

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BILLERUD AKTIEBOLAG (PUBL)

Petitioner,

v.

WESTROCK MWV, LLC.

Patent Owner

Case No. IPR2023-01206

Patent No. 11,293,142

**DECLARATION OF ANDERS WIRÉN PURSUANT TO 37 C.F.R.
§42.64(b)(2)**

I, Anders Wirén, declare as follows:

1. I am a European Patent Attorney residing in Sweden.
2. I am familiar with and recognize what has been identified in this proceeding as Exhibits 1013, 1014, and 1015.
3. Exhibit 1013 is a true and correct copy of a document created by me using Figure 8 of U.S. Patent No. 11,293,142 (the “‘142 Patent”) and a table of data that I made from the underlying data on page 80 (including Figure 62) of Excerpts from Rautiainen, P. (2009). *Papermaking Science and Technology Book 10: Papermaking Part 3, Finishing* (2nd ed., pp. 35-42, 79-99). Paper Engineers’ Association (“*Papermaking*”).
4. Figure 62 on page 80 shows that the cartonboard grade FBB can have a bulk of $1.8 \text{ cm}^3/\text{g}$ and even $1.9 \text{ cm}^3/\text{g}$. Page 80 of *Papermaking* also discloses a basis weight range of from 150 g/m^2 (92.2 lbs/REAM) to 400 g/m^2 (245.8 lbs/REAM) for cartonboard. Since bulk is thickness or caliper divided by basis weight, the bulk values taken from Figure 62 can be plotted into a basis weight vs. caliper graph like Figure 8 in the ‘142 Patent as diagonal straight lines.
5. To plot the straight lines of *Papermaking*’s bulk values into Figure 8 of the ‘142 Patent, I selected a few basis weight values within *Papermaking*’s basis weight range. For practical purposes, these were 100 lbs/REAM, 150 lbs/REAM and 200 lbs/REAM (see the first column of the table in Exhibit 1013), but could – for the purpose of drawing the straight lines – have been any values plottable into Figure 8. After a simple conversion to metric units using the conversion factor of 1.6275 (thereby obtaining the values of the second column of the table in Exhibit 1013), I multiplied these basis weight values with the bulk values ($1.8 \text{ cm}^3/\text{g}$ and $1.9 \text{ cm}^3/\text{g}$) to obtain the thickness values (μm) of the fourth column of the table in Exhibit 1013. I

then converted the thickness (μm) values to the caliper (points) values of the fifth column of the table in Exhibit 1013 using the conversion factor 25.4. To create the graph of Exhibit 1013, I used a blue pen to plot the caliper (points) values for the respective basis weight values (using “x” for $1.8 \text{ cm}^3/\text{g}$ and “#” for $1.9 \text{ cm}^3/\text{g}$) on the existing Figure 8 and then drew a dashed line through the x:s for $1.8 \text{ cm}^3/\text{g}$ and a dotted line through the #:s for $1.9 \text{ cm}^3/\text{g}$ using a ruler.

6. To confirm that the lines had been drawn correctly, I finally calculated the caliper (points) values for $1.8 \text{ cm}^3/\text{g}$ and $1.9 \text{ cm}^3/\text{g}$ at the basis weight of 250 lbs/REAM and plotted them into the graph in the same manner as described above using an x and a #. As these dots were intersected by the respective lines, I concluded that the lines had been drawn correctly.

7. The graph in Exhibit 1013 shows that *Papermaking* discloses cartonboards having bulk values placing them below the Y_2 curve. Exhibit 1013 is therefore significant.

8. Exhibit 1014 is a true and correct copy of a document created by me using bulk values from Table 1 in Gratton, et al., Temperature-gradient calendering of foodboard, TAPPI JOURNAL January 1988 (“Gratton”) combined with the basis weight values from Gratton’s Experimental section (page 86).

9. By first multiplying the bulk values from Gratton’s Table 1 ($1.81 \text{ cm}^3/\text{g}$ and $1.80 \text{ cm}^3/\text{g}$) with the basis weight values from Gratton’s Experimental section ($361 \text{ g}/\text{m}^2$ and $377 \text{ g}/\text{m}^2$), I arrived at the thickness (μm) values presented in the third column of the table in Exhibit 1014. I converted the thickness (μm) values to the caliper (points) values of the fourth column in the table of Exhibit 1014 using the conversion factor 25.4. Using these caliper (points) values, I then calculated Y_2 and Y_3 using the formulas of the ‘142 Patent’s claims 1 and 23, respectively.

10. Exhibit 1014 is significant because, as shown by the calculations, Table 1 in Gratton provides additional examples of paperboard that lies below the Y_2 curve and the Y_3 curve.

