

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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BILLERUD AKTIEBOLAG (PUBL),

Petitioner,

v.

WESTROCK MWV, LLC,

Patent Owner

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Case No. IPR2023-01206

U.S. Patent No. 11,293,142 B2

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**PATENT OWNER'S CONTINGENT MOTION TO AMEND**

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**PATENT OWNER'S EXHIBIT LIST**

| <b><u>Exhibit</u></b> | <b><u>Short Name</u></b>       | <b><u>Description</u></b>                                                                                                                                                                      |
|-----------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ex. 2001              | Baker Declaration              | Declaration of Charles S. Baker, Esq.                                                                                                                                                          |
| Ex. 2002              | Mohan                          | U.S. Patent No. 6,274,001 to K. Krishna Mohan, granted August 14, 2001                                                                                                                         |
| Ex. 2003              | Klass Declaration              | Declaration of Charles P. Klass                                                                                                                                                                |
| Ex. 2004              | Supplemental Klass Declaration | Supplemental Declaration of Charles P. Klass                                                                                                                                                   |
| Ex. 2005              | Zotterman Deposition           | Transcript of Deposition of Carl Zotterman                                                                                                                                                     |
| Ex. 2006              | Equation $Y_3'$                | Note page containing Equation $Y_3'$ , Exhibit 7 to deposition of Carl Zotterman                                                                                                               |
| Ex. 2007              | Zakaib                         | Zakaib et al., <i>Quality Improvements to Publication and Board Grades by Hot Calendering with Induction Heating</i> , Presented at the 1997 TAPPI Newsprint Forum, Birmingham, AL, March 1997 |
| Ex. 2008              | Sigma Thermal                  | PDF printout of webpage: <a href="https://www.sigmathermal.com/products/thermal-fluid-systems">https://www.sigmathermal.com/products/thermal-fluid-systems</a> , last accessed June 14, 2024   |
| Ex. 2009              | Priority Application           | Priority Provisional App. No. 62/846,278, filed on May 10, 2019                                                                                                                                |

## **I. INTRODUCTION**

This Motion to Amend is filed concurrent with Patent Owner's Response. Patent Owner respectfully moves that if the Board find any of Claims 1, 2, 6, or 7 unpatentable after consideration of Patent Owner's Response, then Patent Owner be allowed to replace such claim with its corresponding proposed Substitute Claim 24, 25, 26, or 27, respectively. In a grantable motion, Patent Owner bears the burden to prove on a claim-by-claim basis the following.

- 1) There is support for the amendments, *i.e.*, there is no new matter. 37 C.F.R. § 42.121(a)(2)(ii) and 37 C.F.R. § 42.121(b);
- 2) The amendments do not enlarge or broaden the scope of the claims. 37 C.F.R. § 42.121(a)(2)(ii);
- 3) The amendments address at least one ground of unpatentability. 37 C.F.R. § 42.121(a)(2)(i); and
- 4) The number of substitute claims is reasonable. 37 C.F.R. § 42.121(a)(3).

A complete listing of the Substitute Claims is provided in Appendix A, with changes shown clearly in accordance with 37 C.F.R. § 41.121(b). The sections hereinbelow provide an explanation of compliance with requirements set forth above, including reasons for patentability over the cited art.

Patent Owner requests preliminary guidance from the Board on the Motion to Amend pursuant to the new Pilot Program Concerning Motion to Amend Practice.

## **II. LISTING OF SUBSTITUTE CLAIMS**

Appendix A contains a listing of Substitute Claims 24, 25, 26, and 27. The Substitute Claims overcome all grounds set forth in the Petition and all proper combinations of asserted art. Additionally, Patent Owner notes that the burden of persuasion does not lie with Patent Owner with respect to the patentability of the Substitute Claims. *See* Guidance on Motions to Amend in view of *Aqua Products* dated November 21, 2017. Rather, if the Motion to Amend meets the requirements of 35 U.S.C. § 316(d), then the Board proceeds to determine whether the Substitute Claims are unpatentable by a preponderance of the evidence based on the entirety of the record, including any opposition made by Petitioner. *Id.*

## **III. REASONABLE NUMBER OF SUBSTITUTE CLAIMS**

Substitute Claim 24 is the only substitute for Claim 1, Substitute Claim 25 is the only substitute for Claim 2, Substitute Claim 26 is the only substitute for Claim 6, and substitute Claim 27 is the only substitute claim for Claim 7. In accordance with 37 C.F.R. § 42.121(a)(3), only one Substitute Claim replaces a challenged claim in this Motion. There are no challenged claims with more than one Substitute Claim in the Motion.

## **IV. PROPOSED AMENDMENTS DO NOT ENLARGE SCOPE**

In accordance with 37 C.F.R. § 42.121(a)(2)(ii), the Substitute Claims do not enlarge the scope of the original claims or introduce new subject matter. Each of

the Substitute Claims contains only narrowing amendments. This is explained in further detail in the following sections.

**A. Substitute Claim 24 Does Not Enlarge Scope**

In the Decision Granting Institution, the Board considered Patent Owner's proposed claim construction specifying only one heated roller to be a negative limitation, and declined to adopt that claim construction. Specifically, the Board declined to import the limitation from the '142 Patent's written description that only one roller in the nip is heated to the elevated temperature, because that limitation was not found in Claim 1 itself. (Paper 14, p. 22). The amendments in Substitute Claim 24 narrow the scope relative to Claim 1, because Substitute Claim 24 recites the same limitation that the Board found was missing in Claim 1, namely a contact surface of only said thermo-roller is heated to the elevated temperature, and the counter roller is not heated to the elevated temperature. Therefore, Substitute Claim 24 is narrower than Claim 1 because unlike Claim 1, it is not possible for Substitute Claim 24 to read on nips where both rollers are heated to an elevated temperature. Additionally, Substitute Claim 24 adds a limitation of a nip load ranging from about 20 pli to about 500 pli.

