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Case Number: T 1273/07 - 3.4.02

Application Number: 98949658.3

Publication Number: 1062486

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Language of the proceedings: EN

Title of invention:
Portable light source and system for use in leak detection

Patentee:
Bright Solutions, Inc.

Opponent:
-

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive step - no (appeal dismissed)"

Decisions cited:
-

Catchword:
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Case Number: T 1273/07 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 9 February 2010

Appellant: Bright Solutions, Inc.
1738 Maplelawn Drive
Troy, MI 48084 (US)

Representative: Morton, Colin David
Nash Matthews
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 27 February 2007 refusing European patent application No. 98949658.3 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: A. G. Klein
Members: M. Rayner
B. Müller

Summary of Facts and Submissions

I. The applicant appealed against the decision of the examining division refusing European patent application number 98 949 658.3. The patent application concerns a method and system for leak detection. In the decision under appeal, reference was made to documents including the following

D1 DE-U-297 06 434
D5 US-A- 5 788 364.

The examining division analysed document D1 as disclosing a method of detecting a leak in a system containing a substance capable of emitting an emission wavelength of light after being excited by an excitation wavelength of light, the method comprising:
providing a beam of light at the excitation wavelength from a light source to a leak site; and
detecting emission of light from the substance (see page 3 lines 12-20 and the whole set of claims) wherein the light source comprises:
- a housing (1) having a light outlet (2);
- a reflector (6) located within the housing;
- a low voltage lamp (10) positioned in the housing between the reflector and light outlet (see Fig. 1), wherein the lamp is capable of being connected to a source of electrical power; and
- a filter (4) positioned in the housing between the lamp and the light outlet,
wherein the filter restricts the wavelengths of light emitted from the lamp and the light reflected by the reflector (see page 9, last paragraph - page 10, third paragraph),

whereby the wavelength of the light emitted from the light source through the light outlet is restricted to a predetermined range between 300 and 700 nm (see page 2, lines 19-22) effective to enhance the detection of emission of light from a substance when the substance is excited by the wavelength of light emitted from the light source (see page 10, lines 1 6-25).

The division substantiated its refusal with lack of inventive step of the subject matter of method claim 1 before it, by arguing that the difference with respect to document D1 is only that the light source comprises an essentially parabolic reflector providing a collimated beam of light. A skilled person would look to solving the problem of providing a larger and homogeneously illuminated area or uniform light spot. It is generally known that a homogeneously illuminated area or light spot can be achieved by a collimated beam as shown for instance in document D5 and it would be obvious to have included this feature to solve the problem. Recitation of a definition of average light power density produced in terms of the parameters concerned, as in the apparatus claim, amounts to merely what is necessary for fluorescence, which the skilled person would have selected without an inventive step.

II. The appellant requested that the decision under appeal be set aside and a patent granted on the basis of claims 1 to 26 filed with the statement of grounds for appeal. Oral proceedings were requested on an auxiliary basis.

According to the appellant, light sources can be difficult to use if they are too bulky, have relatively

long warm-up periods, are sensitive to voltage surges or dissipate large amounts of heat. The light source used in the invention has a parabolic reflector for providing a collimated beam. The beam provided according to the invention is less sensitive to range from the light source than a case where a focussed light beam is used. The reader of document D1 would have understood that the provision of a focused beam was necessary to provide sufficient intensity of light at the leak site, thus teaching away from the invention. There was thus no reason for the skilled person to have wanted to use a parabolic reflector, nor is the teaching of document D1 compatible with any other document disclosing a parabolic reflector.

The argument of the examining division that solving the problem of range sensitivity by using a parabolic reflector is obvious is based on hindsight reasoning because it presupposes the skilled person would have understood focussed beams to give a problem. However, document D1 clearly teaches that a focussed beam is essential. Particular parameter values necessary to the excitation of fluorescent light in particular substances are unique to the present invention and would not otherwise be known to a person of ordinary skill. There is, moreover, no disclosure in document D5 that use of a parabolic reflector and a filter that restricts the wavelengths of light emitted from the lamp and reflected by the reflector would solve problems of sensitivity of illumination levels associated with focussed beams. It would thus not have been obvious to combine the teachings of documents D1 and D5. The subject matter of the independent claims is therefore both novel and inventive.

III. The board had serious doubts about the case of the appellant and appointed oral proceedings. In a communication attached to the summons, the board observed that it seemed that the examining division and the appellant were in agreement that only references to the collimated beam and parabolic reflector provide explicit novelty over document D1. It was not entirely clear whether or not the appellant conceded that the claimed intensity values are implicitly known from document D1, just by carrying out the method therein disclosed. The preliminary view of the board was that they are at least obvious. The main area of dispute thus concerned the collimated beam and the parabolic reflector. There was a question about just what is used in the application, for example, reference is made to a 50MR16/Q12/NSP unit, which is probably a multifaceted reflector narrow spot unit of the "TRU-AIM" family, like the "MR-16" and "AR 70" referred to in document D1.

