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Datasheet for the decision of 18 May 2022

Case Number: T 1520/19 - 3.5.06

Application Number: 12821499.6

Publication Number: 2742862

IPC: A61B5/1172, G06K9/00, G06K9/20

Language of the proceedings: EN

Title of invention:
RIDGE PATTERN RECORDING SYSTEM

Applicant:
ABILMA Limited Liability Company

Headword:
Ridge pattern recording/ABILMA

Relevant legal provisions:
EPC Art. 56
EPC R. 42(1)(c)

Keyword:
Skilled person - need to define precise qualifications in all cases (no)
Description - claimed invention cannot be understood as solving a disclosed technical problem
Inventive step (no)

Decisions cited:
G 0001/12, T 0026/81

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 1520/19 - 3.5.06

D E C I S I O N
of Technical Board of Appeal 3.5.06
of 18 May 2022

Appellant: (Applicant)	ABILMA Limited Liability Company Moskovskoe shosse, 46 lit. B, off 319 St. Petersburg 196158 (RU)
Representative:	Steiniger, Carmen Patentanwaltskanzlei Dr. Steiniger Reichsstraße 37 09112 Chemnitz (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 3 January 2019 refusing European patent application No. 12821499.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. Müller
Members:	T. Alecu
	K. Kerber-Zubrzycka

Summary of Facts and Submissions

I. The appeal is against the decision of the Examining Division to refuse the application. The reasons for the refusal were lack of clarity and support (Article 84 EPC) and insufficient disclosure (Article 83 EPC).

II. With the grounds of appeal, the applicant requested that the decision be set aside and that a patent be granted on the basis of the main request or of the auxiliary request as underlying the decision, or that, alternatively, the case was remitted to the Examining Division for further prosecution. The corresponding sets of claims were re-filed with the grounds of appeal. The appellant also submitted several prior art documents.

III. In the communication accompanying a summons to oral proceedings, the Board indicated that it disagreed with the conclusions of the Examining Division in respect of Articles 84 and 83 EPC, but that the issues raised in the reasoning of the decision might lead to the conclusion that the application was deficient in view of Rule 42(1)(c) EPC.

IV. Claim 1 of the main request defines:

A system for recording ridge patterns comprising a source of light, an element determining the position of the scanning surface, an optical system, a multi-element image sensor, an electronic memory for storing images and a processing unit,
characterized in that
the output image from the system is electrically linked in the electronic memory with at least two intermediate

images, by blending in the processing unit the intensity values of elements of the intermediate images corresponding to different intermediate images of one and the same region on the scanning surface and assigning the value obtained for the intensity corresponding to this region to an element of the output image, and each of the intermediate images is linked electrically with light-sensitive elements of the image sensor, which are linked optically with the light source and the ridge pattern scanning surface by way of the image of the ridge pattern scanning surface formed by the optical system,
wherein, in the spectral range of sensitivity of the image sensor, the total flux of useful light with wavelengths less than the boundary wavelength L is at least five times greater than the total flux of stray light with wavelengths greater than L, and the value of L satisfies the condition

$$(0.37\ L^{1.5}) / (A \cdot N \cdot T^{1.2}) < 1$$

where L is the boundary wavelength, expressed in micrometres;
T is the interval between centres of the elements sensitive to the useful light in the image sensor, expressed in micrometres;
A is the effective numerical aperture of the optical system forming the image of the scanning surface on the light-sensitive surface of the image sensor, on the image sensor side;
N is the number of light-sensitive elements in the image sensor per one element of the output image.

V. Claim 1 of the auxiliary request differs therefrom only by further defining the multi-element image sensor as follows:

a multi-element image sensor being constructed as a bar or matrix of metal oxide semiconductor transistors or charge-coupled devices.

VI. Oral proceedings were held on 18 May 2022 as scheduled and at their end the Chair announced the decision of the Board.

Reasons for the Decision

The application

1. The application relates to a system for recording (biometric) ridge patterns (fingerprints). The system is a Frustrated Total Internal Reflection (FTIR) optical system (see page 5, though the term FTIR is not actually used) in the standard general configuration comprising a light source, a prism, a lens (+ a light guiding means, e.g. mirror) and an electronic sensor (CCD matrix). The object of the invention is, according to the description (page 3),
"*to provide a system for recording ridge patterns having a low cost and high reliability and at the same time providing high-quality images, small overall dimensions, a high operating speed and reduced energy consumption.*"
To define the desirable quality of the images, the application makes reference (end of page 2, end of page 6) to compliance with the FBI EBTS Appendix F standard (FBI-F standard in the following).

