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D E C I S I O N
of 9 January 2001

Case Number: T 0042/98 - 3.2.3

Application Number: 90909812.1

Publication Number: 0477264

IPC: F21V 13/04

Language of the proceedings: EN

Title of invention:
Embedded light fitting for runways

Patentee:
Airport Technology in Scandinavia AB

Opponent:
Siemens Aktiengesellschaft, Zentralabteilung Rechtsschutz und
Normung, ZFE PA 1

Headword:

-

Relevant legal provisions:
EPC Art. 54(2), 56

Keyword:
"Novelty - public prior use (no) - main request"
"Inventive step (no) - auxiliary request"

Decisions cited:
G 0010/91

Catchword:

-



Case Number: T 0042/98 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 9 January 2001

Appellant: Siemens Aktiengesellschaft
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 14 November 1997
rejecting the opposition filed against European
patent No. 0 477 264 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: C. T. Wilson
Members: U. Krause
M. K. S. Aúz Castro

Summary of Facts and Submissions

I. The appeal contests the decision of the Opposition Division, dated 30 September 1997 and issued in writing on 14 November 1997, to reject the opposition against European Patent No. 0 477 264. Claim 1 of this patent has the following wording:

"1. A light fitting, intended to be embedded in the surfacing of a runway, including a light source (2) with a reflector (1), a limiting light opening (3) in the field of light, and a mirror device, arranged to reflect a part of the field of light (4) back towards the reflector (1), characterized in that the mirror device (5,6) is arranged such that a large part of the re-reflected light, after reflection in the reflector (1), passes close to the light source (2), and after one reflection more against the reflector (1) is sent through the light opening (3)."

II. The Opposition of the Appellant was filed against the patent in its entirety on the grounds that the subject-matter of the patent is not inventive in view of the following documents:

E1: DE-B-2 229 864 and

E2: US-A-4 151 584

E3: Leaflet A.03.241.e "Touchdown Zone High Intensity Unidirectional Inset Light", ADB S.A., Belgium, 1/02.86

E4: Leaflet A.03.230.e "Runway End High Intensity Unidirectional Inset Light". ADB S.A., Belgium,

2/08.87.

During the proceedings before the Opposition Division and after expiry of the opposition period, the Appellant also referred to the grounds of lack of novelty and submitted, in support of an allegedly novelty-destroying public prior use of so-called "pancake lights", *inter alia* the following additional documents:

E5: Leaflet "Pancake Lights Type PQ 1200/2 and PQ 2200/1", ADB-AIR-Equipment, Zaventem, Belgium

E5*: Drawing denominated "E 3713" and "PQ 1200/2" of ADB-Air Equipment, apparently dated 21.8.67

E5**: Drawing denominated "E 3714" and "PQ 2200/1" of ADB-Air Equipment, apparently dated 23.8.67

He stated that runway lights as shown in E5* and E5** (pancake lights) were sold to a number of clients without obligation to secrecy, and offered the testimony of a witness, Mr Vandevoorde, as evidence for the distribution of the leaflet E5 and the delivery of the "pancake lights".

Further prior art submitted by the Appellant after expiry of the opposition period is:

E6: Leaflet 5005-A "Aerodrome Beacon" of ADB S.A., DER 2/73

E9: US-A-4 408 266

III. The Opposition Division disregarded the alleged prior

use and distribution of document E5 as being belated and not adequately substantiated, and decided that the subject-matter of claim 1 was not obvious in view of the other prior art which only disclosed one reflection at the mirror and one reflection at the reflector, i.e. two reflections in total, whereas claim 1 includes "one reflection more against the reflector", i.e. at least a second reflection at the reflector and three reflections in total.

- IV. The Appellant (Opponent) filed the notice of Appeal on 14 January 1998 and paid the appeal fee on the same day. The statement of the grounds of appeal was filed on 16 March 1998.

