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**Datasheet for the decision  
of 8 April 2013**

**Case Number:** T 1215/11 - 3.3.09  
**Application Number:** 98900120.1  
**Publication Number:** 1009632  
**IPC:** B32B 31/30, B29C 53/24,  
E04D 3/35  
**Language of the proceedings:** EN

**Title of invention:**

Method to produce multi-layer plates, the relative plant and  
multi-layer plates obtained therewith

**Applicant:**

B Plas Bursa Plastik Sanayi Ve Ticaret A.S.  
Demirtas Organize San.

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step - yes"

**Decisions cited:**

-

**Catchword:**

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Case Number: T 1215/11 - 3.3.09

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.09  
of 8 April 2013

**Appellant:** B Plas Bursa Plastik Sanayi Ve Ticaret A.S.  
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**Representative:** Petraz, Gilberto Luigi  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 27 December 2010  
refusing European patent application  
No. 98900120.1 pursuant to Article 97(2) EPC.

**Composition of the Board:**

**Chairman:** W. Sieber  
**Members:** J. Jardón Álvarez  
R. Menapace

## Summary of Facts and Submissions

- I. This appeal lies from the decision of the examining division dated 27 December 2010, refusing European patent application No. 98 900 120.1.
- II. The decision was based on two sets of claims, namely a main request and an auxiliary request, filed with letters dated 5 July 2004 and 10 October 2006 respectively.

The set of 33 claims of the main request included claims directed to a method to produce shaped multi-layer plates (claims 1 to 6), to a plant for the production of shaped multi-layer plates (claims 7 to 12) and to a shaped multi-layer plate obtainable by the method of claims 1 to 6 (claims 13 to 33). Claim 1 read as follows:

"1. Method to produce shaped multi-layer plates consisting of super-imposed layers obtained by individual extrusion from raw materials (12a, 12b, 12c) in powder, granules, crystals, in liquid form, optionally with additives, each layer being able to be mono-component or multi-component, the method being characterised in that comprises:

- a first step to obtain, from the single layers, a continuous multi-layer plate (115) with a plane surface using a co-extrusion head (19) with plane lips,
- a second step to subject the flat multi-layer plate (115) emerging from the co-extrusion head (19) to a calendering pass, and thermal, chemical and dimensional stabilization,

- a third step to subject the flat continuous multi-layer plate (215) emerging from the calendering and stabilization pass to a pass of thermal adjustment and shaping, and
- a fourth step to cool and shear to size the shaped multi-layer plate (315) emerging from the pass of thermal adjustment and shaping so as to obtain shaped multi-layer plates (15) of desired length."

Claim 1 of the auxiliary request was based on claim 1 of the main request and further specified the "thermal adjustment" and the "shaping" in the third step. Similar amendments were made to the other independent claims. The claims of the auxiliary request are not relevant for the present decision.

III. The examining division did not raise a novelty objection against the claims of the main request but refused the application on the grounds that their subject-matter lacked inventive step having regard to the disclosure of the following document:

D3: EP 0 218 252 A2.

The examining division held that the method of claim 1 of the main request differed from the method of D3 in that the thermoforming step was compulsory and in that the final step of shearing the shaped multilayer plate to the desired size was specified.

The features characterising said steps were however trivial because:

- the stabilised multilayer slab/plate had to be at a temperature where it became plastic, which was a *sine qua non* condition for performing thermoforming;
- shearing/cutting to a desired size was an obvious portioning process; and
- thermoforming the continuous flat multi-layer stabilised slab/plate before the final cooling/sizing step was only an obvious simplification over first sizing and then thermoforming.

IV. On 28 February 2011 the applicant (appellant) filed a notice of appeal and paid the appeal fee on the same day. The statement setting out the grounds of appeal was filed on 6 May 2011.

The appellant requested that the decision under appeal be set aside and that a patent be granted based on the claims of amended main and auxiliary requests both filed with the statement of grounds of appeal.

Claim 1 of the main request was identical to claim 1 of the main request before the examining division. Claim 7 was amended and read as follows:

"7. Plant for the production of shaped multi-layer plates consisting of super-imposed layers made of thermoplastic resin obtained by a process of extrusion from raw materials (12a, 12b, 12c) in powder, in granules, in crystals, in liquid form, optionally with additives, each layer being able to be of the mono-component or multi-component type, the plant including at least a mixing and homogenization device (13), a cooling device (14) extrusion assemblies (17a, 17b, 17c)

to obtain the layers, a feeding assembly (36) and an extrusion head (19), the plant being characterized in that it comprises:

