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## Datasheet for the decision of 13 January 2011

T 0776/08 - 3.2.07 Case Number:

Application Number: 98917002.2

Publication Number: 1042076

IPC: B05D 1/26

Language of the proceedings: EN

Title of invention:

Method for producing a thermoplastic coating

Patentee:

H.B. FULLER LICENSING & FINANCING, INC.

Opponent:

Billhöfer Maschinenfabrik GmbH & Co. KG

Headword:

Relevant legal provisions:

EPC Art. 56

Relevant legal provisions (EPC 1973):

Keyword:

"Inventive step - no"

Decisions cited:

Catchword:



Europäisches Patentamt European Patent Office

Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number: T 0776/08 - 3.2.07

DECISION
of the Technical Board of Appeal 3.2.07
of 13 January 2011

Appellant: H.B. FULLER LICENSING & FINANCING, INC.

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LINDNER I BLAUMEIER

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Decision under appeal: Decision of the Opposition Division of the

European Patent Office posted 15 February 2008 revoking European patent No. 1042076 pursuant

to Articles 101(2) and 101(3)(b) EPC.

Composition of the Board:

Chairman: H. Meinders
Members: P. O'Reilly

E. Dufrasne

- 1 - T 0776/08

### Summary of Facts and Submissions

I. Oppositions were filed against European patent
No. 1 042 076 as a whole based on Article 100(a) EPC
(lack of inventive step) and Article 100(b) EPC
(insufficiency).

The opposition division decided to revoke the patent.

The opposition division decided that the invention was sufficiently disclosed but that claim 1 of each of the main request (rejection of the opposition) and the first to fourth auxiliary requests did not involve an inventive step, even though according to the minutes of the oral proceedings before the opposition division the first auxiliary request had been withdrawn.

- II. The appellant (patent proprietor) filed an appeal against that decision.
- Description and that the decision under appeal be set aside and that the patent be maintained as granted or, in the alternative, on the basis of one of the first and second auxiliary requests filed with letter dated 10 December 2010 or on the basis of one of the amended fourth, fifth and sixth auxiliary requests filed during the oral proceedings. The third auxiliary request, filed with letter dated 10 December 2010, was withdrawn during the oral proceedings before the Board which were held on 13 January 2011.

The respondent (opponent) made no request during the appeal proceedings.

- 2 - T 0776/08

- IV. Although it had been duly summoned the respondent did not attend the oral proceedings. In accordance with Rule 115(2) EPC and Article 15(3) Rules of Procedure of the Boards of Appeal the proceedings were continued in the absence of that party. At the end of the oral proceedings the Chairman announced the decision.
- V. Claim 1 of the **main request** reads as follows (patent as granted):

"A method of laminating wherein a thermoplastic composition which has thermally been made flowable is released from a coating device (3) as a substantially continuous non-porous film without contact of the coating device with a substrate or roller, and the substantially continuous non-porous film is subsequently disposed upon the surface of a non-porous substrate (1) by means of a nip roller (5) pressing the air out from between the continuous non-porous film and the first substrate to ensure there is no air entrapment between the first substrate and the thermoplastic composition, at a coating weight ranging from 0.5  $g/m^2$  to 60  $g/m^2$ , and then laminated to a second substrate (4), wherein the complex viscosity of the thermoplastic composition at a coating temperature of less than 177°C is less than 500 poises at 1000 radians/sec and less than 1000 poise at 1 radian/sec."

Claim 1 of the **first auxiliary request** reads as follows (amendments when compared to claim 1 of the main request are depicted in bold or struck through by the Board):

- 3 - T 0776/08

"A method of laminating wherein a thermoplastic composition which has thermally been made flowable is released from a coating device slot nozzle (3) as a substantially continuous non-porous film without contact of the coating device slot nozzle with a substrate or roller, and the substantially continuous non-porous film is subsequently disposed upon the surface of a non-porous first substrate (1) by means of a release-coated nip roller (5) pressing the air out from between the continuous non-porous film and the non-porous first substrate to ensure there is no air entrapment between the non-porous first substrate (1) and the thermoplastic composition, at a coating weight ranging from 0.5  $g/m^2$  to **not more than** 60 20  $g/m^2$ , and then laminated to a second substrate (4), wherein the complex viscosity of the thermoplastic composition at a coating temperature of less than 177°C is less than 500 poises at 1000 radians/sec and less than 1000 poise at 1 radian/sec."

