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**Datasheet for the decision
of 19 November 2015**

Case Number: T 2161/11 - 3.4.02
Application Number: 01920338.9
Publication Number: 1317685
IPC: G02B21/00, G02B21/36, G06T1/00,
H04N1/191
Language of the proceedings: EN

Title of invention:
FULLY AUTOMATIC RAPID MICROSCOPE SLIDE SCANNER

Patent Proprietor:
Leica Biosystems Imaging, Inc.

Opponent:
HAMAMATSU PHOTONICS K.K.

Headword:

Relevant legal provisions:
EPC 1973 Art. 56

Keyword:
Inventive step - main and first auxiliary requests (no) -
second auxiliary request (yes)

Decisions cited:

T 0190/03

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent
Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89
2399-4465

Case Number: T 2161/11 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 19 November 2015

Appellant: Leica Biosystems Imaging, Inc.
(Patent Proprietor) 1360 Park Center Drive
Vista, CA 92081 (US)

Representative: Viering, Jentschura & Partner mbB
Patent- und Rechtsanwälte
Grillparzerstrasse 14
81675 München (DE)

Appellant: HAMAMATSU PHOTONICS K.K.
(Opponent) 1126-1, Ichino-cho
Higashi-ku
Hamamatsu-shi
Shizuoka 435-8558 (JP)

Representative: Hoffmann Eitle
Patent- und Rechtsanwälte PartmbB
Arabellastraße 30
81925 München (DE)

Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
4 August 2011 concerning maintenance of the
European patent No. 1317685 in amended form.**

Composition of the Board:

Chairman B. Müller
Members: A. Hornung
H. von Gronau

Summary of Facts and Submissions

- I. Both the opponent and the patentee appealed against the interlocutory decision of the opposition division maintaining European patent No. 1317685 in amended form.

Opposition was filed against the patent as a whole and based on the grounds of Article 100(a) EPC, together with Articles 54(1) and 56 EPC, and of Article 100(c) EPC.

The opposition division had held that the subject-matter of claim 1 of the main request and the first auxiliary request did not involve an inventive step but that the grounds on which the opposition was based did not prejudice maintenance of the patent as amended according to the second auxiliary request, all these requests having been filed with a letter dated 13 January 2010 and received at the European Patent Office on 15 January 2010.

- II. The patentee, in its statement setting out the grounds of appeal, requested that the decision under appeal be set aside and that the patent be maintained on the basis of either sets of claims filed with the letter of 13 January 2010 as main and first auxiliary requests. In response to the opponent's statement setting out the grounds of appeal, the patentee filed further auxiliary requests, including main request (a), main request (b), first auxiliary request (a) and first auxiliary request (b), so that a total number of 32 sets of claims were on file.

Oral proceedings before the board were held on 19 November 2015. In the course of these oral proceedings, the patentee withdrew main request (a), main request (b), first auxiliary request (a) and first auxiliary request (b), all these four requests having been filed during the written appeal proceedings, so that during the oral proceedings

before the board only the main, first and second auxiliary requests were discussed, all these three requests having been filed with the letter of 13 January 2010 during the first-instance opposition proceedings and considered in the contested decision of the opposition division.

The opponent requested that the decision of the opposition division be set aside and that the patent be revoked.

III. Claims of the requests

The features of claim 1 of the main, first and second auxiliary requests will be referred to as A0 to A11.1 according to the feature analysis as annexed to the opponent's statement setting out the grounds of appeal.

a) Main request

Independent claim 1 according to the main request reads as follows:

A0: "A scanner (11) for automatically digitizing at least a portion of a microscope sample (12) into a contiguous digital image, the microscope sample (12) having a primary sample plane defined by a surface of the sample (12) having the maximum area, the scanner (11) comprising:

A1: a motorized stage (14) for mounting and moving the sample (12) in a first manner and a second manner, the first manner being movement of the sample (12) in the sample plane at constant velocity between a predetermined first position and a predetermined second position along a primary axis of travel (x) defined by the first position and the second position, the second manner being movement of the sample (12) along a secondary axis (y) that is orthogonal to the primary axis of travel (x) and in the sample plane;

