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D E C I S I O N
of 10 December 2002

Case Number: T 1099/98 - 3.4.1

Application Number: 91122014.3

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Language of the proceedings: EN

Title of invention:
Display apparatus for vehicle

Patentee:
YAZAKI CORPORATION

Opponent:
Mannesmann VDO AG

Headword:
-

Relevant legal provisions:
EPC Art. 100(a), 52(1), 56

Keyword:
"Revocation - on substantive grounds"

Decisions cited:
-

Catchword:
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Case Number: T 1099/98 - 3.4.1

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 10 December 2002

Appellant: (Opponent)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 5 October 1998 concerning maintenance of European patent No. 0 492 543 in amended form.**

Composition of the Board:

Chairman: G. Davies
Members: G. Assi
H. K. Wolfrum

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal, received on 24 November 1998, against the interlocutory decision of the opposition division, dispatched on 5 October 1998, maintaining the European patent No. 0 492 543 in amended form. The appeal fee was paid on 24 November 1998 and the statement setting out the grounds of appeal was received on 29 January 1999.

II. Opposition had been filed against the patent as a whole and based on Article 100(a) EPC, on the ground that the subject-matter of the patent was not patentable within the terms of Articles 52(1) and 56 EPC.

III. In the course of the opposition proceedings, the patentee amended *inter alia* claim 1 of the patent.

In the decision under appeal, the opposition division held that, taking into consideration the amendments made, the patent and the invention to which it relates met the requirements of the EPC. As regards the matter of patentability, reference was made *inter alia* to the following prior art documents:

(D2) GB-A-719 398 and

(D3) US-A-3 490 226.

The opposition division observed that not all of the features comprised in amended claim 1 were obviously derivable from the prior art and considered these features to mutually support each other in their effects to such an extent that a new technical result was achieved. The invention was thus found to be a

combination invention.

IV. Oral proceedings before the Board were held on 10 December 2002.

V. The appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed, *ie* that the patent be maintained in the following amended form held allowable in the appealed decision:

Claims: 1-5 filed on 16 September 1998 during oral proceedings before the opposition division,

Description: pages 2, 2a, 3 and 4 filed on 16 September 1998 during oral proceedings before the opposition division; column 7 of the granted patent,

Drawings: sheets 1/8-4/8, 6/8-8/8 of the granted patent; sheet 5/8 filed on 16 September 1998 during oral proceedings before the opposition division.

VI. Claim 1 reads as follows:

"*A display apparatus for a vehicle comprising: a circular pointer plate (28;28';38;58) being a light intercepting plate having an opening (28b), wherein said opening (28b) being a light transmitting slit (28b) extending from a center portion to an outer*

periphery of said pointer plate (28;28';38;58);
a dial (27) adjacent to said pointer plate (28;28';38;58), said dial (27) being provided with a light transmitting portion having a shape of a circle which overlaps said pointer plate (28;28';38;58) and being provided with graduations and numerals which are provided at outer portions of said dial (27);
driving means (21,21a,29;21,32,33;59) for driving said pointer plate (28;28';38;58); and
a light source (23,24) for generating a backlight for said dial (27);
wherein the outer portions other than said light transmission portion overlapping said pointer plate (28;28';38;58) have a black face;
characterized in that
said portions for graduations and numerals are void;
said light source (23,24) includes a reflector (23) having a concave reflecting face which is directed toward said dial (27), and a discharge lamp (24) disposed at a focus of said reflector (23);
said driving means (21,21a,22;21,21a,29;21,32,33;59) is provided outside of said reflector (23) for driving an outer periphery of said pointer plate (28;28';38;58); and
a light dispersion plate (26) is provided between the rear face of the dial (27) and the light source (23,24)."

Claims 2 to 5 are dependent on claim 1.

VII. The appellant's arguments may be summarised as follows:

Document D2 represented the closest state of the art. It disclosed a display apparatus comprising all the

features of the preamble of claim 1.

The novelty of the subject-matter of claim 1 was not contested.