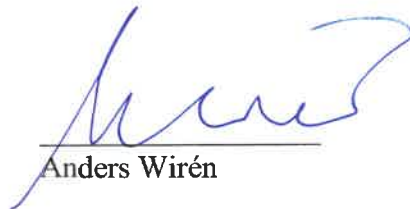
11. For all the calculations discussed above, I used an Excel spreadsheet.

12. Exhibit 1015 is a true and correct copy of an article entitled “StoraEnso Fors starts up a MHV zone controlled calendar” by Margaret Marley in Paper Technology, which is the official journal of The Paper Industry Technical Association (PITA). As shown on the top of the second page of the Marley article, it was published in February 2010.

13. Attached hereto as collective Exhibit 1 is a copy of the cover and interior publication page that confirms the journal, which included Exhibit 1015, was published by PITA in February 2010 (as volume 51, number 1). According to PITA’s web page, each of the three editions of the journal per year is delivered directly to over 1600 industry professionals who are either members or subscribers.

14. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: Oct. 2, 2024



Anders Wirén

PROOF OF SERVICE

The undersigned certifies service pursuant to 37 C.F.R. §§42.6(e) the undersigned hereby certifies that on October 2, 2024, a complete copy of the foregoing Declaration was served in its entirety on Patent Owner's below-listed counsel of record via electronic mail at: Scott.Wofsy@lockelord.com.

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Dated: October 2, 2024

/s/ Richard S. Myers, Jr.
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EXHIBIT 1



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The annual BWPA / Hawkins Wright Symposium was held at Savoy Place, London, home of the Institution of Engineering and Technology, on November 12 2009. This report outlines the various themes discussed by the lecturers and the audience, which together summarise the state of the current pulp market, future options for the industry, and predicts trends in the coming year.

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The micro servo motor has been transferred from military and nuclear applications into general manufacturing where it has provided the basis for a new generation of control systems and low-cost actuators which outperform traditional pneumatically-driven products and the micro servo is now being applied to slitting and winding machines. Servo technology can improve the efficiency and repeatability of converting machinery and reduce downtime via new levels of remote configuration.

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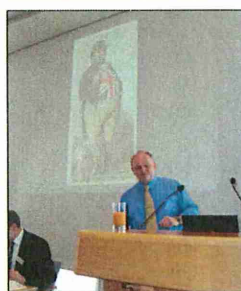
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FRONT COVER PICTURE

The Brits are coming! PITA's Barry Read represents the Association at the recent INGEDE International Symposium in Munich. INGEDE is the International Association for the deinking industry. For further information on INGEDE view their website: www.ingede.com



Working with the Carbon Trust
Industrial Energy Efficiency Accelerator Programme
Cutting the cost of making paper!



Contact Barry Read in the PITA Office for further details (barry@pita.co.uk)



StoraEnso Fors starts up a MHV zone controlled calender

A rolling programme of investment has made Fors one of the world's most successful cartonboard mills. Lightweighting and intelligent medical packaging are the order of the day.

StoraEnso Fors has completed a rebuild which will increase its capacity for lightweight cartonboard while improving the quality and cost efficiency of the BM2 line.

The Swedish mill, which makes 390,000 tpy folding boxboard on two PMs, is a world leader in the move to the lightweight grades for which environmentalists, regulators and retailers are calling - in order to minimise packaging, conserve resources and reduce costs. The Fors Performa grade, for example, is made in grammages which are 10 to 20 per cent below the weights which, traditionally, were thought to be essential for performance.

The production of lightweight grades without any compromise in strength properties, is achieved by increasing the ratio of bending stiffness to basis weight and is a function of the latest technology, from stock prep to finishing.

The BM2 rebuild includes an Andritz Küsters calender which will increase the flexibility of the production line, enabling it to produce high quality FBB of 180-380 gsm. Most folding carton is in the 200-600 gsm range and the lightweight 180 gsm grades are not far from the 160 gsm crossover point between paper and board.

The production of lighter and stiffer board structures for the most demanding uses at the high end of the market - in pharmaceutical, cosmetic and luxury packaging - is part of the StoraEnso strategy which has made Fors one of the most successful FBB mills in the world, even in the recessionary conditions of 2008-2009.

The European cartonboard market is characterised by overcapacity and low margins, a situation which has been intensified by the current economic turnaround. In 2008 European demand for cartonboard fell by 4 per cent to 6.3 million tonnes, which represents 16 per cent of total global demand of 40 million tonnes.