A2: an illumination system (28) whereby at least one portion of the sample (12) is illuminated;

A3: at least one microscope objective lens (16) positioned along an optical axis centered about the portion of the sample (12) illuminated by the illumination system (28) and orthogonal to the sample plane;

A4: focusing optics (34) whereby an optical signal from the microscope objective lens (16) is focused onto an image plane that is orthogonal to the optical axis;

A5: at least one line scan camera (18) comprising a plurality of light-responsive elements disposed in at least one linear array, the light-responsive elements positioned in the image plane with respect to the motorized stage (14) such that the line scan camera (18) has a linear field of view of a region of the sample (12) on the motorized stage (14) illuminated by the illumination system (28) and orthogonal to the primary axis of travel (x);

A6: a data processor (20) configured for digitizing, processing, and storing light intensities from the plurality of light-responsive elements in synchrony with a predetermined sample motion; and

A7: a stage controller (22) connected between the motorized stage (14) and the data processor (20) whereby the data processor (20) determines the position of the motorized stage (14),

A8: wherein the motorized stage (14), the data processor (20) and the stage controller (22) are configured to provide the sample motion

A8.1: in the form of movement of the sample (12) in the first manner to acquire a first image strip (78) of the sample (12)

A8.2: followed by movement of the sample (12) in the second manner to position the line scan camera (18) for acquiring a second image strip (80), and

A8.3: repeat the sample motion so as to generate a complete image (76) of the portion of the sample (12) by assembling the acquired parallel strips (77, 78, 80, 82) thereof into a contiguous digital image to thereby digitize the portion of the sample (12), and

A9: wherein the data processor (20) and the stage controller (22) are configured to, after completing the digitization of an individual image strip (77, 78, 80, 82),

A9.1: decelerate and stop the motorized stage (14),

A9.2: to move the motorized stage (14) in the second manner and

A9.3: to accelerate the motorized stage (14) again to the constant velocity to scan the subsequent image strip (77, 78, 80, 82), and

A10: wherein allowances, in both time and distance, are made for the motorized stage (14) to accelerate and decelerate at the beginning and end of each image strip (77, 78, 80, 82) that is scanned so as to ensure that the motorized stage (14) is moving at the constant velocity during the scanning and digitization process."

The wording of the remaining claims 2 to 47 of the main request, including the independent method claim 46, is not relevant to the present decision.

b) First auxiliary request

Independent claim 1 according to the first auxiliary request differs from claim 1 of the main request only in that it comprises the following additional feature A11 at the end of the claim:

A11: "and wherein the data processor (20) is configured to make focus adjustments in parallel with the on-going motion of the motorized stage (14) by z-axis movement of the microscope objective lens (16)."

The wording of the remaining claims 2 to 47 of the first auxiliary request, including the independent method claim 46, is not relevant to the present decision.

c) Second auxiliary request

Independent apparatus claim 1 according to the second auxiliary request differs from claim 1 of the first auxiliary request only in that it comprises the following additional feature A11.1 at the end of the claim:

A11.1: "in accordance with a pre-scanned focus map of the best focus as a function of the x/y position of the motorized stage (14)."

Independent method claim 46 according to the second auxiliary request reads as follows:

"A method of automatically digitizing with a scanner (11) at least a portion of a microscope sample (12) into a contiguous digital image, the microscope sample (12) having a primary sample plane defined by a surface of the sample (12) having the maximum area, the scanner (11) comprising a linear array

camera digitizing detector (18), a microscope objective lens (16) and a motorized stage (14) for moving the sample (12), the method comprising the steps of:

digitally scanning and storing a first image strip (78) from the portion of the sample (12) using the linear array camera digitizing detector (18), while the sample (12) is moving in a first manner with respect to the linear array camera digitizing detector (18), the first manner being movement of the sample (12) in the sample plane at constant velocity between a predetermined first position and a predetermined second position along a primary axis of travel (x) defined by the first position and the second position;

