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D E C I S I O N
of 7 April 2005

Case Number: T 0408/02 - 3.5.1

Application Number: 93907045.4

Publication Number: 0680641

IPC: G06K 7/10

Language of the proceedings: EN

Title of invention:
Optical Scanning Head

Patentee:
SYMBOL TECHNOLOGIES, INC.

Opponent:
DATALOGIC S.p.A.

Headword:
Scanning head/SYMBOL TECHNOLOGIES

Relevant legal provisions:
EPC Art. 56, 104(1)

Keyword:
"Inventive step (yes)"
"Apportionment of costs (no)"

Decisions cited:
-

Catchword:
-



Case Number: T 0408/02 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 7 April 2005

Appellant: DATALOGIC S.p.A.
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Respondent: SYMBOL TECHNOLOGIES, INC.
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Representative: Wardle, Callum Tarn
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
20 February 2002 concerning maintenance of
European patent No. 0680641 in amended form.

Composition of the Board:

Chairman: S. V. Steinbrener
Members: R. S. Wibergh
B. J. Schachenmann

Summary of Facts and Submissions

I. This is an appeal by the opponent against the decision of the opposition division finding European patent No. 0 680 641 in amended form to meet the requirements of the EPC.

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

D2: US-A-4 315 245

D6: US-A-5 083 246

D7: US-A-4 743 773

D9: Datalogic DL 60-00/01 Operator's Manual, dated May 1990

D12: GB-A-2 225 659.

III. The patent was opposed on the grounds mentioned in Article 100(a), (b), (c) EPC. The opposition division decided that an amended version of the patent fulfilled the requirements of the EPC. In particular, a combination of the document D9, taken to represent the closest prior art, with either document D12, D2 or D6 did not render the invention obvious.

IV. In the grounds of appeal the appellant (opponent) requested that the decision of the opposition division be set aside and the patent be revoked.

- V. The respondent (patent proprietor) requested in the reply to the grounds of appeal that the appeal be dismissed and, additionally, that the costs in respect of the appeal be apportioned.
- VI. In a communication from the Board the opinion was expressed that the reasoning in the decision under appeal appeared largely convincing even if, at least with the benefit of hindsight, some aspects of the invention might appear trivial.
- VII. Oral proceedings were held on 7 April 2005. The Board expressed some concern that claim 1 as amended before the opposition division might encompass embodiments not disclosed in the application as initially filed. In response, the respondent filed a more restricted version of claim 1 and two adapted description pages.
- VIII. Claim 1 as filed on 7 April 2005 reads:

"An optical scanner for scanning a bar code symbol at a variable, non-contact distance from said optical scanner, said optical scanner having a first width and comprising at least one printed circuit board (2) having a front, a centre and a rear, a longitudinal centre plane perpendicularly bisecting said at least one printed circuit board (2) into a first side and a second side and running perpendicular to the front to the PCB, said front having a second width smaller than the first width, a plurality of LEDs (4-15) disposed on the front of the at least one printed circuit board (2) for emitting an incident beam in the form of a fan of light (104-115) for illuminating the bar code symbol, an optical assembly (18) disposed at the centre of the

at least one printed circuit board (2) for focussing light reflected from the bar code symbol, a detector means (20) comprising at least one linear CCD array disposed at the rear of the at least one printed circuit board (2) for detecting light focussed by the optical assembly (18) and generating an electrical signal representative of said bar code symbol therefrom, a signal processing means (22) in electrical communication with the CCD detector means (20) for converting the electrical signal into an output comprising data descriptive of the bar code symbol, a voltage source (46) for providing voltage to the plurality of LEDs (4-15), the CCD detector means (20) and the signal processing means (22), the optical scanner having a single cylindrical lens provided forward of said plurality of LED's having an input edge and an output edge for focussing said fan of light from said plurality of LED's into a line of light at its focal distance for illuminating a bar code within a field of view within a range of said focal distance so that reflected light is reflected therefrom, wherein a first portion (4;5;6;7;8;9) of the plurality of LEDs (4-15) is disposed on the first side and a second portion (10;11;12;13;14;15) of the plurality of LEDs (4-15) is disposed on the second side, wherein all the LED's of the first portion (10-15) are orientated at some non-zero angles in a first direction with respect to the longitudinal centre plane and all the LED's of the second portion (4-9) are similarly orientated at some non-zero angles in a second, opposite direction with respect to the longitudinal centre plane so as to emit light and to create a diverging incident beam that increases in width as a distance between the optical scanner and the bar code increases."

- IX. The appellant requested that the decision under appeal be set aside and the patent be revoked.
- X. The respondent requested that the decision under appeal be set aside and the patent be maintained with the following documents:

Claims:

- 1 filed at the oral proceedings
2 to 13 filed on 19 December 2001

Description:

- pages 1, 2A, 3 to 27 filed on 19 December 2001
pages 2, 2B filed at the oral proceedings

Drawings:

as granted.

The respondent also requested apportionment of costs in respect of the appeal.