Together with the grounds of appeal, he submitted a declaration of Mr Toussaint with Appendix 1 "PQ lights with auxiliary recovery mirror" (E5a) as additional evidence for the alleged public prior use, and a copy of a fax letter sent on 12 March 1998 from ADB to the Appellant and signed by Mr Goerke, showing and explaining ray paths in the pancake light according to E5* (E5b).

- V. In response to communications of the Board dated 26 July 1999 and 17 July 2000, the Respondent (Proprietor) did not state any disagreement with the provisional assessment of the Board that the "pancake light" E5* seemed to have been publicly available. He submitted two new sets of claims according to a main request and an auxiliary request, respectively. Claim 1 of the main request differs from the granted version by specifying, in the precharacterising portion, the mirror device as being arranged to "re-reflect" a part of the field of light "coming from the reflector" back

toward the reflector, and claim 1 of the auxiliary request additionally defines the mirror device as being "bent in an angle or curved and/or inclined inwardly towards the center of the light fitting".

- VI. In Oral proceedings held on 9 January 2001 the Appellant requested that the decision under appeal be set aside and that the European patent No. 0 477 264 be revoked. The Respondent requested that the appeal be dismissed with the proviso that the patent be maintained on the basis of claims 1 to 6 filed on 19 October 2000 as "new set of claims" (main request) or on the basis of claims 1 to 5 filed on 19 December 2000 as "new auxiliary request" (auxiliary request).

Regarding the auxiliary request the Board drew the attention of the parties to document E2 disclosing, in the first paragraph of column 5, the adjustment of a secondary reflector so that the light rays reflected therefrom do not hit the light source, in order to avoid localized heating of the filament in the light source which would shorten filament life.

- VII. The Appellant essentially argued that the Opposition Division did not correctly interpret the disclosure of E1 in that, considering the three-dimensional structure, a number of rays emitted by the light source would be reflected twice at the reflector after reflection at the mirror. The public prior use of the pancake lights shown in E5* and E5** was proven by E5a and the light rays shown in E5b corresponded exactly to the ray path defined in claim 1 of both requests. Considering manufacturing tolerances and the fact that the filament in the light source had a certain length and consisted of spaced wire turns, a large part of the

light reflected by the mirror 11 and the reflector 8 would not hit the filament but bypass the same for further reflection at the reflector 8 onto the inclined re-directing mirror 9. This increased the light output by at least 25%, as mentioned in the patent. Concerning the auxiliary request he stated that it was common practice to adapt the angle of the mirror 11, or to bend this mirror, in order to increase the light yield. Furthermore, claim 1 of this request was indefinite and unclear because no indication could be found in the patent of suitable angles, bending radii or inclinations of the mirror device.

VIII. The arguments of the Respondent can be summarized as follows:

E1 relates to a headlight for vehicles which is not appropriate to be embedded in the surface of a runway. Further, it teaches a single reflection of light coming directly from the light source at the reflector before emission through the light opening, rather than a re-reflection of light reflected from the reflector and further two reflections at the reflector after re-reflection at the mirror, as in claim 1 of both requests. The reflected light is then used to enhance light radiation to one side of the road. The wavy line on the right hand side of the reflector shown in Figure 1 of E1 does not indicate a further extension of the reflector beyond this line as a basis for a further reflection of the rays a and b also shown in the figure.

The documents relating to the prior use of the pancake light (E5) do not show light rays. It can however be concluded from the horizontal arrangement of the flat

mirror 11 that the re-reflected light would pass through the focus and hit the filament, thereby reducing light yield. Computer simulations show that this light yield can be considerably increased by closely bypassing a large part of the re-reflected light around the light source, as specified in claim 1 of the main request. Special measures for controlling this effect are defined in claim 1 of the auxiliary request. There is no clarity problem because the skilled person will choose the required bending angles or inclinations necessary to bypass the filament according to the particular circumstances. Further, these measures are not suggested by E2 because this document relates to the different purpose of increasing filament life and to a different arrangement of the mirror for directly reflecting, as in E1, radiation emitted from the light source. This arrangement is incompatible with the mirror of E5. Replacement of the flat mirror of E5 by the spherical mirror of E2 would lead to an uncontrolled output direction of incoming reflected, not directly emitted, light rays, which would be counterproductive to the intended effect of increasing the yield of the light directed through the light opening. Further, this replacement would increase the dimension of the light fitting in vertical direction which is unacceptable for a runway light. An additional argument in favour of inventive step is seen in the fact that in the long time interval of about 20 years between the installation of the pancake lights of E5* and the priority date of the patent no company developed an embedded light fitting for runways with a better light yield than the pancake light.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

