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**D E C I S I O N**  
of 27 May 1997

**Case Number:** T 0358/96 - 3.2.4

**Application Number:** 89830507.3

**Publication Number:** 0370972

**IPC:** B31F 1/07

**Language of the proceedings:** EN

**Title of invention:**  
Web embossing machine

**Patentee:**  
FABIO PERINI S.p.A.

**Opponent:**  
KAYSERSBERG S.A.

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 54, 56, 123

**Keyword:**  
"Main request: novelty (no)"  
"First auxiliary request: novelty (yes); inventive step (yes)"

**Decisions cited:**  
T 0002/83, T 0005/81, T 0056/87

**Catchword:**  
-



Case Number: T 0358/96 - 3.2.4

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.4  
of 27 May 1997

**Appellant:** KAYSERSBERG S.A.  
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**Representative:** David, Daniel  
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**Respondent:** FABIO PERINI S.p.A.  
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**Representative:** Mannucci, Gianfranco, Dott.-Ing.  
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**Decision under appeal:** Interlocutory decision of the Opposition Division  
of the European Patent Office posted on 10 April  
1996 concerning maintenance of the European  
patent No. 0 370 972 in amended form.

**Composition of the Board:**

**Chairman:** C. A. J. Andries  
**Members:** R. E. Gryc  
M. Lewenton

## Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal, received at the EPO on 22 April 1996, against the interlocutory decision of the Opposition Division, dispatched on 10 April 1996, on the amended form in which the patent No. 0 370 972 can be maintained.

The fee for appeal was paid simultaneously and the statement setting out the grounds of appeal was received on 12 August 1996.

- II. Opposition was filed against the patent as a whole and based on Article 100(a)EPC.

The Opposition Division held that the grounds for opposition cited in Article 100(a)EPC did not prejudice the maintenance of the patent in an amended version, having regard to the following documents:

- D1: Prospectus "Nouveau Lotus Petite Fleur", Sodibé and a sample of embossed tissue paper,
- D2: EP-A-265 298
- D2A: US-A-4 320 162
- D3: US-A-4 659 608
- D4: US-A-3 323 983
- D5: US-A-4 181 068
- D6: US-A-3 414 459 and
- D7: US-A-3 961 119.

- III. In his statement setting out the grounds of appeal, the appellant repeated the argumentation already given during the opposition proceedings.

In particular, he argued that, since Claim 1 of the patent in suit did not define clearly how the alignment of the protrusions should be considered and what the expression: "adjacent protrusions" exactly meant, D2 or D2A anticipated totally the claimed subject-matter.

The appellant was also of the opinion that the sample of embossed tissue paper according to D1 disclosed implicitly the machine used to manufacture said paper.

He contended also that, assuming that the invention was novel and starting from D2 as closest state of the art, the person skilled in the art would find in D4 the solution to the problem according to the invention. Therefore, in his opinion, the subject-matter of Claim 1 could not be considered as inventive in comparison of the combined teachings of D2 (or D2A) and D4.

IV. Oral proceedings took place on 27 May 1997.

The respondent (patentee) filed a main request and four auxiliary requests.

The main request was based on an amended Claim 1 and on claims 2 to 7 of the patent as granted.

The first auxiliary request was based on an amended Claim 1, on claims 2 to 6 as granted and on an adapted description.

Starting from the state of the art disclosed in D2, which he considered to be the closest to the invention, the appellant contended that the subject-matter of Claim 1 lacks novelty or at least lacks inventive step when combining the teaching of D2 with those of D4 or D5.

In reply the respondent again referred to the problem to be solved and argued that none of the cited documents clearly teaches to take advantage of a combination of particular alignments of the protrusions in order to improve the functioning of the embossing rolls.

- V. The appellant requested that the decision under appeal be set aside and the patent No. 370 972 be revoked.

The respondent requested that the decision under appeal be set aside and the patent be maintained on the basis of one of the requests filed during the oral proceedings.