- XI. At the end of the oral proceedings the Board announced its decision.

Reasons for the Decision

1. *The invention*

The invention concerns an optical scanner for scanning bar code symbols. Previous CCD scanners have been held close to the bar code or at a short distance from it. This has limited their use to bar codes only as wide as

the window or housing of the scanning head (see paragraph [0003] of the patent specification). According to the invention the light sources in the scanner (LEDs, ie Light Emitting Diodes) are oriented to emit light at different angles with respect to the longitudinal centre plane so that a fan of light is created. Claim 1 sets out the geometry of a LED configuration intended to achieve this.

2. *Amendments*

At the oral proceedings before the Board the appellant objected to the word "similarly" inserted in claim 1 as being obscure ("all the LED's of the second portion (4-9) are *similarly* orientated at some non-zero angles in a second, opposite direction with respect to the longitudinal centre plane"). The Board notes that the expression "similarly oriented" is used at p.23, l.14 of the original application to indicate that the LEDs are oriented symmetrically with respect to a centre line, and this is in the Board's view the only reasonable interpretation of the feature. It appears that no other expression based on the original application could better convey this idea. The particular interpretation made here is supported by all embodiments, which comprise symmetrical LED arrays. The word "similarly" is therefore regarded as not objectionable under Article 84 EPC.

3. *The prior art*

3.1 D9 shows a scanner with an array of non-inclined LEDs (1 in fig.1). The scanner is held close to the bar code to be read (distance less than about 20 mm, see part 5.1).

D7 is similar. From fig.4B it can be seen that the light beam emitted from the LEDs is diverging.

The subject-matter of claim 1 differs from the disclosure of both documents in substance in that the LEDs are arranged in a specific inclined configuration.

3.2 D12 describes a scanner having one or two LEDs (rather than an array). In fig.9 the two LEDs are inclined. In fig.1 (two LEDs) and fig.12 (one LED) they are not.

3.3 D2 concerns a reading device for character recognition having a plurality of LEDs to illuminate the material to be read. In fig.3 ten LEDs arranged in two rows illuminate an area 3 mm wide and 12 mm long. The LEDs in fig.2 are not shown to be inclined but the light rays are. In fig.1, concerning a similar prior art configuration, the two incandescent lamps used as light sources are inclined.

3.4 D6 shows an apparatus for illuminating a portion of the cockpit of an aircraft. An illumination unit comprising two inclined LEDs is mounted on the microphone on the pilot's helmet (fig. 2 and 3). Its purpose is to illuminate the gauges without impairing the pilot's night vision.

4. *Inventive step*

4.1 At the oral proceedings before the Board the appellant, focussing on inventive step, presented three different arguments, each of which involved a combination of D9 (or D7) with another document. These will be examined below.

4.2 Combination D9 and D12

The first argument concerns a combination of D9 with D12. According to the appellant the skilled person, starting from D9, would realise that the illumination at the end portions of the beam emitted from the LED array was lower than at the centre. This would limit the usefulness of the scanner when positioned at a distance from the bar code to be read. The technical problem was thus how to obtain a uniform illumination of the bar code. D12 addressed this problem. The embodiment of fig.9, in which two LEDs were disposed symmetrically at non-zero angles with respect to the scanner centre line, would have been especially attractive since the skilled person would have realised that the lenses used to shape the light beams were relatively simple and in fact approximately corresponded to the kind of lens (eg hemispherical or paraboloid) often integrated into LEDs. The embodiments shown in fig.1 and fig.12, in which the LEDs were not inclined, were less suitable in the circumstances. Although also achieving a largely uniform illumination, the embodiment of fig.1 required more complex lenses and the one of fig.12 would not provide enough light since it had one LED only.

The respondent has argued that in D12 the uniform illumination is obtained by the particular lens system used, not by inclining the LEDs. The purpose of the embodiment with the two inclined LEDs was to ensure satisfactory operation even in case one LED failed. Moreover, it was an explicit goal in D12 to use one or two single LEDs instead of arrays. Its teaching would therefore not have been considered by a skilled person in combination with D9.

The opposition division concluded that D12 could not be combined with D9 to arrive at the invention. Although the first instance considered a problem formulation ("permitting the reading of bar codes wider than the scanner") which is somewhat different from the one now suggested by the appellant (how to obtain a uniform illumination of the bar code - see above), the Board comes to the same result as the opposition division. Even assuming that the skilled person would be aware that the illumination at the periphery of the beam is often critical, and consider D9 in the light of this general knowledge, he would mainly learn from D12 that the uniformity of illumination can be improved by suitably formed lenses. This is in the embodiments of D12 a matter of beam-shaping ("the light beam emitted from the LED is focussed in two directions: one is parallel to the length of the object... Thus, the light emitted from the LED is effectively available for illuminating the object", D12, p.11, bottom). Within this general teaching the specific purpose of the arrangement in fig.9 of D12, showing two inclined LEDs, is however expressly a different one: "if either one of the LEDs 5 and 6 malfunctions, or if the light path of either optical system is intercepted by something for

