

**Internal distribution code:**

- (A) [ ] Publication in OJ  
(B) [ ] To Chairmen and Members  
(C) [X] To Chairmen  
(D) [ ] No distribution

**D E C I S I O N**  
**of 16 July 2002**

**Case Number:** T 0614/00 - 3.2.1

**Application Number:** 93913910.1

**Publication Number:** 0597081

**IPC:** B60S 1/08

**Language of the proceedings:** EN

**Title of invention:**

Window mounted optical moisture sensor having light pipes with distal ends

**Patentee:**

LIBBEY-OWENS-FORD CO.

**Opponents:**

I: Leopold Kostal GmbH & Co. KG  
II: Robert Bosch GmbH

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step - yes"

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 0614/00 - 3.2.1

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.1**  
**of 16 July 2002**

**Appellant:** Leopold Kostal GmbH & Co. KG  
(Opponent I) D-58505 Lüdenscheid (DE)

**Representative:** -

**Party as of right:** Robert Bosch GmbH  
(Opponent II) Postfach 30 02 20  
D-70442 Stuttgart (DE)

**Respondent:** LIBBEY-OWENS-FORD CO.  
(Proprietor of the patent) 811 Madison Avenue  
Toledo  
Ohio 43697-0799 (US)

**Representative:** Barnfather, Karl Jon, Dr.  
Withers & Rogers  
Goldings House  
2 Hays Lane  
London SE1 2HW (GB)

**Decision under appeal:** Interlocutory decision of the Opposition Division  
of the European Patent Office posted 19 May 2000  
concerning maintenance of European patent  
No. 0 597 081 in amended form.

**Composition of the Board:**

**Chairman:** F. A. Gumbel  
**Members:** J. Osborne  
M. K. S. Aúz Castro

## Summary of Facts and Submissions

- I. The appeal is directed against the interlocutory decision of the Opposition Division that, taking into account the amendments made by the patent proprietor during the opposition procedure, the European patent No. 0 597 081 and the invention to which it relates satisfy the requirements of the EPC.
- II. Two oppositions had been filed, both naming the ground of lack of inventive step and relying upon *inter alia* the following prior art:
- D1 EP-A-0 461 424
- D4 US-A-4 620 141.
- III. The decision of the Opposition Division was posted on 19 May 2000. Notice of appeal together with authorisation of payment of the appeal fee was filed by opponent I on 15 June 2000. The grounds for appeal were received on 5 September 2000. Opponent II filed an appeal which was withdrawn with a letter dated 11 July 2002.
- IV. During the oral proceedings held on 16 July 2002 the appellant requested that the contested decision be set aside and that the patent be revoked in its entirety. Opponent II did not attend the oral proceedings but had filed the same request with a letter dated 28 July 2000. The respondent requested that the appeal be dismissed, by way of auxiliary request with the proviso that the patent be maintained in further amended form according to three auxiliary requests filed on 17 June 2002.

V. Claim 1 according to the respondent's main request reads as follows:

"A sensor (17) mounted upon the interior surface of a vehicle windshield for detecting the presence of moisture on the exterior surface of the windshield, comprising a block (18) having a base surface (21) facing the interior surface (31) of the windshield, a first light pipe (23) in said block (18) for transmitting incident light from an associated light source (25) to the windshield, a second light pipe (27) in said block (18) for receiving and transmitting reflected light from the windshield to an associated photo-detector (29), the base surface being adhesively bonded to said windshield, said first and second light pipes (23, 27) having distal ends (24, 28) facing said interior surface (31), a light transmitting interlayer (33) disposed between the base surface (21) and the windshield interior surface (31) and having adhesive surfaces (34, 35) facing both said base surface (21) and said windshield interior surface (31), the interlayer (33) adhesively securing the block (18) to the windshield and engaging said distal ends (24, 28) for optically coupling said first and second light pipes (23, 27) to said interior surface (31), and characterised in that at least one of said first and second light pipes includes a distal end (36, 37) projecting above the base surface of the block such that said distal end presses into the interlayer (33)."

Dependent Claims 2 to 10 according to the main request relate to further features of the sensor according to Claim 1.

VI. The appellant's submissions in respect of the respondent's main request can be summarised as follows:

The closest prior art is the subject-matter documented by D4 when seen in the light of the general knowledge of the skilled person at the priority date of the contested patent. D4 teaches that the sensor block be adhesively attached to the windscreen inner surface. At the priority date it was standard practice to attach such a sensor block using an elastic, adhesive interlayer in order to accommodate a difference in curvature between the sensor block face and the windscreen. The subject-matter of Claim 1 therefore differs from the closest prior art by the characterising feature. The corresponding problem is to avoid formation of bubbles in the area of the interlayer through which light passes between the windscreen and the light pipe and its realisation was obvious for the skilled person. D1 teaches that it is desirable to avoid bubbles in this area and that this can be achieved by providing a convex surface on the end of the light pipe. Although D1 also suggests separating the functions of mechanical fastening and optical coupling, this does not teach away from the solution according to the respondent's claim because the problems involved in providing a reliable optical coupling are the same, irrespective of the mechanical fastening. The skilled person is presented by D1 with two possible solutions, to provide a convex area either on the light pipe or on the interlayer. He would choose the former in order to be able to use a standard material for the interlayer.