moving the sample (12) in a second manner so as to position the detector (18) for digitally scanning and storing a second image strip (80) from the portion of the sample (12), the second manner being movement of the sample (12) along a secondary axis (y) that is orthogonal to the primary axis of travel (x) and in the sample plane;

digitally scanning and storing the second image strip (80) from the portion of the sample (12), while the sample (12) is moving in the first manner with respect to the detector (18);

repeating the steps of digitally scanning and storing image strips (77) until the portion of the microscope sample (12) has been completely digitized; and

assembling the plurality of parallel image strips (77, 78, 80, 82) into a contiguous digital image (76), wherein after completing the digitization of an individual image strip (77, 78, 80, 82) the motorized stage (14) decelerates, comes to a stop, moves in the second manner and accelerates again to the constant velocity to scan the subsequent image strip (77, 78, 80, 82), and wherein allowances, in both time and distance,

are made for the motorized stage (14) to accelerate and decelerate at the beginning and end of each image strip (77, 78, 80, 82) that is scanned so as to ensure that the motorized stage (14) is moving at the constant velocity during the scanning and digitization process,

and wherein focus adjustments are made in parallel with the on-going motion of the sample (12) by z-axis movement of the microscope objective lens (16) in accordance with a pre-scanned focus map of the best focus as a function of the x/y position of the motorized stage (14) on which the sample is mounted."

IV. The following documents will be referred to in the present decision:

D1: US 5,922,282

D4: US 6,049,421

D13: JP 11-211988 A, in combination with the "accurate" translation of D13 filed by the opponent with a letter of 20 May 2011

D17: JP 7-243823

D18: WO 97/20198

D19: EP 0 871 052 A1

Documents D17 to D19 were filed after the nine-month period provided for in Article 99(1) EPC. The patentee, therefore, objected to their admittance into the proceedings as far as the main request and the first auxiliary request were concerned.

V. In a communication annexed to the summons to oral proceedings, the board informed the parties about its provisional and non-binding opinion on the patentability of the claimed subject-matter of the main request and of the first auxiliary request.

- a) The board's opinion concerning patentability of the subject-matter of claim 1 of the main request was worded as follows (see point 7 of the communication annexed to the summons to oral proceedings):

7. *"Main request*

The set of claims of the present main request is identical with the set of claims filed with the letter of 15 January 2010 as the then main request.

- 7.1 *According to the appealed decision, embodiment 4 of D13 represents the closest prior art. The subject-matter of claim 1 was novel over the scanner of D13 because D13 neither disclosed a constant velocity scanning and digitization process (defined by features **A1**, **A9.3** and **A10**), nor a serpentine type sample motion (defined by features **A1**, **A8** to **A8.3**).*

However, the subject-matter of claim 1 lacked inventive step in view of the disclosure of D13 in combination with D1.

- 7.2 *According to the opponent, the subject-matter of claim 1 lacks novelty with respect to the disclosure of any of D1, D13 and D19 (see opponent's letter of 5 November 2012, page 21).*

Even in the event that certain features were novel, the opponent contends that the claimed scanner would lack an inventive step, at least with respect to D13 in combination with any of D1, D4, D17 or D18. "Merely for the purpose of argument", the opponent, assuming that the features A9 to A9.3 and A10, relating to deceleration and acceleration of the motorized stage to constant velocity, were novel, argues that the subject-matter lacked an inventive step in view of

D13 in combination with common general knowledge or in combination with D1. See opponent's letter of 5 November 2012, pages 21 to 24.

7.3 *The patentee seems to acknowledge that the subject-matter of claim 1 differs from the scanner of D13 by the same features as identified in the appealed decision, i.e. A1, A8 to A8.3, A9.3 and A10.*

According to the patentee (see its second letter P2 dated 30 April 2012, page 46), the claimed scanner comprises an inventive step over the available prior art at least for the following reasons:

(a) The inventor has recognized that constant stage velocity (as defined by features A1, A9.3 and A10) contributes to the solving of the objective technical problem of providing a scanner for rapidly creating a high quality image. This finding neither formed part of the common general knowledge, since the corresponding evidence was missing, nor could it be derived from D1 or any other prior art document.

