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Datasheet for the decision of 14 January 2016

Case Number: T 0626/12 - 3.4.02

Application Number: 08152297.1

Publication Number: 2098900

IPC: G02B21/00, G02B21/26

Language of the proceedings: EN

Title of invention:
Scanner arrangement and method for optically scanning an object

Applicant:
Westfälische Wilhelms-Universität Münster

Headword:

Relevant legal provisions:
EPC Art. 83

Keyword:
Sufficiency of disclosure - (no)

Decisions cited:

Catchword:

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Case Number: T 0626/12 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 14 January 2016

Appellant: (Applicant)	Westfälische Wilhelms-Universität Münster Schlossplatz 2 48149 Münster (DE)
Representative:	Viering, Jentschura & Partner mbB Patent- und Rechtsanwälte Kennedydamm 55 / Roßstraße 40476 Düsseldorf (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 3 November 2011 refusing European patent application No. 08152297.1 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	B. Müller
Members:	A. Hornung
	F. Maaswinkel

Summary of Facts and Submissions

I. The applicant appealed against the decision of the examining division refusing European patent application No. 08152297.1 on the basis of Article 56 EPC (main request and auxiliary requests 1 to 5 then on file) and Rule 137(5) EPC (auxiliary request 6 then on file).

II. The applicant requested that the appealed decision be set aside and a patent be granted on the basis of the claims according to the main request or one of the auxiliary requests 1 to 7, all requests filed with a letter dated 12 March 2012 setting out the grounds of appeal, the present main request and auxiliary requests 2 to 7 being identical, respectively, to the main request and auxiliary requests 1 to 6 underlying the appealed decision.

As a precaution, the appellant requested oral proceedings.

III. In a communication annexed to the summons to oral proceedings, the board informed the appellant about its provisional and non-binding opinion according to which, *inter alia*, the claimed subject-matter of all requests lacked sufficiency of disclosure within the meaning of Article 83 EPC.

Reference was made *inter alia* to document D1: WO2006/024279.

The board's opinion about the issue of sufficiency of disclosure was worded as follows (see points 6.1 and 7.1 of the communication annexed to the summons):

6. "Main request

6.1 Sufficiency of disclosure

In the preliminary view of the board, the present application does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC).

According to claim 1 and the description, paragraph [0011], the contribution of the present invention to the prior art, exemplified by the scanner arrangement of D1, consists in the provision of a scanner arrangement which enables the acquisition of a standing, or unblurred, image while the object to be scanned and imaged is disposed on a continuously moving object stage.

Invention is not disclosed in manner sufficiently complete

6.1.1 The skilled person does not receive sufficient guidance from the application as filed on how to implement such a scanner arrangement. In particular, the description does not disclose a single working embodiment contrary to Rule 42(1)(e) EPC. This means that the skilled person, who has no inventive skills, will have to establish himself the relationship between the moving speed and direction of the object stage and the moving speed and direction of the lens imaging the moving object onto the sensor in order that the image of the moving object remains still.

- *Due to his technical knowledge, the skilled person might possibly be aware that this relationship depends on many parameters including the focal length of the focusing lens, the distance between the focusing lens and the object stage, the actual speed of the moving object, the actual sensing speed of the sensor, the hardware and software processing properties of the camera, but he receives no hint from the application as filed about how these parameters interact with each other. Therefore, also in view of the available prior*

art documents which appear to contain little relevant information in this respect, it is doubtful that the skilled person will be able to fill the gap in the disclosure of the present application to carry out the invention.

- *In addition to the parameters mentioned above, whose existence the skilled person might be aware of due to his own knowledge, the skilled person has to determine further parameters which are less known but which the application requires to take account of. For instance, according to the present description, page 20, lines 1 to 3, the objective assembly is split into a moving front objective lens and a fixed objective upper part. The description, however, discloses no information about what characterizes and differentiates these two lens parts: has the front objective lens a much smaller or a much larger focal length than the rest of the objective assembly; do their optical aberrations compensate each other or are they optimized independently? In view of this complete lack of guidance, it is obscure how the skilled person will be able to split the lens objective into two parts in order to carry out the invention as claimed .*

- *Another example of more specific parameters which have to be taken into account is related to the optical aberrations of individual lenses which, according to the application, page 6, lines 4 to 6, may require the velocity profile of the front objective lens to include compensating accelerations. According to claim 1, which is not limited in respect of the kind of optical lenses, a standing image must be obtained for any lenses having any kind of optical aberrations. Therefore, in order to carry out the invention over the whole scope of claim 1, the need to design a specific,*

non-linear velocity profile of the front objective lens arises. No explanations, however, are given in the application as filed about how to compensate optical aberrations of individual lenses by implementing a specific, non-linear velocity profile of the front lens. It appears highly improbable that the skilled person possesses the skills required for designing such a velocity profile since the technical relationship between static properties of a lens (optical aberrations) and dynamic properties of another lens (velocity profile of the front lens) does not appear to be generally known in the art.

