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D E C I S I O N
of 21 May 2001

Case Number: T 0041/99 - 3.4.2

Application Number: 91301957.6

Publication Number: 0447136

IPC: H05B 41/36, H05B 41/392

Language of the proceedings: EN

Title of invention:
A method for automatic switching and control of lighting

Patentee:
TLG plc

Opponent:
01: Koninklijke Philips Electronics N.V.
02: Whitecroft Plc.
03: Siemens AG

Headword:
-

Relevant legal provisions:
EPC Art. 56, 111(1)

Keyword:
"Main request: inventive step (no)"
"Auxiliary request: remittal to first instance"

Decisions cited:
-

Catchword:
-

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Case Number: T 0041/99 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 21 May 2001

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 5 November 1998 revoking European patent No. 0 447 136 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: E. Turrini
Members: A. G. Klein
B. J. Schachenmann

Summary of Facts and Submissions

I. The appellant (patent proprietor) lodged an appeal against the decision of the opposition division revoking the European patent No. 0 447 136 (application No. 91 301 957.6).

Three oppositions against the patent as a whole had been filed by respondents I, II and III (opponents I, II and III, respectively). The oppositions were based on the grounds of lack of novelty and lack of inventive step (Article 100(a) EPC) and on the ground of insufficiency of disclosure (Article 100(b) EPC).

In the decision under appeal, the opposition division held that the subject matter of the independent apparatus Claim 3 as amended in accordance with the patent proprietor's request did not fulfill the requirements of Articles 52(1) and 56 EPC for inventive step.

II. The opposition division relied on a series of prior art documents, of which the following are pertinent to the present decision:

E1: GB-A-2 213 983

E2: EP-B-0 098 521

E4: US-A-4 449 074

E6: US-A-4 461 977

E9: National Lighting Conference 1988, pages 107 to 108; R. A. S. Kay, "Passive infra-red occupancy detectors for lighting energy management"

E20: US-A-4 823 051

During the appeal proceedings, the respondents submitted the following further document:

E24: AT-B-376 781

III. Oral proceedings before the board of appeal took place on 21 May 2001, at the end of which the decision of the board was given.

IV. The appellant requested that the decision under appeal be set aside and that the European patent be maintained in amended form on the basis of a set of claims, of which independent Claim 3 filed with the letter dated 5 March 1999 reads as follows:

"3. A lighting arrangement including:
a luminaire (1) incorporating a light source (3, 4) for illuminating a localized area (7);
a presence detector (5) for detecting the presence of a person in the localized area (7);
a light detector (6) for providing a signal related to the light intensity in the localized area; and
control means connected to the presence detector, the light detector and the light source for controlling the light source, the control means being arranged to

(a) maintain the light source in a dark luminous condition when a presence is detected and the light intensity in the localized area is of at

least a reference level;

(b) switch the light source to a high luminous condition which gives increased lighting in the localized area and maintain the light source in the high luminous condition when a presence is detected and the light intensity is less than the reference level;

(c) switch the light source to a dark luminous condition when detection of a presence ceases and

(d) switch the light source to a dark luminous condition when the light intensity exceeds the reference level, characterized in that

the luminaire is a self-contained luminaire (1) having the presence detector (5), the light detector (6) and the control means included therein, and
the control means is provided for controlling only the light source in said luminaire and further includes:
means (12) for dimming the light source;
control circuits for adjusting the light source during the presence of the person in said localized area between minimum and maximum light output levels within the high luminous condition in response to the light intensity detected by said light detector to maintain a substantially constant light intensity in the localized area;
first delay means for delaying for a predetermined period when detection of a presence ceases before switching to a dark or dim luminous condition; and
second delay means for delaying for a predetermined period when the light intensity exceeds the reference level before switching to a dark or dim luminous

condition. "

As a first auxiliary request the appellant requested that the patent be maintained as amended on the basis of Claims 1 to 11 constituting the first auxiliary request filed with the letter dated 23 April 2001. In the following the first auxiliary request is referred to as "auxiliary request" because for reasons given below discussion of a second auxiliary request of the appellant (corresponding to the second auxiliary request filed with the letter dated 23 April 2001) is not necessary.