1.1 In a first embodiment of the invention (page 5 to page 6, line 2), the system forms multiple (four) intermediate image which are averaged to form the output image. In a variant (page 6)
"*the objective lens forms the image covering a number*

of light sensitive elements exceeding the required number of elements in the output image", for instance 10% in each direction, resulting "*in each element being assigned 1.1^2 = 1.21 light-sensitive elements of the sensor in the output image*".

1.2 The system is restricted in its possible configurations by a formula (claim 1, page 4 and page 6) defining the boundary wavelength to be used as a function of the distance T between the sensor elements, the numerical aperture A and the number N of light sensitive elements per element in the output image.

The decision under appeal

2. The Examining Division stated (point 13) that the structure and arrangement of the light sensitive elements leading to certain values of A, N and T were undefined. It further contended that the formula linking the said parameters was empirical and its validity was confirmed by reference to the standard (point 15). This formula should vary as a function of the type of light sensitive elements used - the characteristics thereof being absorbed in the empirical pre-factor and possibly in the exponents. Because of that "*the skilled person, exercising solely common general knowledge, would have an undue burden in carrying out the invention with a system that would behave according to the prescribed empirical formula*" (points 16 to 18). These observations led the Examining Division to find a lack of clarity (Art. 84 EPC), the claimed matter being obscure and defining an (impermissible) result to be achieved.

There was also a lack of support, because the claim covered very small T values which led to very short

wavelengths, where the system could not be compliant with the quoted standard (point 19).

3. The undue experimentation required by the skilled person in order to implement a system that would "fulfill[] the criterion of the formula of claim 1" and comply with the FBI-F standard as required by the application, also led to a lack of disclosure (point 22). There was no implementation provided in sufficient detail, nor was guidance provided to lead the skilled person to a design fulfilling the requirements of that formula.

The statement of grounds

4. The appellant explained (statement of grounds of appeal, section II) that the invention reduced disturbances due to diffraction effects. The formula addressed this aspect and provided a relationship between the maximal (boundary) wavelength to be used and the spacing between the sensor elements.

4.1 The cited documents showed, in the appellant's opinion (section VIII of the grounds of appeal), that the portion of diffracted light falling on the wrong element only depended on the distance from the axis and that there was no undue burden for the skilled person to execute the invention. It was also shown (page 26 of the grounds) that the formula of the application allows, in a certain optical configuration, the use of a larger wavelength than that established by the Rayleigh criterion.

5. The conclusions of the Examining Division were wrong (section IV) already on the basis that the skilled person was not defined and incorrect assumptions about the skilled person's qualifications were made. For the

appellant the skilled person
"*is a physicist having a tertiary education, having a PhD and having a longtime practical experience in optics and the manufacturing of optical devices, in particular in manufacturing of optical devices using microelectronic components. Furthermore, said person skilled in the art has concerned himself/herself with the development of ridge pattern recording devices for many years*".

6. Parameters A, N and T were given by the manufacturer and/or were chosen when designing the optical system, and the corresponding boundary wavelength could be calculated. The shape and the arrangement of the light sensitive elements, as well as their type were not essential for the claimed invention. The recited parameters were sufficient to define the invention - the sensors only needed to be sensitive to light in the useful range (sections VII.1, VII.2. VII.7).

6.1 The claims otherwise defined no result to be achieved (VII.4), and there was no obligation to explain why an invention works (VII.6). The use of the claimed relationship *allowed* compliance with the Appendix 7 standard, but the system did not have to comply with it (VII.5).

6.2 The formula was applicable also for very small intervals T, where the boundary wavelength was shifted to ultraviolet (VII.6).

6.3 Filters or specific light sources could be used to restrict light flux so as to provide the necessary ratio of 1 to 5 between stray light and useful light (page 15, middle, page 17, middle). So there was no undue burden for the skilled person to select a combination that fulfilled the criterion in the formula (section VII.3).

The skilled person

7. The appellant correctly indicated that the Examining Division did not define the skilled person.

7.1 In proceedings before the EPO, the skilled person is often left undefined as long as its skills and knowledge are implied by the circumstances or the reasoning provided, in particular the application itself or the chosen starting point for the assessment of inventive step which the skilled person must be assumed to understand.

7.2 The Board considers this appropriate, at least until the skilled person's qualifications are challenged. In most cases it is pointless to fix the academic degree of the skilled person, unless attributing any specifically relevant, and controversial skill or common general knowledge to the skilled person depended on such detail. What exactly it requires to establish any controversial qualification of the skilled person will depend on the case at issue.

7.3 As the appellant seems not to have challenged the skilled person's qualifications during examination, and does not argue that it had, the Board can see no fault in the Examination Division not going further into detail on the skilled person's definition.

8. In the present case, the Board agrees that the appellant's definition of the skilled person is a suitable one, except for the fact that he/she should "*hav[e] a PhD*". It doubts that the qualification "Ph.D." level provides a practicable definition of a skilled person, and considers that appreciation of the application is possible for a person with the relevant practical experience in the art as proposed by the

appellant. This was accepted by the appellant during the oral proceedings.

