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**Datasheet for the decision  
of 21 June 2016**

**Case Number:** T 0454/13 - 3.3.05

**Application Number:** 03795576.2

**Publication Number:** 1539920

**IPC:** B01L7/00, B01L9/00

**Language of the proceedings:** EN

**Title of invention:**

SAMPLE BLOCK APPARATUS AND METHOD FOR MAINTAINING A MICROCARD  
ON A SAMPLE BLOCK

**Patent Proprietor:**

Life Technologies Corporation

**Opponent:**

Illumina, Inc.

**Headword:**

Sample block apparatus/LIFE TECHNOLOGIES

**Relevant legal provisions:**

EPC Art. 100(a), 56, 54(1), 54(2)

**Keyword:**

Novelty - (yes)

Skilled person would have combined teachings of documents from  
remote technical fields (no)

Inventive step - (yes)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
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Case Number: T 0454/13 - 3.3.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.05**  
**of 21 June 2016**

**Appellant 1:** Life Technologies Corporation  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
8 January 2013 concerning maintenance of the  
European Patent No. 1539920 in amended form.**

**Composition of the Board:**

**Chairman** H. Engl  
**Members:** A. Haderlein  
P. Guntz

## Summary of Facts and Submissions

I. The present appeals of the patentee (appellant 1) and the opponent (appellant 2) lie from the opposition division's interlocutory decision holding that European patent No. 1 539 920 in amended form and the invention to which it relates meet the requirements of the EPC.

II. The opposition division held that the patent complied with the requirement of sufficiency of disclosure, but that the subject-matter of claim 1 as granted was not novel over each of the following documents:

D1: US 5 802 856 A

D2: US 6 402 369 B1.

The first auxiliary request underlying the impugned decision was held to comply neither with the requirement of clarity of the claims nor with the requirement of novelty. The second auxiliary request was considered to comply with the requirements of the EPC in view of D1, D2 and the following documents:

D3: US 6 127 125 A

D4: US 5 430 957 A.

III. In its statement of grounds of appeal, appellant 1 requested that the decision under appeal be set aside and that the opposition be rejected. It filed eleven auxiliary requests.

IV. With its statement of grounds of appeal, appellant 2 filed the following documents:

D6: US 2002/0000294 A1

D7: US 6 394 797 B1

D8: US 5 738 165 A.

- V. In a communication, the board informed the parties of its preliminary opinion.
- VI. In response to the communication of the board, appellant 1 filed a new tenth request to replace the tenth and eleventh requests on file.
- VII. At the oral proceedings before the board, appellant 1 withdrew all auxiliary requests.
- VIII. The sole independent claim of the patent as granted reads as follows:

"1. A sample block apparatus (30) for a thermal cycler configured for use with a microcard (12) containing a plurality of samples of biological material, comprising:

a sample block (34) comprising an upper surface (52) configured for resting a microcard (12) thereon, the upper surface (52) including surface irregularities for defining spaces (54, 56) between the surface irregularities and a microcard (12) that may be positioned thereon;

a vacuum source in fluid communication with the space (54,56) between the surface irregularities and the microcard (12) positioned thereon, the vacuum source being configured to create a substantial vacuum in the spaces thereby imparting a force on the microcard (12) to retain the microcard (12) on the sample block upper surface (52); and

a temperature control system operatively connected with the sample block to cycle the sample block according to

a user-defined profile."

IX. Appellant 1 argued in essence as follows:

*Novelty*

None of documents D1 to D3 disclosed the feature of irregularities in the upper surface suitable for creating spaces between them and the microcard in order to apply a vacuum. Even if one considered a hole in the upper surface as irregularities this would not be sufficient to form spaces between these and the microcard. The contentious feature required that spaces were formed between the microcard and a part of the upper surface of the sample block opposing the microcard and being distant therefrom. A hole bored through the sample block or the heating plate did not fulfil this requirement.

*Inventive step*

If D1 was taken as the closest prior art, the starting point could not be represented by the vacuum-line alternative for fixing the substrate. The person skilled in the art would not have consulted any of documents D6 to D8 because they were from a technical field remote from the field of biological testing. The subject-matter of claim 1 therefore involved an inventive step.

