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D E C I S I O N
of 30 April 1998

Case Number: T 0502/97 - 3.2.1

Application Number: 91916008.5

Publication Number: 0544799

IPC: B64F 1/20, F21Q 3/00, F21V 5/02

Language of the proceedings: EN

Title of invention:
Marker Light

Patentee:
Dahlberg, Anders

Opponent:
Siemens AG

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
G 0004/95

Catchword:
-



Case Number: T 0502/97 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 30 April 1998

Appellant: Siemens AG
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Representative: -

Respondent: Dahlberg, Anders
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 25 March 1997
rejecting the opposition filed against European
patent No. 0 544 799 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: F. A. Gumbel
Members: P. Alting van Geusau
V. Di Cerbo

Summary of Facts and Submissions

- I. The mention of the grant of European patent No. 0 544 799 in respect of European patent application No. 91 916 008.5, filed as the international application No. PCT/SE91/00572 on 30 August 1991, and claiming priority from SE application No. 9 002 784 filed on 31 August 1990 in Sweden, was published on 12 April 1995.

Claim 1 of the patent reads as follows:

"1. Marker light comprising a casing (1) to be flush-mounted into the ground, comprising

- a lower light source (2) adapted to emit a collected upwardly directed light bundle (L_1, L_2),
- a prism (4) placed above the light source with inclined surfaces adapted to divide said upwardly directed light bundle into two bundle portions (L_1', L_2') being directed obliquely upwards in opposite directions, and
- an upper cover plate (3), being transparent at least in the area of said bundle portions, with an upper, essentially planar surface (3a, 3b), possibly being slightly inclined in two opposite directions and, upon installation of the marker light, lying essentially in the ground level plane, and with a lower surface (16a, 16b), being saw-tooth shaped at least in said area,

said prism (4) and saw-tooth shaped surface (16a, 16b) being mutually adapted in such a way that said obliquely upwards directed bundle portions will incide essentially perpendicularly onto the respective saw-tooth surface portion (16a, 16b) and, after passage through the upper cover plate (3), be refracted in the upper surface (3a, 3b) thereof, so that two light beams (L_1'', L_2'') are emitted in opposite directions at a desired vertical angle (ϵ) to the ground level plane,

characterised in that said prism (4) has an essentially planar lower surface being perpendicular to the upwardly directed light bundle (L_1 , L_2) from the light source (2), and an upper surface with at least one saw-tooth formation, the inclined surface portions (17a, 17b) of which having such angles of inclination that the inciding light will be redirected through total reflection at the respective inclined surface portion (17a, 17b) and be emitted under the least possible refraction in the respective adjacent, inclined surface portion (17a, 17b) while at the same time maintaining said essentially perpendicular angle of incidence onto the lower saw-tooth surface portions of the cover plate and said desired vertical angle (ϵ) for the two light beams (L_1'' , L_2'') being emitted from the upper surface of the cover plate."

II. Notice of opposition was filed on 11 January 1996 on the grounds of Article 100(a) EPC. In respect of an alleged lack of inventive step the opposition was supported by the documents

D1: WO-A-88 00157 and

D2: US-A-4 161 770.

III. By decision dated 25 March 1997 the Opposition Division rejected the opposition.

The Opposition Division was of the opinion that, starting from the closest prior art as was represented by D1, document D2 did neither show the remaining features of claim 1 of the patent in suit nor did this document give any suggestion to the specific arrangement of the optical parts in the manner as defined in claim 1.

- IV. On 21 April 1997 a notice of appeal was lodged against that decision together with payment of the appeal fee. The statement of grounds of appeal was filed on 24 July 1997.
- V. In support of its request for revocation of the patent in its entirety the appellant essentially relied upon the following submissions:

The technical problem to be solved by the subject-matter of claim 1 of the patent in suit was that of improvement of light yield and light density. The competent skilled person was well aware of the optical possibilities for improvement of light yield and only needed to complete the suggestions disclosed in D1 and D2 with his technical expertise to arrive in an obvious manner at the marker light claimed in claim 1 of the patent in suit.

In particular, when starting from the marker light known from D1 the light expert would immediately realise that light losses were lowest when directing a light beam perpendicularly into a prism through a planar surface, which principle was in fact also used in D2. D2 further disclosed that a saw tooth formation was able to redirect inciding light through total reflection at the respective inclined surface portion and emit the light beam with least possible refraction through the adjacent inclined surface portion.

The remaining characterising feature of the marker light of claim 1 followed immediately from the requirement that an intensive light beam with small angle to the ground was wanted. In order to achieve this, it was obvious to the skilled person that a saw-toothed exit surface for the light beam should be combined with a saw-toothed entry surface in case a two-part optic was selected.

For further substantiation in respect of the alleged obviousness of the combination of features claimed, the appellant offered hearing of a witness (Dr Görke).

VI. The respondent requested rejection of the appeal and submitted that the arguments presented by the appellant did not add anything in substance concerning the issue of inventive step. A decision should be made on the basis of the written material presented previously in this case.

VII. In a communication for preparation of oral proceedings auxiliary requested by the appellant, the Board summarised the arguments submitted by the parties and expressed a provisional opinion on the issues to be discussed at the oral proceedings.

D1 was considered to represent the closest prior art. As regards the teachings of D2 the Board took the view that this document rather appeared to disclose that a single two-sided prism should be used on its own. It was further questioned whether the skilled person would indeed anticipate an overall improvement of the luminous efficiency of the combination of prism and cover plate by replacement of the refractive plate according to D1 by the prism known from D2. It was further noted that a combination of structures shown in D1 and D2 would involve adaptation of the inclination angles of the oblique surfaces. It should therefore also be discussed during the oral proceedings whether the skilled person, when applying its general knowledge, would inevitably arrive at the claimed marker light construction as was submitted by the appellant, rather than using other means such as improved focussing, another suggestion derivable from D2, or the use of generally known coatings on the reflective surfaces.