The substantive amendments in Substitute Claim 24 are narrowing in nature, and the only other amendments are non-substantive, to correct printer's errors with

no effect on scope. Therefore, there is no broadening of scope in the amendments of Substitute Claim 24.

**B. Substitute Claim 25 Does Not Enlarge Scope**

Claim 2 recites a nip load ranging from about 20 to about 500 pli. In contrast, substitute Claim 25 recites a nip load ranging from about 20 to about 90 pli. Since the range in Substitute Claim 25 is narrower than the range in Claim 2, the amendments in Substitute Claim 25 are narrowing in nature. Since there are no other amendments in Substitute Claim 25, Substitute Claim 25 does not contain any broadening amendments.

**C. Substitute Claim 26 Does Not Enlarge Scope**

The amendments in substitute Claim 26 do not delete any of the limitations of Claim 6. Instead, the amendments only add a new limitation not previously recited in Claim 6, namely wherein said elevated temperature is at least about 480° F. This does not broaden the scope of substitute Claim 26 relative to original Claim 6. Therefore Substitute Claim 26 does not contain any broadening amendments.

**D. Substitute Claim 27 Does Not Enlarge Scope**

The amendments in substitute Claim 27 do not delete any of the limitations of Claim 7. Instead, the amendments only add new limitations not previously recited in Claim 7, namely that the counter roller is not heated to the elevated temperature, and the elevated temperature is at least 400° F. This does not broaden

the scope relative to original Claim 7. Therefore, Substitute Claim 27 does not contain any broadening amendments.

## **V. CLAIM CONSTRUCTION**

For purposes of this Motion, Patent Owner adopts the claim constructions as set forth in the Decision Granting Institution. The amendments in the Substitute Claims do not add any terms that are not already defined, construed, or accepted in this proceeding. Therefore the Substitute Claims do not require any additional claim construction.

## **VI. OBVIATED GROUNDS OF UNPATENTABILITY**

Petitioner's challenge to the '142 patent includes three grounds of unpatentability. Ground 1 challenges Claims 1, 2, and 5-23 based on *Fugitt* and *Papermaking*. (Pet., p. 6). Ground 2 challenges Claims 1, 2, and 4 based on *Fugitt*, *Papermaking*, and *Gratton*. (*Id.*). Ground 3 challenges Claim 4 based on *Fugitt*, *Papermaking*, and *Papermaking II*. (*Id.*). The amendments in each of the Substitute Claims address each one of the grounds of unpatentability as explained in detail below.

### **A. Ground 1 and Substitute Claim 24**

In Ground 1, Petitioner challenges Claim 1 based on *Fugitt* and *Papermaking*. Petitioner contends *Fugitt* discloses hot-hard calendering because the dry stack calender 36 in *Fugitt* may be steam heated. (Pet., pp. 30-31; *see also*

Ex. 1004, [0026])). However, Substitute Claim 24 recites that a contact surface of only the thermo-roller is heated to an elevated temperature and the counter roller is not heated to the elevated temperature.

*Fugitt* does not disclose a calender where only the contact surface of the thermo-roller is heated to an elevated temperature or that the counter roller of the calender is not heated to the elevated temperature. Instead, *Fugitt* states that the rolls (plural) of the calender may be “steam heated.” (Ex. 1004, [0026])). There is nothing in *Fugitt* that suggests only one of the rolls in any of the nips of the calender is heated. *Papermaking* describes multi-nip calenders with several thermo-rolls, but it does not mention a multi-nip calender with only a single thermo-roll in any given nip. (Ex. 1005, 127:24-25). *Papermaking* includes a section that specifically discusses multi-roll hard-nip calenders like the one in *Fugitt*, but it does not mention heating or thermo-rollers. (Ex. 1005, pp. 54-60).

Petitioner argues that *Fugitt* discloses a thermo-roller, and indicates the roller arranged opposite the thermo-roller in *Fugitt*’s dry stack calender acts as a counter roller. (Pet., p. 31). Patent Owner disagrees to the extent that Petitioner is implying the counter-roller in *Fugitt* is not heated. It is heated, because as pointed out above *Fugitt*, indicates the rolls (plural) can be heated, without any suggestion of deviating from the normal multi-nip calender with several thermo-rolls described in *Papermaking*. (Ex. 1004, [0026]); Ex. 1005, p. 127, lns. 24-25).

*Fugitt* and *Papermaking* fail to disclose any calender nip wherein a contact surface of only the thermo-roller is heated to an elevated temperature and the counter roller is not heated to the elevated temperature, as recited in Substitute Claim 24. Therefore, there can be no reason or rationale as to why it would have been obvious to one having ordinary skill in the modify *Fugitt* to have only a single heated roller, and thus a *prima facie* case of obviousness with respect to the combination of *Fugitt* and *Papermaking* as it relates to Substitute Claim 24 cannot be established. (*Ball Aerosol v. Ltd. Brands*, 555 F.3d 984 (Fed. Cir. 2009); *see also In re Van Os*, 844 F.3d 1359, 1361 (Fed. Cir. 2017) (“Absent some articulated rationale, a finding that a combination of prior art would have been ‘common sense’ or ‘intuitive’ is no different than merely stating the combination ‘would have been obvious.’”).