X. Appellant 2 argued in essence as follows:

*Novelty*

The word "space" was not only used in the plural but also in the singular in claim 1. The expression

"irregularities" encompassed not only channels but also recesses and voids as set out in paragraph [0037] of the patent as granted. As a consequence, claim 1 also encompassed embodiments wherein a single hole was provided in the upper surface of the heating block. D1 disclosed a heating block suitable for resting a card-like object thereon, the block being suitable for a thermal cycler used in processes such as polymerase chain reaction. D1 disclosed that the substrate could be held directly against the heating plate by means of a vacuum line, the vacuum line constituting a channel in the sense of dependent claim 2 of the patent. This implied that at least a single hole was present in the upper surface of the heating plate. A single hole in the upper surface of the heating plate was suitable for creating a single space beneath the card-like object, the space being in fluid communication with a vacuum source. The remaining features of claim 1 being disclosed in D1, the subject-matter of that claim was not novel over the disclosure of D1.

The arguments with respect to document D3 were essentially the same. In particular, D3 taught that a biochip could be fixed onto a rotative plate by "vacuum adsorption", implying that the plate was provided with at least one hole in its upper surface.

D2 disclosed a thermal interface of a sample holder as depicted in Figure 3 of D2 having a profile matching closely that of the sample container. The sample container could also be a microtiter plate. Therefore, D2 disclosed a sample block whose upper surface was adapted for resting a microcard thereon and having at least one hole beneath the microcard, which hole formed a single space within which a substantial vacuum could be formed by a vacuum source.

*Inventive step*

If the board did not hold any of documents D1 to D3 to disclose surface irregularities in the sense of claim 1, it was at least obvious to include this feature in the upper surface of the sample block of any of these documents. The problem of improved temperature uniformity between the plurality of sample chambers was not solved over the hole scope claimed since the patent in suit only taught that in the case of the surface irregularities being channels temperature uniformity was improved. But even if an improvement was recognised, the subject-matter of claim 1 was obvious in view of a combination of document D1 or D2 or D3 with any of documents D6 to D8. Moreover, the subject-matter of claim 1 was also obvious when starting from D4 as the closest prior art. The skilled person was aware that in the field of semiconductor manufacturing similar problems arose compared to the technical field of the patent in suit, i.e. handling of microcards containing biological samples. This was evidenced by the passage in D1, column 12, lines 48 to 55.

D6 disclosed channels on the upper surface of a heating block. It was true that D6 mainly addressed the problem of holding a flexible substrate flat in order to facilitate the mounting of a semiconductor chip thereupon. But D6 also taught in particular in paragraph [0013] that the lying flat of the substrate guaranteed a reliable heat transfer. When looking for improved temperature uniformity the skilled person would thus have incorporated the channels disclosed in D6 in the upper surface of the plate 34 of D1.

D7 and D8 too taught that vacuum channels were well known in the art and only amounted to a different



design choice from vacuum holes. D7 disclosed in Figures 1 and 2 vacuum seals forming channels within the meaning of the patent in suit. Likewise, D8 disclosed in Figures 2 and 3 protruding portions of the upper surface constituting surface irregularities as called for in claim 1.

D4 taught solving the problem of improving temperature uniformity by surface irregularities as called for in claim 1. The support plate 31 included openings 56 in its bottom surface 55. When a vacuum was applied to these openings, the bottom surface 55 was sucked against the upper side 51 of the heat rail 13, thereby improving thermal contact between the heat rail and the support plate 31.

Hence, the subject-matter of claim 1 lacked an inventive step.

#### XI. Requests

Appellant 1 requested that the decision under appeal be set aside and that the patent be maintained as granted.

Appellant 2 requested that the decision under appeal be set aside and that the patent be revoked.

### **Reasons for the Decision**

#### 1. Novelty

##### 1.1 Document D1

1.1.1 It is not contested that D1 discloses an apparatus for a thermal cyclor configured for, i.e. suitable for, use with a microcard containing a plurality of samples of

biological material. In fact, D1 relates to the "thermal cycling of material substrates such as semiconductor wafers and flat panel displays" (see column 1, lines 14 to 19), but explicitly mentions "polymerase chain reaction processes" (PCR) as a possible field of application of the thermal cycler disclosed therein (cf. column 12, lines 47 to 55). D1 discloses a sample block or plate 34 (see Figure 3) comprising an upper surface configured for, i.e. suitable for, resting a microcard thereon and a temperature control system operatively connected with the sample block to cycle the sample block according to a user-defined profile (cf. Figure 5, reference numerals 54 and 55). D1 also discloses that the substrate can be held directly against the plate 34 with a vacuum line (see column 4, lines 38 and 39).