Invention is not disclosed in a manner sufficiently clear

6.1.2 *Not only does the application as filed disclose no working embodiment of the invention, but it appears that it contains obscure and even contradictory hints about how to select certain parameters of the scanner arrangement. For instance:*

- The present description discloses, on page 18, lines 2 to 4, that "the front objective lens is moved by the same distance and in the same direction as the object". This teaching appears to be contradictory to claim 1 and to other passages of the description, e.g. page 18, line 9 mentioning a "relative motion between the front objective lens and the object".

- From figure 1 it can also be inferred that, during each scanning step, the front objective lens is moved by the same distance and in the same direction as the object, thereby contradicting claim 1.

- According to the description, page 5, lines 20 to 22, for large magnifications, e.g. over 10-fold, the velocity of the front objective lens may be 2 or 3 times the velocity of the

moving stage. It is obscure on which technical considerations this statement is based and even whether it is correct (for instance, in view of the ray tracing annexed to the refusal by the examining division).

- On page 17, lines 14 to 16, a new lens parameter is introduced, i.e. the diameter of the front objective lens. This leads the skilled person to reflect on whether the lens diameter plays any significant role in obtaining the claimed result of a standing image, and if yes, how this parameter should be taken into account in the design of the claimed scanner.

Such confusing information significantly disturbs the skilled person trying to carry out the invention as claimed.

Obscure which problem is to be solved

6.1.3 *It appears from the description, paragraphs [0010] and [0011], that the incentive for making the present invention is to solve the problem occurring with the prior art scanner of D1. In a case, as in the present one, where the application as filed appears to lack fundamental technical information, it would be helpful if the skilled person were able to derive missing relevant information from understanding the problem to be solved. However, it is obscure for the skilled person which problem exactly occurs in the prior art and, hence, what the skilled person's task actually is.*

On the one hand, only a vague statement exists in the description of the present application that "it has been found that this arrangement [of D1] did not always lead to the acquisition of an unblurred image" (page 4, lines 5 to 7) and that "the optical magnification produced by the lens assembly hinders acquisition of an unblurred image" (page 5,

lines 19 to 20). This means that sometimes an unblurred image is provided, in which case, no improvement of D1 appears to be required, leaving the skilled person without any task to fulfill - and sometimes no unblurred image can be provided. Both the present description and claim 1, however, remain silent about the specific technical conditions existing in those situations when no unblurred image can be provided.

On the other hand, the skilled person, upon reading D1, would learn that the scanner arrangement of D1 does enable the camera to acquire a standing image (D1, page 9, line 21), whatever the technical circumstances are.

The skilled person is neither taught by the present application nor by D1 under which technical conditions the image gets blurred in D1 but nevertheless has the task, according to the wording of present claim 1, to implement a scanner which allows acquisition of an unblurred image whatever the technical conditions are. Therefore, it is doubtful whether the skilled person, having no inventive skills, will be able to carry out the invention over the whole scope of claim 1.

6.1.4 In conclusion, the discrepancy between, on the one hand, the technical complexity of the rather sophisticated invention and, on the other hand, the lack of guidance in the application, combined with inconsistent teaching in places, is such that the board has severe doubts that the skilled person would be able to carry out the invention as claimed.

6.2 Clarity

[...]

6.3 Inventive step

[...]

7. Auxiliary requests 1 to 7

7.1 It would appear that none of the amendments introduced in claim 1 of the auxiliary requests 1 to 7 in order to overcome the examining division's objection of lack of inventive step is suitable for overcoming the objections of lack of sufficiency of disclosure and of lack of clarity raised in respect of the subject-matter of claim 1 of the main request (see points 6.1 and 6.2 above)."

IV. In response to the summons to oral proceedings, the applicant informed the board with its letter dated 14 December 2015 that it would not be attending the oral proceedings. The applicant filed no comments concerning the board's preliminary opinion as annexed to the summons.

Oral proceedings were held on 14 January 2016 in the absence of the applicant.