Claim 1 of the **second auxiliary request** reads as follows (amendments when compared to claim 1 of the **first** auxiliary request are depicted in bold or struck through by the Board):

"A method of laminating wherein a thermoplastic composition hot melt adhesive which has thermally been made flowable is released from a slot nozzle (3) as a substantially continuous non-porous film without contact of the slot nozzle with a substrate or roller, and the substantially continuous non-porous film is subsequently disposed upon the surface of a non-porous first substrate (1) by means of a release-coated nip roller (5) pressing the air out from between the

- 4 - T 0776/08

continuous non-porous film and the non-porous first substrate (1) to ensure there is no air entrapment between the non-porous first substrate (1) and the thermoplastic composition hot melt adhesive, at a coating weight ranging from 0.5 g/m² to not more than 20 g/m², and then laminated to a second substrate (4), wherein the complex viscosity of the thermoplastic composition hot melt adhesive at a coating temperature of less than 177°C is less than 500 poises at 1000 radians/sec and less than 1000 poise at 1 radian/sec."

Claim 1 of the **fourth auxiliary request** reads as follows (amendments when compared to claim 1 of the **second** auxiliary request are depicted in bold or struck through by the Board):

"A method of laminating wherein a thermoplastic hot melt adhesive which has thermally been made flowable is released from a slot nozzle (3) directly onto a first non-porous substrate (1) as a substantially continuous non-porous film without contact of the slot nozzle with a the substrate or roller, and the substantially continuous non-porous film on the non-porous first substrate (1) is subsequently disposed upon laminated to a the non-porous first substrate (1) by means of a release-coated nip roller (5) pressing the air out from between the continuous non-porous film and the nonporous first substrate (1) to ensure there is no air entrapment between the non-porous first substrate (1) and the hot melt adhesive, at a coating weight ranging from  $0.5 \text{ g/m}^2$  not more than to  $20 \text{ g/m}^2$ , and then laminated to a second substrate (4), wherein the complex viscosity of the hot melt adhesive at a coating temperature of less than 177°C is less than 500 poises

- 5 - T 0776/08

at 1000 radians/sec and less than 1000 poise at 1 radian/sec."

Claim 1 of the **fifth auxiliary request** reads as follows (amendments when compared to claim 1 of the **second** auxiliary request are depicted in bold or struck through by the Board):

"A method of laminating wherein a thermoplastic hot melt adhesive which has thermally been made flowable is released from a slot nozzle (3) as a substantially continuous non-porous film and contacted with a first non-porous substrate (1) before being contacted with a roller, without contact of the slot nozzle with a the substrate or the roller, and the substantially continuous non-porous film on the non-porous first substrate (1) is subsequently laminated to the nonporous first substrate (1) by means of a release-coated nip roller (5) pressing the air out from between the continuous non-porous film and the non-porous first substrate (1) to ensure there is no air entrapment between the non-porous first substrate (1) and the hot melt adhesive, at a coating weight ranging from 0.5  $g/m^2$  to 20  $g/m^2$ , and then laminated to a second substrate (4), wherein the complex viscosity of the hot melt adhesive at a coating temperature of less than 177°C is less than 500 poises at 1000 radians/sec and less than 1000 poise at 1 radian/sec."

Claim 1 of the **sixth auxiliary request** reads as follows (amendments when compared to claim 1 of the **fifth** auxiliary request are depicted in bold by the Board):

- 6 - T 0776/08

"A method of laminating wherein a thermoplastic hot melt adhesive which has thermally been made flowable is released from a slot nozzle (3) as a substantially continuous non-porous film and contacted with a first non-porous substrate (1) after starting advancing the first non-porous substrate by means of a drive roll and before being contacted with a roller, without contact of the slot nozzle with the substrate or the roller, and the substantially continuous non-porous film on the non-porous first substrate (1) is subsequently laminated to the non-porous first substrate (1) by means of a release-coated nip roller (5) pressing the air out from between the continuous non-porous film and the non-porous first substrate (1) to ensure there is no air entrapment between the non-porous first substrate (1) and the hot melt adhesive, at a coating weight ranging from  $0.5 \text{ g/m}^2$  to  $20 \text{ g/m}^2$ , and then laminated to a second substrate (4), wherein the complex viscosity of the hot melt adhesive at a coating temperature of less than 177°C is less than 500 poises at 1000 radians/sec and less than 1000 poise at 1 radian/sec."

