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**Datasheet for the decision
of 30 November 2021**

Case Number: T 2496/18 - 3.3.06

Application Number: 10703769.9

Publication Number: 2376708

IPC: D21H19/20, D21H19/36,
D21H19/54, D21H19/84

Language of the proceedings: EN

Title of invention:

LOW DENSITY PAPER AND PAPERBOARD WITH TWO-SIDED COATING

Patent Proprietor:

WestRock MWV, LLC

Opponents:

- 1) Stora Enso Oyj
- 2) Holmen AB

Headword:

Low Density Paper and Paperboard/WestRock

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - (no)

Decisions cited:

T 1014/07

Catchword:



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Case Number: T 2496/18 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 30 November 2021

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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted on
16 August 2018 maintaining European Patent No.
2376708 in amended form.

Composition of the Board:

Chairman J.-M. Schwaller
Members: G. Santavicca
 R. Cramer

Summary of Facts and Submissions

I. The appeals of both opponents lie from the decision of the Opposition Division to maintain European Patent No. 2 376 708 in amended form based on the new main request filed at the oral proceedings, claim 1 thereof reading as follows:

*"1. A paper or paperboard comprising:
a paper or solid bleached sulfate (SBS) paperboard substrate having a first side and a second side; and
a first coating applied to said first side and a second coating applied to said second side to form a coated structure, wherein each of said first and second coatings includes at least one pigment, and wherein each of said pigments in said coatings is an inorganic pigment, said coated structure having a structure basis weight, a caliper thickness and a Parker Print Surf smoothness, said Parker Print Surf smoothness on each side being at most about $2\mu\text{m}$, wherein said structure basis weight is less than about Y_1 , wherein Y_1 is a function of said caliper thickness (X) in μm and is calculated as follows:*

$Y_1 = 47.44 + 0.7656X - 0.0001870X^2 \text{ g/m}^2$ ($Y_1 = 29.15 + 11.95X - 0.07415X^2$ pounds per 3000 ft^2 , where X is measured in points) and said substrate has a substrate basis weight of at least 105.8 g/m^2 (65 pounds per 3000 ft^2) with the proviso that said substrate is substantially free of chemical bulking agents."

II. In the decision, the Opposition Division decided that the claims complied with the requirements of Articles 123(2) and 83 EPC; that late-filed documents D16 (Ensocoat product sheet, publicly available in 2007)

and D22 (T. Kano: "A comparison between Oken Air Resistance-Smoothness Tester and related Tested in Relation to Measured Values", Japan Tappi Journal, p 1570-1577, (2008)) were *prima facie* relevant and thus admitted into the proceedings; furthermore the claimed subject-matter was not obvious over the closest prior art (Example 7 of D6 (JPH06341100 and its manual translation D6b) or D3 (US 2008/311416 A1)).

III. With their respective statement of grounds of appeal:

Opponent 1 (also appellant 1) maintained its objections of added subject-matter, insufficient disclosure and lack of an inventive step over D16 or D3 as closest prior art.

Opponent 2 (also appellant 2) filed two further items of evidence D23 (Pappersteknik; Fellers, Norman; KTH; pages 393-425 (1996)) and (D23a: Translation of pages as marked in D23) and maintained objections under Articles 83 and 56 EPC, the latter based on D6b/Example 7, in possible combination with declaration A1 of Per-Åke Johansson and/or D22, as regards the smoothness values.

IV. With its replies, the patent proprietor (also respondent) enclosed an updated leaflet for Ensocoat 2S (D24), to show the natural development of the Ensocoat of D16. It *inter alia* requested not to admit late filed documents D23 and D23a, and rebutted all the objections under Articles 83, 123(2) and 56 EPC.

V. In its preliminary opinion the board held *inter alia* that D20 (Pigment Coating and Surface Sizing of Paper, published in 2009, p. 64, 71, 76) was admissible, but not D23 and D23a. The objections of added subject-

matter and insufficiency of disclosure of the invention did not convince the board but the board did reject the objection of lack of inventive step based in particular on D6b/Example 7 as representing the closest prior art.

- VI. In response thereto, the respondent enclosed an annotated Figure 3 and argued that D6b would not lead to the claimed invention.
- VII. At the oral proceedings, which took place on 30 November 2021, the question whether the subject-matter of upheld claim 1 met the requirements of Article 56 EPC was discussed, starting from document D6/D6b as closest prior art. The opponents requested that the modified figure 3 annexed to the respondent's letter of 22 June 2021 not be admitted into the proceedings and the respondent argued its case without relying upon it. Appellant 2 further requested that documents D23 and D23a be admitted into the proceedings.