The object of the present invention was to provide a display apparatus for a vehicle having high luminance without unevenness, small outer dimensions (column 2, lines 45 to 50 of the granted patent) and tightness. This object was achieved by the features of the characterising portion of claim 1. These features were not correlated so as to produce a synergistic effect. They rather constituted a mere "*aggregation*" of features, as opposed to a "*combination*". Therefore, the inventive merit of each aggregated feature had to be assessed separately. In particular, each feature and its associated advantage were well-known in the state of the art or constituted common background knowledge in the field of illuminated displays. The provision of graduations and numerals as void portions on the dial was nothing else than a straightforward alternative to what was shown in D2 where the graduations and numerals were dark markings on a light transmitting background. The arrangement of a light source at the focal point of a concave reflector in order to maximise the luminance was common general knowledge. The provision of driving means at the outer periphery of the pointer plate was expressly taught by D3. The fact that a discharge lamp provided a higher luminance than the electroluminescent layer of D2 fell within the skilled person's technical knowledge. The use of a dispersion plate for increasing the evenness of the light distribution belonged to the basics of optical engineering.

Hence, the subject-matter of claim 1 did not involve an

inventive step having regard to the combination of the disclosures of D2 and D3, taking into consideration the skilled person's general knowledge.

VIII. The respondent argued essentially as follows:

The closest state of the art was represented by document D2 which indeed disclosed a display apparatus according to the preamble of claim 1.

In the known apparatus, the light source consisted of a layer of electroluminescent material and the circular pointer plate was driven by an axial spindle.

In distinction to the known apparatus, several improvements were achieved, concerning the optical properties and the overall size of the apparatus, by the features of the characterising portion of claim 1. The technical problem to be solved with respect to D2 consisted in providing a compact display apparatus for a vehicle with improved optical characteristics, in particular having improved luminance of high uniformity over a long time period.

Higher luminance for a long period of operation was, in particular, due to the provision of a discharge lamp. The luminance was further improved by placing the lamp in the focus of a reflector ensuring that all the emitted light was evenly directed towards the dial. The uniformity of the illumination was further improved by the provision of a diffusion plate placed between the light source and the dial.

Even if the skilled person contemplated replacing the electroluminescent light source by an incandescent bulb

and arranging the bulb in front of a reflector, he would not have any incentive to change, at the same time, the driving means. Hence, the driving means of a hypothetically improved apparatus still included an axial spindle driving the pointer plate. The axial spindle, however, inevitably generated a shadow on the dial and, moreover, penetrated the reflector, resulting in an arrangement of optical elements which could not be tightly sealed. Hence, dust and moisture could enter into the interior of the display apparatus and settle on the light source and on the dial, this causing, over time, a deterioration of the luminance. It required a considerable amount of experimental work to arrive at the inventive idea to arrange the driving means at the outer periphery of the pointer plate where it did not impede the illumination of the dial. Moreover, this measure allowed for a tightly sealed structure of the optical elements and a significant reduction of the thickness of the apparatus. The number of advantages obtained by a purposeful functional interaction of the various technical measures as claimed showed that the appellant's argument that the claimed solution was nothing else than a mere aggregation of features, was not justified. Indeed, the invention consisted in the choice of features among many possibilities, the chosen features synergistically cooperating with each other to solve a complex technical problem. Rather than a simple "*aggregation*" the invention implied a "*combination*" of features, which was not rendered obvious by the cited prior art.

In particular, document D3, relied upon by the appellant, related to a clock face assembly having illuminated elements. This document disclosed the feature *per se* that a driving means was provided for

driving an outer periphery of a pair of clock hands. But D3 mentioned neither a discharge lamp as light source to be placed in the focus of a reflector nor a light dispersion plate. Since these features were not known from D2 either, even a combination of the disclosures of D2 and D3 did not lead to the subject-matter of claim 1. Indeed, it was doubtful that the skilled person had even contemplated such a combination, in view of the fact that D2 and D3 did not deal with the problem of providing a display apparatus having improved luminance characteristics which were constant over a long time period.