V. Claim wording

a) Independent claim 1 of the main request reads as follows:

"A scanner arrangement (50), in particular a scanning microscope, for optically scanning an object (101) in a sequence of scanning steps, having a detector to collect an image of the object during each scanning step, a control means, a driveable moving object stage (40) driven by the control means, and an objective assembly (4, 7-10) to pass light from an object on the object stage to the detector, which objective assembly has a front objective lens (9, 103) on an objective lens carriage, (8) which can be moved parallel to the object stage (40) by a carriage drive (5, 6,

10, 11) which is controlled by the control means, wherein the object stage (40) is arranged to be driven during the sequence of scanning steps in order to achieve a continuous movement, and the objective lens carriage (8) with the front objective lens (9, 103) is arranged to be driven in each of the scanning steps for a forward movement step, in which the front objective lens (9, 103) is arranged to move with the object stage (40) out of an initial position so that it moves in parallel with the object stage and in the same direction as the object stage, and in each case between successive scanning steps for a backward movement into the initial position, with the object (101) able to be optically scanned during the continuous movement of the object stage (40) characterised in that there is at least one scanning step in which the speed of the front objective lens, relative to the scanner arrangement and in a direction parallel to, and in the same direction as, the direction of motion of the object stage, is not equal to the speed of the object stage, relative to the scanner arrangement, for a substantial period of time relative to the length of time taken for the at least one scanning step to be performed so that the relative motion of the front objective lens and the object stage during the at least one scanning step allows acquisition of a standing image in the image plane of the detector."

b) Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that it comprises the following amendments which are underlined or striked through:

(i) "having a detector to collect ~~a~~n digitised image of the object during each scanning step"

(ii) "which objective assembly has an objective upper part (4) fixed in place and a front objective lens (9, 103) on an objective lens carriage, (8)"

c) Independent claim 1 according to auxiliary request 2 differs from claim 1 of the main request in that it comprises the following feature added at the end of the claim:

"by varying the motion of the front objective lens relative to the motion of the object stage".

d) Independent claim 1 according to auxiliary request 3 differs from claim 1 of auxiliary request 2 in that it comprises the following feature added at the end of the claim:

"wherein the velocity profile of the front objective lens includes compensation accelerations".

e) Independent claim 1 according to auxiliary request 4 differs from claim 1 of auxiliary request 3 in that it comprises the following feature added at the end of the claim:

"and wherein the object stage (40) is continuously displaced relative to the front objective lens at a velocity (V) whereas the front objective lens moves with a velocity profile (V')".

f) Independent claim 1 according to auxiliary request 5 differs from claim 1 of auxiliary request 2 in that it comprises the following feature added at the end of the claim:

"wherein the carriage drive (5, 6, 10, 11) has a forward movement device (5, 6) with a piezoelement, and wherein the control for the piezoelement drives the piezoelement at a

variation in speed by applying a variable voltage to the piezoelement".

g) Independent claim 1 according to auxiliary request 6 differs from claim 1 of auxiliary request 2 in that it comprises the following feature added at the end of the claim:

"wherein for magnifications over 10-fold the velocity of the front objective lens is two or three times the velocity of the moving stage (40)".

h) Independent claim 1 according to auxiliary request 7 differs from claim 1 of auxiliary request 5 in that it comprises the following feature added at the end of the claim:

"wherein the control means comprise a control computer, which controls the interplay of the forward movement of the object by means of the object stage (40), the forward and backward movement of the front objective lens (9, 103) on the objective lens carriage (8) by means of the carriage drive (5, 6, 10, 11) and the image recording by the scanner camera by means of a trigger mechanism and wherein the velocity profile or the voltage profile for the piezoelement is stored in a database of the computer control".

Reasons for the Decision

1. In the communication annexed to the summons (see point III. above), the board expressed its preliminary view, along with the underlying reasons, that the present application did not disclose the invention according to the main request and

auxiliary requests 1 to 7 in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC), due account having been taken of the applicant's statement of grounds of appeal containing arguments essentially in favour of inventive step only, accompanied by amendments of claim 1 according to auxiliary requests 1 to 7. While the amendments of claim 1 according to auxiliary requests 1 to 7 may limit the scope of the claimed invention, they do not provide the missing information to the skilled person about how to carry out the invention.

2. The appellant neither attempted to rebut the board's provisional opinion, nor submitted any new requests aiming at overcoming the objections.

The board sees no reason to deviate from its preliminary opinion regarding sufficiency of disclosure, which therefore becomes final.

3. It follows that the present patent application does not meet the requirements of Article 83 EPC for the reasons set out in the board's preliminary opinion.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl B. Müller

Decision electronically authenticated