VII. The respondent countered essentially as follows:

It is accepted that the skilled person at the priority date would attach the sensor block by means of an elastic interlayer and the appellant's assessment of the problem is correct. However, D1 does not suggest the claimed solution to the skilled person. The problem which D1 aims to solve is one caused by shearing of the interlayer and loss of adherence at high humidity levels. The solution is to separate the functions of mechanical fastening and optical coupling and so teaches away from the claimed solution. D1 merely states that it is desirable to avoid bubbles between an optical prism and a foil having an adhesive coating only on the side directed towards the prism. There is no connection between this statement and a subsequent passage relating to alternative embodiments having convex surfaces which, moreover, differ from the arrangement of Claim 1 in suit.

### **Reasons for the decision**

1. The appeal is admissible.

#### *Main request*

2. The Board agrees with the parties that the closest prior art is correctly represented by the preamble of Claim 1. This corresponds to the teaching of D4, according to which the sensor block is adhesively attached to the interior surface of the windscreen, when read in the light of the knowledge of the skilled person at the priority date of the patent in suit that this attachment is best performed using an elastic interlayer.

- 2.1 The subject-matter of Claim 1 therefore differs from the closest prior art by the characterising feature. The Board also agrees with the parties both that the problem to be solved relates to the formation of bubbles in the area of light transmission between the light pipe and the windscreen and that the realisation of the problem by the skilled person would be obvious. The matter at issue therefore is only whether the teaching of D1 to the skilled person renders the claimed solution obvious.
- 2.2 D1 takes as its starting point prior art generally corresponding to the preamble of Claim 1 in suit, i.e. a sensor block having an adhesive interlayer between it and the windscreen, which serves both to mechanically fasten the sensor block and to optically couple the light pipes to the windscreen. The problems addressed by D1 relate to shearing of the interlayer, which can lead to both optical distortion and mechanical failure (Column 1, Lines 14 to 17 and 20 to 23), and impairment of the adhesive properties due to high humidity, possibly leading to detachment of the sensor from the windscreen (Column 1, Lines 17 to 20). It is stated in D1 that the solution to these problems avoids bubbles in the optical path, which may be sufficient incentive for the skilled person faced with the problem of avoiding bubbles to consider the teaching of D1. However, the solution proposed by D1 is to discard the adhesive interlayer and to separate the functions of mechanical fastening and optical coupling. The optical coupling is achieved either by using elastic prisms at the ends of the light pipes, which directly contact the windscreen, or by using rigid prisms together with an elastic layer in the area of the ends of the light pipes. The sensor block may be attached to the

windscreen by means of separate fastening means such as screws. The skilled person faced with a problem of bubble formation when using an adhesive interlayer, in the light of the teaching of D1 that discarding the interlayer would also solve additional problems associated with that interlayer, would simply follow that teaching. It would be illogical for the skilled person to look more deeply into D1 to attempt to find a solution to one problem resulting from the use of the adhesive interlayer whilst ignoring the other problems associated with it, particularly as the solution in D1 no longer employs such an interlayer.

- 2.3 If the skilled person were nevertheless to look beyond the basic teaching of D1 in search of clues regarding the avoidance of bubbles when using the adhesive interlayer, the most relevant information would be that contained in Column 3, Lines 9 to 32, upon which the appellant's arguments are based. Various embodiments are proposed by D1 in this section of the description. The first embodiment employs rigid optical prisms 21 located at the distal ends of the light pipes, each of which is optically coupled with the windscreen by means of elastic foil pieces having an adhesive on the side facing the prism in order to attach the foil to it. The second embodiment dispenses with the foil and uses elastic prisms which directly contact the windscreen and which are of a material which itself adheres well to glass. It is explicitly stated in the sentence bridging Columns 1, 2 that the bubble-free adhesive connection of the prism, the importance of which is stressed in Column 3, Lines 18 to 21, is achievable according to each of these first two embodiments. There is therefore no indication that the skilled person would be encouraged to look further than these first



two embodiments for a solution to the problem solved by Claim 1 in suit.

2.4 Were the skilled person nevertheless to consider the subsequent teaching that the first two embodiments can be modified by including a raised formation on the surface facing the windscreen, he still would not arrive at the subject-matter of Claim 1 in suit. This further teaching modifies the first two embodiments to produce a third embodiment in which the rigid prism is associated with a foil having a convex, non-adhesive surface in contact with the windscreen and a fourth embodiment in which the elastic prism has a convex surface directly in contact with the windscreen. An embodiment corresponding to the subject-matter of Claim 1 in suit, i.e a rigid prism with a convex surface projecting into an adhesive interlayer, is not disclosed. Even a desire on the part of the skilled person to use standard material for the foil and thereby avoid having the convexity thereon, would leave available the alternative embodiment using the elastic prism.

2.5 On the basis of the foregoing considerations the Board comes to the conclusion that the skilled person would not be encouraged by D1 to arrive at the subject-matter of Claim 1 in suit which therefore is considered to involve an inventive step (Article 56 EPC). Since Claims 2 to 10 contain all features of Claim 1 this conclusion applies equally to those claims. Under these circumstances consideration of the auxiliary requests is unnecessary.

**Order**

**For these reasons it is decided:**

The appeal is dismissed.

The Registrar:

The Chairman:

S. Fabiani

F. Gumbel