

VDO ADOLF SCHINDLING/Illuminating device
(Opposition by Diehl)

T324/94
May 7, 1996

Technical Board of Appeal 3.4.1
Reich, van Henden, Holtz

Inventive step—skilled person—team—individually obvious
features—aged art—long-felt want (no)

HEADNOTE

The patent related to an illuminating device for the transillumination of a display panel, particularly an LCD display, and had been revoked by the Opposition Division for lack of inventive step.

On appeal, the patentee restricted Claim 1 by incorporation of the ventilating openings feature of granted Claim 3. Following criticism by the Board of the drafting of this new Claim 1, in a preliminary communication in advance of oral proceedings, the patentee submitted a revised version of that amended claim. The patentee relied, *inter alia*, on the long interval (24 years) between the date of the patent and the date of the only prior art document (D6) describing a light-box of a display device provided with ventilating openings.

Held, dismissing the appeal:

1. A plurality of individually obvious steps, each generating only their predictable individual effects, cannot provide inventive subject-matter.
2. The interval of 24 years would only be relevant if the patentee were able to prove that during this time there had been an unsatisfied cooling requirement.

Editors' Note

The Editors are grateful to the opponent's representative, Dr R. Sieckmann, for a copy of the German text and a translation of the same. The decision may prove useful in instances where inventive step is urged on a "could/would" basis.

Cases referred to

T21/81 ALLEN-BRADLEY/Electromagnetically operated switch [1979-85] EPOR Vol. B 342
T32/81 FIVES-CAIL BABCOCK/Cleaning apparatus for conveyer belt [1979-85] EPOR Vol. B 377

Indexed under

Inventive step—Combination of citations (yes)
Inventive step—Individually obvious steps
Inventive step—Long-felt want
Inventive step—Skilled person, team
Technical subject-matter—Illuminating device

Representation

For patentee: T. Klein, Schwalbach
For opponent: R. Sieckmann, Dusseldorf

Source of text

Sweet & Maxwell translation of original German text
Not published in the Official Journal of the EPO

TEXT OF DECISION

Summary of Facts and Submissions

- I. The appellant is the proprietor of European patent No. 0 225 977.
- II. The contested patent was revoked on the basis of the opposition filed by the respondent. Revocation was substantiated by the lack of inventive step compared with the prior art, as evident from the following documents cited by the respondent in his Notice of Opposition:

D1: DE-A-3 145 127; and
D2: DE-A-3 302 156.

Document D2 disclosed an "illuminating device intended for the transillumination of a display panel, in particular an LCD display, which illuminating device has a light-reflecting light-box with a light source provided with a cover and facing the display panel, which cover consists of a transparent material". The subject-matter of Claim 1 in the granted wording applied for as the main request differed from this merely in that "the cover is a sieve". The screen foil known from document D1 had to be described as a "sieve" on account of its regular structure and in consideration of its optical effect. Since the lattice (17) used in the illuminating device known from document D2, and the screen foil (16, 17) according to document D1 both served the same explicitly stated purpose of rendering even the luminance distribution, it was obvious to the person skilled in the art also to select, as required, a screen foil made in accordance with document D1 for luminance distribution adjustment. Claim 1, in accordance with the subsidiary request, differed from Claim 1 of the granted patent in the features of a light source "radiating an infrared portion" and a covering "absorbing the infrared portion of the light". However, compared with the combination of documents D1 and D2, this introduced no new factual content since the copper of the scanning elements (17) of D1 absorbed the infrared portion emitted by the filament lamp (6) of document D2. Apart from making the luminance distribution even, the sieve—specified by no other features—would solve no additional problem. A sieve having holes would not contribute to the protection of the display panel from undesired heating, since the conveyance of heat and the transmission of infrared radiation to the display panel through sieve holes was stimulated rather than prevented.

- III. The appellant (patent owner) has lodged an appeal against this decision and has submitted a newly revised Claim 1, with the Statement of Grounds of appeal, as a single application which, among other things, also encompassed the features of granted Claim 3, *i.e.* ventilating openings in the light-box. The appellant pleaded that the claimed cover

panel in the form of a sieve had a large surface as a result of its holes or pores. The appellant claimed that this large surface allowed a large portion of the infrared radiation to be absorbed. The intrinsic heat of the sieve which developed in this way was distributed across the surface such that it could be released effectively into the air in the light-box and carried away through the ventilating openings.