- a calendering assembly (20) arranged downstream of the co-extrusion head (19), having the function of thermal, chemical and dimensional stabilization of the layers (18) of the multi-layer plate (115) as it emerges flat from the co-extrusion head (19),
- a thermal adjustment and shaping assembly (21), arranged downstream of the calendering assembly (20), comprising at least shaping rollers (22) associated with heating means (23),
- a sliding surface (24) disposed downstream the thermal adjustment and shaping assembly (21) for cooling the shaped multi-layer plate (315) exiting therefrom;
- an assembly for trimming the edges (26) of the shaped multi-layer plate (315) arranged downstream the thermal adjustment and shaping assembly (21);
- an assembly (28) for shearing to size the shaped multi-layer plate (315) to obtain multi-layer plates (15) of the desired length, arranged downstream said sliding surface (24) and
- an assembly (30) to discharge and collect the shaped multi-layer plates (15) which have been sheared to size."

V. In a communication dated 21 December 2012 the board informed the appellant that, in its preliminary view, the subject-matter of claims 1 to 12 involved an inventive step. The board also raised objections concerning the drafting of claims 13 to 33 as claims directed to a "product obtainable by a process".

VI. With a letter dated 18 March 2013, the appellant filed an amended set of claims wherein claims 13 to 33 were redrafted as dependent claims and renumbered as claims 7 to 27. Previous claims 7 to 27 were renumbered as claims 28 to 33.

The set of claims of this amended main request includes two independent claims, namely claims 1 and 28. Claim 1 is identical to claim 1 of the main request before the examining division (see point II above) and claim 28 corresponds to claim 7 of the main request filed with the grounds of appeal (see point IV above). Claims 2 to 27 and 29 to 33 are dependent claims.

VII. The relevant arguments presented by the appellant may be summarised as follows:

- The reasons given by the examining division to refuse the application were based on an "*ex post facto* analysis" finding that it would have been obvious to a skilled person to obtain the invention from the teaching of D3.
  
- In fact, D3 disclosed a method to produce shaped multi-layer plates comprising simultaneous extrusion of different polymers in a single co-extrusion head. According to example 2, the composite slabs exiting the co-extrusion head were thermoformed on a thermoforming machine to obtain a shell. Although not specified, it was implicit that the method of D3 thermoformed the slabs directly emerging from the co-extrusion head, and then cooled and cut or winded the shaped slabs thus obtained.

- In contrast, the method of claim 1 strictly required that the flat multi-layer plate exiting from the co-extrusion head was directly subjected to calender pass and thermal, chemical and dimensional stabilisation before any thermal adjustment and shaping, cooling and shearing-to-size operation took place.
  
- Due to this thermal stabilisation in the shaping step, the layers did not slip against each other and did not cause surface tensions. In the plates thus obtained the inner layers did not show through, the outer surfaces did not crumble and no powder particles were released into the atmosphere. These advantages of the obtained plates due to its method of preparation were evidence of an inventive step.
  
- Document D3 would not allow the skilled person to obviously obtain the claimed invention. No mention was made in D3 of lack of cohesion of the layers due to a non-stabilised structure after co-extrusion. Delamination of the layers was indeed mentioned, but it was a different phenomenon, caused by chemical incompatibility between the polymers. The gist of D3 was to modify the chemical composition of the layers, and not to modify the steps and the sequence of steps involved in the extrusion and shaping process.

VIII. The appellant requested that the decision under appeal be set aside and that a patent be granted based on the claims of the main request filed with letter of 18 March 2013 or, alternatively, based on the claims of the auxiliary request filed on 6 May 2011 with the statement setting out the grounds of appeal.



## Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 The subject-matter of all claims has been limited to the production of shaped plates. That is to say, the alternative relating to the preparation of flat plates has been deleted from the claims.

Dependent claims 7 to 27 are directed to preferred features of the shaped multi-layer plate produced according to the method of claim 1. Support for the claims can be found in claims 14, 16 to 32 and 35 to 37 of the application as filed (WO 98/32607 A1).

Claim 28 has been further amended by specifying that the claimed plant comprises a sliding surface (24) disposed downstream from the thermal adjustment and shaping assembly (21) for cooling the shaped multi-layer plate (315) exiting therefrom, and that the assembly for trimming the edges (26) is arranged downstream from said sliding surface. This amendment is supported by the disclosure on page 11, lines 13 to 16 (see also figures 1 and 2) of the application as filed.

2.2 The amended claims therefore comply with the requirements of Article 123(2) EPC.

3. *Novelty*

The examining division did not raise a novelty objection, and the board too sees no reason to do so.

4. *Inventive step*

4.1 The present invention relates to a method to produce shaped multi-layer plates and to a plant for their production. The plates are used in the field of building construction, principally as modular elements to provide a mantle or covering.

Claim 1 is directed to a multistep method to produce shaped plates from single layers characterised in that it comprises:

- first: co-extruding the single layers using a co-extrusion head with plane lips;
- second: calendering, and thermal, chemical and dimensional stabilisation;
- third: thermal adjustment and shaping, and
- fourth: cooling and shearing to size.