The appellant's arguments, in particular its reliance on the skilled person's technical knowledge to arrive at the subject-matter of claim 1, implied an *ex post facto* analysis, whereas the application of the problem and solution approach led to the conclusion that the subject-matter of claim 1 involved an inventive step.

Reasons for the Decision

1. The appeal is admissible.

2. At the oral proceedings, both the appellant and the respondent considered that document D2 represents the most relevant state of the art and acknowledged that the subject-matter of claim 1 is novel having regard to this document. The Board has no reasons to take a different view in this respect.

3. Document D2 (see Figures 1 and 2) discloses a display apparatus suitable for use in a vehicle. The apparatus comprises a light intercepting circular pointer plate 7

made of aluminium and perforated by a radial slot 8 extending from the centre to the periphery of the plate. The slot defines a pointer cooperating with graduations and numerals 10 provided at outer portions of a circular glass dial 4 located adjacent to the pointer plate. A spindle 6 passing through an opening at the centre of the dial rotationally drives the pointer plate at its centre. A layer 12 of electroluminescent material acts as light source. On energising the electroluminescent layer, light is emitted through the radial slot of the pointer plate, which thus appears as an illuminated pointer rotating during operation of the apparatus. Moreover, the graduations and numerals on the dial are visible as dark markings on a luminous background formed by the outer portions of the dial through which light passes. Alternatively, the graduations and numerals may be rendered visible as luminous regions on a dark background (see from page 1, line 84, to page 2, line 10).

Thus, document D2 discloses a display apparatus including all the features of the preamble of claim 1 as well as the feature of the characterising portion that the graduations and numerals are void, the term "*void*" implying light transmission. It follows that the subject-matter of claim 1 differs from the display apparatus known from D2 in the following features:

(i) the light source is a discharge lamp,

(ii) the discharge lamp is disposed at the focus of a reflector having a concave reflecting face directed towards the dial,

(iii) a light dispersion plate is provided between the rear face of the dial and the light source, and

(iv) the driving means is provided outside of the reflector for driving an outer periphery of the pointer plate.

4. Using a discharge lamp as light source (see (i)) instead of the electroluminescent layer of D2 contributes to increasing the luminance of the graduations, numerals and pointer because a discharge lamp is brighter than an electroluminescent layer. Disposing the discharge lamp at the focus of a concave reflector (see (ii)) further increases the luminance and leads to an even illumination of the dial, due to the fact that the light emitted towards the rear side of the apparatus is not lost but reflected as parallel light rays towards the dial. Uniformity of illumination is further improved by the provision of a light dispersion plate (see (iii)).

According to the patent description (see column 5, lines 22 to 31, and column 6, line 52 to column 7, line 3), the main effects achieved by providing the driving means outside the optical path so as to drive the outer periphery of the pointer plate (see (iv)), are the possibility to reduce the overall thickness of the apparatus and, the driving shaft being shorter, to obtain an increase in the resistance to vibration. As an additional effect (see column 5, lines 32 to 42, of the patent description), uniformity of the illumination is not compromised, because there are no axially arranged mechanical parts which could cast a shadow on the dial.

With regard to the further object to be achieved, as emphasised by the respondent, that a constant luminance was preserved for a long period of time since damp and dust were prevented from entering the sealed display apparatus, the Board notes that this object does not find support in the patent as granted nor in the application documents as originally filed. Moreover, as a matter of fact, claim 1 under consideration does not define any specific measure which would either explicitly or implicitly relate to a sealed structure of the apparatus.

Thus, based on the aforementioned differences (i) to (iv), the Board identifies the problem addressed by the subject-matter of claim 1 under consideration as that of providing a display apparatus for a vehicle in which

(j) the luminance of the graduations, numerals and pointer is increased,

(jj) unevenness in the luminance is avoided, and

(jjj) the depth of the apparatus is reduced.

The problem so defined includes two main aspects, one concerning the optical properties (see (j) and (jj)) and the other the compactness (see (jjj)) of the display apparatus. Both aspects come within the scope of normal tasks with which the skilled person is usually confronted.