some reason, the whole barcode area of the object 11 remains illuminated by the other LED" (D12, p.10, second complete paragraph). The intention is thus primarily to achieve, by means of the two inclined LEDs, redundancy, so that the scanner works - albeit less efficiently - also when one of the two LEDs has failed. The appellant has argued that this embodiment in fact leads to a simpler lens shape than if the LEDs are not inclined. This, however, is not expressly said in D12. Even if it were true and could be deduced from the drawing, the given technical problem did not lead the skilled person to examine this embodiment more closely since it had nothing to do with the possibility of a LED failing. In the Board's view it is only because of knowledge of the inclined LEDs shown in the patent-in-suit (ie hindsight) that the attention is at all drawn to this embodiment. It appears likely that a skilled person without such knowledge would have tended to disregard this embodiment exactly because of the inclination of the LEDs which distinguishes it not only from the other embodiments in D12 but also from the geometry of the scanner described in the starting document, D9. Finally, as pointed out by the respondent and the opposition division, it cannot be denied that D12 teaches away from LED arrays altogether ("assembly work of the many LEDs is troublesome and is expensive in assembly cost", D12, p.2, bottom).

The same conclusion can be drawn with D7 taken as starting document. The Board is thus of the opinion that the skilled person would hardly have considered a combination of D9 and D12, and even if he had, he would not necessarily have been led to a configuration with

LEDs oriented at non-zero angles, as required by claim 1.

4.3 Combination of D9 and D2

The appellant has argued that the same problem of poor peripheral illumination would lead the skilled person from D9 to D2. Document D2 concerns a hand-held scanner provided with two arrays of LEDs (fig.3) arranged in two rows to illuminate the rectangular area between them. The LEDs are not mentioned or illustrated as inclined towards this area but in the appellant's view they would be inclined, considering that otherwise light would be wasted. This document thus rendered obvious the idea of inclining the LEDs in D9 to achieve uniform illumination of the barcode area.

The Board however remains unconvinced by this argument. The first reason is that D2 does not expressly mention that the LEDs are inclined. But even if they were inclined, it is not certain that the skilled person would learn anything additional from the document considering that the LEDs in D9 are already directed towards the area to be illuminated, namely the barcode, and that the further aim consisting in illuminating sufficiently the end parts of this area is not discussed in D2. In the Board's view it is thus unlikely that the skilled person would have at all considered D2 in connection with D9.

4.4 Combination of D9 and D6

The appellant has suggested that, again starting from D9, the skilled person would have turned to D6 in order

to solve the problem of uniform illumination. This document concerns a "helmet mounted aviation night vision illuminating device" (title) provided with two LEDs (32,34 in fig.2). The diodes emit beams each 75° wide and "are disposed horizontally at an angle with respect to each other to enable a broad field of view laterally of approximately 150°" (col.3, 1.47-61). Thus, they are oriented at non-zero angles to achieve a uniform illumination over as wide a field of view as possible. The Board may agree that this simple principle is similar to the one underlying the invention as defined in claim 1. However, as the respondent has pointed out, D6 belongs to a technical area which has nothing in common with the invention except the use of inclined LEDs to generate a diverging beam. Therefore, D6 would most probably never have been considered by a skilled person searching for a solution to the specific problem of providing uniform illumination of a barcode using a scanner. It follows that it need not even be considered whether a combination of D9 and D6 yields the subject-matter of claim 1 or not.

4.5 Conclusion

For these reasons the Board is of the opinion that the skilled person would not have combined D9 (or D7) with any one of the documents D12, D2 or D6 to arrive at the invention. Thus, in view of the prior art cited against the patent in suit, the subject-matter of claim 1 involves an inventive step (Article 56 EPC).

The remaining documents of the patent specification have been adapted to the wording of claim 1 now under consideration and also meet the requirements of the EPC.

5. *The request for apportionment of costs*

The respondent has requested that its costs in respect of the appeal proceedings be apportioned (cf Article 104(1) EPC) on the grounds that the appellant had raised neither new information nor new arguments in relation to the various previously cited documents.

The Board does not consider an apportionment of the costs incurred to be justified since in accordance with established case law the right to oral proceedings is not subject to any conditions. The respondent's allegation that the oral proceedings before the Board were pointless because the same arguments were discussed as before the opposition division is thus irrelevant. It is therefore hardly necessary to point out that the appellant's final argumentation was in fact different at least in that it involved a formulation of the technical problem which was not identical with the one discussed in the decision appealed (cf point 4.2 above).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent as amended with the following documents:

Claims:

- 1 filed at the oral proceedings
- 2 to 13 filed on 19 December 2001

Description:

- pages 1, 2A, 3 to 27 filed on 19 December 2001
- pages 2, 2B filed at the oral proceedings

Drawings:

- as granted.

3. The request for apportionment of costs is refused.

The Registrar:

The Chairman:

M. Kiehl

S. Steinbrener