and that “hardness” refers to Rockwell hardness. Pet. 17–19 (citing Ex. 1001, 4:53–58). At this time, Patent Owner does not appear to contest these

assertions. Based on our review of the record, we are persuaded that Petitioner’s proposed constructions of “average hardness” and “hardness” are the broadest reasonable constructions in light of the Specification. Accordingly, we adopt these proposed constructions.

*B. The Prior Art*

*1. Industrial Heating*

Industrial Heating is a monthly periodical directed to those in the industrial heating industry. Ex. 1004, Table of Contents (stating that Industrial Heating is “Published Monthly” and including a March 1951 date).<sup>8</sup> One article discusses continuous annealing of strip steel and in particular discusses how “[s]ome of the applications which normally require a T-2 steel (50-55 R 30-T) are regularly made from T-4 continuously annealed steel at 60-65 R 30-T, i.e., crown caps, . . . .” Ex. 1004, 566.

*2. Other References*

Petitioner also relies on Frishman, Wagner, Mumford, and U.S. Steel. Frishman discloses a crown cap having a pull tab. Ex. 1003, Abstr. Wagner discloses a crown cap having concentric beads and a lining. Ex. 1005, Figs. 1–3. Mumford discloses a closure cap for bottles and jars that uses sheet metal having a Rockwell hardness of about 54 to 72 on the “T-30” scale. Ex. 1006, 1:9–12, 3:74–4:3, 4:44–45. U.S. Steel discloses various tin mill product grades and their mechanical properties. Ex. 1012, *passim*. For

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<sup>8</sup> We note that the pages of Exhibit 1004 have not been numbered by the Petitioner. In the future, all exhibits submitted in this proceeding should contain page numbers.

example, U.S. Steel discloses T4 tinplate (aka T61 or TH415), as having hardness ranges from 56 to 66, depending on the thickness of the material.<sup>9</sup>  
*Id.*

### *C. Petitioner's Asserted Grounds*

Petitioner's asserted grounds can be divided into two approaches: those with Frishman showing most of the features of the crown cap and those with Wagner doing the same. Both of these approaches rely on Industrial Heating, however, for showing the particular steel recited in each claim. Patent Owner's arguments focus, almost exclusively, on the teachings of Industrial Heating. Accordingly, we address the issues pertaining to Industrial Heating first.

#### *1. Industrial Heating*

Petitioner asserts that Industrial Heating shows that it previously was known to make crown caps of steel having an average hardness of greater than 62 on the 30T scale. Pet. 2, 20–23, 52; *see also* Ex. 1007 ¶¶ 26–28 (Petitioner's declarant, Mr. Crochiere, testifying to the same). Patent Owner makes three main arguments as to why Petitioner's assertion should not be found persuasive. Patent Owner argues: (a) one of ordinary skill in the art would not have looked to Industrial Heating; (b) Petitioner has not provided the full article of Industrial Heating; and (c) Industrial Heating's disclosure is "an obvious error."

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<sup>9</sup> The scale used for the hardness values in U.S. Steel is obscured, but are generally consistent with values expected of these materials on a Rockwell 30T scale. *See* Ex. 1007 ¶ 16 (depicting a table of various temper designations and corresponding 30T Rockwell hardness range (HR30T)).

*a. Industrial Heating as Prior Art*

Patent Owner argues that Petitioner has not explained why a skilled artisan would have looked to Industrial Heating (Prelim. Resp. 8–9) and that Petitioner has not shown how anyone would have found the Industrial Heating disclosure (*id.* at 9–12). Patent Owner’s argument, in general, seems to be that Industrial Heating reference is not prior art because of the purported difficulty in finding it, especially by modern search technology. *See, e.g., id.* at 11 (“The salient issue is whether a reasonable search could have dug up the actual article within Industrial Heating”).

Patent Owner’s arguments are not persuasive. Documents become prior art by way of public dissemination *or* by being made sufficiently available to the public (e.g., via a search engine). *Bruckelmyer v. Ground Heaters, Inc.*, 445 F.3d 1374, 1378 (Fed. Cir. 2006) (“A given reference is ‘publicly accessible’ upon a satisfactory showing that such document has been disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, can locate it.”) (citation omitted). Patent Owner’s argument assumes that all prior art must be discoverable via search, but this argument ignores the other ways that information becomes prior art, such as presentations, or, in the case of Industrial Heating, physical dissemination of a printed periodical.

The material provided by Petitioner regarding Industrial Heating presents sufficient indicia of public dissemination for purposes of relying on it for showing a reasonable likelihood of success. Industrial Heating, on its face, appears to be a periodical trade magazine regularly and widely

disseminated. It includes volume, number, and date (Ex. 1004, contents page). It asserts it is “Published Monthly.” *Id.* The content listed therein also tends to show widespread dissemination because, for example, there are advertisements.