(b) Moreover, claim 1 was to be interpreted as defining a special type of constant velocity scanning which made an inventive contribution over the available prior art:

(i) Each individual image strip was continuously captured at constant velocity, i.e. without interrupting the stage movement during the capture of the individual image strip, thus obviating the need to mosaic along the individual image strip (this followed from features A1 and A8 to A8.3).

(ii) Image data was captured exclusively at constant velocity (this followed from feature A10).

7.4 The board is of the preliminary view that the subject-matter of claim 1 appears to lack an inventive step. The board's view generally follows the reasons given in the appealed decision under point 6.

Concerning patentee's argument (a):

It appears that the skilled person would choose to drive the sample stage of embodiment 4 of D13 at constant velocity (corresponding to feature A1) because of the obvious technical advantages relating to scanning an image with constant velocity, such as reduced unevenness in image brightness and less complex synchronization of the moving stage and the captured image data. This finding is based less on common general knowledge, requiring some sort of evidence as suggested by the patentee, than on the cognitive faculty of the skilled person, also referred to as the "mental furniture" of the skilled person (see e.g. decision T 190/03, point 16 of the reasons). Indeed, it appears undisputable that means suitable for driving a sample stage at constant velocity were commonly known in the art at the date of priority of the present application. Combining the embodiment 4 of D13 with such means is a matter of judgement of the skilled person requiring no evidence. Reference to D1 as possibly disclosing a constant scanning velocity appears to be merely an additional, though unnecessary, piece of argument recited in points 6.5 to 6.9 of the appealed decision.

Concerning patentee's argument (b) (i):

Even though D13 does not explicitly disclose how the individual image strips are exactly obtained, the board is of

the preliminary opinion that the skilled person, when putting embodiment 4 of D13 into practice, would infer from paragraphs [0111] to [0121] and figure 9 of D13 that, most likely, the image strips are continuously scanned. For instance, [0115] discloses that "the stage is controlled rightwards until the x-axis value becomes (x2+154)", without mentioning any interruption of the scanning motion. Paragraph [0115] further discloses that "This is repeated (k2-1) times, and k2 still images are captured to memory", one still image being the whole image strip; there is no mention of recording sub-images composing the image strip.

Concerning patentee's argument (b) (ii):

Decelerating, stopping and accelerating as defined in features A9.1 to A9.3 and A10 appears to be an obvious consequence of moving the sample stage at a constant velocity during the scanning and digitization process. Capturing image data at the beginning and at the end of each image strip at a non-constant velocity would destroy the advantages mentioned above with respect to simplified synchronization and improved brightness evenness both linked to constant velocity scanning.

7.5 *According to the appealed decision, points 5.15 and 6.11, claim 1 further differs from embodiment 4 of D13 in that the data processor and stage controller are configured to provide the sample motion in the form of a bidirectional serpentine scanning motion, since D13 disclosed unidirectional scanning.*

The board, however, is of the preliminary opinion that the scope of claim 1 is not limited to bidirectional serpentine scanning but also covers unidirectional scanning. In particular, feature A8.2 of claim 1 does not stipulate that the movement in the first manner is directly followed by the movement in the second manner. The patentee appears to be of

the same view (see patentee's letter P1 of 11 October 2011, pages 6-7, and letter P3 of 31 January 2013, page 27-28). Therefore, independently of whether embodiment 4 of D13 discloses a bidirectional or a unidirectional scanning, novelty cannot be based on the claimed scanning type."

b) The board's opinion concerning patentability of the subject-matter of claim 1 of the first auxiliary request was worded as follows (see point 9 of the communication annexed to the summons to oral proceedings):

9. *"First auxiliary request*

The present first auxiliary request is based on the set of claims filed with a letter of 13 January 2010 as the then first auxiliary request. Claim 1 of the first auxiliary request is further limited with respect to claim 1 of the main request by feature A11 relating to a general focus adjustment.