Compared with the patent as granted, claim 1 of the main request is amended by specifying that the mirror device is arranged to "re-reflect" a part of the field of light "coming from the reflector" back towards the reflector. This specific ray path is derivable from Figures 1 and 2 of the application as filed and excludes a direct reflection of light coming directly from the light source to the reflector and following the further path around the light source and out of the light opening. This amendment therefore meets the requirements of Article 123(2) and (3) EPC.

The additional measures included in claim 1 of the auxiliary request and defining the mirror device are taken from dependent claims 5 and 7 of the original application. Whereas the fact that original claim 7 refers to claim 5 would support the inclined arrangement of the mirror only in combination with an angled or curved shape thereof, the text on page 2, lines 15 to 19, read by a skilled person with reference to Figure 1, indicates that an inclined arrangement of a flat mirror should not be excluded. Thus, the amended claim 1 of the auxiliary request likewise meets the requirements of Article 123(2) and (3) EPC.

3. *Prior use*

Taking into account the evidence E5a and E5b submitted by the Appellant in addition to the evidence E5, E5* and E5** submitted during the opposition procedure before the first instance, it can be concluded that the

company ADB S.A. in Zaventem, Belgium, has unconditionally sold light fittings of the type PQ 1200/2 and PQ 2200/1 as shown in drawings No. E 3713 (E5*) and E 3714 (E5**), respectively, to SAGAT of Italy, to the Department of Transport and Power of Eire and to the Civil Aviation Department of Norway, and installed the fittings at the airports of Torino-Caselle, Dublin and Oslo-Fornebu in the period from 1965 to 1970. Thus, in contrast to the circumstances prevailing in the proceedings before the first instance, the alleged public prior use has now been adequately substantiated in that the required details are given of what was made available to the public where, when, how and by whom. The evidence, including that submitted in the form of the declaration E5a is considered sufficient to prove the alleged unconditional sales, the more so in view of the fact that they are not contested by the Respondent.

The prior use comprises unidirectional runway lights PQ 1200/2 according to drawing E 3713 8 (E5*) and bi-directional runway lights PQ 2200/1 according to drawing E 3714 (E5**). Only the unidirectional lights sold to SAGAT of Italy and installed at the airport of Torino-Caselle in 1967 are relevant in the present case because they include auxiliary mirrors which are said, in E5a, to reflect stray light back onto the main parabolic reflector. The prior use of the runway lights shown in E5* will, therefore, be admitted into the proceedings as relevant prior art.

4. *Main request*

4.1 Novelty:

E5* shows a runway light fitting, i.e. a light fitting intended to be embedded in the surfacing of a runway. The light fitting comprises a lamp installed at the focus of a parabolic reflector 8. Two flat mirrors 11, a larger one on the left side and a small one on the right side, are horizontally arranged at the upper open side of the reflector 8 and an excentric gap between the mirrors 11 is covered by an optional colour filter 12. An inclined re-directing mirror 9 is installed above the colour filter 12 or gap at an angle adapted to redirect light striking the mirror 9 from the gap to a light opening including a front glass 10. Considering, in this arrangement, the optical laws of reflection, light rays emitted by the lamp to portions of the reflector 8 below the gap will be directly reflected to the re-directing mirror 9 to be sent out through the light opening, whereas light rays emitted to portions of the reflector 8 below the auxiliary mirrors 11, in particular below the larger left auxiliary mirror 11, will be substantially vertically reflected onto those mirrors, which will re-reflect the light rays vertically back onto the parabolic reflector 8 and therefrom through the lamp to the reflector 8 on the other side of the lamp and out of the light opening via the gap and the re-directing mirror 9, adding to the directly emitted radiation. Thus, at least the larger auxiliary mirror 11 is arranged to re-reflect a part of the field of light coming from the reflector 8 back towards the reflector wherefrom it passes through the lamp, owing to scatter resulting from the manufacturing tolerances of the reflector, from the imperfect reflections at the reflector and from the finite dimensions of the filament in the lamp, practically in a narrow region around the light-emitting filament which is positioned at the focus of

the reflector 8.