In addition, Substitute Claim 24 recites “applying a nip load to the paperboard substrate ranging from about 20 pli to about 500 pli.” With the proper unit conversion from kN/m to pli, *Papermaking* discloses nip loads ranging from 57.1 to 228.6 pli, which is not stated as being particularly relevant to cartonboard. (*See* Ex. 1005, p. 72; Ex. 2003, ¶105). Further, *Papermaking* gives a nip load value that can be exceeded, 100kN/m (571 pli), on page 82, which may be relevant to cartonboard, but this is wholly outside the range recited in Substitute Claim 24. (*Id.*).

It is improper to combine the *Papermaking* nip load range of 57.1 to 228.6 pli with *Fugitt*. Specifically, the relevant teachings of a basis weight of 130 lbs/3000 ft<sup>2</sup>, a bulk of 12 points, and a smoothness of PPS 102 of 1.5 microns in *Fugitt* are taken from Example 3 in *Fugitt*. (Ex. 1004, [0057]). But Example 3 in *Fugitt* pertains to SBS board. (*Id.* at [0053]). In contrast, the nip load range 57.1 to 228.6 pli from *Papermaking* pertains to wood-containing paper grades, a completely different kind of paper product from the wood-free SBS board in Example 3 of *Fugitt*. (See Ex. 1005, p. 72; Ex. 2005, p. 32, lns. 22-24). Petitioner has not justified why it uses a nip load range for wood-containing paper grades from *Papermaking* in Ground 1, but basis weight, bulk, and smoothness for SBS board provided by *Fugitt*. (*Id.*; Ex. 1004, [0053], [0057]). The concoction constitutes impermissible hindsight at best.

In his deposition, Petitioner's expert, Carl Zotterman, demonstrates the inappropriateness of picking and choosing properties from SBS with nip loads for wood-containing paper grades. ("Zotterman Deposition") (Ex. 2005). Zotterman explained at length that SBS board is made from a kraft process, SBS board is a wood-free paper, and that it has substantially different yield, bulk characteristics, and light fastness from wood-containing paper products. (Ex. 2005, 32:15-34:24). Patent Owner notes that *Papermaking* gives the same nip load range for WFC (woodfree coated papers, a third type of paper product from wood-containing

paper grades and from SBS) on page 76, as for wood-containing paper grades on page 72. (Ex. 1005, pp. 72, 76). WFC is similarly irrelevant to *Fugitt's* SBS in Example 3, as WFC is in a completely different branch of the paper products family. This can be seen in the diagram in paragraph 57 of the Zotterman Declaration, where SBS, solid bleached board, is a member of the Paperboard Grades, but WFC is not. (Ex. 1003, ¶ 57).

In view of the foregoing, *Fugitt* and *Papermaking* do not render Substitute Claim 24 obvious. Substitute Claim 24 is therefore patentable over *Fugitt* and *Papermaking*.

#### **B. Ground 1 and Substitute Claim 25**

Ground 1 challenges Claim 2 based on *Fugitt* and *Papermaking*. Substitute Claim 25 recites a nip load ranging from about 20 pli to about 90 pli. *Fugitt* does not specify any particular nip loads. Petitioner relies upon *Papermaking* for the nip load range recited in Claim 2. (Pet., pp. 39-40). But *Papermaking* discloses nip loads ranging from 57.1 to 228.6 pli, which is not stated as being particularly relevant to paperboard or cartonboard, but is instead relevant to coated wood-containing paper grades and woodfree coated (WFC), paper grades that are both outside of the SBS context of Example 3 in *Fugitt*. (See Ex. 1005, pp. 72, 76). (Ex. 1004, [0053], [0057]; Ex. 2003, ¶105). Relevant to cartonboard, *Papermaking* gives a nip load value that can be exceeded, 100kN/m (571 pli), on

page 82, which is again wholly outside the range recited in Claim 2 or Substitute Claim 25. (*Id.*). For the only nip load range in *Fugitt* or *Papermaking* that even partially overlaps the range in Substitute Claim 25, namely 57.1 to 228.6 pli, Petitioner has cherry picked a nip load range out of context. (*Id.* at ¶106). That range is not relevant to paperboard and is thus irrelevant to the claims. (*Id.*). The range is for completely different paper products, *i.e.*, wood-containing paper grades and WFC in *Papermaking*, not for the SBS of *Fugitt*. (*Id.*).

The arguments provided above with respect to Substitute Claim 24 and Zotterman's testimony about wood-containing paperboard versus wood-free SBS can be readily applied to Substitute Claim 25. In view of the foregoing, *Fugitt* and *Papermaking* do not render Substitute Claim 25 obvious.