With regard to the appellant's offer to hear Dr Görke, it was noted that, rather than being a witness, Dr Görke appeared to be an expert within the meaning of Article 117(1)(e) EPC.

The Board had no objections hearing Dr Görke during the oral proceedings if the conditions set out in the decision G 4/95 (OJ 1996, 412) were complied with so as to give the respondent the opportunity to prepare itself in relation to the proposed oral submissions.

- VIII. In response to the communication issued by the Board, the appellant withdrew with letter dated 5 March 1998 its request for oral proceedings and requested a decision on the basis of the documents on file.

Reasons for the Decision

1. The appeal is admissible.
2. *Novelty*

Novelty of the marker light in accordance with claim 1 of the patent in suit follows from the fact that none of the available documents discloses a marker light with a cover plate having an essentially planar upper surface and with a lower surface being saw-tooth shaped combined with a prism plate provided under the cover plate and having an essentially planar lower surface which is perpendicular to an upwardly directed light bundle and an upper surface with at least one saw tooth formation.

Novelty was in fact not contested by the appellant.

3. *Inventive step*

3.1 Document D1 represents the closest prior art and the preamble of claim 1 is related to this known marker light.

A problem arising with marker lights of this kind is associated with the heat development originating from the light source and the interaction of the light with the different optical components. Therefore, there always has to be found a compromise between luminous efficiency and functional reliability.

Against this background, the main object of the patent in suit is to provide a marker light having high luminous efficiency and a high intensity without high temperatures within the fitting (see column 1, lines 16 to 34 of the patent in suit).

3.2 This object is achieved by the features of claim 1 and in particular by the arrangement of the prism and cover plate in the manner as defined in the characterising part of claim 1. Heat development by refraction in the internal optical components of the marker light is reduced, resulting in associated advantages as to strength, in particular impact and wear resistance of the upper surface of the cover plate, dimensional stability and functional reliability during operation as well as increased working life (see column 2, lines 30 to 40 of the patent).

3.3 The appellant essentially argued that the skilled person being well aware of the optical possibilities for improvement of luminous efficiency was led by D2 to change the orientation of the prism used in D1 and use the planar surface as light entry surface. The saw-

toothed surface of the prism was then combined with the saw-toothed surface of the cover plate. Adaptations of the angles of incidence were considered to follow immediately from the requirement of optimised luminous efficiency.

3.4 However, considering D2 more in detail, this marker light being developed for highest possible performance for a relatively low power consumption (see column 1, lines 29 to 35), essentially relies on light transmission conducted through a single prism which partially projects above the runway (see column 1, lines 36 to 43). No teaching is thus derivable from D2 to combine this known prism with a cover plate.

Furthermore, as was also submitted by the respondent in the opposition proceedings and supported by the Opposition Division, the prior art marker lights disclosed in D1 and D2 are each constructed to give optimum performance and must be seen to give complete but alternative solutions for providing an efficient marker light. At least from the documents D1 and D2 not the slightest hint is derivable that optical parts shown in one of the documents could be used to replace parts in the other or, when used in an other manner, could improve the performance of one of the arrangements.

3.5 It is further to be noted that for obtaining the best possible light efficiency (see page 8, lines 20 to 23 of D1) the prism in D1 is constructed to have intermediate oblique surfaces (7b, 7c) which have a vertical extension which is less than that of the outer oblique surfaces (7a and 7d). Simply turning the prism upside down would therefore not lead to the arrangement claimed.

Furthermore, in view of the problem to be solved by the patent in suit, the Board is of the opinion that the skilled person would not abandon such basis for optical improvement of the light efficiency without having a clear teaching for an alternative in the context of the arrangement disclosed in D1. Such teaching is neither derivable from D2 nor can it be said that the improvement of the luminous efficiency by replacing the prism in the optical arrangement of D1 by the prism known from D2 is immediately apparent having regard to the general knowledge of the skilled person. Moreover, further non-evident adaptations as to the tuning of the saw-toothed surfaces would become necessary. Finally the skilled person has many other means available, such as improved focussing (see D2, column 3, lines 5 to 7) or use of coatings on the reflective surfaces which can be used without changing the basic structure of the marker light and which are readily available for improvement of the luminous efficiency.

The appellant's argument according to which the skilled person was immediately led by the disclosure of D2 to replace the prism in the arrangement of D1 with the prism shown in D2 is therefore not considered convincing.

- 3.6 In view of the fact that the appellant withdrew its request for oral proceedings and requested a decision on the basis of the documents on file the appellant's request to hear the expert Dr. Görke has become void.
- 3.7 Summarizing the Board comes to the conclusion that the marker light in accordance with claim 1 of the patent in suit involves an inventive step within the meaning of Article 56 EPC.

Therefore this claim 1, as well as its dependent claims 2 to 4, relating to particular embodiments in accordance with Rule 29(3) EPC, are allowable.

Order

For these reasons it is decided that:

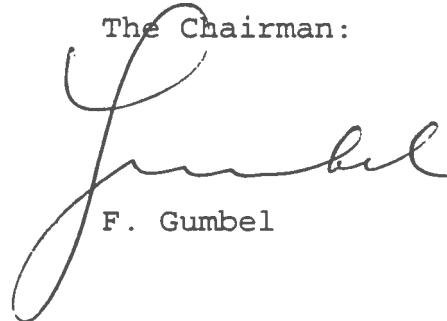
The appeal is dismissed.

The Registrar:



S. Fabiani

The Chairman:



F. Gumbel