The respondent accepted as a matter of fact that the skilled person starting from Example 7 of D6b **could** have arrived at the claimed paper but argued that he **wouldn't** do it without hindsight (T 1014/07 was mentioned) because Example 7 was an **optimisation**, a trade off of parameters in a much broader disclosure, whereby the skilled person was concerned with economical reasons, and would not want to use more material/fibres, or change any other parameter, as this implied a change of further parameters and properties, whereby e.g. a change in calendaring affected density and smoothness; as regards the improvement of the mechanical properties, D6b did not mention that any possible higher substrate basis weight values than those of Example 7 were desirable and the economical

reasons mentioned in [0003] of D6b taught away from increasing the substrate basis weight. In fact, a change of the latter required a change of the calendering, and thus of densification and smoothness. Indeed, if any, D6b ([0017] and [0018]) hinted at improving the mechanical properties by the use of chemical strength enhancers. Thus, there was no hint in D6b to increase the substrate basis weight without increasing the density whilst maintaining the structural base weight Y1. As regards surface smoothness, although Example 7 was closest to the claimed smoothness, even with the problems of Oken vs PPS, D6b taught away from using too much coating, and the teaching of using kaolin as coating material was merely to arrive at an Oken smoothness of 300 or more, and so this simply meant that it should be made smooth enough. In fact, example 7 was already at the top of the smoothness of D6b, but, even upon considering D2a and D22, no PPS smoothness could be accurately determined from the Oken smoothness of Example 7 of D6b, let alone by rounding (which would expand the claim beyond its limits), because the PPS smoothness was not easily relatable with the Oken smoothness, as acknowledged in the last two paragraphs of the declaration A1. In fact, the values calculated applying the formulae/diagram of D2a (J. Fiber Sci. and Tech., Japan, 53(3), 86-95 (1997), Enomae and Onabe) or D22 to the Oken smoothness of the two sides of the paper of Example 7 lay respectively above (2.1 with D2a) the limit of claim 1 or below (1.7 with D22). D6b neither disclosed nor hinted at further improving smoothness as claimed. Thus, the skilled person had no positive motivation whatsoever to make the proposed changes in Example 7 of D6b to arrive at claim 1 at issue.

The opponents maintained that [0003] of D6b belonged to the prior art and did not run against increasing the substrate base weight for economical reasons. This interpretation was contested. As a matter of fact, [0003] merely hinted at trading off between smoothness and strength properties, whilst the invention of D6b ([0006] to [0008]) was directed to good printability (depending on glossiness and smoothness), *inter alia* by using kaolin, good printing workability (depending on mechanical properties) and bulkiness (by using light calendering with nip pressures such that the density did not become higher than 1.05, thus avoiding densification). The hint to increase the substrate basis weight was implicit from the disclosure of the preferred range of from 50 to 160g/m², implying that there was a hint to increase the basis weight of the paper used in Example 7, especially towards values in the middle and higher part of the range. If D6b really hinted at using strength enhancers, there would be no need to specify a range for the substrate basis weight in D6b. This was because mechanical resistance dramatically increased with the basis weight of the substrate as apparent from e.g. D16. Also, by increasing the basis weight, i.e. by using more fibres, the density became less and below the Y1 parameter. In any case, D6b limited the density upper value and preferred lower values, and so taught away from densification. In this respect, a paper based on the preferred upper limit of the range (160g/m²) and density (0.95) of D6b, coated as in Example 7 of D6b, fulfilled all the requirements (including Y1) of claim 1 at issue. As regards the smoothness defined in claim 1, this was conventional in the art (reference was made to D1 (Invercote Createo Product sheet 2004) and D16) and even if there was any difference, it did not produce an effect. In any case, upon relying on D22

(Point 2. Experimental, 2.1(4), on page 89), which was based on coated papers with the same basis weight range as D6b, as well as on its page 90 (3.1, last sentence on Figure 11), it was apparent that there was a strong correlation between PPS and Oken smoothness, so that the log values of the smoothness of Example 7 of D6b were within the measurement errors of about 10%, and thus well within a log PPS value of below 0.3, as in upheld claim 1. Thus, there was no real difference at all, and if any, it would not be critical. This was not by chance, but because D6b had the objective of providing papers of good printability.

VIII. The final requests of the parties were as follows:

The **Appellants/Opponents 1 and 2** requested that the decision under appeal be set aside and that the patent be revoked.

The **Respondent/Patent proprietor** requested that the appeals be dismissed.