Claim 1 specifies that a large part of the re-reflected light, after reflection in the reflector, passes "close to" the light source. The Respondent argues that this means that a large part of the light actually bypasses the light source, whereas in the prior art most of the light hits the filament in the lamp. The Board cannot follow this argumentation. In fact, it is pointed out in the patent at column 2, lines 31 to 33, that the mirror device reflects the light back towards the light source or immediately beside it. The expression "close to" therefore comprises a reflection onto the filament of the light source, as a theoretical borderline case, as well as a reflection to a region immediately beside the filament. Furthermore, the skilled reader is aware that, because of the above-mentioned scattering effect, the re-reflected light comprises a bundle of light rays resulting in a minor portion of the light rays actually hitting the filament and a large part of the rays passing through the interstices between the turns of the filament or immediately beside the filament even if the mirror is arranged to re-reflect the light towards the light source. As a consequence, the light will pass the light source in a narrow region including the light source in the same manner as in the light fitting shown in E5*.

In summary, the prior light fitting shown in E5* is identical to that claimed in claim 1 which, therefore, lacks novelty.

5. *Auxiliary request*

5.1 Clarity and sufficiency of disclosure

The objection of the Appellant that claim 1 is indefinite and unclear because no indication can be found in the patent of suitable bending angles, radii of curvature or angles of inclination relates to the question of sufficiency of disclosure which is a new ground of opposition. According to opinion G 10/91 (OJ 1993, 420) the Board is confined to the grounds of opposition, as defined in the notice of opposition, and any further grounds introduced by the opposition division. As set forth under item 19 of this decision, amendments of the claims in the course of appeal proceedings are to be fully examined as to their compatibility with the requirements of the EPC. This concerns the situation where an objection relating to a new ground of opposition was occasioned by an amendment of the claims during the appeal proceedings where the alleged problem causing the objection is found for the first time. In the present case, however, the problem of insufficient disclosure concerns a feature which was already included in the granted claim 6 which was incorporated into claim 1. Thus, the objection was not occasioned by the amendment and the Appellant could have raised it at an earlier stage of the proceedings but decided not to do so. The Board sees, therefore, no reason to deal with this additional objection.

It should be noted, however, that the patent gives, in lines 45 to 47 of column 2, an indication of a suitable angle of inclination of the mirror, and a skilled person would derive from this indication, on the basis of his knowledge, a similar value for the bending angle and a corresponding value for the radius of curvature. The new ground, therefore, appears to be unfounded.

5.2 Novelty

According to claim 1 of the auxiliary request the mirror device of the light fitting is bent in an angle or curved and/or inclined inwardly towards the center of the light fitting. This feature is not shown in E5* which exhibits flat horizontal mirrors 11.

Document E1 discloses a headlight for vehicles including an inclined mirror 1 for reflecting portions of the radiation emitted by a lamp 3 onto a reflector 2. The mirror 1 is inclined outwardly towards the center of the headlight. Furthermore, the mirror 1 is arranged to reflect a part of the direct radiation from the lamp 3, rather than to re-reflect a part of the light coming from the reflector back towards the reflector.

Document E2 discloses a light fitting, in particular for spotlights, having a secondary reflector 13 to redirect light emitted from the light source 15 back to the main reflector 12 to be then directed out through a light opening 19. The secondary reflector 13 has a curved shape obtained by a composite arcuate surface (see Figure 1 and last two lines of column 4). However, the secondary reflector is, as in E1, arranged to reflect radiation emanating directly from the light source back to the main reflector, rather than to re-reflect light coming from the reflector back towards the reflector.