- 1.1.2 What is contentious between the parties is whether D1 discloses surface irregularities in the sense of claim 1 of the patent in suit.
- 1.1.3 According to appellant 2, the word "space" was not only used in the plural but also in the singular in claim 1. The expression "irregularities" encompassed not only channels but also recesses and voids as set out in paragraph [0037] of the patent as granted. As a consequence claim 1 also encompassed embodiments wherein a single hole was provided in the upper surface of the heating block since such a single hole would create a single space. By reference to the "vacuum line", D1 implicitly disclosed at least one hole in the upper surface of the plate 34 of D1 and thus a single space in the sense of claim 1.
- 1.1.4 The board agrees with appellant 2 only in so far as, by disclosing a "vacuum line" in order to hold the

substrate directly against the plate, D1 discloses implicitly that a hole is present in the upper surface of the plate 34. While such a hole could in principle be considered "surface irregularities" included in the upper surface of the plate 34, the board fails to see that such a disclosure necessarily implies the functional relationship between the vacuum source, the surface irregularities and the microcard, as required in claim 1, i.e. the "suitability" of the plate 34 to function as required.

In fact, the features "surface irregularities for defining spaces between the surface irregularities and a microcard" and "the vacuum source being configured to create a substantial vacuum in the spaces" require, as submitted by appellant 1, that, in use, spaces are formed which are delimited on the one side by the microcard and on the other side by a structural portion which the skilled person would consider to be part of the upper surface of the plate, the structural portion being opposed to the microcard and distant therefrom. There is no disclosure of such a feature in D1 either implicitly or explicitly. In particular, the hole implicitly disclosed in the surface of plate 34 of D1 could well be one that is bored through the entire plate 34 resulting also in a hole in the lower surface thereof. In such a case a vacuum channel would be present, as was argued by appellant 2. But no structural portion would be present which the skilled person would consider as a part of the upper surface of the plate, the structural portion being opposed to the microcard and distant therefrom.

The board thus concludes that the subject-matter of claim 1 is new over D1.

1.2 Document D3

D3 discloses a plate 14 on which a biochip can be fixed, the means of fixing the biochip comprising "vacuum adsorption" (column 4, lines 40 to 46). This passage can at most be construed as implicitly disclosing a hole in the upper surface of the plate 14. The disclosure of D3 thus does not go beyond the content of D1 in this respect and the subject-matter of claim 1 is novel over D3 for the same reasons as for D1 (see 1.1 above).

1.3 Document D2

1.3.1 Turning now to D2, this document discloses a sample holder 101 (see Figure 3) whose profile is said to match that of a sample container S1 (see column 13, lines 22 to 31). The sample container shown in Figure 3 is a reaction tube or vial. D2 also teaches that the sample container could be a microtiter plate (column 13, lines 10 to 15), i.e. a card-like object comparable to a microcard as called for in claim 1 of the patent in suit. D2 thus teaches that the thermal interface of the sample holder 101 could be adapted so that it matches a microtiter plate.

1.3.2 D2 is however silent as to the result of such an adaptation. In particular, D2 does not disclose that such an adaptation would necessarily result in surface irregularities comprising a structural portion which the skilled person would consider to be part of the upper surface of the holder, the structural portion being opposed to the microtiter plate and distant therefrom.

- 1.3.3 The appellant also argued that the sample container S1 depicted in Figure 3 of D2 should be considered a microcard in the sense of the patent in suit because the patent explicitly stated that the microcard could contain only a single sample chamber.

It is true that the description of the patent refers to a microcard containing only one single sample chamber (see column 4, line 46), contrary to claim 1, which requires the sample block to be configured for use with a microcard containing a plurality of samples. This passage, however, does not support the appellant's contention that the sample holder 101 as depicted in Figure 3 was suitable for use with a microcard. Clearly, a skilled person would construe this feature to mean that the sample block has an upper surface which is essentially flat. Nor do the other passages of the patent referred to by the appellant support the appellant's view that a microcard was "any device for receiving samples of biological material".

- 1.3.4 As a consequence, the subject-matter of claim 1 is also novel over D2.