### **C. Ground 1 and Substitute Claim 26**

Ground 1 challenges Claim 6 based on *Fugitt* and *Papermaking*. Since *Fugitt* does not disclose any specific elevated temperatures in underlying Claim 1, Petitioner relies upon *Papermaking* for teachings of elevated temperatures. (Pet., p. 32-34). In Ground 1, Petitioner cites temperatures of 338° F, 392° F, and 428° F, from *Papermaking* which come from various contexts. (*Id.*). Zotterman testified that he is not aware of any reference in the prior art in this proceeding where hot oil is shown to be used for heating rollers to temperatures higher than 220° C, which converts to 428° F, and that regulations prohibit going above 204° C (399.2°

F). (Ex. 2005, 76:17-78:8). In contrast to *Fugitt* and *Papermaking*, Substitute Claim 26 recites that the elevated temperature is at least about 480° F, which is clearly well above any of the temperatures disclosed in *Papermaking* and cited in Ground 1. Since *Fugitt* and *Papermaking* do not disclose the elevated temperature as recited in Substitute Claim 26, this claim is patentable over *Fugitt* and *Papermaking*. Additionally, arguments are provided below for Substitute Claim 27 with respect to factual issues regarding paperboard properties and increased cost. These arguments also apply with even greater force of logic to Substitute Claim 26.

**D. Ground 1 and Substitute Claim 27**

Ground 1 challenges Claim 7 based on *Fugitt* and *Papermaking*. Since *Fugitt* does not disclose the specific elevated temperatures in underlying Claim 1, Petitioner relies upon *Papermaking* for teachings of elevated temperatures. (Pet., p. 32-34). *Papermaking* discloses temperatures of up to 338° F for steam heated rollers. (*Id.*). *Fugitt* states that the rollers can be steam heated, without ever giving a specific temperature in the range of temperatures achievable by steam. (Ex. 1004, [0026]).

Substitute Claim 27 recites the elevated temperature is at least 400° F, which is above 338° F. According to *Papermaking*, this is above the upper limit for steam heating and is instead in the temperature range provided for hot oil heating. (Ex.

1005, p. 98). The highest temperature stated in *Papermaking* for oil is 220° C, which converts to 428 °F. (*Id.*).

It would not have been obvious to modify the steam heating system disclosed in *Fugitt* with the oil heating system disclosed in *Papermaking*. In order for the modification to read on Substitute Claim 27, which depends from Claim 1, the output of the modified, oil-heated combination of *Fugitt* and *Papermaking* would have to comply with the Y<sub>2</sub> curve in terms of bulk and basis weight. (Ex. 1001, 12:33-53). But such a change would affect *Fugitt*'s paperboard properties and increase cost, and thus would not be obvious to a person having ordinary skill in the art.

Regarding the paperboard properties, the Board has indicated “Patent Owner is correct that Petitioner relies on *Fugitt*'s disclosure of paperboard properties (smoothness and basis weight Y<sub>2</sub> as a function of caliper thickness) obtained without modifying the roller surface temperature.” (Paper 14, p. 26). The Board has also indicated there is a factual issue as to whether a person of ordinary skill in the art would have expected to achieve the paperboard properties disclosed in *Fugitt* if the roller temperature were increased above the level achievable by steam-heated rolls. (*Id.*).

Petitioner has not proffered any proof that the *Fugitt* paperboard properties would be achieved, aside from unsubstantiated statements by Zotterman that it is

well known. (*See, e.g.*, Ex. 2005, 71:19-72:16). No evidence in the asserted art supports Zotterman's testimony, and indeed there is strong evidence to the contrary. The following provides a physics-based explanation for what would happen to the paperboard structure in *Fugitt* if the roller surface temperature were heated beyond the temperatures for steam heating, as suggested by the Petitioner's combination of *Fugitt* with the oil heating temperatures from *Papermaking*. Specifically, as Patent Owner's expert Charles Klass states in his Supplemental Declaration (Ex. 2004), if the process in *Fugitt* were modified with heating increased from the steam heating regime into the oil heating regime, the caliper points in Example 3 of *Fugitt* would be reduced significantly. (Ex. 2004, 86). This phenomenon is well known, as shown, for example, by Zakaib et al., *Quality Improvements to Publication and Board Grades by Hot Calendering with Induction Heating*, presented at the 1997 TAPPI Newsprint Forum in Birmingham, Alabama in March 1997 (Ex. 2007). (*See* Ex. 2007, p. 61, Fig. 7). Figure 7 shows that increasing sheet temperature reduces caliper points. (*Id.*). The basic reason for higher sheet temperature reducing caliper points is explained in *Papermaking*, and relates to the deformation and softening of polymers with increasing temperature. (Ex. 1005, pp. 23-27; Ex. 2004, ¶86). Among the relevant polymers, cellulose is the most relevant to the present case. Dry cellulose softens at temperatures up to 250° C (482° F), as shown in Figure 12 of *Papermaking*. (Ex.

1005, p. 24). Softened cellulose results in lower caliper as calendering temperature is increased. Zotterman should have known this – it is taught in basic college papermaking courses. (Ex. 2004, ¶86).

The only way to prevent this loss in caliper points would be to modify the nip loading. (Ex. 2004, ¶87). But Petitioner has not explained and Zotterman has not testified **why** that change would be obvious without undue experimentation. The inventors in *Fugitt* certainly did not raise the temperature higher than that attained by steam heating at the time they were preparing the application for the *Fugitt* patent. Petitioner has simply not provided any evidence that one of ordinary skill in the art would expect the same paperboard properties if *Fugitt* were modified to use oil heating, or that one of ordinary skill in the art would have known how to modify the nip load to do so without undue experimentation.