- VI. The wording of Claim 1 of the main request reads as follows:

"A machine for the paper converting industry, having two embossing cylinders (3, 5), each with a plurality of parallel rows of protrusions (S) and each with a cooperating pressure roller (7, 9), to emboss a pattern onto two respective paper webs (N3, N5), said embossing cylinders (3, 5) being movable close to one another for bonding the two embossed paper webs by pressure-contact between mutually corresponding protrusions of the embossing cylinders, wherein said rows of protrusions are developed in a pattern such that each protrusion is aligned with each one of the adjacent protrusions according to lines which are all inclined with respect to a plane passing at right angles through the axis of each cylinder, thus to avoid or at least to reduce the repetition of pressure actions in localized circumferential zones of the pressure roller, characterized in that said protrusions are disposed also in such a way that each protrusion is aligned with each one of the adjacent protrusions according to lines which are all inclined with respect to the axis of the

relevant cylinder, in order to obtain a continuous and substantially uniform contact of the protrusions of one cylinder with those of the other cylinder to avoid stress concentrations and vibrations."

The wording of Claim 1 of the first auxiliary request reads as follows:

"A machine for the paper converting industry, having two embossing cylinders (3, 5), each with a plurality of parallel rows of protrusions (S) and each with a cooperating pressure roller (7, 9), to emboss a pattern onto two respective paper webs (N3, N5), said embossing cylinders (3, 5) being movable close to one another for bonding the two embossed paper webs by pressure-contact between mutually corresponding protrusions of the embossing cylinders, wherein said rows of protrusions are developed in a pattern such that each protrusion is aligned with each one of the adjacent protrusions according to lines which are all inclined with respect to a plane passing at right angles through the axis of each cylinder, thus to avoid or at least to reduce the repetition of pressure actions in localized circumferential zones of the pressure roller, characterized in that said protrusions are disposed also in such a way that each protrusion is aligned with each one of the adjacent protrusions according to lines which are all inclined with respect to the axis of the relevant cylinder, in order to obtain a continuous and substantially uniform contact of the protrusions of one cylinder with those of the other cylinder to avoid stress concentrations and vibrations, and that each protrusion is formed by a single protruding element."

## Reasons for the Decision

### 1. Admissibility of the appeal.

After examination the appeal has been found to be admissible.

### 2. *Main request*

#### 2.1 Amendments to Claim 1 (Article 123 EPC)

The new Claim 1 filed at the oral proceedings differs from Claim 1 as granted in that the following statement has been added at the end of the claim:

"...in order to obtain a continuous and substantially uniform contact of the protrusions of one cylinder with those of the other cylinder to avoid stress concentrations and vibrations." The addition of this statement which has a counterpart in the description of the application as filed (see in particular from line 14 of page 8 to line 20 of page 9 of the English translation) clarifies the claim and restricts the protection conferred by the patent.

Furthermore, apart from a displacement of the expression "characterized in that", the term "also" has been introduced for clarity reasons between the words "disposed" and "in" in column 5, line 21 of the patent as granted. These modifications fulfill the requirements of Article 123(2) and (3) EPC and are allowable.

2.2 Interpretation of Claim 1:

In view of the description of the specification (see on the one hand column 1, lines 28, 29 and also column 4, lines 24 to 26 and on the other hand column 4, lines 6, 7) the term: "protrusion" can be interpreted as designing:

- either a complete design or pattern (for example a flower),
- or each of the protuberances contributing to form the pattern (for example the petals of a flower taken separately),
- or a single isolated protruding element (for example a pyramidal-frustum shaped protuberance as represented in Figure 2 of the specification).

In accordance with the above interpretation, the expression "row of protrusions" means:

- either an alignment of repetitive patterns (for example a row of flowers),
- or a line formed by the protuberances of a pattern (for example a row of the analogue petals of the flowers),
- or an array of juxtaposed single protruding elements (see for example Figure 2 of the patent under appeal).