Reasons for the Decision

Main request - Inventive step

1. The patent relates (paragraph [0001]) to low density paper and paperboard having a smooth coated surface on both sides and according to paragraph [0006], the patent addresses the need for a low density paper and paperboard that provides the desired smoothness on both sides for high quality printing, while reducing raw material cost.

1.1 According to paragraph [0008], this need is fulfilled by a low density paper or paperboard as defined in

claim 1 at issue, including a fiber substrate having the defined minimum basis weight, and a coating with inorganic pigments applied to each side of the fiber substrate to form a coated structure having a Parker Print Surf (PPS 10, soft platen) smoothness on each side of at most about 2 μm , a caliper thickness and a structure basis weight functionally related by the particular relation as defined in claim 1 at issue.

2. At the oral proceedings before the board, it was common ground that D6/D6b represented the closest prior art.

2.1 D6/D6b indisputably pertains to the technical field of the patent in suit, namely "low density paper having a smooth, coated surface on both sides" [0001], and addresses the same technical problem as the patent in suit, as apparent from paragraphs [0001], last sentence; [0002], last sentence; [0003] and particularly [0007]. As apparent from the disclosure of paragraphs [0004] and [0005], D6 teaches away, respectively, from using hollow microspheres or calendering, and instead *inter alia* discloses the use of fine kaolin (an inorganic pigment according to D20) for coating the paper.

2.2 Thus, in line with the decision under appeal, D6/D6b is the most promising starting point for assessing (non)obviousness of the claimed paper/board.

2.3 It is not in dispute that Example 7 is the closest embodiment of D6b, as it discloses a base paper C (paragraph [0033], LBKP (paragraph [0031]), having a basis weight of **80** g/m² (paragraph [0031]); inorganic pigments coating compositions on both sides (see paragraphs [0039] and [0046]; **Oken** type smoothness (rather than **PPS** smoothness); physical properties as

depicted in table 1, *inter alia* mentioning structure basis weight (107.9 g/m²) and density (1.03 g/cm³) of the coated paper, from which a caliper thickness of **104.8** micrometers and a Y1 value of 125,6 m/g² (i.e. higher than the lower value of 107.9 g/m² defined in claim 1) have been calculated.

- 2.4 The process of claim 1 at issue thus **distinguishes** itself **therefrom** by the specified **PPS** smoothness on both sides and the **basis weight** of the substrate.

3. At the oral proceedings before the board, the respondent accepted that the patent solves the same problem as D6b but in an alternative way, and so provides an alternative board/paper having good enough properties. However, in the board's view, since the substrate of claim 1 at issue should have a greater basis weight than that of Example 7 of D6b, the problem formulation of opponent 2 (statement, page 10), namely the provision of a board/paper with improved mechanical properties, still appears to be the most appropriate over Example 7 of D6b, disclosing a lower weight of the basis substrate used.

4. The patent in suit in its upheld form proposes as a solution to the above formulated technical problem the paper or paperboard as defined in claim 1 at issue, which is characterised by the following distinctive features over the closest embodiment of D6b/Example 7, namely "a **Parker Print Surf smoothness**, said **Parker Print Surf smoothness on each side** being **at most about 2µm**, and a substrate having a **substrate basis weight of at least 105.8 g/m² (65 pounds per 3000 ft²)**".

5. *Success of the solution*

- 5.1 The board shares in this respect several of the objections of the opponents, namely that:
- no technical effect is disclosed (or proven) for the difference, if any, in smoothness of the claimed paper(board), let alone over D6b [0006] which aims at good printability, thus also requires good smoothness;
 - claim 1 neither specifies the coating material nor does it require a top coating, used in the examples of the patent to "further improve the surface smoothness", so that no improved smoothness can be taken into account in the formulation of the technical problem;
 - also the minimum value of the open range of claim 1 for the substrate basis weight (**at least 105.8 g/m²**) is not critical, as no particular effect whatsoever is disclosed or invoked for it. In fact the basis weight used in the examples is much higher than that of claim 1. Further, the claimed open range for the basis weight of the substrate plainly falls within the upper half part of the range for the basis substrate of D6b (from about 105 to **160 g/m²**), so that they overlap each other starting from 105.8 g/m² (i.e. from the middle part of the range of D6b) to 160 g/m²;
 - however, as argued by opponent 2, an increase of the basis weight by using more fibres implies higher mechanical strength and lower density (the density of fibres being lower than that of the coating material).

Since the paper of Example 7 of D6b (0003) is formed from a substrate basis weight of only 80 g/m², it follows that the technical problem of providing a board with improved mechanical properties is nevertheless effectively solved by claim 1.