Claim 1 of the auxiliary request is directed to "A lighting system for controlling the lighting conditions in room, including a plurality of ceiling mounted lighting arrangements disposed at different locations in the room", wherein each of the plurality of lighting arrangements is specified to comprise all the features set out in Claim 3 of the main request.

Claim 10, the only further independent claim of the auxiliary request, recites substantially the same limitations as Claim 1 of the auxiliary request in terms of method features.

The respondents for their part requested that the appeal be dismissed.

V. The appellant's arguments in support of his requests are essentially the following:

Document E24 discloses a desk lighting device for maintaining constant the illumination of the work surface of the desk where a person is working. In order

to save energy, the lighting device is switched off automatically when it is detected that the person leaves the desk. The lighting device, however, is switched on by means of the mains switch 23 represented in Figure 3, and not automatically when it is detected that a person enters the region of presence detection. Switching on the lighting device automatically whenever a presence is detected would result in a waste of energy and would therefore run counter the main purpose of the document. Furthermore, the lighting device disclosed in the document is switched off without delay upon detecting that the person leaves the region of presence detection. In addition, the document teaches mechanical presence detectors which are not integrated in the lighting device and electric presence detectors which may be, but are not taught to be integrated in the lighting device, so that no self-contained luminaire in the sense of the patent is disclosed in the document.

The appellant also submitted that the teaching of other document considered by the respondents is not congruent with the illumination control of the lighting device disclosed in document E24. In particular, document E20 discloses an illumination arrangement in which the illumination operation, the presence detection and the light intensity detection are carried out for an entire room and not in a localised area, and it thus relates to the different technical field of room lighting. Moreover, document E2 teaches a centralized control system using a single detector mounted on a wall, document E6 fails to teach a self-contained arrangement and a delay in connection with the presence detection, and document E1 teaches away from integrating the lamp disclosed in the document into a luminaire. Therefore,

a person skilled in the art would not combine the disclosure of document E24 with the teaching of these documents.

VI. The respondents' arguments in support of their requests can be summarised as follows:

In the first of the alternatives disclosed on page 3, line 44 of document E24 the presence detector is located in the luminaire, which accordingly is a self-contained luminaire within the meaning of the claims.

Furthermore, in the lighting device of document E24, when the light intensity is less than the reference level, the light source is switched on only when a presence is being detected, which anticipates the corresponding feature of the invention. In addition, the instabilities associated with the switching off of the lighting device when a person walks around the desk or leaves the desk only momentarily would be immediately apparent when working with the device disclosed in document E24 and would hint at a consideration of the delay known from document E20, the combination of these two document being obvious since desk illumination follows the same technical standards as room illumination.

Finally, document E20 discloses controlling the illumination of a localized area constituted by the room itself so as to save energy, so that there is a strong incentive to combine the complementary energy-saving features disclosed respectively in document E20 and E24.

Reasons for the Decision

1. *Admissibility of appeal*

The appeal complies with the provisions of Articles 106 to 108 and Rule 64 EPC and is therefore admissible.

2. *Main request of the appellant - independent Claim 3*

2.1 Compliance of the amendments with the requirements of Articles 123(2) and (3) EPC

Claim 3 of the main request differs from Claim 3 as granted in that the term "fitting" has been replaced by "luminaire" and in that the claim has been amended so as to specify that the control means is provided for controlling only the light source in the self-contained luminaire.

The term "luminaire" has been explicitly disclosed in the original application as designating a "lamp fitting", see in particular the statement "each of the lamp fittings is designed [...] as an intelligent luminaire [...]" in the last paragraph of page 3 of the application as originally filed. In addition, the board is satisfied that, as submitted by the appellant during the oral proceedings and agreed by the respondents, in the technical field of illumination a lamp fitting and a luminaire are two equivalent expressions and that therefore, as far as the patent in suit is concerned, they can be replaced by one another.

The feature according to which the control means of Claim 3 is provided only for controlling the light source in the luminaire is supported in the original

application by the disclosure that each luminaire is provided with its own lighting control system, see the last paragraph of page 3 in conjunction with Figure 1 of the application as originally filed. This additional feature also restricts the scope of the claims.

Therefore, Claim 3 of the main request satisfies the requirements of Articles 123(2) and (3) EPC.