The expression "adjacent protrusions" has to be interpreted as defining two protrusions lying near each other in a determined direction without any other pressure-contact surface of the embossing cylinder interposed therebetween, i.e. two protrusions are



considered as being "adjacent" in the meaning of the invention only if the area delimited by the opposite parts of the contours of these protrusions and the opposite tangential lines to said contours remains free from any further pressure-contact surface.

### 2.3 Novelty (Article 54 EPC)

D2 describes a tip-to-tip embossing machine for the paper converting industry comprising embossing cylinders having parallel rows of protrusions in the form of flowers (see D2: Figures 2 and 3), this pattern being repeated indefinitely along two directions inclined with respect to the machine running direction (see D2: column 6, lines 5 to 7).

On Figure 2 of D2, it can be seen that the protrusions or patterns which are aligned parallel to the axis of the embossing cylinder, i.e. along line A-A, are not "adjacent" in the meaning of the invention since upper and lower parts of petals of flowers located under and above the line AA interfere between the aligned patterns, whereas the protrusions which are adjacent in the meaning of the invention, i.e. the patterns between which there is no interposed pressure-contact surface (for example the protrusions which are disposed around a central one), are aligned according to lines which are inclined with respect to the axis of the embossing cylinder (see indicated inclined lines in Figure 2).

Due to the density of protrusions per surface unit (see D2: column 6), to the numerous protruding petals forming each flower pattern, to the relatively large area covered by each flower, to the uniform distribution of said flower patterns (see D2: Figure 2) and to the inclination of the rows of patterns, it is implicit for the person skilled in the art that a continuous and substantially uniform contact is

obtained between the corresponding protrusions of the two embossing cylinders of the machine according to D2 so that stress concentrations and vibrations are also avoided.

Consequently, the subject-matter of Claim 1 is totally anticipated by the disclosure of D2 and is thus not new in the meaning of Article 54 EPC.

2.4 The main request therefore has to be rejected.

3. *First auxiliary request*

3.1 Amendments (Article 123 EPC)

Claim 1 of the auxiliary request filed at the oral proceedings differs from Claim 1 of the main request in that the following sentence has been added at the end of the claim:

"...and that each protrusion is formed by a single protruding element."

Moreover, the following passages of the description of the patent specification have been deleted:

- column 1, lines 28 and 29:

"Also lines formed by repetitive patterns are similar to rows of protrusions."

- column 4, lines 24 to 26:

"The arrangement of rows of protrusions remains valid even when the alignment is formed by repetitive patterns."

These modifications are allowable in application of Article 123 EPC.

3.2 Interpretation of Claim 1:

Due to the above-mentioned amendments, the term: "protrusion" is now to be interpreted as designating only a single isolated protruding element such as, for example, each of the pyramidal-frustum shaped protuberances shown in Figure 2 of the specification.

In accordance with said interpretation, the expression "row of protrusions" designates an array of juxtaposed single protruding elements, as shown in Figure 2, forming a row of pressure-contact surfaces (tip-to-tip surfaces) between the embossing cylinders.

3.3 Novelty:

3.3.1 D1 concerns a product manufactured by an embossing machine whereas Claim 1 refers to the machine itself. Consequently, D1 cannot anticipate the subject-matter of Claim 1.

3.3.2 D2 and D2A concern web embossing machines comprising embossing cylinders provided with protrusions each constituted by several petals forming a flower instead of protrusions formed by a single protruding element provided on the cylinders of the machine claimed in Claim 1.

3.3.3 D3, D4 and D5 do not concern a tip-to-tip embosser as described in Claim 1 but either machines for embossing a unique ply (D3 and D5) or a machine for ply-bonding (D4).