6. *Obviousness*

6.1 It remains to be decided whether the skilled person starting from Example 7 of D6b and faced with the technical problem posed would have found any motivation within the teaching of D6b or based on common general knowledge to use a substrate with a basis weight as claimed whilst achieving/maintaining the further conditions required by claim 1 such as PPS smoothness and structure basis weight less than Y1.

6.2 For the board, the arguments of the opponents are more convincing than those of the respondent, for the following reasons:

6.2.1 [0003] of D6b acknowledges the prior art (starting with [0002]) as follows: "*from an economic point of view, it is desirable to reduce the weight of paper in order to reduce the manufacturing cost of paper and the logistic cost thereof. If the amount of the coat layer is reduced in view of a lightweight solution, it may be difficult to maintain the surface property of paper such as a glossiness. On the other hand, if the weight of a base paper, that is, the basis weight is reduced, the thickness of the paper is also reduced to cause the weakening of the body of the paper which is important as the printing workability. Therefore, both cases have the problems.*"

Irrespective of whether it belongs to the invention, the underlined sentences clearly run against the interpretation given by the respondent. Already from the second and third sentences, it is apparent that D6b does not hint at providing the mentioned problems, i.e. at reducing the coating amount or the basis weight of the substrate. Instead, it hints at avoiding the

mentioned problems, namely at trading off to maintain both a surface property such as glossiness and printing workability.

6.2.2 This is clearly apparent from the needs acknowledged by D6b in [0007], namely "a double sided coated paper which has **both trade-off qualities**, ... superiority in printability (an effect of coating glossiness) and printing workability (an effect of a higher basis weight of the substrate), and in addition, ...a high smoothness (another effect of the coating) as well as a high bulkiness (an effect of having less density)". D6b thus clearly departs from the difficulties to manufacture such double-sided coated paper in view of economics.

6.2.3 According to D6b ([0008]) this technical problem is solved by providing "a method ... without necessity of large modification of the facilities, and without using expensive raw materials and chemicals, that is, a method of obtaining a double-sided coated paper exhibiting both the **bulkiness** and the surface properties of a glossiness and a **smoothness**, by applying a coating composition mainly formed from fine kaolin having a specific particle size as a finish coat layer and then carrying out a light calendering treatment thereto". Paragraph [0009] makes it even more apparent that the object of D6b is a "double-sided, coated paper which is bulky and is excellent in printing suitability (i.e. its body should not be weak, but resistant to the conditions of the printing) with a high glossiness and a high smoothness".

6.2.4 Since bulkiness, printing suitability and smoothness are the guiding criteria of D6b, the disclosure therein for coating amounts and weight of the basis substrate

(50-160 g/m²) must be appropriate for the purposes of D6b, and would thus be used by the skilled person also for making further embodiments within the teaching of D6b. In particular, the guiding criteria "**bulky**" would not lead the skilled person to use a calendering which could densify the paper.

- 6.2.5 More particularly, to achieve its objective, D6b teaches to apply the following materials/measures:
- kaolin, average particle size 0.3-0.8 µm, to develop **smoothness** on the coated film ([0011]), whereby the lower the size the better the **smoothness**,
 - a coating amount of 6 to 12 g/m² ([0017]), whereby the higher the amount the better the **smoothness**,
 - a base paper ([0018], last sentence), such as bleached kraft pulp, having a basis weight ranging from 50 to **160** g/m²,
 - a nip pressure in the light calendering (paragraphs [0024] and [0025]) of 40 to 60 kg/m, to ensure that the density of the coated paper is 1.05 g/cm³ or less, preferably in the range of from 0.95 to 1.05 g/cm³ (i.e. the bulkier the better); and that
 - the smoothness is 300 seconds or more, preferably 320 to 1000 seconds (i.e. the higher the better).

- 6.2.6 Thus, the skilled person starting from Example 7 of D6b with the objective to comply with the printing suitability requirement would obviously increase the basis weight of the substrate, and thereby improve its mechanical properties, as D6b discloses, in relation to printing workability, that a reduction of the weight of the basis paper should be avoided. He would thus apply all values falling within the given range up to 160 g/m², *a fortiori* those in the middle part of the range (namely about 105 g/m²), as this is expressly suggested or implied as preferable by the range defined in D6b.

Thereby, the skilled person would inevitably expect that providing more fibres improves the mechanical strength and also the bulkiness, seen that the density of the fibres is less than that of the coating material. Thus, any substrate basis weight $> 80 \text{ g/m}^2$ within the range of D6b was an option at hand for the skilled person within the disclosure of D6b alone.