VI. The documents of the opposition proceedings cited in the present decision are the following:

D1: WO-A-96/25902

D3: US-A-3 421 960

- VII. The arguments of the appellant may be summarised as follows:
  - (i) The subject-matter of claim 1 of the main request involves an inventive step.

- 7 - T 0776/08

The closest prior art document is D1. The subjectmatter of claim 1 is distinguished over the disclosure
of D1 by the features that the first substrate is nonporous and there is a nip roller pressing the air out
from between the applied continuous non-porous
thermoplastic film and the first substrate to ensure
that there is no air entrapment between the first
substrate and the thermoplastic film. D1 does not
disclose that the first substrate is non-porous. All
the embodiments of the substrate disclosed in D1 are
porous, such as textiles.

The problems to be solved are to avoid air entrapment between the first substrate and the non-porous thermoplastic film and to provide more flexibility by allowing intermediate storage of the non-porous substrate/film laminate. The problem of air entrapment does not arise in the method known from D1 since the substrate is porous and the air can thus escape through the substrate. The fact that D1 does not mention any non-porous substrates shows that the skilled person would not consider applying its teaching to these.

The opposition division argued that the measure of using a nip roller to remove trapped air belongs to the general knowledge of the skilled person. The appellant disputes this statement and notes that the opposition division did not provide any evidence to support its view, which it should have done. Furthermore, there is a prejudice for the skilled person against using a nip roller on a film as defined in claim 1. Such a film is thin and has a low viscosity so that it is easily damaged. The skilled person would not consider applying

- 8 - T 0776/08

pressure to such a film by such a device as a nip roller as this could damage the film which should remain continuous. It is surprising that it is possible to use a nip roller also on such thin films.

In its provisional opinion the Board indicated that applying a nip roller to a partly molten thermoplastic composition belongs to the general knowledge of the skilled person without, however, supplying any proof for this assertion.

The second problem that is solved is the provision of flexibility. By passing the film/first substrate laminate through a nip roll it is possible to roll up and store this laminate before it is laminated to a further second substrate in a separate operation.

By passing the combination of the thermoplastic film and the first substrate through nip rolls before lamination of the second substrate the quality of the final product is improved.

(ii) The subject-matter of claim 1 of the first auxiliary request involves an inventive step.

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that: (i) the coating device is a slot nozzle; (ii) the nip roller is release-coated and (iii) the upper limit of the range of the weight per unit area of the thermoplastic film is reduced to  $20 \text{ g/m}^2$ .

Feature (i) together with the claimed viscosity value imply that the thermoplastic compositions are highly

- 9 - T 0776/08

flowable at the coating temperature. This means that the skilled person would be even more surprised that these compositions can be nipped to a first substrate by a nip roller without damaging such a low-viscosity film.

The use of a release-coated roller as set out in feature (ii) without damaging the fragile film was not considered possible by the person skilled in the art.

The presence of feature (iii), which reduces the maximum thickness of the film, means that the skilled person would be even more surprised that a nip roller could be applied to such a thin film without damaging it.

(iii) The subject-matter of claim 1 of the second auxiliary request involves an inventive step.

This claim contains the additional feature compared to claim 1 of the first auxiliary request that the thermoplastic composition is a hot melt adhesive. The skilled person would be even more surprised that a nip roller could be applied to this type of thin low-viscosity film without damaging it.

(iv) The subject-matter of claim 1 of the fourth auxiliary request involves an inventive step.

The extra wording of this claim compared to claim 1 of the second auxiliary request eliminates the possibility that the hot melt adhesive film is first deposited on a roller and then transferred to the first substrate. This improves the control of the process. In the method - 10 - T 0776/08

according to D3 the film is deposited onto the substrate in the nip of the rollers, which does not allow good control of the process.

- (v) The subject-matter of claim 1 of the fifth auxiliary request involves an inventive step for essentially the same reasons as for claim 1 of the fourth auxiliary request.
- (vi) The subject-matter of claim 1 of the sixth auxiliary request involves an inventive step for essentially the same reasons as for claim 1 of the fourth auxiliary request.
- VIII. The respondent did not file any arguments during the appeal proceedings.