That Industrial Heating might not have been indexed in a modern internet search engine at some particular point in time does not undo any prior public dissemination. Accordingly, Patent Owner’s arguments that Industrial Heating is not prior art are not persuasive.

*b. Provision of the Full Industrial Heating Article*

Patent Owner points out that Petitioner has not provided the entirety of the Industrial Heating publication. Patent Owner argues that the portions of the article within, which were not provided, may support Patent Owner’s assertions (discussed below) that the article is incorrect. Prelim. Resp. 12–14.

It is not uncommon for portions of prior art documents to be excerpted. This is especially the case for lengthy documents that contain much irrelevant information, such as textbooks, dictionaries, and periodicals. Whether the missing portions should be provided is an issue that must be decided on a case-by-case basis. During appropriate times after institution, Patent Owner has the opportunity to seek discovery of the remaining portions of the Industrial Heating article under 37 C.F.R. § 42.51, as well as the opportunity to object to evidence under 37 C.F.R. § 42.64.

*c. Does Industrial Heating Contain an “Obvious Error”?*

Patent Owner argues that Industrial Heating’s disclosure of T4 continuously annealed steel having a hardness in the range of 60–65 on the

30T scale is an obvious error. Prelim. Resp. 14–23. Patent Owner argues, citing to many sources (including Petitioner’s declarant) that it was known in the art that T4 steel has a hardness of 58–64 on the 30T scale, not 60–65 as disclosed in Industrial Heating. *See id.*

Reviewing the evidence before us, we are not persuaded that Industrial Heating’s disclosure is an obvious error. The range of hardness values that make up the acceptable range for T4 steel is not strictly limited to a range of  $\pm 3$ . For example, U.S. Steel shows T4 steel (a.k.a. T61) as having acceptable hardness values as low as 56 and as high as 66. Ex. 1012, 2. The American Society for Testing and Materials (ASTM) standard for tinplate steel, A623-11, lists T4 tinplate as having a hardness range of 57–65. Ex. 3001, 3; *see also* Ex. 1001, 5:6–7, 4:67 (the ’271 patent uses tinplate conforming to ASTM 623). Accordingly, we are not persuaded that the slightly different hardness range in Industrial Heating is an obvious error because it is within the known T4 temper hardness range according to the ASTM standard.

In addition, the disclosure in Industrial Heating of a T4 hardness range of 60–65 has been publicly disseminated and is useful for all that it teaches a person of ordinary skill in the art. *See, e.g., In re Preda*, 401 F.2d 825, 826 (CCPA 1968) (“it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom”). Thus, even if we did not have evidence before us indicating that T4 hardness ranges were known to include values of 60–65, we have the teaching of Industrial Heating to persons of ordinary skill in the art that crown caps were used at 60–65 Rockwell

hardness, and no evidence tending to show that this disclosure was affirmatively in error.

Lastly, we note that Exhibit 1011 lists many different “tempers and thicknesses to enable downgauging and cost reduction” of steel crown caps, including TH435, which is equivalent to T5 tinplate and has a 30T average hardness of  $65 \pm 3$ . Ex. 1011, 33, *see also id.* at 16 (table listing equivalent standards); Ex. 1007 ¶ 16 (listing average Rockwell hardness of various T temper designations); Ex. 1012, 1–2 (listing properties of various tin mill products). Exhibit 1011 also lists TH620 for use as a crown cork (Ex. 1011, 33), which uses a DR9 temper (*id.* at 16) having a nominal 30T hardness of 75 (Ex. 3001, 4).

*d. Conclusion Regarding Industrial Heating*

Based on the record before us, we are persuaded that Petitioner has shown sufficiently that Industrial Heating discloses the use of steel crown caps having an average hardness of greater than 62 on the 30T scale, as required by independent claims 1, 12, and 20. We now turn to the individual grounds presented by Petitioner.

*2. Frishman and Industrial Heating  
(Claims 1–4, 10, 12–15, and 17–20)*

The Petition includes a detailed analysis of this ground. *See* Pet. 20–40, 52–56; *see also id.* at 12–17 (setting forth an analysis of crown cap grooves and hardness values, in general). As to independent claim 1, Petitioner asserts that Frishman discloses the claimed peripheral skirt, round panel having recessed grooves, and liner. *Id.* at 23–30. Petitioner asserts that Industrial Heating discloses that it was known to make crown caps

formed of a material comprising steel having an average hardness of greater than 62 on the 30T scale. *Id.* at 20–23. Petitioner asserts that the combination of Frishman’s cap with the steel disclosed in Industrial Heating would have been obvious—a known use with a predictable result. *Id.* at 30; Ex. 1007 ¶ 39 (Mr. Crochiere testifying that it would have been obvious to use a known material to make crown caps). Petitioner also asserts that it was a trend in the industry to use increasingly thinner but harder crown caps, such that the proposed combination is merely following a known trend. Pet. 16–17 (citing Ex. 1011, 24, depicting said downsizing trend); *see also* Ex. 1011, 33 (explicitly listing harder steels for crown corks). Petitioner’s assertions for independent claims 12 and 20 are similar. *See id.* at 33–34, 38–40.

