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D E C I S I O N
of 5 July 1999

Case Number: T 0007/99 - 3.4.2

Application Number: 93116975.9

Publication Number: 0594150

IPC: G02F 1/03, G06E 3/00, G09G 3/36

Language of the proceedings: EN

Title of invention:
An optical operation element and use thereof

Applicant:
Fuji Photo Film Co., Ltd.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 123(2), 54

Keyword:
"Amendment (main request) - added subject-matter (yes)"
"Auxiliary request - novelty (no)"

Decisions cited:
-

Catchword:
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Boards of Appeal

Chambres de recours

Case Number: T 0007/99 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 5 July 1999

Appellant: Fuji Photo Film Co., Ltd.
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Representative: Klunker, Schmitt-Nilson, Hirsch
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 27 July 1998
refusing European patent application
No. 93 116 975.9 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: E. Turrini
Members: M. A. Rayner
B. J. Schachenmann

Summary of Facts and Submissions

- I. The present appeal is against the decision of the examining division to refuse European patent application 93 116 975.9 for lack of novelty of the independent claims before it. Amongst others, the following documents were mentioned in the decision:
- D5: International Journal of Optical Computing, Vol.2, 397-407 (1991), "Optical Neural Networks based on error back-propagation learning for hetro-association of two-dimensional patterns," Yuk et al.
- II. In its decision, the examining division referred to the disclosure of document D5 and in particular to the network shown in Figure 3 thereof and one of its constituent elements according to Figure 4. The division pointed to the photodiodes which receive light separated through polarisers and output electrical signals to electronic circuits performing operations resulting in an electrical output controlling a laser diode output. The division reasoned that a weighting means is provided by the electrically controlled polariser at the output of the laser diode. In view of this disclosure, the division concluded that the subject matter of claim 1 of the requests then under consideration lacked novelty.
- III. In its notice of appeal, the appellant (=patent applicant) requested that the decision be set aside and on an auxiliary basis oral proceedings.
- IV. The appeal board issued a summons to oral proceedings

indicating its preliminary opinion in relation to Article 123(2) EPC that so far as passages of the application mentioned in the appellants statement setting out the grounds of appeal concerned "received signals" and not signals transmitted from weighting means, it seemed doubtful whether the claim under consideration was supported by the application as filed. The board also indicated the polariser known from D5 appeared to function as a weighting means within the meaning of this claim.

- V. The appellant filed a set of claims in advance of the oral proceedings replacing previous versions and during the oral proceedings an amended set, and requested as main and auxiliary request, respectively, grant of a patent based thereon. The wording of the independent claims according to the main and auxiliary requests is as follows:

Main request

An optical operation light emitting element (81,100,110) comprising:

a photoelectric operation element (8) having

(a) a plurality of light receiving separation elements (4,3) arranged adjacently to each other which receive and separate a plurality of input information beams (83) into individual information beams, and which output separated information beams in the form of electric signals (5a,5b) independently of each other;

(b) an operation element (6) which outputs a resulting electric signal (7) corresponding to an operation result obtained by subjecting said outputted

electric signals (5a,5b) to an operation; and
a light emitting element (62) which emits light (84,114) at an intensity in response to an electrical signal (7) which corresponds to an operation result output from the photoelectric operation element (8), characterized in that the operation light emitting element has a weighting means (82,111) for weighting a beam output from said light emitting element (62), the weighting means being adapted for weighting said beam output from said light emitting element with simultaneously positive and negative values.

The wording of claim 1 according to the **auxiliary request** differs from that of the main request by deletion of the last six words of the latter and replacement of weighting "means" by weighting "mask".

VI. The arguments of the appellant can be summarised as follows:

An explicit recitation of the wording of the last feature of claim 1 of the main request is not present in the application as filed. Nevertheless this last feature is fully supported by the original application because:

According to page 56, last sentence of top paragraph relating to Figure 6 (corresponding to lines 53 to 55 on page 16 of the application as published), the weighting mask W is composed of a blue filter and a red filter so that it can effect desired weighting.

The optical neuron elements receive and separate red and blue light (positive and negative information)

which may be present simultaneously (see the last paragraph on page 69 of the application as filed corresponding to lines 27 to 30 on page 20 of the application as published).

According to the paragraph bridging pages 71 and 72 related to Figure 14 (corresponding to the paragraph bridging pages 20 and 21 of the application as published), the weighted output beam I10 is coupled to layer 92 as a "locally coupled transfer", i.e. "an information beam is only transferred to an optical neuron element in the vicinity of one optical neuron element on the optical neuron layer 92 which corresponds to one optical neuron element on the optical neuron layer 91"

Therefore, if a certain optical neuron element 81 of any of layers 92 to 94 in Figure 14 receives simultaneously red and blue light, the weighting mask 82 at the output of the preceding layer must "simultaneously" output red and blue light.