#### Reasons for the Decision

Main request

- 1. Inventive step
- 1.1 The closest prior art document is D1. This was the view of the opposition division and the appellant agrees with this, as does the Board.
- 1.2 The method according to claim 1 is distinguished over the disclosure of this document by the features that the first substrate is non-porous and that a nip roller is applied which presses air out from between the continuous non-porous film and a first non-porous substrate in order to ensure that there is no air

- 11 - T 0776/08

entrapment between the first substrate and the film. This step takes place before the combination of the first substrate and the film is laminated to a second substrate.

The opposition division considered that D1 also disclosed a non-porous first substrate as an alternative to a porous first substrate so that the method disclosed in that document is applied to either porous or non-porous substrates.

The appellant on the other hand considers that the teaching of D1 does not disclose a non-porous substrate.

The Board agrees with the appellant in this respect. The disclosure of D1 is not restricted to porous substrates (see claim 1 thereof). On the other hand, it does not mention non-porous substrates and does not disclose examples of any non-porous substrates so that there is no disclosure of these.

1.3 The opposition division considered that the problem to be solved was to improve bonding without air entrapment between a first substrate and a continuous non-porous film applied to that substrate.

The appellant considers that the problems to be solved are to avoid air entrapments when coating non-porous substrates with a non-contact coating method (see section III.1 of the grounds of appeal dated 16 June 2008) and to provide greater flexibility in allowing intermediate storage of the non-porous substrate/non-porous film laminate before its lamination to the

- 12 - T 0776/08

second substrate (as argued in the oral proceedings before the Board).

The Board accepts the argument of the appellant regarding the problems to be solved.

- 1.4 The Board considers, however, that the solution to the problems was obvious for the person skilled in the art.
- 1.4.1 Although D1 does not make reference to any non-porous substrates it does disclose in general a method of applying a film coating which is continuous and of a weight of less than  $30 \text{ g/m}^2$  to substrates. There is no indication in the document that the disclosed method cannot or should not be applied to non-porous substrates. Since the application of continuous thin films to non-porous substrates would also be useful (see paragraph [0003] of the patent in suit) the skilled person would wish to do this and would receive no negative information from D1 in this respect. The fact that none of the examples of the substrates mentioned in D1 employ a non-porous substrate cannot alone be considered to show a prejudice against such an application.
- 1.4.2 The skilled person wishing to apply the teaching of D1 to a non-porous substrate would be aware that it would be necessary to avoid the entrapment of air between the continuous film and the substrate. This problem does not arise in the case of the examples of the substrates in D1 since these substrates are porous and thus allow the air to escape through them. Even if the skilled person did not consider the problem in advance he would at the latest perceive the problem when applying the

- 13 - T 0776/08

method taught in D1 to a non-porous substrate since the resulting surface properties of the coated substrate would not be satisfactory.

- 1.4.3 The solution to this problem according to claim 1 is to provide a nip roller which exerts pressure on the continuous film and substrate and presses out any trapped air.
- 1.4.4 The opposition division considered that this measure was an obvious one that the skilled person would take based on his general knowledge.

The appellant disputes that this measure belongs to the general knowledge of the skilled person, pointing out that the opposition division provided no evidence in support of this allegation, and nor did the Board. The appellant further argues that there was a prejudice against passing a thin continuous coating film having a low viscosity as defined in claim 1 under such a roller exerting a high mechanical pressure as he would expect it to damage the film.

1.4.5 Regarding the question of whether the skilled person would know that trapped air between a film and substrate can be removed by nip rollers the Board would first note that it is a standard practice in general life when attaching an adhesive film to a sheet, e.g. a map, that the adhesive film is smoothed using the hand to remove trapped air and avoid wrinkles.

In the context of laminating films it is also standard practice to use nip rollers to effect the lamination process. This is already the case in D1 where the

- 14 - T 0776/08

lamination is carried out by nip rolls 5 (see figure 1) though in the presence of the second substrate. However, in the case for the method disclosed in D3 the thermoplastic film F meets the web W directly in the nip of the pressure laminating rolls 12 and 13 without the presence of a second substrate and while still in a plastic state (see column 2, line 51 to column 3, line 9). The film may even be still partially molten as indicated in column 3, lines 54 to 57 which refers to contact of molten film with the roll 13. This means that it is still capable of being smoothed out removing trapped air.