In addition, to make the proposed modification, there are practical considerations that would weigh on one of ordinary skill in the art. Specifically, there would be capital costs and ongoing energy costs that would deter one of ordinary skill in the art from making the proposed modification. Zotterman has testified the capital cost to do this would be about \$50,000. (Ex. 2005, 81:10-8:5). Zotterman offered this figure without evidence, without citing any of the asserted art, without any statement of underlying assumptions, without any cost breakdown, and without any rationale to explain the figure. (*Id.*) This order-of-magnitude low

estimate and lack of reasoning or proof give the appearance of a self-serving, unrealistic off-the-cuff nature to Zotterman's \$50,000 figure. (Ex. 2004, ¶¶88-89). Zotterman also testified, again without evidence, that the energy cost increase would be negligible given there would be a savings in bulk. (Ex. 2005, 73:18-74:6).

In contrast, Klass provides the following cost estimate, which is formulated considering a typical SBS or FBB machine that is 7 meters (275 inches) wide and is equipped with a steam heated roll prior to modifying to heat with oil. (Ex. 2004, ¶89). Converting this calender to a high temperature oil heated calender would include:

- A new oil heater with temperature control in the range of \$500,000 to \$1 million. The information at the web site of Sigma Thermal helps to illustrate what is involved in an oil heating system. (*See* Ex. 2008).
- New high temperature rotary joints in the range of \$50,000 to \$100,000.
- Insulated supply and return piping between the oil heating device and the rotary joints on the heated calender roll in the range of \$100,000 to \$500,000 installed.
- If the oil heating source is gas, and if a gas supply is not already in place, addition of a new gas supply line at \$100,000 to \$300,000.
- If electric heating is used, there may or may not be a need for a new transformer or substation, which could be in the range of \$100,000 to \$250,000 or higher.
- I also include consideration of whether the existing calender roll is suitable for oil heating. It might be

necessary to replace the calender roll with a new roll and spare at \$300,000 to \$500,000.

(*Id.*).

In view of this itemized breakdown, at the low end, the estimated capital expenditure for converting a calender from steam heating to oil heating would be about \$650,000 (assuming there is no need to add a new heat source like gas or electrical equipment, and no need for a new calender roll and spare). (Ex. 2004, ¶90). At the high end, the estimated capital cost would be about \$2.4 million (assuming the worst-case scenarios for the operator based on my itemization above). (*Id.*). This range of about \$650,000 to about \$2,400,000 is at least an order of magnitude higher than Zotterman's \$50,000 figure.

With respect to operating cost, there would be an ongoing incremental cost for heating the oil that is higher than the cost of heating steam, given the basic principle that higher temperatures require greater energy. (Ex. 2004, ¶91). Klass introduced this basic argument in his initial Declaration. (Ex. 2003, ¶96). Zotterman testified that ongoing energy cost increase would be "totally negligible" given the cost savings from increase bulk. (Ex. 2005, 73:18-74:6). But Zotterman's testimony puts the calender heating energy cost in the context of operating cost as a whole. The theory is that if an operator can increase bulk, they therefore use less fiber, which saves some material cost and some energy cost in

preparing the fiber. However, just as with the capital cost, the wholistic operating cost is not as simple as Zotterman has made it out to be. (*Id.*).

Depending on the equipment, configuration, and utilities available for a given mill, the increase in overall operating cost for steam versus oil may or may not offset the increased calendering cost for oil heating versus steam heating. (Ex. 2004, ¶92). It is not a given that the increased calender heating energy cost would be offset, as it requires a coincidence of the right mill configuration. It would take a mill-specific, mill wide energy balance to determine how much cost offset there would be, if any, from reducing bulk. (*Id.*). And all of the foregoing is taking Zotterman's assumption of increased bulk as a given. That would not be a given to one of ordinary skill in the art at the time of *Fugitt*, since the bulk levels achieved in *Fugitt* were already exceptional for their time. (*Id.*). These matters are complicated enough for me to comfortably say one of ordinary skill in the art would not find it obvious that the increased energy cost for calender heating would be "totally negligible." Zotterman's testimony in this regard requires a coincidence of the right mill configuration, which strongly indicates he formed his testimony in this regard with the luxury of hindsight.

In short, one of ordinary skill in the art wishing to make the proposed modification would face about \$650,000 to about \$2,400,000 in capital cost, and likely at least some ongoing incremental increase in the total operating cost due to

gas or electricity to heat the oil. (Ex. 2004, ¶93). One of ordinary skill in the art at the time of *Fugitt* would be confronted with all of this cost to upgrade from steam to oil heating. Their only expectation of success would have been to produce paper that already complied with the bulk and weight basis per the  $Y_2$  curve in Claim 1 prior to the extra costs. Modifying the calender heating in *Fugitt* to convert from steam to oil heating would simply not be an obvious choice.

Since the combination of *Fugitt* and *Papermaking* would not be obvious, *Fugitt* and *Papermaking* do not disclose the elevated temperature as recited in Substitute Claim 27. Substitute Claim 27 is patentable over *Fugitt* and *Papermaking*.

#### **E. Ground 2 and Substitute Claim 24**

Ground 2 challenges Claim 1 based on *Fugitt*, *Papermaking*, and *Gratton*. The deficiencies in the combination of *Fugitt* and *Papermaking* with respect to Substitute Claim 24 have already been established above with respect to Ground 1. *Gratton* does not remedy the deficiencies of the disclosures of *Fugitt* and *Papermaking*. Patent Owner pointed out above that in Substitute Claim 24, only the contact surface of the thermo-roller is heated to the elevated temperature, and the counter roller is not heated to the elevated temperature. In *Gratton*, both rollers are heated to an identical temperature. (Ex. 1006, Fig. 1; p. 86).