Supposing, for argument's sake, the appellant were to delete the units which seem to be narrow spots or to show they are parabolic reflector units, then the question to be answered is whether the difference really involves an inventive step. Looking carefully at document D1, so far as beam spread is concerned, it is plain that a beam angle of 4° is preferred in the detailed description (see page 10, fourth paragraph). Moreover, page 7 second paragraph, last sentence teaches unequivocally that the smaller the beam spread is, the larger is the illumination and intensity of fluorescence generated. Following this teaching leads towards making beam spread as small as attainable. Ultimately, the teaching thus leads the skilled person

to a collimated beam, which, in practice, itself can anyway only be achieved as an approximation. The board was therefore inclined to consider the subject matter claimed obvious without reference to another document.

Nevertheless, so far as document D5 is concerned, it amounts to no more than an illustration of a parabolic reflector in a torch of rather similar construction to the light source unit of the application.

Other submissions of the appellant about problems of bulky sources, warm up times, sensitivity to voltage surges and heat generation are not relevant to the present case as such problems have already been solved in the teaching of document D1.

IV. Responsive to the summons, the appellant declared that it had decided not to attend the oral proceedings. It was understood that the board would continue the proceedings anyway and the appellant looked forward to receiving the decision. The appellant referred to the observation of the board that document Dl teaches that narrow spots are preferred, and that this would lead the skilled addressee to minimise the beam spread and, ultimately, therefore to come up with a collimated beam. However, the passage which the board has cited is clearly concerned with focussed beams, which can result in a focal point that "can produce as high as 50,000 candle power from extremely small light sources". The passage is therefore referring to convergent beams with a negative beam spread. Thus the teaching would ultimately lead the skilled person to produce, not a collimated beam, but a beam which converges to as small a spot as is practicable for detection purposes.

Document D1 accordingly does not render the invention obvious but, as has previously been argued, teaches the skilled addressee away from the invention.

V. Independent method claim 1 and corresponding apparatus claim 17 according to the sole request of the appellant are worded as follows:

"1. A method of detecting a leak in a system containing a substance capable of emitting an emission wavelength of light after being excited by an excitation wavelength of light, the method comprising:
providing a collimated beam of light at the excitation wavelength from a light source to a leak site; and
detecting emission of light from the substance wherein the light source comprises:
a housing (1) having a light outlet (25);
an essentially parabolic reflector located (6) within the housing (1);
a low voltage lamp (10) positioned in the housing (1) between the parabolic reflector (6) and light outlet (25), wherein the lamp (10) is capable of being connected to a source of electrical power (28; 28A); and
a filter (4) positioned in the housing (1) between the lamp (10) and the light outlet (25), wherein the filter (4) restricts the wavelengths of light emitted from the lamp and the light reflected by the parabolic reflector (6), whereby the wavelength of the light emitted from the light source through the light outlet (25) is restricted to a predetermined range between 300 and 700 nm effective to enhance the detection of emission of light from the substance when the substance is excited by the wavelength emitted from the light source; and

the light source produces an average light power density in the ultraviolet wavelength region of at least 0.1 mW/cm^2 at a distance of two feet from the light outlet or an average light power density in the blue wavelength region of at least 0.75 mW/cm^2 at a distance of two feet from the light outlet.

17. A system for detecting leaks in a fluid system, said system comprising:
a substance capable of emitting an emission wavelength of light after being excited by an excitation wavelength of light; and
a light source capable of emitting a collimated beam of the excitation wavelength of light, the light source comprising:
a housing (1) having a light outlet (25);
an essentially parabolic reflector (6) located within the housing (1);
a low-voltage lamp (10) positioned in the housing (1) between the reflector (6) and light outlet (25); and
a filter (4) positioned in the housing (1) between the lamp (1) and the light outlet (25), wherein the filter (4) restricts the wavelengths of light emitted form the lamp (10) and the light reflected by the reflector (6); whereby the wavelength of the light emitted form the light source through the light outlet (25) is restricted to a predetermined range including the excitation wavelength between 300 and 700 nm effective to enhance detection of the emission wavelength of light from a substance when the substance is excited by the excitation wavelength and wherein the light source produces an average light power density in the ultraviolet wavelength region of at least 0.1 mW/cm^2 at a distance of two feet from the light outlet or an

average light power density in the blue wavelength region of at least 0.75 mW/cm^2 of a distance of two feet from the light outlet."

VI. The oral proceedings took place in the absence of the appellant and at the end thereof, the board gave its decision.

Reasons for the Decision

1. The appeal is admissible.

2. *The Light Source*

2.1 An MR16 light unit is common to both document D1 (see page 10, lines 10 to 11) and the application (see page 12, line 24) in finding application in leak detection. The light units used are both 50 Watt (see application **50**MR16 and document D1, page 11, line 24).