But, while the full force of the recession is being felt at the low-end of the sector - the white lined chipboard which is produced at StoraEnso's Barcelona Mill in Spain - value-added grades continue to make a profit, but at reduced margins.

This is achieved via rigorous capacity control, the closure of unprofitable machines and continuous investment in viable mills. Last year, for example, StoraEnso closed the 190,000 tpy FBB mill at Baienfurt in Germany and transferred its work load to Swedish and Finnish mills.

These mills - Ingerosi and Imatra in Finland and Fors in Sweden - are now the focus of a RMB 1.170M (USD 171M) investment programme which will increase pulp, board and sheeting capacity while maintaining StoraEnso's edge at the quality end of the market.

At Fors, the board machines, BM2 and BM3, have been rebuilt extensively in recent years and capacity has increased from 360,000 tpy to 395,000 tpy. The most recent rebuild focused on BM2, the smaller of the two machines, which trims at 3.72m and has capacity of 125,000 tpy. It came on stream in 1961 and has been upgraded several times: the wet end in the 1990s; headbox and winder in 2006-07 and the calender in the 2008-09 rebuild.

A calender with zone control

For the 2008 rebuild, Andritz Küsters supplied a Prime Cal Hard calender; a Prime Feeder threading system which feeds the web into the coating station; a VIB spray dampener and the rebuild of the drying section. To create space for the new calender, four drying cylinders were removed from the approach to the coater and three of them were replaced further upstream, and the beginning and middle of the drying section.

The calender has a working width of 4m and an operating speed of 700 mpm. The surface temperature of the heated roll is 300° C; and, a line force ranging from 10 to 100 N/mm can be applied, depending on the grade produced.

'We are convinced that fibre-based packaging will take over from plastics and other fossil fuel-based packaging', says StoraEnso.

MHV technology enables precise profiling even at the roll edge and over the full line load range.

The production of lightweight grades without any compromise in strength is achieved by increasing the ratio of bending stiffness to basis weight.



Expanding markets: a Stora Enso Discbox Slider



A PrimeRoll zone-controlled roll in the new BM2 calender

The new calender is equipped with MHV zone-controlled rolls which were developed by Eduard Küsters and are installed on several StoraEnso machines, including Langerbrugge PM3. PrimeRoll Multi HV technology includes a precise profiling system with the capacity to provide long and short-wave cross-section corrections, even at the roll edge and over the full line load range.

Profile corrections can be carried out while the calender is running at high speed - no need to decelerate. They equal the resolution of the best precision profiling systems and can also be run - without expenditure of energy - at high roll temperatures.

The BM3 production line

BM3, a 6m machine with a speed of 800mpm, has also been rebuilt several times over the last 10 years. The new coater of 1999 was followed by drying section rebuild by Kadant in 2004-05; and, in 2008 a wet end rebuild which included the upgrade of the middle ply headbox by Vaahto. Quality and productivity is enhanced by an on-line, condition monitoring system which was installed by SPM Instruments. It is based on 438 measuring points, five VCM continuous measuring units and more than 10 kilometers of cable.

With this technology Fors can produce the highest quality cartonboard on the market, value added grades which are returning a reasonable profit in a difficult marketplace. This is, moreover, a market segment with positive, long-term growth, even in the mature markets of the West, where:

- Fibre based packaging is gaining market share from less eco-friendly materials which are made from non-renewable raw materials and are not recyclable. A StoraEnso life cycle analysis shows that its fibre based packaging - made in mills with a high ratio of bio-energy - has a very

small carbon footprint. In fact, it accounts for only 3-10 per cent of the carbon footprint produced by the entire package and its contents. This is a 'huge draw' in the marketplace.

- The high quality packaging sector - for healthcare, pharmaceuticals, cosmetics and luxury goods - is growing faster than the market average.

To maintain its market leadership, StoraEnso also invests heavily in innovation; and, in 2008 the buzz words in R&D were: future packaging solutions, biorefinery, operations efficiency and sustainability.

2008 was the year in which Pharma DDSi, an intelligent pharmaceutical pack developed by StoraEnso won the the annual packaging award of Europe's Healthcare Compliance Packaging Council.

The packaging material has an embedded microchip which can beep to remind the patient to take a pill and records the precise date, time and dose taken. This data can be transferred by mobile phone to doctor or drugs company to assess the efficacy of the medication.

In September 2008, StoraEnso established fibre based packaging as a strategic priority. 'We are convinced that fibre-based packaging will take over from plastics and other fossil fuel-based packaging', says the 2008 annual report. 'Our mills are shifting production and we have outlined new focus areas for mature markets'.



An intelligent medical pack