4.2 Prior-art methods for preparing such shaped plates are acknowledged on page 3, lines 8 to 15 of the specification and include methods wherein:

a) the plates are shaped directly during the step of extrusion, or of co-extrusion, by an extrusion head with lips which have an outlet in the shape desired for the plate; or

b) the plates are shaped downstream of the extrusion machine, by sizing-shaping rollers placed immediately at the outlet of the extrusion head.

In both cases, the plates are shaped when the plastified material is not yet stabilised thermally, dimensionally and chemically.

Document D3, on which the examining division relied, discloses in column 2, lines 24 to 31, a method to produce multi-layer slabs and structural shapes by simultaneous extrusion of different polymers in a single extrusion head wherein one of the layers consists of a sheet of vinyl-aromatic polymer containing up to 20% by weight of an ethylenically unsaturated nitrile. The method of D3 represents therefore an example of a process of type b) above.

According to the specification of the application, the shaped plates obtained by these prior-art processes present some drawbacks due to this lack of stabilisation. Thus, the layers of the plates slip against each other and cause surface tensions resulting in plates with irregular and discontinuous tensions. Moreover, in some segments, especially if the outer layers are thin, fissures, cracks or micro-craters are generated, resulting in structurally weakened plates (see page 3, line 19 to page 4, line 25 of the application as filed).

- 4.3 The appellant saw the problem underlying the present invention in the light of this prior art as being to provide a method to produce multi-layer shaped plates of improved mechanical characteristics and high quality, such as high structural and surface resistance to stress and destructive agents, lightness, brightness, uniform thickness of all the layers, cohesion between

the layers, no cracks, micro-fissures, surface tensions, etc. (page 5, lines 7 to 13).

4.4 As a solution to this problem, the application proposes the method of claim 1 that is essentially characterised in that it requires that the flat multi-layer plate exiting from the co-extrusion head is directly subjected to calender pass and thermal, chemical and dimensional stabilisation **before** any thermal adjustment and shaping, and before cooling and shearing to size take place.

4.5 By these measures the overall thickness and/or the thickness of the individual plates are uniform over all the surface of the plate and a shaped plate wherein the layers do not slip against each other and do not cause surface tensions is obtained. The inner layers do not show through, the outer surfaces do not crumble and no powder particles are released into the atmosphere (see page 5, lines 14 to 17). The board is therefore satisfied that the above defined problem is solved by the method of claim 1.

4.6 Obviousness

4.6.1 It remains to be decided whether, in view of the available prior-art documents; it would have been obvious for the skilled person to solve this problem by the means claimed.

4.6.2 Document D3 gives no hint to the claimed method. It does not mention the possible slip of the layers due to surface tensions between the layers at the exit of the co-extrusion head. In fact D3 deals with a

different problem, namely the poor adhesion of the layers caused by chemical incompatibility between vinyl aromatic polymers and other polymers (see column 2, lines 5 to 9). D3 suggests improving the adhesion by using a vinyl-aromatic polymer modified with an ethylenically unsaturated nitrile (see claim 1). There is no suggestion in D3 to modify the known processes for the preparation of multilayer slabs in the way claimed in the application.

- 4.7 The examining division did not acknowledge an inventive step essentially because the features characterising the distinguishing steps of the claimed method, namely the compulsory thermoforming step after thermal adjustment and the shearing of the shaped multilayer plate to the desired size were somewhat trivial and only provided an obvious simplification of the method.
- 4.8 The board disagrees with the examining division. The examining division in its reasoning did not consider the advantages of the claimed process over the prior-art process. The analysis of the examining division is based more on an *ex post facto* analysis of the claimed invention. As indicated above, D3 requires the use of a specific polymer to improve adhesion of the layers and is completely silent about a modification of the process steps to improve the mechanical stability of the shaped plates.
- 4.9 Hence the board considers that, in the light of the available prior art, it would not have been obvious to a skilled person to derive the subject-matter of claim 1 from the teaching of D3.

- 4.10 Consequently, the subject-matter of claim 1 and, by the same token, of dependent claims 2 to 27 involves an inventive step within the meaning of Article 56 EPC. The same considerations apply to the subject-matter of claims 28 to 33 which are directed to a plant adapted to carry out the method of claim 1.
5. As the main request of the appellant is allowed, there is no need for the board to deal with the auxiliary request.

## **Order**

### **For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the examining division with the order to grant a patent on the basis of claims 1 to 33 of the main request filed with the letter dated 18 March 2013, after any necessary consequential adaptation of the description.

The Registrar:

The Chairman:

M. Cañueto Carbajo

W. Sieber