2.2 The board assumes, favourably for the appellant, that light unit 50MR16/Q12/NSP (=50 Watt, multifaceted reflector, 16/8" diameter, quartz, 12° beam angle, narrow spot) does not have a parabolic reflector. Nevertheless, even in this case it can be concluded that the MR16 unit is suitable for carrying out the method both in the teaching of the application and that of document D1.

2.3 The reference made by the appellant to 50000 in document D1 is not quite correctly cited in context. The value, of course, depends on reflector size. Therefore, while a relatively larger (as taught in

lines 18 to 19 on page 10 of document D1) AR 111 unit may produce the figure of 50000, this is not taught for the MR16 unit.

3. *Patentability*

3.1 Document D1 can be taken as representing the closest prior art to the subject matter claimed in the independent claims of the application. The appellant has not disputed the analysis of the examining division concerning features disclosed by document D1 and the board will take this as a starting point for its own assessment. As set out in the communication from the board, it is not entirely clear whether the appellant conceded that the parameter values claimed, i.e. 0.1 mW/cm^2 and 0,75 mW/cm^2 are implicitly known from document D1 by virtue of carrying out the method. However, in view of the common light source, even taking the most favourable position for the appellant, the board can only maintain its view that the parameters are at least obvious. In other words, the board does not accept that the parameter values are unique to the application, but considers, in agreement with the examining division, that their selection does not involve an inventive step.

3.2 The main point of dispute thus remains whether the collimated beam and parabolic reflector claimed are obvious in the light of the prior art. The situation in this area is obscured by the common use of the MR16 light unit in the teaching of document D1 and the application. The appellant did not respond to the comments of the board concerning deletion of this unit from the description of the application or clarify its

relation to a parabolic reflector. The board will, favourably for the appellant, assume in considering inventive step the teaching of the application to be restricted to those units specified as having a parabolic reflector. Nevertheless, in this case arguments of the appellant supporting inventive step and based on alleged recognising of problems with units like the MR16, whereas the teaching of document D1 did not so do, are not convincing.

3.3 To avoid confusion, the board remarks that "beam spread" is a general term, describing the angle between the two directions opposed to each other over the beam axis for which the luminous intensity is a certain fraction of that of the maximum luminous intensity. Beam angle is the angle between the two directions opposed to each other over the beam axis for which the luminous intensity is half that of the maximum luminous intensity.

3.4 All of the three units mentioned in document D1, i.e. the MR16, the AR70 and the AR111 have a beam spread, corresponding to beam angles indicated as being between 4° and 11°, in which range they are preferred smaller (see page 7, lines 11-13 of document D1 as referred to in the board's communication). The figure of 50000, having to do with physical size of the unit, does not counter the teaching towards a smaller, in this case the specifically recited 4°, beam angle of the AR111 unit. Ultimately, becoming smaller suggests to the skilled person that the beam angle should move down ideally to zero, in other words tending towards the beam not spreading wider than the reflector diameter. As a collimated beam does not spread, this is therefore

what is suggested and such, as is well known, is produced by a parabolic reflector. In practice, a collimated beam can anyway only be achieved as an approximation.

3.5 A negative beam spread as postulated by the appellant is no longer a spread and is not a property of the light units disclosed in document D1. Nor is there any provision of, for instance, extra lenses for the units in document D1 which might support the appellant's concept of a negative beam angle. The approach of the appellant based on negative spread therefore relies on reading subject matter into document D1 which is not there and which conflicts with the disclosure. This approach did not therefore convince the board.

3.6 It follows that the problem (providing a homogeneous illuminated light area) and solution (parabolic reflector and collimated beam) analysis advanced by the examining division was not erroneously based on hindsight but was correct. It is rather more the case that the appellant misinterpreted the teaching of document D1. The board therefore agrees with the division on lack of inventive step.

3.7 The argument that the skilled person would not have combined the teachings of documents D1 and D5 because the latter is not concerned with range sensitivity of focussed beams or enhancing detection of emission light from a fluorescent substance is not really pertinent because the latter document was cited by the examining division mainly to illustrate that generating a collimated beam from a parabolic reflector was, as such, generally known, i.e. to demonstrate that a parabolic

reflector had not been presented for the first time by the applicant. In this sense, the document does indeed show a torch of rather similar construction to the light source unit of the application.

3.8 Moreover, it was not disputed that the teaching of document D1, like that of the application, meets problems of bulky sources, warm up times, sensitivity to voltage surges and heat generation.

3.9 The board has not therefore been offered any convincing reason to depart from its negative view as expressed in its communication. Accordingly, the subject matter of claim 1, and correspondingly, apparatus claim 17, cannot be considered to involve an inventive step within the meaning of Article 56 EPC, 1973.

3.10 The appeal against the decision of the examining division accordingly fails.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar The Chairman

M Kiehl A G Klein