2.2 Novelty of the subject matter of independent Claim 3

2.2.1 In the board's view, the prior art document which comes closest to the subject matter of independent Claim 3 of the main request is represented by document E24 which discloses a lighting arrangement comprising a luminaire (luminaire 2 shown in Figure 1) for illuminating and controlling the illumination of a localized area (see page 3, lines 8 to 11 and the work surface 13 of the desk 1 illuminated by the luminaire 2 in Figure 1). Document E24 was filed by the respondents during the appeal proceedings, which is long after the expiry of the nine-month opposition period. In view, however, of the particular relevance (see point 2.3 below) of this late-filed document for the assessment of the patentability of the main request, of the simplicity of its technical content and of the fact that the appellant had several opportunities to present his comments on this document, which he actually did, the board decided, in the exercise of its discretion under Article 114(1) EPC, to admit document E24 into the proceedings.

2.2.2 The lighting arrangement disclosed in document E24 with reference to Figures 1 to 3 comprises a luminaire 2 incorporating a light source constituted by lamps 14,

15 and 16 (see page 3, lines 8 to 9 and 20 to 28) for illuminating a localized area, i.e. the area determined by the region of incidence of the illumination light bundles 5 on the work surface 13 of the desk, see Figure 1 together with page 3, lines 8 to 11. The lighting arrangement also comprises a presence detector for detecting the presence of a person in the localized area (see page 3, lines 44 to 48) and a light detector 7 and 8 for providing a signal related to the light intensity in the localized area (page 3, lines 11 to 17).

In addition, the lighting arrangement comprises control means (see the control means including the controlling switching means 12 represented in Figure 3 together with page 3, lines 17 to 28) connected to the presence detector (page 3, lines 44 to 45), the light detector (Figure 3 and page 3, lines 17 to 18) and the light source (Figure 3), and arranged to control the light source constituted by the lamps of the luminaire (page 3, lines 17 to 20). The control means 12 is arranged to switch off the lamps of the luminaire when detection of a presence by the presence detector ceases (page 3, lines 44 to 46 and 48 to 50). The control means is also arranged to separately switch on and off each of the lamps (page 3, line 24) or, alternatively, to vary the illumination intensity of the lamps (page 3, lines 26 to 28) according to the light intensity detected by the light detector (page 3, lines 17 to 20). The illumination intensity of the lamps is controlled so as to maintain a substantially constant light intensity in the localized area as derivable from the discussion of the prior art in E24, page 2, lines 8 to 11 together with lines 22 to 33 according to which the light source is controlled on

the basis of the light intensity detected by the light detector (page 2, lines 22 to 28) so as to compensate for variations of the ambient illumination (see page 2, lines 8 to 11 and 30 to 33), thus maintaining a uniform illumination in the illuminated area (see page 2, lines 28 to 29).

It follows from the features and from the operation of the control means specified above that the control means is arranged to switch off the lamps, and therefore to switch the light source of the luminaire to a dark luminous condition, when the light intensity detected by the light detector exceeds a predetermined light intensity reference level, and that the light source is maintained in the dark luminous condition as long as the light intensity in the localized area is of at least the predetermined light intensity reference level referred to above. It also follows from the operation of the control means that, when the light source is in a luminous condition, and as long as a presence is being detected, the control circuit constituted by the controlling switching means 12 represented in Figure 3 adjusts the light source between a maximum light output level corresponding to the on state of all the lamps and a minimum light output level corresponding to the state in which only one of the lamps is on (see page 3, line 24) or, alternatively, to the state in which the lamp or lamps are in the minimum illumination level (see page 3, lines 26 to 28), the control circuit adjusting the actual light output level between the maximum and the minimum output levels in response to the light intensity detected by the light detector to maintain a substantially constant light intensity in the localized area. Furthermore, the controlling switching means 12

is arranged both to adjust the light output level of the light source to the minimum output level and to switch off the light source depending on the light intensity detected, so that the controlling switching means 12 also constitutes means suitable for dimming the light source of the luminaire both in the sense of decreasing the output of the light source to a minimum and in the sense of switching off the light source.

Furthermore, document E24 specifies that the control means includes delay means (see page 3, lines 29 to 30) for delaying for a predetermined period of time the switching off of the lamps, i.e. the switching of the light source to a dark luminous condition, when it is detected that the light intensity exceeds the predetermined reference level (page 3, lines 29 to 40).