The reasons underlying the decision

9. Considering the different grounds advanced for the refusal of the application, the Board remarks that they rest primarily on two statements. The first is that the claimed system should output images of a quality compliant with the FBI standard (see points 15, 19, 22). The second is that the claimed formula is empirical and not generally valid (points 15, 16, 18).

9.1 The Board understands this second statement to mean that the use of this empirical formula does not yield images of standard-compliant quality, or at least of sufficient quality for the intended purpose (here biometric recognition), when considering all types of shapes, arrangements and materials for the sensing elements. The Examining Division presumed that this might be the case only for a specific type of sensor, which is neither claimed, nor disclosed in sufficient details.

9.2 In other words, for the Examining Division, the claimed invention, in particular the claimed formula, does not solve the problem posed by the application. This raises the question of whether the application fulfils the requirement of Rule 42(1)(c) EPC.

Diffraction effects

10. The point of view of the appellant expressed in the grounds of appeal, is that the skilled person, as defined, familiar with diffraction phenomena, understands that the use of the claimed formula reduces disturbances caused by diffraction, and that this leads to images of sufficient quality even with smaller-sized

sensors, though not necessarily to compliance with the quoted standard.

11. The Board remarks that the application does not explicitly mention diffraction effects, let alone a reduction of corresponding disturbances. The objectives stated by the application relate to cost, reliability, quality and compactness. This does not imply a solution addressing the reduction of diffraction effects.

11.1 The formula in discussion is proposed without any explanation. Its general form may be considered as a hint to the skilled person as defined above, towards diffraction considerations, inasmuch it resembles the classical Rayleigh separation criterion and sets out a relationship between the wavelength and the spacing on the image plane.

11.2 However, it is noticeably not consistent with the Rayleigh criterion (as also shown by the appellant's calculations as referred to in point 4.1 above), even beyond scalar weighting factors: the formula is not homogeneous in terms of physical units and uses power factors which are not derivable from the diffraction theory. The application claims that the use of this formula allows one to obtain high quality ridge pattern images, but this statement is not backed up by theoretical considerations or experimental results.

12. It follows from the above that it is not derivable from the application that the technical problem to be solved is one related to diffraction effects, let alone that this problem is solved by way of the claimed relationship.

The appellant's arguments during oral proceedings

13. In response to the above observation, communicated in the Board's preliminary opinion, the appellant submitted during the oral proceedings that the invention solved the technical problem as disclosed on page 3 of the application, i.e. to provide a sensor that would be as small as possible but still provide high quality images in a reliable manner.

13.1 The claimed invention required inter alia to average multiple acquired images and to restrict the wavelengths used in the sensor according to the provided formula. This restriction, in interaction with the other claimed features, provided the solution to the posed problem. The problem and the solution were therefore clear so that Rule 42(1)(c) EPC was complied with.

13.2 As explained in the grounds of appeal, the claim itself was also clear, satisfying Article 84 EPC, and there was no problem of carrying out the invention as required by Article 83 EPC.

14. The inventor did not have to explain why the invention worked. The inventor had determined the formula for the allowable wavelength range in an experimental manner and it did reduce the amount of light that was meant to fall on one element but fell on a different, neighbouring element. It was not implausible to the skilled person that the use of the formula helped to achieve this effect. That the formula was heuristic was also an indication in favour of an inventive step, because, if it could have been derived by way of general theoretical considerations, e.g. based on the Rayleigh criterion, then it could have been held to be obvious. Presenting results would serve no purpose,

because one could not verify how they have been obtained; either way one had to trust the inventor.

15. Should the Board not be satisfied that the requirements of Rule 42(1)(c) EPC were satisfied on the basis of the cited problem, this could be reformulated in a more concrete manner as
(1) building a fingerprint sensor that was as small as possible but provided high resolution images.
Alternatively, one could see the technical problem as
(2) providing design instructions to the skilled person as to how to build a fingerprint sensor with an increased resolution.

The Board's conclusions

The claimed invention

16. Claim 1 of both requests defines a device by a set of specific features, which also correspond to what the description teaches to be embodiments of the invention. Throughout the proceedings the appellant also argued the invention to be the combination of all features, with the formula for wavelength range restriction providing the essential contribution.

17. The Board agrees with the appellant that the claimed invention defines no result and that the claimed system is clearly defined by way of the claimed formula. One can easily verify whether a system satisfies this relationship and can also build one to such specifications without any particular burden, e.g. by calculating the boundary wavelength and using corresponding light sources and/or filters.

Technical problem

18. The Board has already explained above why it cannot be derived from the application that this claimed invention solves a problem related to diffraction effects based on theoretical considerations, or on experimental results.