The combination of *Gratton* with *Fugitt* and *Papermaking* does not teach a hot-hard calender wherein the contact surface of only the thermo-roller is heated to an elevated temperature and the counter roller is not heated to the elevated temperature as recited in Substitute Claim 24. Therefore, there is not even a *prima facie* case of obviousness of Substitute Claim 24 in view of *Gratton*, *Fugitt*, and *Papermaking*. In view of the foregoing, Substitute Claim 24 is not obvious over *Fugitt*, *Papermaking*, and *Gratton*.

**F. Ground 2 and Substitute Claim 25**

Ground 2 challenges Claim 2 based on *Fugitt*, *Papermaking*, and *Gratton*. Patent Owner explained above that *Fugitt* and *Papermaking* do not disclose the nip load range recited in substitute Claim 25. In Ground 2, Petitioner relies upon *Gratton* for the teaching of the nip load range in Claim 2. (Pet., pp. 63-64). In contrast to *Fugitt*, *Papermaking*, and *Gratton*, Substitute Claim 25 recites a nip load ranging from about 20 pli to about 90 pli. The nip loads disclosed in *Gratton* are 114.2, 228.4, 342.6, 456.8, and 571.0 pli, which define a range from 114.2 to 571.0 pli using the highest and lowest values disclosed in *Gratton* to define limits of a range. (Pet., pp. 63-34). There is no overlap between the range disclosed in *Gratton*, and the range recited in Substitute Claim 25. Since *Gratton*, *Papermaking*, and *Fugitt* do not disclose the nip load range recited in Substitute

Claim 25, under Ground 2, there is no *prima facie* case of obviousness for

Substitute Claim 25 based on *Gratton*, *Papermaking*, and *Fugitt*.

### **G. Ground 2 and Substitute Claim 26**

Ground 2 did not challenge Claim 6. Nonetheless Patent Owner points out that Substitute Claim 26 adds to the language of Claim 6 that the elevated temperature is at least about 480° F. In challenging the underlying Claim 1 in Ground 2, Petitioner cited *Gratton* for disclosure of elevated temperatures of 405° F, 408° F, and 411° F. (Pet., p. 58). Patent Owner notes that *Gratton* also discloses in Figure 1 roller temperatures of 210° C, which converts to 410° F. (Ex. 1006, p. 81).

In his deposition, Zotterman appears to claim that *Gratton* teaches a possible roller surface temperature of 250° C (482° F). (Ex. 2005, p. 102-103). Zotterman derives that temperature from Figure 1 in *Gratton*, which shows a graph of the temperature profile as a function of position in the web and within each of the rollers. (*Id.*). The highest temperature in this graph is less than 250° C, and is at a position fairly deep of the roller surfaces. It is not a surface temperature. *Gratton* gives the roller surface temperature in the circles to the left of the graph in Figure 1, *i.e.*, 210° C. (*Id.*) The surface temperature of the rollers is relevant, since that is the temperature controlled for calendering the web. Zotterman was simply incorrect to assert that *Gratton* discloses roller surface temperatures of 250° C

(482° F). Note that the highest roller surface temperature disclosed in *Gratton* is in Table II and has a value of 211° C (412° F), well below the 250° C (482° F) values Zotterman attempted to read into *Gratton*. (Ex. 2004, ¶1110; Ex. 1006, p. 84).

In contrast to *Fugitt*, *Papermaking*, and *Gratton*, Substitute Claim 26 recites that the elevated temperature is at least about 480° F, which is well above any of the roller surface temperatures from *Papermaking* cited in Ground 1, and well above any of the roller surface temperatures from *Gratton* temperatures cited in Ground 2. Since *Fugitt*, *Papermaking*, and *Gratton* do not disclose the elevated temperature as recited in Substitute Claim 26, Substitute Claim 26 is patentable over *Fugitt*, *Papermaking*, and *Gratton*.

#### **H. Ground 2 and Substitute Claim 27**

Ground 2 did not challenge Claim 7. Nonetheless, Patent Owner points out that Substitute Claim 27 recites that the counter roller is not heated, and the elevated temperature is at least 400° F.

Ground 2 combines *Gratton* with *Papermaking* and *Fugitt*. Patent Owner has already pointed out above in Ground 1 that the combination of *Fugitt* and *Papermaking* would not make the temperature recited in Claim 27 obvious. In *Gratton*, both rollers in the nip of the calender are heated. (Ex. 1006, Fig. 1; p. 86).

Claim 1 and *Fugitt* both outclass *Gratton* on every metric, so it would not be obvious to modify *Fugitt* with *Gratton* in the manner suggested by Petitioner, because the extra heat would downgrade the paperboard structure of *Fugitt* Example 3 out of the Y<sub>2</sub> area of Claim 1. (Ex. 2003, ¶137). This would all be in a hindsight driven attempt to arrive at a product in league with *Fugitt* and the equation in Claim 1. (*Id.*)

There is also a teaching against the combination of *Gratton* and *Papermaking*. *Gratton* is a research paper typical of the research work referred to in *Papermaking*, “[h]eating up both nip rolls, however, is complicated because the other roll is a deflection-compensated roll. Because of the benefits of soft-calender technology, this kind of calendering has remained very rare in spite of the amount of research work done.” (See Ex. 1005, p. 40). Given the level of one of ordinary skill in the art, it would not have been obvious to use the two-heated rollers of *Gratton* in any practical setting, let alone in combination with *Papermaking* and *Fugitt*. (Ex. 2003, ¶139). This is especially true since *Papermaking* teaches away from that combination by associating the very rare two-heated-rolls technique of *Gratton* with complications and research work. (*Id.*). Instead, *Papermaking* teaches toward using soft calendering. (*Id.*) One of ordinary skill in the art possessing copies of *Fugitt*, *Papermaking*, and *Gratton* would ignore the teachings

of *Gratton* and follow the suggestion in *Papermaking* to use a soft calendering technique, which is not relevant to Claim 1. (*Id.*).