6.2.7 It follows from the foregoing that the rationale of the invoked decision T 1014/07 is not applicable in the present case as it deals with a different situation (see reasons, 26), where the teachings of different documents (D4, D5, D9 on the one hand and documents D1, D2, D6 or D7 on the other hand) should have been combined by the skilled person to arrive at the claimed subject-matter, i.e. part of the disclosure of one of these documents should have been replaced. Such is not the case here, where D6b discloses all the alternative features sought-for as preferred embodiments.

6.2.8 *A fortiori* the skilled person would also follow the further suggestions of D6b, such as to use coatings in order to keep smoothness as high as possible within the disclosed range (the values in Example 7 are already high, not yet the highest), and to use a light calendaring in order to maintain the sought-for good bulkiness of D6b, and so he would avoid densification.

6.2.9 As regards smoothness, it is to be noted that the claimed PP smoothness of "**at most about $2\mu\text{m}$** " is not unusual in the technical field of the patent, seen that both D1 (table on page 2) and D16 (table on page 1) (*idem* in D24, if admissible) disclose a number of paper boards having a smoothness as claimed. Moreover, concerning the PPS smoothness requirement, at least the Oken smoothness value of 890 seconds ($\log 890 = 2,95$) of

one side of the paper of Example 7, irrespective of whether D2a (**equation 13**; 4. Conclusions, fourth sentence "Thus the two followed this relationship well") or D22 (Figure **11**; 2.1(4), 3.1.(4), last sentence; 4.1(2)) is considered, appears to fulfil the condition of claim 1 at issue. Instead, the other value (720 s) ($\log 720 = 2.8573$) appears to correspond to a different value for the PPS smoothness depending on which of D2a or D22 is considered. If D22 (Fig.11) is considered, also for this Oken value its calculated corresponding PPS value will be < 2 micrometers ($\log 2 = 0.3010$). Thus, for the board, it is highly probable that at least one of the Oken smoothness values of D6b complies with the PPS smoothness requirement of claim 1 (see Figure 11 of D22). The fact that it is not possible to precisely determine whether there is actually a difference is however not decisive in the present case because, with respect to smoothness, D6b has a complete teaching for improving smoothness, as it suggests several preferred means therefor, namely:

- the adjustment of the smoothness of the base paper from 15 to 80 seconds, preferably from 20 to 70 seconds [0019],
- an appropriate coating amount for the primer coating in the range of 3 to 8 g/m² per each side [0020],
- [0017] an appropriate amount of kaolin above 6 g/m² and up to 12 g/m² for the finish coat layer, and
- the use of a blade coater for making smoother surfaces.

6.2.10 Example 7 of D6b *inter alia* uses a paper with a basis weight of 80 g/m² [0031] and a smoothness of the base paper of $F/W = 62/52$ sec [0033] (i.e. less than 80 and even less than 70 seconds disclosed as preferred upper limits); the primer coating composition of [0034], made

of only kaolin for the finish coating [0041], applied with dwell-coaters, 5g/m² of primer coating and 8g/m² of finish coating per side (i.e 10 + 16 g/m²) [0046]; and surface finishing (light calendering) at a nip pressure of 51 kg/cm [0047].

- 6.2.11 The board is of the opinion that, since the values for basis weight and smoothness of the substrate used in Example 7 of D6b are far from the preferred upper limits, and the effect of these upper limits is predictable, the skilled person facing the problem of providing alternative papers to that of Example 7 with improved mechanical properties and good smoothness would inevitably use other preferred values thereof as suggested by D6b, such as those which are plainly suitable for achieving still higher mechanical resistance for printing workability, bulkiness and good smoothness for better printability.
- 6.2.12 Furthermore, in view of the suggestion of D6b to have as high as possible smoothness for printability, a better smoothness than that of Example 7/Table 1 was thus desirable. In fact the paper of Example 7 has not the same smoothness on both sides. Whilst the value of 890 seconds appears to fulfil the smoothness required by claim 1, irrespective of whether D2a or D22 is considered, the other (720 seconds) might be below it. Hence, in the board's view, the skilled person wishing to simply obtain the same smoothness on both sides of the paper, would want to increase the lower value disclosed (720 seconds) within the suggested values (up to 1000 seconds), thereby expecting to achieve good smoothness on both surfaces, and so it would arrive at a value as claimed. Then, the alleged grey area created by the uncertainty of the relations between PPS and Oken smoothness (D2a and D22), if still any, vanishes.

6.3 It follows from the above considerations that, for the skilled person, the paper according to claim 1 at issue was an obvious modification within the whole teaching for bulkiness and smoothness of D6b.

6.4 The main (and sole) request on file is thus not allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside
2. The patent is revoked

The Registrar:

The Chairman:



A. Pinna

J.-M. Schwaller

Decision electronically authenticated