19. The technical problem which is disclosed in the application is formulated in a vague manner. There is a large set of technical issues that can affect image quality, including different types of electronic noise and various optical effects, and quality itself may be defined in various ways. As it stands, this vague formulation does not aid the skilled reader in understanding which particular technical issue(s) the claimed invention addresses.

19.1 The appellant has not advanced any other theoretical considerations that could explain the alleged effects of the proposed formula, nor has it provided any results that could establish the allegation that image quality, resolution or any other parameters mentioned in the objective of the invention could positively depend on the use of the claimed formula.

19.2 Thus the Board is of the opinion that the skilled person has no way of understanding whether the claimed invention solves the only concretely disclosed technical problem, or in which circumstances or to what extent.

20. Regarding the two reformulated technical problems as proposed by the appellant, the Board notes the following, on the - unverified - assumption that they are derivable from the application.

20.1 The first one (see (1) above) does not help because the image resolution cannot be assessed independently of

the image quality: it serves no purpose of having a very high resolution sensor if the resulting image is extremely noisy or blurry. Hence, the Board's observations still apply.

20.2 The second one (see (2) above), does not help either, because the design instructions in question will still yield a fingerprint sensor which does not constitute a solution to the disclosed technical problem. Thus the Board's observations still apply as well.

21. The appellant's remark that the skilled person would find it not implausible that the proposed formula can work means little more than that the skilled person has no reason to assume the inverse, i.e. that it the formula does not work. However, this is insufficient for the Board to acknowledge that the alleged technical effects are positively established by the application. Proceedings before the EPO are conducted in accordance with the free evaluation of evidence (see, e.g., G1/12, catchword, answer to question (2)). While this may involve a degree of trust in individual cases, trust cannot replace all evidence, especially not in cases like here were the alleged technical effect has been challenged. Experimental results carried out by the appellant may or may not help to establish an alleged technical effect. But this uncertainty cannot be accepted as an argument not to file any in the first place. In passing, the Board notes that the related question whether experimental results might be admitted given the degree of "plausibility" established by the application, or lack of "implausibility", is currently pending before the Enlarged Board of Appeal as G2/21.

Legal consequences

22. The factual situation can be summarized as follows: it is clear what the claimed invention is and how it can be implemented. However, the skilled person cannot understand from the application or its common knowledge whether the claimed invention solves a technical problem, and which one.

23. The Examining Division refused the application pursuant to Articles 83 and 84 EPC. The Board does not find this to be correct in this case.

23.1 The requirement for the claims in Article 84 EPC is that they define the matter for which protection is sought and that they be clear and supported by the description. These requirements are satisfied: the claimed set of features defines the invention as the description does, so this definition of the invention is supported by the description. It is irrelevant in this regard whether the claimed invention solves a technical problem, or which one.

23.2 According to the requirement of Article 83 EPC that the invention be sufficiently disclosed, the skilled person must be able to carry out the alleged invention. This is the case here for the reasons provided above (point 17).

24. However, even if the claimed invention can be carried out by the skilled person, that the skilled person is not in a position to understand it as a solution to a technical problem means that the present application fails to fulfill this requirement expressed in Rule 42(1)(c) EPC.

25. According to T 26/81 (headnote, last sentence, and reasons 9, esp. second and last sentence), the

requirement that the invention should be disclosed in such terms that the technical problem and its solution can be understood (now in Rule 42(1)(c) EPC) cannot be set up as a separate formal criterion independent of inventiveness.

25.1 Established case law holds that if a technical effect is not present, i.e. if a technical problem is not solved, then inventive step is to be denied. This is also consistent with the statement in T 26/81 (reasons 9) that, if the subject-matter of of an independent claim, for which there is sufficient disclosure, is judged as being inventive, it must always be possible to derive a technical problem from the application.

25.2 In the present case, the application relates to an allegedly improved FTIR fingerprint sensor. This undoubtably has the character of an invention in the sense of Article 52 EPC. However, it does not solve any technical problem in respect of a standard FTIR fingerprint sensor, so inventive step is to be denied under Article 56 EPC.

26. The additional feature of the auxiliary request is insufficient to overcome the preceding analysis or conclusion, as the appellant acknowledged during oral proceedings.

Remittal

27. At the end of the oral proceedings, the appellant requested remittal to the first instance for further prosecution, so that it had a chance to further consider the formulation of the technical problem. In the Board's view, however, this is not a special reason for remittal (Article 11 RPBA 2020). As not only the decision of the Examining Division was concerned with

the question which technical problem the claimed invention solved, but also the Board's preliminary opinion and the larger part of the oral proceedings before the Board, there is no convincing reason to allow that discussion to continue before the first instance. The request is therefore rejected.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

L. Stridde Martin Müller

Decision electronically authenticated