In view of the foregoing, *Fugitt*, *Papermaking*, and *Gratton* do not constitute an obvious combination with respect to Substitute Claim 27. As such, Substitute Claim 27 is patentable over *Fugitt*, *Papermaking*, and *Gratton*.

### **I. Ground 3 and Substitute Claim 24**

Claim 4 depends from Claim 1. Although Claim 4 is not amended with a substitute claim, Substitute Claim 24 is a contingent replacement for Claim 1, and therefore the same arguments provided above with respect to Substitute Claim 24 also apply to Claim 4 for purposes of this Motion. Specifically, under Ground 1 above, the deficiencies of the combinations of *Fugitt*, and *Papermaking* with respect to Substitute Claim 24 have already been addressed. *Papermaking II* does not even discuss the temperature range in Substitute Claim 24, let alone reach the amended features of Substitute Claim 24, nor has Petitioner alleged anything about *Papermaking II* and temperature. (*See* Pet., pp. 66-67). Moreover, *Papermaking II* does not disclose the nip load range recited in Substitute Claim 24, which is also missing from *Fugitt* and *Papermaking* as explained above under Ground 1.

*Papermaking II* does not remedy the deficiencies of the combination of *Fugitt* and *Papermaking* with respect to Substitute Claim 24. Therefore, the combination of *Fugitt*, *Papermaking*, and *Papermaking II* does not render

Substitute Claim 24 obvious. For at least the same reasons, dependent Claim 4, should it become dependent on Substitute Claim 24 through the contingency of this Motion, is not obvious over *Fugitt, Papermaking*, and *Papermaking II*, and therefore would be patentable over *Fugitt, Papermaking*, and *Papermaking II*.

## **VII. CONCLUSION**

Patent Owner respectfully requests that any issued claim the Board finds to be unpatentable be replaced with its corresponding proposed substitute claim. In view of the foregoing reasons, the Substitute Claims are patentable over the cited art.

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Respectfully submitted,

/Scott D. Wofsy/

Scott D. Wofsy  
Reg. No. 35,413  
scott.wofsy@lockelord.com  
Joshua L. Jones  
Reg. No. 57,044  
joshua.jones@lockelord.com  
LOCKE LORD LLP  
1 Landmark Square, Suite 1650  
Stamford, Connecticut 06901  
Telephone: (203) 975-7505

Charles S. Baker  
*Admitted Pro Hac Vice*  
cbaker@lockelord.com  
Daniel G. Nguyen  
Reg. No. 42,933  
dnguyen@lockelord.com  
LOCKE LORD LLP  
600 Travis St., Suite 2800  
Houston, Texas 77002  
Telephone: (713) 226-1200

*Attorneys for Patent Owner*  
**WESTROCK MWV, LLC**

**CERTIFICATE OF SERVICE**

Pursuant to 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105(b), the undersigned hereby certifies that on June 19, 2024, a complete copy of the foregoing **Patent Owner's Contingent Motion to Amend**, including **Appendix A**, was served in its entirety on Petitioner's below-listed counsel of record via electronic mail at: richard.myers@stites.com.

Richard S. Myers, Jr. (Reg. No. 42,022)  
richard.myers@stites.com  
Stites & Harbison, PLLC  
401 Commerce Street  
Suite 800  
Nashville, Tennessee 37219

Dated: June 19, 2024

/Scott D. Wofsy/

Scott D. Wofsy  
Reg. No. 35,413

## **APPENDIX A**

### **LISTING OF SUBSTITUTE CLAIMS**

**Claim 1 is replaced by proposed Substitute Claim 24:**

24. (Proposed substitute for Claim 1) A method for manufacturing a paperboard structure comprising:

passing a paperboard substrate through a hot-hard calender to yield a calendered paperboard substrate, said hot-hard calender comprising a nip defined by a thermo-roller and a counter roller, wherein a contact surface of only said ~~thereto-roller~~ thermo-roller is heated to an elevated temperature of at least 250° F[[]], and wherein the counter roller is not heated to the elevated temperature, wherein said passing said paperboard substrate through said hot-hard calender comprises applying a nip load to said paperboard substrate ranging from about 20 pli to about 500 pli;

applying a basecoat to said calendered paperboard substrate to yield a basecoated paperboard substrate, said basecoat comprising a basecoat binder and a basecoat pigment; and

applying a topcoat to said basecoated paperboard substrate,

wherein said paperboard structure has a basis weight, a caliper thickness and a Parker Print Surf (PPS 10S) smoothness, said Parker Print Surf (PPS 10S) smoothness being at most 3 microns, said basis weight being at most Y<sub>2</sub> pounds per

3000 ft<sup>2</sup> , wherein Y<sub>2</sub> is a function of said caliper thickness (X) in points and is calculated as follows:

$$Y_2 = 3.71 \left[ \frac{1}{X} \right] + 13.14X - 0.1602X^2 .$$

**Claim 2 is replaced by proposed Substitute Claim 25:**

25. (Proposed substitute for Claim 2) The method of claim 1 wherein said passing said paperboard substrate through said hot-hard calender comprises applying a nip load to said paperboard substrate ranging from about 20 pli to about [[ 500]]90 pli.