The board notes that according to the disclosure of document E24 (page 3, lines 44 to 50 and page 2, lines 41 to 47) the control means is only responsive to the presence detector to switch off the light source when the detector detects that the presence ceases. Once the person has left the desk and the light source has been switched off by the control means, the light source can only be switched on again by actuation of the mains switch 23 represented in Figure 3 (see page 3, line 23). Therefore, the submission made by the respondents in this respect can only be partially followed to the extent that, once the lighting arrangement has been put in operation and the detection of a presence has not been interrupted, the light source is then switched on upon detecting that the light intensity is less than the reference level. This feature, however, does not fully anticipate the feature defined in Claim 3 of the main request according to

which the light source is switched on to a high luminous condition when a presence is detected and the light intensity is less than the reference level, this feature also implying that, when the light intensity is less than the reference level, the control means defined in Claim 3 of the main request is also arranged to switch on the light source upon detecting that a person enters the detection region of the presence detector.

Finally, in the lighting arrangement disclosed in document E24 not only the light detector (detector 7 in Figure 1, see page 3, lines 11 to 12) and the control means (means 12 in Figure 3) but, as submitted by the respondents, also the presence detector (see the first of the alternatives specified at line 44 of page 3) are all included in the luminaire. In addition, only the light source is controlled by the control means. Document E24, however, does not specify where the mains switch 23 for switching on the light is located. This prior art luminaire is thus self-contained within the meaning of present Claim 3 only to the extent that it comprises all the control and detection elements, except for the mains switch 23.

2.2.3 It follows that the subject matter of Claim 3 of the main request differs from the disclosure of document E24 by the following features:

(i) the provision in the control means of delay means for delaying for a predetermined period when detection of a presence ceases before switching to a dark or dim luminous condition, and

(ii) the removal of the mains switch 23 by arranging

the control means so as to also switch the light source to a high luminous condition upon detection of a presence when the light intensity is less than the reference level, which also renders the luminaire fully self-contained within the meaning of the claim.

2.2.4 The other prior art citations on file do not come closer to the subject matter of Claim 3, which therefore is novel over these citations.

2.3 Inventive step of the subject matter of independent Claim 3

2.3.1 Technical problem

According to the distinguishing feature (i) identified above, a response delay in switching off the light source when detection of a presence ceases is introduced into the control circuit, this feature resulting in the light source being prevented from being switched off when the person leaves the detection region of the presence detector only for a short time (see column 4, lines 53 to 56 of the specification of the patent in suit), thus avoiding unnecessary switching cycles of the light source.

The distinguishing feature (ii), on the other hand, results in the control means switching on automatically the light source upon detecting that a person reoccupies the desk when the light intensity is less than the reference level.

It follows that the two distinguishing features (i) and (ii) are directed to different improvements and that

they solve two different technical problems, namely, on the one hand, avoiding unnecessary switching cycles and the subsequent instabilities in the illumination and, on the other hand, achieving a fully automatic control operation of the lighting arrangement.

The mere formulation of these two objective problems cannot, in the board's view, provide any positive contribution for the assessment of the inventive step involved by Claim 3. The need for overcoming the improper switching off of the light source whenever the user leaves only momentarily the desk would be readily apparent when working with the device disclosed in document E24, and the automatisation of manual functions is a common concern in most technical areas.

2.3.2 Inventive step

In the submissions made in writing and during the oral proceedings before the board, the respondents have referred to various document disclosing a response delay in the control circuit of an illumination device upon detection of a change in an external condition monitored by the control circuit, see for instance document E1 (page 4, lines 16 to 24 and page 12, lines 8 to 11) as well as document E4, E9, E20 and the closest prior art document E24. More particularly, in document E4 as well as in E24 the monitored external condition is constituted by the ambient intensity illumination (see document E4, column 4, lines 29 to 40 together with column 5, lines 35 to 55, and document E24, page 2, lines 33 to 38 and page 3, lines 29 to 43), and in document E9 and E20 the monitored condition refers to the detection of the presence of a person in the region monitored by the

control circuit (see document E9, page 107, second and third paragraphs, and document E20, column 4, lines 35 to 46 and column 21, lines 11 to 26 and claim 38).