Dependent claims 2–4, 10, 13–15 generally recite groove features for the caps. Petitioner asserts that Frishman includes these features. Pet. 30–32, 34–36, 52–54. Dependent claim 17 recites a plug-like lip and dependent claims 18 and 19 recite that the cap is a twist-off or pry-off type cap. Petitioner asserts that Frishman also includes these features. *Id.* at 37–38, 55. Petitioner also asserts that twist-off and pry-off caps are admitted prior art. *Id.* at 37–38 (citing Ex. 1001, 1:22–37, 2:50–54). Accordingly, Petitioner’s ground addresses each limitation of each challenged dependent claim and why it would have been obvious to combine the teachings in the manner proposed.

Patent Owner’s challenge to Industrial Heating is not persuasive, for the reasons expressed above. Patent Owner raises no other persuasive arguments against this ground at this time. In view of the record before us,

we are persuaded that Petitioner has demonstrated a reasonable likelihood of showing claims 1–4, 10, 12–15, and 17–20 to be unpatentable in view of Frishman and Industrial Heating.

3. *Frishman, Industrial Heating, and Wagner*  
(Claims 11 and 16)

Dependent claims 11 and 16 recite that the cap includes beads. Petitioner asserts that Wagner discloses compressible beads and the '271 patent states that bead liners were “conventional,” commercially available products. Pet. 40–42, 53–54, 55. Indeed, Wagner discloses a crown cap having concentric beads to assist in closure. Ex. 1005, 2:32–3:20. Petitioner asserts that the benefit of additional sealing from such a feature is predictable and known. Pet. 41. Patent Owner does not offer specific arguments against this ground at this time. Reviewing the record before us, we are persuaded that Petitioner has demonstrated a reasonable likelihood of showing claims 11 and 16 to be unpatentable in view of Frishman, Industrial Heating, and Wagner.

4. *Frishman, Industrial Heating, Mumford, and U.S. Steel*  
(Claims 5–9)

Dependent claims 5–9 each recite various hardness values for the cap, from 65 to 73. Petitioner asserts that Mumford shows caps (but not crown caps) having a hardness of 54–72, and that U.S. Steel shows various steels having hardness ranges of 57–79, 70–76, and 73–79. Pet. 44–45; *see also id.* at 44–50 (setting forth Petitioner’s reasoning in further detail). Petitioner asserts that it would have been obvious to try various harder steels, given the “general trend and motivation in the market place for many years.” *Id.* at

45; Ex. 1007 ¶ 73 (Mr. Crochiere testifying that Exhibit 1011 depicts such a trend in the art). We further note that Exhibit 1011 lists several steel tempers that are harder than T4 as suitable for crown caps. Ex. 1011, 33. Patent Owner does not offer specific arguments against this ground at this time.

The record before us support's Petitioner's characterization of the marketplace as one favoring a continual shift to harder and thinner materials for crown caps, as shown in Exhibit 1011. Indeed, Exhibit 1011 lists several harder materials than T4 tinplate for crown cap use, including TH620, which is also used in steel twist-off caps such as those disclosed in Mumford. Ex. 1011, 33. Reviewing the record before us, we are persuaded that Petitioner has demonstrated a reasonable likelihood of showing claims 5–9 to be unpatentable in view of Frishman, Industrial Heating, Mumford, and U.S. Steel.

*5. Industrial Heating and Wagner  
(Claims 1–4 and 10–20)  
and  
Industrial Heating, Wagner, Mumford, and U.S. Steel  
(Claims 5–9)*

These grounds are similar to those already addressed above, with Wagner taking the place of Frishman for the disclosures relating to a crown cap skirt and grooves. *See* Pet. 42–43, 51. Petitioner asserts that Wagner discloses a crown cap with the claimed shell, peripheral skirt, and flutes. *Id.* at 42. For the reasons expressed above, we are persuaded that Petitioner has demonstrated a reasonable likelihood of showing claims 1–20 to be unpatentable on these grounds.

### III. ORDER

In view of the foregoing, it is hereby:

ORDERED that a *inter partes* review is instituted as to all claims (1–20) of the '271 patent on the following grounds:

Whether claims 1–4, 10, 12–15, and 17–20 are unpatentable in view of Frishman and Industrial Heating;

Whether claims 11 and 16 are unpatentable in view of Frishman, Industrial Heating, and Wagner;

Whether claims 5–9 are unpatentable in view of Frishman, Industrial Heating, Mumford, and U.S. Steel;

Whether claims 1–4 and 10–20 are unpatentable in view of Industrial Heating and Wagner;

Whether claims 5–9 are unpatentable in view of Industrial Heating, Wagner, Mumford, and U.S. Steel; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, *inter partes* review of the '271 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial; and

FURTHER ORDERED that no ground other than that specifically provided above is authorized.

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