**Claim 6 is replaced with proposed Substitute Claim 26:**

26. (Proposed substitute for Claim 6) The method of claim 1 wherein at least one of said thermo-roller and said counter roller comprises a metallic material, and wherein said elevated temperature is at least about 480° F.

**Claim 7 is replaced with proposed Substitute Claim 27**

27. (Proposed substitute for Claim 7) The method of claim 1 wherein said basecoat is applied to only one side of said calendered paperboard substrate, wherein the contact surface of only said thermo-roller is heated to the elevated temperature, wherein the counter roller is not heated to said elevated temperature, and wherein said elevated temperature is at least 400° F.

## **SUPPORT FOR EACH SUBSTITUTE CLAIM**

The '142 Patent claims the benefit of priority to Provisional Application No. 62/846,278 (“Priority Application”), filed on May 10, 2019. (Ex. 1001, 1:8-11). There is support in both the original disclosure for the '142 Patent and the Priority Application (Ex. 2009) for each limitation added in the proposed Substitute Claims, pursuant to 37 C.F.R. § 42.121(b)(1). The following sections describe the support in detail for each respective Substitute Claim.

### **Support for Substitute Claim 24**

Beyond correcting typographical errors in Claim 1 as published, Substitute Claim 24 adds the word “only” and the phrase “and wherein the counter roller is not heated to the elevated temperature.” This language explicitly recites the limitation provided in the claim construction of Patent Owner’s Preliminary Response (Paper 13). There, Patent Owner’s construction of “hot-hard calender” provided proof from the intrinsic record that only one roller, the thermo-roller, of the hot-hard calender has a contact surface that is heated to the elevated temperature. (Paper 13, pp. 11-18). This same proof from the intrinsic record also serves as the support in the original application for the added language in Substitute Claim 24. Rather than repeat the same information already provided in Patent Owner’s Preliminary Response, in this Motion, Patent Owner relies upon the Board’s statement in its Decision Granting Institution of *Inter Partes* Review

(Paper 14): “We can reasonably infer from the ’142 Patent’s disclosed embodiments and examples that the counter-rollers in the hot-hard calender are not heated to an elevated temperature.” (Paper 14, p. 22). In short, the Board has already determined there is support for the language added in Substitute Claim 24 regarding the counter roller not being heated to the elevated temperature.

With respect to the added language “wherein said passing said paperboard substrate through said hot-hard calender comprises applying a nip load to said paperboard substrate ranging from about 20 pli to about 500 pli” in Substitute Claim 24, there is verbatim support in original Claim 2 of the ’142 patent. (Ex. 1001, 12:56-59).

### **Support for Substitute Claim 25**

Substitute Claim 25 deletes the upper end of the nip load range in pounds per linear inch (pli) of about 500 and replaces it with about 90. The lower end in the range is about 20 pli, so the range recited in Substitute Claim 25 is from about 20 to about 90 pli. The ’142 Patent specification lists four example ranges, three of which have about 20 pli as their lower limit, and one of which has about 30 pli as its lower limit. (Ex. 1001, 5:53-62; Ex. 2009, [0033]). All four ranges have upper limits higher than 90 pli, and therefore it is clear the inventors were in possession of the invention of Substitute Claim 2, wherein the nip load ranges from about 20 to about 90 pli. In addition, 90 pli is not arbitrary, as it is specifically called out as

the nip load in the hot-hard calender in three of six detailed examples in the '142 Patent specification, which makes it the most frequent nip load used in the six examples. (Ex. 1001, 7:52-57, 8:23-28, and 8:60-65; Ex. 2009, [0053], [0060], and [0067]). Accordingly, it is clear that the inventors were in possession of the invention with nip loads ranging from about 20 to about 90 pli as recited in Substitute Claim 25 at least at the time the Priority Application for the '142 Patent was filed.

### **Support for Substitute Claim 26**

Substitute Claim 26 includes amendments which make no deletions but add the phrase “wherein said elevated temperature is at least about 480° F.” The specification for the '142 Patent provides ample support for the elevated temperature of at least about 480° F. For example, the specification discloses the surface temperature of the thermo-roller was about 480° F in Examples 1, 2, and 3. (Ex. 1001, 6:49-50, 7:19-20, and 7:56-57; Ex. 2009, [0039], [0046], and [0053]). The specification also contemplated temperatures over about 480° F, because it states the elevated temperature may be at least 400° F. This covers temperatures from 400° F up to about 480° F and beyond. (Ex. 1001, 6:2-4; Ex. 2009, [0034]). The specification contemplated the elevated temperature may even be at least 500° F, as recited in unchallenged Claim 3. (*Id.*). The foregoing stands as proof that the specification disclosed elevated temperatures for the contact surface of the thermo-

roller of about 480° F and even higher temperatures. Accordingly, it is clear that the inventors were in possession of the invention wherein the elevated temperature of the contact surface of the thermo-roller is at least about 480° F.

### **Support for Substitute Claim 27**

For the added language of Substitute Claim 27, “wherein the contact surface of only said thermo-roller is heated to the elevated temperature, wherein the counter roller is not heated to said elevated temperature,” the support is already provided above with respect to Substitute Claim 24.

For the added language of Substitute Claim 27, “wherein said elevated temperature is at least 400° F” there is support in the Priority Application, where it says “In another example, the elevated temperature may be at least 400 °F.” (Ex. 1001, 6:5-23; Ex. 2009, [0035]).