The weighting means in the present application is a static device and this is expressed in the claims of the auxiliary request by use of the word mask. A mask is not disclosed in D5 which employs an electrically controlled polariser at the output of the element shown in Figure 4. The state of the polariser at any instant determines the signal which is output and this state is changed electrically and so is not static. Therefore a mask within the meaning of claim 1 is not disclosed.

VII. At the end of the oral proceedings, the appeal board gave its decision.

Reasons for the Decision

1. *Admissibility*

The appeal complies with the provisions mentioned in Rule 65(1) EPC and is therefore admissible.

2. *Main Request*

- 2.1 Claim 1 concerns an optical operation light emitting element with a weighting means such as shown in Figure 13 (see the weighting mask 82). In the application, the reference to a weighting mask W comprising a blue and a red filter relied upon by the appellants applies not to this optical operation element but to a mask arranged between layers and separate from the elements as is shown in Figure 6. Such a mask is common to all the elements of the type shown in Figure 5 of a layer and the network shown in Figure 7 comprising a plurality of layers incorporating the elements is designated as space invariant with a common weight of connection for each point of each layer. Unlike this network, the network described with reference to Figures 13 to 15 is designated as a space variant network and each element of the type shown in Figure 13 has its own separate weighting mask 82, there being thus no need for a weighting mask like the weighting mask W between the layers. No specific information is given about the individual mask 82 of each element of the type shown in Figure 13 in the space variant network according to Figures 14 to 15, especially not about any colour filter in the mask.

Thus, in view of the different type of network and different interaction of element and mask, it is not possible to derive directly and unambiguously from the disclosure relating to weighting mask W in the space invariant network that each individual weighting mask 82 in the space variant network comprises a blue and a red filter. The board observes that it is, for example, equally possible that some of the weighting masks 82 in a layer comprise just a blue filter and the remainder just a red filter.

2.2 The description on page 20 relating to the optical element of Figure 13 being exposed simultaneously to red and blue light concerns light received by the element and not light transmitted from the individual weighting mask thereof and therefore does not directly give any information about the function of the weighting mask 82 at the output of the element. Since the neural network containing a weighting mask in each element of the layer is space variant, the layers can be arranged in close proximity to each other (Figure 14) to provide a one to one coupling or the distance between the layers can be increased (Figure 15) to establish a total coupling involving transfer from one element to all the elements in the subsequent layer. Accordingly one reasonable reading of the description relating to Figures 3 to 15 leads to a specific understanding that a layer comprises elements each of which has a weighting mask having just a red or just a blue filter and consequently elements simultaneously receive blue and red light for example only when the layers are separated with the elements in a one to all configuration and not when the layers are together and the elements in a one to one

configuration. There are other specific possibilities, including the interpretation of the appellants that each filter of each element is coloured both red and blue. However, since the general teaching of the application is silent about the nature of the filter in the element, no specific possibility can be directly and unambiguously derived from the general disclosure of a weighting mask. Accordingly, the specific feature of claim 1 concerning the weighting means being adapted for weighting with "simultaneous positive and negative values" amounts to additional subject matter not present in the documents as filed. Therefore the requirement specified in Article 123(2) EPC is not satisfied.

3. *Auxiliary request*

The preamble of claim 1 of the auxiliary request is identical to that before the examining division. The board sees no reason and nor have any been offered by the appellant for diverging from the assessment of the examining division that document D5 discloses all the features thereof. The characterising feature of claim 1 according to the auxiliary request makes reference to a weighting mask, which is defined in the claims as being adapted for weighting a beam output from the light emitting element. Since not all of the light passes the electrically controlled polariser disclosed in document D5, whatever its polarisation state, this polariser always masks the light which does not pass, independent of its polarisation at any instant. Therefore, the board concludes that the electrically controlled polariser is a mask within the meaning of claim 1. Submissions of the appellants relying on the mask being

static do not affect this conclusion because they do not relate to any feature in the claim. Weighting in the context of the present application in fact means providing a light beam with a detectable polarity coding such as a colour coding or a polarisation coding. According to the last complete sentence on page 399 of document D5, polarisation encoding by the electrically controlled polariser handles bipolar output. Thus, the polariser constitutes a weighting mask within the meaning of claim 1 because it is adapted for weighting the beam from the laser diode by assigning a polarisation according to polarity. Therefore the disclosure of Figures 3 and 4 of D5 also meets the wording of the characterising part of claim 1. Accordingly, the subject matter of claim 1 according to the auxiliary request lacks novelty and therefore fails to satisfy Article 54 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

E. Turrini