9.6 *According to the appealed decision, embodiment 4 of D13 represents the closest prior art. Since D1 disclosed feature A11, the subject-matter of claim 1 lacked an inventive step in view of the disclosure of D13 in combination with D1 for the same reasons as claim 1 of the main request.*

9.7 *According to the opponent, the subject-matter of claim 1 lacked either novelty with respect to D1 or, at least, inventive step with respect to D13 and D1 (see e.g. opponent's letter O1 of 2 December 2011, page 26, or letter O3 of 5 November 2012, page 24).*

9.8 *According to the patentee, the skilled person, starting from D13, would not be motivated to consult D1 since D1 did not capture contiguous image strips to form a complete image of a*

sample but was only concerned with the localization of a bacterium in a sample by detecting its x,y coordinates. Even if the skilled person consulted D1, he/she would not arrive at feature A11 since D1 did not disclose the moving of the objective lens but of the microscope stage. See e.g. patentee's letter P2, pages 50 to 52.

- 9.9 *The board tends to agree with the arguments of the opposition division and of the opponent. Feature A11 solves the problem of improving image quality of the scanned image. D13 clearly concerns high-quality imaging since, for instance, the positional in-plane accuracy is 10 micrometers. The skilled person is aware that high-quality imaging presupposes perfect focusing. Since lateral scanning motion in a microscope generally includes slight axial movement due to constructional tolerances, perfect focusing cannot be maintained while scanning an image. Considering these aspects, it will be immediately apparent to the skilled person that automatic focusing during the scanning process contributes to improving image quality by avoiding out-of-focus imaging (see, for instance, D1, column 8, lines 16-27; see also the application as filed, page 40, lines 15-16, which seems to acknowledge that autofocusing is known in the field of imaging scanners). Moving either the objective lens or the stage along the Z-axis appear to be both straightforward options for implementing the auto-focusing means.*

Therefore, the subject-matter of claim 1 of the first auxiliary request appears to lack an inventive step in view of the disclosure of D13, possibly in combination with the disclosure of D1."

Reasons for the Decision

1. Main request and first auxiliary request

1.1 In the annex to the summons, the board expressed its preliminary view, along with the underlying reasons, that the subject-matter of claim 1 of the main request and of the first auxiliary request were new, but lacked an inventive step in view of the disclosure of D13 in combination with common general knowledge (Article 56 EPC 1973), and that none of the patentee's arguments in favour of inventive step, filed in writing during the appeal proceedings, were convincing. See point V. above. According to the appealed decision, the opposition division had come to the same conclusion of lack of inventive step of the claimed subject-matter.

1.2 During the oral proceedings before the board, the patentee did not attempt to rebut the board's provisional opinion. The patentee merely confirmed orally that point 7.3 of the communication correctly summarized the patentee's position and that, despite the fact that the patentee was still of the opinion that the claimed subject-matter involved an inventive step, it had no further comments going beyond its written submissions.

The board sees no reason to deviate from its preliminary opinion regarding inventive step, which therefore becomes final.

1.3 It follows that the subject-matter of claim 1 of the present main request and of the present first auxiliary request does not meet the requirements of Article 56 EPC 1973 for the reasons set out in the board's preliminary opinion (cf. point V. above).

2. Second auxiliary request

2.1 Added subject-matter

According to the appealed decision, point 8.2, the opponent had no objections under Article 123(2) EPC. Nevertheless, in its letter of 5 November 2012, section 3.1, the opponent for the first time raised an objection under Article 123(2) EPC. Claim 1 left undetermined how the best focus map was obtained, while the application as originally filed discloses the obtention of the best focus map only in combination with the use of a standardized calibration sample. However, irrespective of whether this objection is admissible under Article 12(2) RPBA, the objection is not found convincing by the board since the use of a standardized calibration sample, which admittedly is not defined in claim 1, is not described in the application as originally filed as being an indispensable tool for obtaining the pre-scanned focus map (cf. letter of the proprietor dated 31 January 2013, point 3).