The process of lamination normally involves pressing at possibly an elevated temperature two layers together such that they adhere. This can involve a physical intermingling of the adjacent surfaces of the two layers in addition to a possible chemical bonding connection. Both the intermingling and the chemical bonding require that the layers are not separated by trapped air, since otherwise they would not occur. The skilled person therefore knows that when lamination is carried out by nip rolls one of its effects is to remove trapped air. The appellant admitted at the oral proceedings before the Board that this was the case. The Board therefore considers that the skilled person would recognise that the nip rolls disclosed in D1 also may have the effect of removing any trapped air during the lamination process. The same applies to the laminating nip rolls 12, 13 disclosed in D3 wherein in this case the effect would be even clearer since there is no second substrate intervening between the film and one of the rolls.

- 15 - T 0776/08

1.4.6 Since the skilled person knows that nip rolls may be used to remove trapped air the Board considers that he would apply this measure when wishing to apply the method known from D1 to a non-porous substrate which could give rise to this problem. The appellant argues that there is a prejudice for the skilled person against the application of nip rolls to a thin film of low viscosity. The Board notes, however, that no evidence of such a prejudice has been presented so that already for this reason this argument cannot be accepted. Furthermore the appellant has offered no evidence that the skilled person would consider a film of the weight per unit area specified in the claim to be thin and that its viscosity as specified in the claim to be low.

> In this respect a film having such a weight per unit area and viscosity is in any case already disclosed in D1. D1 further discloses passing such a film through nip rolls so that the weight per unit area and viscosity cannot per se be the basis of a prejudice. There remains the question of a prejudice against the application of a nip roller to such a film in the absence of a second substrate. The appellant has supplied no evidence that such a prejudice actually exists. The appellant argues that it is surprising that it is possible to apply a nip roller to a thin, low viscosity film without damaging it. This, however, is only an unsubstantiated allegation of the appellant. In this respect the Board notes that the upper limit of the weight per unit area of the film is  $60 \text{ g/m}^2$ . This value is not much less then the weight per unit area of normal A4 paper as used for instance in photocopiers which is 80 g/m<sup>2</sup>. Such paper itself passes through nip

rollers in its production process so that an argument of a prejudice based on weight is in any case not valid. Furthermore, in accordance with the case law of the Boards of Appeal (see Case Law of the Boards of Appeal, 6th Edition 2010, I.D.9.2) a technical prejudice should be widely held by experts in the field and normally demonstrated by reference to literature or to an encyclopaedia.

1.4.7 The appellant argues that the application of nip pressure to the film after coating but before lamination to a second substrate provides flexibility in the use of the laminate since it could be rolled up and stored, cf. paragraph [0037] of the patent in suit. It thus solved a further problem.

In D1, however, it is already indicated that it may be desirable to roll up and store the coated first substrate so that the lamination to the second substrate could take place in a separate operation (see page 7, lines 9 to 17). Also in D3 there is either the simple application of the film to the first substrate when passing through nip rolls (see figures 1, 2 and 4) or the application of the film to the first substrate when passing through nip rolls followed by the application of a second substrate to the other side of the film (see figure 3).

The skilled person when applying the teaching of D1 to a non-porous substrate would be aware of these teachings and would therefore also wish to have this possibility of storing coated non-porous substrates. It is clear that in order to do this any trapped air must already be removed before the coating loses its

- 17 - T 0776/08

flowability and tackiness and thus its ability to allow air removal. The skilled person is therefore incited to provide the nip roller at a position before lamination with a second substrate so as to allow for this possibility, i.e. the position shown in figure 3 of D3, whereby D3 indicates that the film has not lost tackiness (see column 3, lines 54 to 57).

- 1.4.8 The appellant argues that the separate application of pressure to the film coated first substrate and to the second substrate gave advantages regarding the quality of the laminate that is produced. The appellant has not, however, provided any evidence to support this allegation so that it need not be considered further.

  Moreover, even if evidence of a surprising effect had been supplied it still would not have altered the situation, since it would only have constituted a so-called bonus effect, i.e. one obtained by a measure which is already obvious for another reason.
- 1.5 Therefore, the subject-matter of claim 1 of the main request does not involve an inventive step in the sense of Article 56 EPC.