- 1.4 In conclusion, the subject-matter of claim 1 is new and the ground for opposition set forth in Article 100(a) in conjunction with Article 54(1), (2) EPC does not prejudice the maintenance of the patent as granted.

## 2. Inventive step

### 2.1 The invention

The invention concerns a sample block apparatus and a method for maintaining a microcard on a sample block.

2.2 Closest prior art

2.2.1 Appellant 2 proposed any of documents D1 to D4 as representing the closest prior art.

The board considers D1 to represent the closest prior art for the following reasons.

2.2.2 D2 discloses a sample block in the sense of claim 1 except for the surface irregularities as called for in that claim. While D2 relates in general to biological testing, as does the patent in suit, it more specifically relates to thermal assays making use of temperature differences (see column 6, lines 24 to 33). It is true that D2 refers to drawbacks associated with temperature gradients (column 5, line 67 to column 6, line 3 and column 6, lines 37 to 40) and that the method of D2 comprises the step of driving the temperature difference between two samples toward zero (see in particular column 7, lines 4 to 9). However, in D2 the initial temperature difference between the two samples is essential (see for instance column 6, line 66 to column 7, line 3 and column 7, lines 25 to 30), and "thermal cross-talk" between the samples is to be avoided (see for instance column 13, lines 31 to 34). It also appears that the suggested use of a microtiter plate in D2 (column 10, lines 24 to 28) is of rather theoretical nature because differential thermopiles are to be located between the samples (see Figures 1 to 5). When taking D2 as the closest prior art, the skilled person would thus have to first implement the concept of using differential thermopiles between individual samples in a microtiter plate followed by further modifying this configuration possibly by abandoning the core concept of D2, i.e. abandoning the use of temperature differences between individual samples.

Thus, D2 cannot be said to constitute a promising starting point for the assessment of inventive step.

- 2.2.3 D3 deals with PCR processes and discloses all the features of claim 1 except for the surface irregularities as called for in that claim.

D3 discloses a temperature controller for holding the biochip at a predetermined temperature (column 4, lines 33 to 36) but is silent as to temperature uniformity between the samples or probes. It deals with the problem of evenly distributing a sample over the entire features of a biochip with a smaller amount of the sample (column 2, lines 1 to 5). Hence, D3 aims at a different object from that of the patent in suit and therefore fails to constitute a promising starting point.

- 2.2.4 In the written proceedings, appellant 2 also referred to D4 as a possible starting point for assessing inventive step without, however, providing a detailed analysis of this document. For the sake of completeness, the board observes that the plastic plate 62 (see the Figures of D4), which could be considered a microcard in the sense of claim 1 of the patent, is in direct contact with the support plate 31 (see Figure 5) and is fixed thereto by means of screws 64 (column 9, lines 58 to 64). Moreover, D4 is not concerned with the thermal contact between the support plate 31 and the plastic plate 62, but rather with the thermal contact between the support plate 31 and the heat rail 13 (column 2, lines 13 to 16). This configuration is thus not a promising starting point.

- 2.3 D1 discloses all the features of claim 1 except for the surface irregularities as defined in that claim (see

1.1 above). In particular, while D1 specifically describes a thermal cycling module for use of material substrates such as semiconductor wafers, D1 further explicitly states that the thermal cycling module disclosed therein may also be used in PCR processes (see column 12, lines 48 to 55). As the module has an essentially flat surface (see in particular Figure 3), it is therefore suitable for use with a microcard containing a plurality of samples of biological material.

Furthermore, D1 aims at controlling temperature uniformity of the substrate to be heated (see for instance column 2, lines 7 to 10), i.e. it has an objective similar to that of the patent in suit (see the patent, column 1, lines 34 to 38).

The board also notes that documents D6 to D8, which are from the field of semiconductor manufacturing, i.e. remote from that of the patent in suit (biological testing), are the sole documents in the proceedings disclosing surface irregularities in the sense of claim 1 (cf. 2.7.2 below). Moreover, among the documents D1 to D4, D1 alone refers to both the field of semiconductor manufacturing and that of biological testing or PCR (see column 12, lines 48 to 55).

D1 therefore appears to be the most promising starting point for assessing inventive step.

2.3.1 Accordingly, the board starts from D1 as the closest prior art.

2.4 Problem

According to the patent, the problem to be solved



consisted in improving temperature uniformity between the plurality of samples on a single microcard (column 1, lines 34 to 39; column 7, lines 1 to 6; column 8, lines 2 to 4).