- 3.3.4 D6 discloses embossing cylinders having rows of discrete protruding elements developed in a pattern such that the successive protuberances are aligned parallel to the machine running direction (see D6: Figure 2) whereas according to the invention, the row of protrusions should be inclined with respect to the machine running direction.
- 3.3.5. The embossing surfaces of the rolls of the machine disclosed by D7 are not identical but complementary so that the projections of one roll during its rotation are receivable in mating recesses of the other roll (see D7: column 1, lines 57 to 61). The two embossed papers are not bonded between mutually corresponding protrusions of the cylinders as according to the invention but between the tip of a protrusion of a roll and the bottom of the corresponding mating recess of the other roll.
- 3.3.6 Consequently, compared to the afore-mentioned state of the art, the subject-matter of Claim 1 is new in the meaning of Article 54 EPC.
- 3.4 The closest state of the art:
- 3.4.1 When taking into account the amendments brought into Claim 1 according to the first auxiliary request, the Board cannot agree anymore with the appellant's opinion that the state of the art closest to the invention was disclosed by D2 or D2A since the embossing cylinders of the machines described in these documents comprise protrusions each having the form of an elaborated pattern (flower) instead of protrusions each formed by a single protruding element as according to the claimed invention.

Since moreover, on the surface of the cylinders of the machines known from D2 and D2A, a great number of protruded flowers (each comprising several protruding petals covering a relatively large area) are regularly distributed, a continuous and substantially uniform contact is obtained between the two cylinders so that the skilled person is not faced with the problem of stress and vibrations which is at the basis of the invention.

- 3.4.2 The Board considers that the state of the art closest to the claimed invention can be found in D6 (US-A-3 414 459) which was cited for the first time during the opposition procedure in appellant's letter of 6 June 1995.

This document discloses a web embossing machine, of the same type as the machine according to the invention, comprising embossing cylinders provided with rows of protrusions each formed by a single protruding element (see D6: Figures 2 to 3).

On a particularly preferred embodiment of a steel embossing roll for use in the process disclosed in D6 (see D6: Figures 2 to 4 and from line 68 of column 4 to line 5 of column 5), the protuberances are identical and have a flattened distal end structure. Although the protruding elements appear to be very close to each other and the distance between two successive protruding elements in the machine running direction is less than the length of each protuberance (see D6: Figure 2), there is no continuous contact between the embossing rolls during rotation because the arrays of pressure-contact areas formed by the flattened distal end of the protuberances which are aligned in rows

parallel to the axis of the rolls are separated from each other in the machine running direction by zones without contact in form of strips parallel to the axis of the rolls.

Moreover, as already mentioned above (see section 3.3.4) adjacent protuberances are also aligned in rows parallel to the machine running direction.

3.4.3 Therefore, the machine according to Claim 1 differs from the tip-to-tip embosser described in D6 in that the adjacent protruding elements of the machine according to Claim 1 are all aligned according to lines inclined with respect to both the machine running direction and the axis of the embossing cylinders.

3.5 Problem to be solved and solution.

Taking into account the above-mentioned differences between the closest state of the art and the subject-matter of Claim 1, the problem to be solved as objectively determined appears to be to avoid, with tip-to-tip embossing cylinders comprising patterns of protrusions each formed by a single protruding element the drawbacks described in the patent specification, i.e. to avoid firstly the concentration of wear on the rubberized pressure roller according to annular lines and secondly vibrations and concentrated and repeated stresses during operation (see the patent: column 1, lines 39 to 49 and column 2, lines 10 to 24).

The Board is convinced that the invention as claimed in Claim 1 brings effectively a solution to this problem.

3.6 Inventive step (Article 56 EPC).

3.6.1 The questions to be answered as regards the inventive step are not only whether the skilled person examining the prior art in the light of his general common knowledge would be provided with enough indications so that he could arrive at the solution claimed in Claim 1, but moreover whether, starting from the closest state of the art disclosed in D6, he would be incited to follow a particular teaching found in a particular prior art in order to modify the machine of D6 in the direction of the invention in expectation of the improvement he was searching (see Decision T 2/83, OJ EPO 1984, 265).

3.6.2 As already mentioned above (see section 3.3), D1 does not concern an embosser and D2 or D2A discloses machines having embossing cylinders comprising a great number of regularly distributed protrusions, each comprising several protruding elements, so that a continuous and substantially uniform contact is obtained and the problem of stress and vibrations does not exist.