No further objections under Article 123(2) EPC were raised by the opponent. The board is satisfied that the set of claims of the second auxiliary request is compliant with the requirements of Article 123(2) EPC.

2.2 Novelty

Novelty of the claimed subject-matter was not questioned by the opponent. The board is also satisfied that the claimed subject-matter is novel over the available prior art (Article 54 EPC 1973).

2.3 Inventive step

The board is of the view that the claimed subject-matter is not rendered obvious in the light of the available prior art documents (Article 56 EPC 1973), thereby confirming the conclusion of the opposition division.

D13 represents the closest prior art for assessing the patentability of the subject-matter of the second auxiliary request. This was not disputed by the parties. At the end of the oral proceedings, the opponent, after having presented the lack of inventive step argumentation based on D13 as closest prior art document, even stated that none of the other documents on file, including D19 if admitted into the proceedings, would represent a more promising starting point for challenging inventive step of claim 1.

The subject-matter of claim 1 differs from the scanner of D13 in that

- a constant velocity scanning is carried out (features A1, A9.3 and A10),
- the data processor is configured to make focus adjustments in parallel with the on-going motion of the motorized stage (14) by z-axis movement of the microscope objective lens (16) (feature A11),
- the focus adjustment is made in accordance with a pre-scanned focus map of the best focus as a function of the x/y position of the motorized stage (14) (feature A11.1).

The first two distinguishing features (features A1, A9.3, A10 and A11) also form part of claim 1 of the first auxiliary request. The board already decided that the subject-matter of claim 1 of the first auxiliary request, including features A1, A9.3, A10 and A11, lacked an inventive step in view of

the disclosure of D13 and common general knowledge (cf. point 1. above).

Therefore, the assessment of inventive step of the subject-matter of claim 1 of the second auxiliary request boils down to the question of whether the third distinguishing feature (feature A11.1) in combination with the other features of the claim leads to the conclusion that the claim involves an inventive step. The opposition division took the same view.

The opponent argued that feature A11.1 did not confer an inventive step on the subject-matter of claim 1 in view of the disclosure of D13 in combination with D1 and common general knowledge, or D13 in combination with D4, D18 or D17. The objective technical problem was to avoid complexity due to expensive dynamic auto-focusing arrangements.

2.3.1 D13 in combination with D1 and common general knowledge

In the opponent's view, focusing the objective lens of a microscope scanner was known from D1 and the option of using a pre-scanned focus map as defined in feature A11.1 belonged to the skilled person's toolbox. Its advantage of enabling speedy focusing was obvious. The patent itself already conceded in paragraph [0057], lines 26 to 31, that the claimed pre-scanned focus map was well-known in the art. The skilled person was able to choose among different focusing options at hand and select the most cost-effective and simple autofocus arrangement, i.e. the claimed pre-scanned focus map arrangement, thereby arriving at the claimed subject-matter without exercising any inventive skills.

The board, however, concurs with the patentee in that, firstly, the "instantaneous automated focus control" of D1 is a real-time autofocus arrangement which is different from a pre-scanned focus map arrangement and, secondly, the cited

paragraph [0057] of the patent does not disclose a pre-scanned focus map arrangement either. Paragraph [0057] of the patent, lines 26 to 31, discloses that "the scanner 11 uses a calibration method in which a standardized calibration sample of predetermined shape and size is digitized and the best focus determined as a function of the x/y position of the motorized stage 14 using methods that are well known in the art". This only means that the best focus *per se* is determined using known methods. But it does not mean that the focusing of a scanner of the claimed line-scan type was known to use a calibration method providing a pre-scanned focus map. Since there is no evidence in the art to use a pre-scanned focus map in parallel with an on-going line-scanning, the board is not persuaded that the subject-matter of claim 1 lacks an inventive step with respect to D13 in combination with D1 and common general knowledge.