E6 discloses a beacon with a curved mirror or secondary reflector similar to that of E2, and the other prior art does not show an internal mirror at all.

Since no prior art discloses a light fitting having a mirror device as defined in claim 1 of the auxiliary request, the requirement of novelty does not prejudice maintenance of the patent in the form of the auxiliary request.

5.3 Inventive activity

Since the pancake light PQ 1200/2 shown in E5* is the only light fitting which is suitable for embedding in the surfacing of a runway and provided with an internal mirror for enhancing the light yield from the light opening, the prior use of this light represents the closest prior art. As set forth above, the internal mirrors 11 of this pancake light are substantially flat and disposed horizontally across the open side of the parabolic reflector 8, whereby the re-reflected light will pass, after reflection in reflector 8, the light source as a light bundle so that a portion of the rays in the bundle may hit the filament in the light source.

According to claim 1 of the auxiliary request the mirror device is bent in an angle or curved and/or inclined inwardly towards the center of the light fitting. All of these measures have the common effect that the paths of the re-reflected light rays deviate from those of the incoming light so that the portion of the rays in the re-reflected bundle hitting the light source, i.e. the filament in the lamp, is reduced, thereby reducing the accompanying negative impacts, such as lower service life of the filament caused by the heating effect of the rays absorbed by the filament, and lower yield of the light emitted through the light opening. Thus, a basis for the problem underlying the invention as claimed in claim 1 of the

auxiliary request can be seen in the reduction or elimination of these negative effects. The objective problem therefore comprises two aspects, one being to increase the service life of the filament and the other to increase the light yield from the light fitting.

A skilled person faced with this problem will search for a solution in all fields of lighting providing a directional light beam, because the common use of reflectors and mirrors in these fields will make him expect a solution. He will come across document E2 disclosing an arrangement of reflectors adapted to direct light from a light source as a directional light beam through a light opening, and touching upon, in column 5, lines 13 to 16, the problem of reflected rays shortening the filament life by localized heating of the filament when striking the filament. To solve this problem it is proposed "that the reflected light not pass ... through a point on the central axis along the length of the filament" (column 5, lines 8 to 11). This is achieved, in the particular arrangement of E2, by moving the center of the composite spherical secondary reflector 13 away from the foci and from the central axis. As pointed out by the Respondent, this solution is not applicable to the light fitting of E5* because there is no comparable spherical secondary reflector as the mirror 11 is adapted to re-reflect light reflected from the reflector 8, rather than to reflect light directly emitted from the filament. However, the above general teaching to avoid that reflected light pass through a point on the central axis along the length of the filament is part of a more general teaching concerning the adjustment of the reflecting mirrors to obtain the desired effect. This teaching lends itself to application for any arrangement of reflecting

mirrors. In fact, the skilled person knowing this general information from E2 will redesign the mirrors 11 of E5* so that the light rays reflected from the mirrors 11 will avoid the filament in the light source on their way to the light opening, i.e. in this case after a further reflection at the parabolic reflector 8. This redesign is made on the basis of simple measures available to the person skilled in the field of lighting, for example a small inclination of the mirrors either sideways or away from the central axis of the fitting to direct the re-reflected light, after the further reflection at the reflector, around the side or over the top of the filament in the light source. The skilled person will therefore arrive at the subject-matter of claim 1, without exerting an inventive step, by considering the filament life aspect of the problem. However, as a side effect, a solution to the other aspect of enhancing the light yield is automatically obtained because the increased portion of the reflected light bypassing the filament is now available to be directed out through the light opening.

According to the case law of the Boards of Appeal the time interval between the installation of the pancake lights of E5* and the priority date of the present patent can be taken as an indication for inventiveness only in the case where there is clear evidence of a serious demand (long-felt want) in that time interval which remained unsatisfied. No such evidence was available in the present case.

The requirement of inventive step therefore prejudices maintenance of the patent in the form of the auxiliary request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

A. Counillon

C. T. Wilson