The skilled person starting from the state of the art described in D6 has therefore a priori no reason to consult these prior documents. Even if he does so, he will find neither a clear indication nor a hint to solve his problem and, according to decision T 05/81 (OJ EPO 1982, 249), he will even not have the possibility of interpreting their teaching as influenced by the problem solved by the invention since this problem is neither mentioned nor even suggested and such an approach is considered merely as the result of an ex-post facto analysis which has to be avoided.

3.6.3 Since D3 and D5 concern machines for embossing a unique ply of paper between a single embossing roll and a mating roll, the skilled person cannot expect to find in this literature a solution to the problem of vibrations and stress concentrations between two cooperating identical embossing cylinders. Therefore, without any particular hint, the skilled person would also have no reason for consulting these prior art documents.

3.6.4 As far as D4 is concerned, it reveals a ply bonding machine comprising radial pegs on two complementary embossing rolls, the ends of the pegs of one roll being provided with bosses which mate with corresponding grooves in the ends of the pegs of the other roll, so as to provide very high unit pressures to compress and fuse the fibers of the paper tissue plies together.

When the skilled person searches to improve the machine of D6, there is a priori no reason why, without a particular hint, he should try to find a solution to a problem specific to tip-to-tip embossers in a document that concerns machines implementing a process of a different type (i.e. ply-bonding) under working conditions which are different, in particular with regard to the much higher pressure applied between the contact areas and with regard to the areas coming in contact (i.e. tapering surfaces mating with complementary opposite flaring surfaces as described in D4: column 1, lines 41 to 50 and column 4, lines 22 to 29, instead of a tip-to-tip contact).

Contrary to the invention, D4 teaches that the opposed flat portions (i.e. the tips) of the corresponding elements of the embossing rolls never come in contact and have very little or no pressure between them (see D4: column 4, lines 68 to 72).



In his statement of the grounds of appeal, the appellant contended also that the skilled man will learn from D4 that a continuous contact between the protrusions is obtained when the protrusions are disposed in lines which are inclined with respect to the axis of the embossing cylinders.

The Board cannot agree with this assertion because this particular disposition of the protrusions with respect to the axis of the rolls defines only partially the complete arrangement which is acknowledged as assuring a continuous contact.

In fact, D4 teaches that a continuous contact is obtained with the complete arrangement shown in its Figure 6 and described in column 3, lines 32 to 42 i.e. an arrangement resulting from the combination of alignments in two main directions, the first one being inclined with respect to the axis of the roll and the second one being parallel to the machine running direction whereas, according to the invention, the second direction of alignment of the protrusions is inclined with respect to the machine running direction.

Since, in line with the established case law of the Boards of Appeal (see in particular decision T 56/87, OJ EPO 1990, 188), the technical disclosure in a prior art document should be considered in its entirety and since it is not justified arbitrarily to isolate parts of such a document from their context in order to derive therefrom an indication distinct from the integral teaching of the document, the person skilled in the art has a priori no reason to deduce from D4 that vibrations could be avoided just by aligning the protrusions with an inclination with respect to the axis of the rolls, all the more since there is no tip-to-tip contact between the protrusions of the embossing rolls of the known ply-bonding embosser.

3.6.5 For the foregoing reasons, the Board is convinced that the step of improving the tip-to-tip embossing machine known from D6 according to the teaching of Claim 1 does not follow plainly and logically from the prior art but implies an inventive step within the meaning of Article 56 EPC.

3.6.6 Therefore the invention as described and claimed in the version according to the first auxiliary request appears to meet the requirements of the EPC and a patent can be maintained on this basis as requested by the appellant.

4. *Other respondent's auxiliary requests:*

Since the board has acknowledged the first auxiliary request as allowable, there is no need to consider the other respondent's auxiliary requests.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent in the following version:

**Claims:** 1 to 6 of the first auxiliary request filed during the oral proceedings;

**Description:** columns 1 to 4 filed during the oral proceedings;

**Drawings:** Figures 1 to 4 as granted.

The Registrar:




N. Maslin

The Chairman:



~~C. Andries~~

A.G.  


2325.D