2.3.2 D13 in combination with D4

Opponent's point of view

In the opponent's view, D4 disclosed feature A11.1 and the skilled person would obviously apply the teaching of D4 to the scanner of D13 to arrive at the claimed subject-matter. In particular, D4, column 6, lines 24 to 47 and lines 51 to 58, essentially disclosed that a preliminary scan was carried out to collect focus data for a series of positions distributed along the spiral scanning path. Then, during the actual image scan, the stored focus data was fed to the autofocus assembly so as to maintain correct focus while the motor moving the sample stage was running continuously.

Expressing the pre-scanned focus map as a function of the x/y position of the stage, instead of using polar coordinates along a spiral scan path, as in D4, represented no difficulty for the skilled person.

The opponent further insisted on the fact that although a two-dimensional CCD was used in D4, the sample was imaged without stopping the stage in a way very much similar to a line scan camera by using a scan with a constant velocity and using stroboscopic light. Therefore, the scanning operation disclosed in D4 was different from a conventional tiling scan in which the stage was stopped for taking the images.

Anyway, the fact that the scanner of D4, using a two-dimensional-CCD and a stroboscopic light, was not a line-scanner as claimed had no effect on the obviousness of the choice of a focus map. The concept of a focus map was independent of these aspects since it was generally applicable to any kind of scanners. If at all, the only issue was a time-related issue, meaning that the focusing had to be carried out more quickly if a line sensor was scanning at a higher speed than a two-dimensional sensor. However, the two scanning techniques of D4 and D13 were not incompatible with respect to a common focusing method.

The board's point of view

Following the opposition division's opinion expressed in point 8.13 of the appealed decision, the board is not persuaded that the skilled person starting from the disclosure of D13 would be motivated to apply the teaching of D4 to the line sensor camera of embodiment 4 of D13.

Indeed, as argued convincingly by the patentee (see e.g. its letter of 30 April 2012, pages 59 to 63, and its letter of 31 January 2013, pages 23 and 24), D4 discloses a microscope scanner operating along the conventional image tiling approach based on a two-dimensional CCD sensor, whereas embodiment 4 of D13 implements a microscope scanner based on a uni-dimensional CCD sensor and a motorized stage moving the

sample along two orthogonal axes, precisely striving after overcoming the disadvantages of the image tiling approach, such as slowness and image quality (cf. D13, paragraphs [0111], [0119] and [0121]). It is not obvious to the skilled person to go back to a conventional image tiling system whose disadvantages the embodiment 4 of D13 seeks to avoid. The scanner of D4 also differs fundamentally from that of D13 in that it uses stroboscopic illumination and a spiral scan path. The respective technologies applied in the two prior art scanners of D4 and D13 are sufficiently different so that the skilled person would not have the incentive to look at the disclosure of D4 for a focusing method suitable for the scanner of embodiment 4 of D13.

Even in case the skilled person did consider D4, he would essentially be taught a method of how to achieve best focusing in a very specific scanner, i.e. a two-dimensional CCD sensor, stroboscopic illumination, and spiral scan path, which is markedly different from the scanner of D13 where the sample is moved along two orthogonal axes. The method taught in D4 implements a preliminary scan procedure to collect best focus data for a series of positions along a spiral path. However, there is neither a hint in D4 to apply this method to a scanner according to embodiment 4 of D13, nor a hint in D13 to look for a focusing method according to the disclosure of D4.

It follows that the subject-matter of claim 1 involves an inventive step in view of D13 in combination with D4.

2.3.3 D13 in combination with D18

Opponent's point of view

The opponent, during the oral proceedings before the board, argued that D18 disclosed a further example of a pre-scanned

focus map as defined in feature A11.1, thereby confirming that pre-scanned focus maps were well known in the art. When looking for a solution to the problem of how to focus the microscope scanner of D13, the skilled person would have the choice only between two approaches: acquiring focusing data either before or during image scanning. Knowing the advantages of the cost-effective, simple and speedy pre-scanned focus map approach, for instance from D18 or D4, the skilled person would obviously select such a focusing approach for the scanner of D13.