## 2.5 Solution

As a solution to the above problem, the patent proposes a sample block apparatus for a thermal cycler configured for use with a microcard containing a plurality of samples of biological material and comprising a vacuum source, characterised in particular by surface irregularities included in the upper surface of the sample block for defining spaces between the surface irregularities and the microcard, the vacuum source being configured to create a substantial vacuum in the spaces.

## 2.6 Success of the solution

2.6.1 As to the success of the solution, appellant 2 concedes that surface irregularities in the form of channels indeed improve thermal contact between the sample block and the microcard, thereby leading to improved temperature uniformity between the samples on the microcard.

2.6.2 Appellant 2 however contests that the problem was also solved with other surface irregularities encompassed by claim 1 such as recesses and voids (cf. column 6, line 38 of the patent).

The board is not persuaded by this argument. Compared to a single hole in the upper surface of the sample block as implicitly disclosed in D1, a plurality of recesses or voids will, like channels, normally cover a

larger area. Hence, by applying a vacuum to such recesses or voids it is possible to press the card more firmly against the upper surface of the sample block, thereby leading to an increased temperature uniformity between the sample chambers of the microcard.

2.6.3 The board is thus satisfied that the problem is successfully solved. The problem therefore does not need to be reformulated.

2.7 Obviousness

2.7.1 According to appellant 2, the solution was obvious in view of any of documents D6 to D8 and also in view of document D4.

2.7.2 The board notes that documents D6 to D8 can be considered to disclose surface irregularities in the sense of claim 1 because when using the devices disclosed therein, spaces are formed which are delimited on the one side by a card-like substrate and on the other side by a structural portion which the skilled person would consider to be part of the upper surface of the plate, the structural portion being opposed to the microcard and distant therefrom (see D6, Figure 2 and paragraph [0025]; D7, Figures 1, 2 and 4; D8, Figure 2). In particular, D6 (*loc. cit.*) discloses channels in the sense of dependent claim 2 the opposed patent.

D6 to D8 are however from a field remote from the field of biological testing, i.e. these documents all concern the manufacturing of semiconductor devices (see D6, paragraph [0002]; D7, column 1, lines 9 to 15; D8, column 1, lines 6 to 12) and therefore cannot give any hint of how to solve the problem of improving

temperature uniformity between a plurality of samples of biological material located on a microcard.

Appellant 2 argued that D1 proved that it was common general knowledge that similar problems arose in the fields of semiconductor manufacturing and biological testing.

D1 is however a single patent specification which on its own fails to prove common general knowledge. The board notes that D1 indeed teaches that the device disclosed therein may be used in thermal cycling of substrates such as semiconductor wafers as well as in thermal cycling in PCR processes (column 12, lines 48 to 59). This however does not mean that the skilled person would look for solutions in the field of semiconductor manufacturing when faced with the specific problem of increasing temperature uniformity between a plurality of biological samples on a microcard. As the issue of biological samples is not normally encountered in the field of semiconductor manufacturing, he would have no incentive to look for a solution in that field. For the sake of completeness, the board also observes that D1 only mentions PCR processes but is silent as to a microcard having a plurality of biological samples thereon, i.e. a system wherein temperature non-uniformity between individual sample chambers in a microcard could possibly occur.

For the above reasons, the skilled person would have been dissuaded from consulting documents D6 to D8.

2.7.3 Turning now to D4, the board already has doubts whether the openings 56 (see in particular Figure 4) can indeed be considered surface irregularities in the sense of claim 1 of the patent. But even if, they are located in

the substrate to be heated (i.e. the support plate 31) and not in the surface which provides the heat (i.e. the heat rail 13). Therefore, D4 fails to teach providing the plate 34 of D1 with surface irregularities in the sense of claim 1 of the patent.

2.7.4 It follows that the subject-matter of claim 1 fulfils the requirements of inventive step as set forth in Article 56 EPC. The same applies to the dependent claims, which relate to particular embodiments of the sample block apparatus of claim 1.

2.8 Hence, the ground for opposition set forth in Article 100(a) in conjunction with Article 56 EPC does not prejudice the maintenance of the patent.

## Order

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

1. The decision under appeal is set aside.
2. The patent is maintained as granted.

The Registrar:

The Chairman:



C. Vodz

H. Engl

Decision electronically authenticated