First auxiliary request

- 2. Inventive step
- Claim 1 of the first auxiliary request differs from claim 1 of the main request essentially in that: (i) the coating device is specified to be a slot nozzle; (ii) the nip roller is specified to be release-coated and (iii) the upper limit of the range of the weight

- 18 - T 0776/08

per unit area of the film is reduced from 60  $g/m^2$  to 20  $g/m^2$ .

With regard to feature (i) this feature is already disclosed in D1 (see page 6, lines 1 to 3) so that it cannot count towards establishing an inventive step when taking D1 as the closest prior art. Also, the argument of the appellant that this feature implies highly flowable compositions does not change the situation as there is no evidence that the skilled person was prejudiced against taking the step of using a nip roller on such compositions.

The provision of feature (ii) ensures that that the coated film does not attach itself to the roller. Since the film will still be tacky as it encounters the nip roller to allow for the escape of trapped air it is evident that it could attach preferentially to the roller rather than to the substrate. The provision of a release coating on the roller is a self-evident solution to this problem. The provision of a release-coated roller is known from D3 to solve the same problem (see column 3, lines 54 to 57). This document also shows that there was no prejudice for the skilled person against applying a release-coated roller directly to a thermoplastic film.

Also, feature (iii) is known from D1 (see page 8, lines 1 to 5). The appellant argues that there was a prejudice against using a nip roller on thin low viscosity films. The Board considers with respect to claim 1 of the main request that there is no evidence to support this argument (see point 1.4.4 above). That view also applies to the upper limit of claim 1 of this

- 19 - T 0776/08

request. Although the figure of  $20 \text{ g/m}^2$  is further from the normal paper weight of  $80 \text{ g/m}^2$  than the value of  $60 \text{ g/m}^2$  according to claim 1 of the main request, there is no evidence that this lower value encounters a prejudice.

2.2 Therefore, the subject-matter of claim 1 of the first auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

Second auxiliary request

- 3. Inventive step
- 3.1 Claim 1 of this request has the extra feature (compared to claim 1 of the first auxiliary request) that the thermoplastic composition is a hot melt adhesive.

A hot melt adhesive is the preferred thermoplastic composition for use in the method disclosed in D1 (see page 8, lines 24 to 30). The skilled person applying the teaching of D1 would hence preferentially use a hot melt adhesive.

3.2 Therefore, the subject-matter of claim 1 of the second auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

Fourth auxiliary request

- 4. Inventive step
- 4.1 Claim 1 of this request differs from claim 1 of the second auxiliary request in that the hot melt adhesive

- 20 - T 0776/08

is released directly onto the first non-porous substrate, i.e. there is no intermediate deposition onto a roller for instance, and in that the film is specified to be laminated to the first substrate and not just disposed upon it.

The appellant has pointed out that there is more than one way of applying the adhesive since it could be deposited onto an intermediate roller, or it could be released into the nip of the roller, as in the method disclosed in D3, or it could be released directly onto the substrate and subsequently passed into the nip roller as is specified in the claim.

Already in D1 the hot melt adhesive is released from the nozzle directly onto the first substrate before it passes through a nip roller so that this feature cannot add an inventive step to the subject-matter of the claim.

4.2 Therefore, the subject-matter of claim 1 of the fourth auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

#### Fifth auxiliary request

- 5. Inventive step
- 5.1 Claim 1 of this request essentially defines the same extra feature as claim 1 of the fourth auxiliary request though using other words and this was the declared intention of the appellant. The feature is likewise already disclosed in D1 and hence cannot

- 21 - T 0776/08

contribute to the presence of an inventive step in the subject-matter of the claim.

5.2 Therefore, the subject-matter of claim 1 of the fifth auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

#### Sixth auxiliary request

- 6. Inventive step
- 6.1 Claim 1 of this request essentially defines the same extra feature as claim 1 of the fourth auxiliary request though using other words and this was the declared intention of the appellant. The feature is likewise already disclosed in D1 and hence cannot contribute to the presence of an inventive step in the subject-matter of the claim.
- 6.2 Therefore, the subject-matter of claim 1 of the sixth auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

### Order

# For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

G. Nachtigall

H. Meinders