In preparation of oral proceedings, the opponent had submitted reasons in writing why in its view D18 disclosed feature A11.1 in combination with feature A11. In particular, the opponent referred to figure 14 of D18 and to page 13, line 23 to page 14, line 4, disclosing a "least squares plane", which is fit to an array of 3 x 3 focus positions, and representing a pre-scanned focus map. The saved focus data in D18 was employed during the scan and according to the x/y position of the stage, just as defined in features A11 and A11.1 of present claim 1 (cf. opponent's letter of 5 November 2012, pages 18 and 19). Furthermore, at each position of the scanning table, i.e. a point of the scan area, the focus was positioned to the best fit focus plane, this process being repeated for all scan points, which clearly constituted a "map" in the sense of the patent (cf. opponent's letter of 6 August 2013, page 11).

The board's point of view

D18 discloses a two-dimensional CCD scan camera operating along the conventional image tiling and "stop-and-shoot" approach.

The board, agreeing with the conclusion drawn in points 8.9 to 8.12 of the appealed decision, is of the opinion that the

skilled person would have no incentive to apply the focusing method of D18 to the line-scan camera of embodiment 4 of D13 for reasons similar to those already given with respect to the focusing method of D4 (see point 2.3.2 above). As convincingly argued by the patentee in its letter of 30 April 2012, a further reason lies in the specific mode of operation of the area scan camera of D18, wherein the camera is moved over the sample in a raster scan mode and repetitively stopped at certain positions to allow the focus Z-stage to be positioned to the best fit focus plane, an image being captured only once the sample has stopped moving (see D18, sentence bridging pages 13 and 14). The X/Y stage in D18 is stationary during the capturing of the image. This means that the focus adjustments in D18, contrary to what is claimed in feature A11, are not made in parallel with the on-going motion of the X/Y-stage. Such a mode of operation is also incompatible with the line scan camera of D13 which is moved at constant velocity along an image strip, without stopping.

It follows that the subject-matter of claim 1 is not rendered obvious in view of D13 and D18.

2.3.4 D13 in combination with D17

Concerning inventive step of the claimed subject-matter in view of the disclosure of D17, the parties merely referred to their written submissions. Based thereupon, the board concurs with the patentee's (see *inter alia* pages 53 and 54 of the patentee's letter of 30 April 2012) and opposition division's (see point 8.6 of the appealed decision) opinions that the combined disclosure of D13 and D17 does not render obvious the claimed subject-matter essentially for the following reasons:

D17 relates to a pattern tester that tests mask patterns formed on semi-conductor wafers. A reference pattern formed on the substrate is used for focus calibration and correction of the pattern tester. The reference pattern enables the determination of the best focus position when scanning and imaging the mask. However, D17 does not disclose that this best focus position is updated during the scan of the mask to provide a pre-scanned focus map of the best focus as function of the X/Y position of the stage. D17 does also not disclose that the focus adjustment is carried out in parallel with the motion of the X/Y stage for scanning and imaging the mask. Therefore, since D17 does neither disclose features A11 or A11.1, it cannot support the opponent's argumentation of lack of inventiveness.

It follows that the subject-matter of claim 1 involves an inventive step in view of D13 in combination with D17.

2.3.5 In view of the above findings, the board comes to the same conclusion as the opposition division that the subject-matter of claim 1 according to the second auxiliary request on file fulfils the requirements of Article 56 EPC 1973.

The subject-matter of the independent method claim 46 differs from the disclosure of D13 by the same corresponding features as the subject-matter of claim 1. Therefore, the subject-matter of the claim 46 involves an inventive step for reasons corresponding to those given in points 2.3.1 to 2.3.4 above.

The subject-matter of the dependent claims 2 to 45 and 47 also involves an inventive step since they include the limitations of the claims from which they depend.

Order

For these reasons it is decided that:

The appeals filed by the patent proprietor and the opponent are dismissed.

The Registrar:

The Chairman:



M. Kiehl

B. Müller

Decision electronically authenticated