5. With regard to the optical properties, the skilled person would realise that the electroluminescent light source used in D2 has the disadvantage of low luminance. Moreover, the skilled person would be aware,

at the priority date of the patent in suit, of the availability of alternative light sources in the form of incandescent bulbs or discharge lamps offering higher luminance. These lamps existed in miniaturized form and thus were clearly suitable, for instance, for illumination of the instruments in the dashboard of a modern car. Of these two alternatives, a discharge lamp was generally known to be preferable in terms of resistance to vibrations and energy consumption.

All these preliminary considerations come within the scope of the common technical knowledge to be expected from the skilled person in the field of display apparatuses for vehicles and would lead to replace, according to aforementioned feature (i), the electroluminescent layer of the display apparatus of D2 with a discharge lamp so as to increase the luminance of the graduations, numerals and pointer.

Document D2 is based on the principle of back lightening, *ie* the light emitted by the light source illuminates the graduations, numerals and pointer before reaching the eyes of the driver. It is clear that, if a discharge lamp replaces the luminescent layer, the light emitted towards the back of the display would be lost or not efficiently used. Being familiar with elementary principles of optics, the skilled person would realize that this inconvenience can be avoided and the luminance increased by arranging a reflector behind the discharge lamp. Moreover, in case an illumination is desired, which is as even as possible, the same principles would teach the skilled person, according to aforementioned feature (ii), to use a concave reflector and to place the lamp in the focus thereof so as to obtain a uniform parallel beam

of light in the desired direction. Should the evenness of the illumination of the dial be further improved, the skilled person would also consider the provision of a light dispersion plate between the rear face of the dial and the light source, according to feature (iii), in application of an elementary optical principle. In view of the fact that these measures are realised in a vast number of illuminating devices which may be experienced in everyday life, they need not necessarily be proved by means of documents.

6. When contemplating replacing, in the apparatus of D2, the luminescent layer by a discharge lamp in the focus of a concave reflector, the skilled person would realize that the lamp and the axial spindle driving the pointer plate could not be arranged together in the centre. Faced with this difficulty, the skilled person would be aware of the necessity that the spindle has to be moved out of the centre towards the periphery so as not to compromise the advantages obtained by the envisaged improvements to the illumination.

Document D3 shows an example for a peripherally arranged driving means in a display apparatus suitable for use in a vehicle. D3 (see in particular Figures 1 to 3) discloses a clock face assembly having an annular dial 10 with light transmitting hour numbers displayed thereon and a pair of transparent clock hands 22, 23 illuminated by an internal source of light 20 centrally arranged behind the dial. The light of the bulb is guided through light transmitting sleeves 24, 25 into the clock hands so as to illuminate the hands uniformly along their entire length. A driving means rotates the clock hands at their outer periphery so as not to interfere with the light transmission path (see

column 3, lines 52 to 72).

Hence, D3 would offer the skilled person a solution to the difficulty to be resolved when modifying the optical elements in the display apparatus of D2, consisting in that the discharge lamp and the driving means could not both be centrally arranged. Moreover, in applying the idea of a peripherally arranged driving means known from D3 to the display apparatus of D2 for driving the pointer plate, as specified by aforementioned feature (iv), the skilled person would realize that the depth of the display apparatus is reduced. A further advantage is that, by arranging the driving means so as to drive the outer periphery of the pointer plate, the mechanical integrity of the reflector as well as its long term optical quality are preserved.

7. It follows from the above considerations that the skilled person, setting out from the display apparatus according to D2, would readily consider the distinguishing features (i) to (iv) so as to make use of each of the associated partial effects. Taken together, the total effect achieved does not go beyond the sum of the immediately foreseeable partial effects so that claim 1 under consideration cannot be considered to define a combination invention but rather constitutes a mere aggregation of known or obvious measures.

For these reasons, the subject-matter of claim 1 does not involve an inventive step having regard to the combination of the teachings of documents D2 and D3 and the common technical knowledge of the skilled person.

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:

R. Schumacher G. Davies