In the board's view, the introduction of a response delay in the control circuits of the illumination devices of all these document illustrates as a matter of fact a principle well known in the field of automatic control of illumination. According to this principle, small temporary changes in the monitored condition are disregarded and only changes of the monitored condition lasting a predetermined period of time are taken into account by the control circuit and are effective in the control operation of the illumination device, thus avoiding unnecessary switching cycles that are cumbersome for the user and detrimental to the effective life of the light source.

Now, since the inventive merit of the patent in suit must be assessed on the basis of the knowledge and expertise of the person skilled in the field of automatic control of illumination, and this person is aware of the principle set out above, the board is of the view that this skilled person, confronted with the first of the objective problems formulated in point 2.3.1 above, would recognise that short periods of absence should be simply ignored by the control circuit in order to avoid switching off of the light source when the user leaves only momentarily the detection region of the presence detector. Thus, the skilled person would readily envisage introducing in the control circuit of the lighting arrangement disclosed in document E24 a means for achieving a predetermined delay of response to the change of the presence condition detected by the presence detector in order to

solve the problem.

As to the second of the objective problems formulated in point 2.3.1 above, the file includes a number of prior art document pertaining to the technical field of automatic control of illumination and which disclose the automatic switching on of light sources upon detection of a presence by a presence detector, see in this respect document E1 (page 4, lines 4 to 9), E2 (column 3, lines 18 to 22), E6 (column 1, line 65 to column 2, line 9), E9 (page 107, first and second paragraphs) and E20 (abstract). The lighting arrangement of document E24, which is the starting point for the assessment of inventive step, already comprises a presence detector for controlling the switching off of the luminaire when the presence detection ceases. In the board's view, the skilled person would therefore readily envisage the use of the same presence detector also for controlling the switching on of the luminaire, as taught in the document mentioned above, when a person enters the detection region of the presence detector, on the assumption of course that the light intensity being detected is less than the reference level.

The appellant has submitted that the object of the disclosure of document E24 is saving energy and therefore calls for maintaining the light source off as much as possible, so that the document clearly teaches turning on the light source only at the request of the user. However, ease of use is certainly another main concern in the design of lighting arrangements and, in the board's view, the skilled person cannot be denied the ability to balance, in accordance with the particular circumstances and the specific conditions of

use of the luminaire, the additional convenience afforded by the provision of the automatic switching on of the light source against the subsequent increase in energy consumption which might result therefrom.

The board therefore comes to the conclusion that a skilled person, starting from the teaching of document E24, would arrive in an obvious manner at the invention defined by independent Claim 3 of the main request. The subject matter of independent Claim 3 of the main request therefore does not involve an inventive step (Article 56 EPC).

2.4 For these reasons, the appellant's main request cannot be allowed.

3. *Auxiliary request of the appellant*

The set of claims in accordance with the appellant's auxiliary request comprises two independent claims. Claim 1 is essentially directed to a lighting system comprising a plurality of ceiling mounted lighting arrangements disposed at different locations in a room, each lighting arrangement comprising all the features of Claim 3 of the main request. Independent Claim 10 of the auxiliary request is directed to the corresponding room illumination control method.

The mounting of a plurality of independently controlled self-contained luminaires to the ceiling of a single room, as encompassed by the subject matter of the claims of the auxiliary request, is a new technical aspect which would not appear to be addressed in the prior art document on file. In addition, the question of its contribution to patentability was not discussed

in detail during the opposition proceedings.

In the opposition proceedings the respondents had also presented statements and documentary evidence in support of an alleged public prior use, which the opposition division did not fully assess, the patent having been revoked on the basis of the prior art citations. This issue, and the further ground of opposition under Article 100(b) EPC initially raised in the opposition proceedings against the patent and based on an alleged insufficiency of the disclosure, might still require consideration since the respondents at the oral proceedings held before the board expressly confirmed that they maintained their objections in both respects.

In these circumstances, and in order not to deprive the parties of an instance of jurisdiction, the board deems it appropriate to make use of the discretionary power given to it by Article 111(1) EPC to remit the case to the opposition division for further prosecution on the basis of the auxiliary request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance for further prosecution.

The Registrar: The Chairman:

P. Martorana E. Turrini