IV. In a communication attached to the summons for an oral hearing, the Board basically notified the parties of its provisional view as follows: the wording of Claim 1 now applied for has deficiencies in the light of the requirements of Articles 84, 123 (2) and 123 (3) EPC and Rule 29 (1) EPC. A wording of Claim 1 not having these deficiencies has, with regard to the generally known characteristic of a flat grid made of copper to absorb and reflect infrared light, to treat document D1 as the closest prior art. The "screen foil" used in document D1 does not come under the recognised definition of a "sieve", which, in accordance with the enclosed expert document:

D5: Duden: *Das große Wörterbuch der Deutschen Sprache* (Bibliographisches Institut Mannheim, Wien, Zürich, 1980), Vol. 5, p. 2394,

is a device "which consists in its entirety or in its base of a *uniformly perforated material* or of a network-like or grid-like (wire) meshing". Document:

D4: FR-A-2 250 172,

already introduced into the opposition proceedings by the Opposition Division, discloses, on page 4, lines 17 to 33, light-optical advantages which could suggest to a person skilled in the art that the cover of the light source in the form of a (perforated) sieve (17, 18) provided in this illuminating device may also be used in the device known from document D1. The fitting of ventilating openings in a light-box seems to the Board to be a routine measure of someone skilled in the art. It thus remains to be discussed whether it is obvious to the person skilled in the art to improve heat carry-off from the cover by replacing an unperforated cover with a sieve.

V. The appellant removed the deficiencies with regard to Articles 84, 123 (2) and 123 (3) EPC and Rule 29 (1) EPC cited by the Board in its communication attached to the summons by submitting a new wording of Claims 1 to 10 on March 29, 1996.

Claim 1, submitted on March 29, 1996, reads as follows:

1. Illuminating device intended for the transillumination of a display panel, in particular a liquid crystal display, which illuminating device has a light-reflecting light-box (3) in which a light source (4) is arranged, which light source is provided with a cover (8) facing the display panel (1), which cover absorbs and reflects the infrared light emitted by the light source and is made of a transparent material, *characterised in that* the cover is a sieve (8), and in that the light-box (3) has ventilating openings (13, 14) on its top and bottom sides when in the assembled state, through which openings the air is able to flow in order to carry away the heat collected in the sieve (8).

Claims 2 to 10 are dependent on Claim 1.

VI. On May 7, 1996, oral proceedings were held, at the start of which the parties were asked, among other things, to comment on the unimpeded penetration of the light source radiation through the matter-free pore cross-sections of a sieve; cf. also point II, last sentence.

VII. The appellant (patent proprietor) applied for the setting aside of the contested decision and for the patent to be upheld on the basis of Claims 1 to 10 submitted on March 29, 1996.

The respondent (opponent) applied for the dismissal of the appeal by the patent proprietor.

VIII. The request of the appellant was essentially based on the following arguments:

(a) The light-box of the illuminating device known from document D1 was not light-reflecting. The prior art thus gave no suggestion of combining two steps—namely the inner surface of the light-box repeatedly reflecting the light and the sieve covering the light source—to render even the transillumination of the display panel.

(b) Moreover, the light-box of the illuminating device known from document D1 was closed and led to a build-up of heat. Document D1 contained no indications of heat problems, particularly not in connection with the screen foil provided with a copper coating. The person skilled in the art and working in the particular field of illuminating devices would not be orientated by the generally known prior art of cooling, particularly not radiators for living areas with a perforated surface for air to flow through and whose housing has ventilating openings above and below for the formation of a convection current for carrying off heat. Of all documents cited in the European Search Report only one, namely:

D6: US-A-3 027 669,

described a light-box of a display device provided with ventilating openings. The prolonged time of approximately 24 years between the publication of document D6 and the priority dates of the contested patent was an indication that it was not obvious to the person skilled in the art to provide the light-boxes known from document D1 with ventilating openings.

(c) The sieve holes (18) of the sieve (17), illustrated in Figure 2 of document D4, sit directly on an electroluminescent cell (2) on one side and, on the other side, sit directly on a polarising filter (16) and, for this reason, air did not pass through them and they did not contribute towards heat carry-off. Moreover, document D4—as can be seen from page 2, paragraph 1—solved the heat problem by using an electroluminescent cell as a light source generating no heat. Thus, document D4 gave the person skilled in the art no suggestion of using a sieve to improve heat carry-off from a light-box, but guided the person skilled in the art down a technically different path for solving the problem. In contrast, the sieve—in the case of the arrangement in accordance with Claim 1 of the contested patent—absorbed heat, stored it and then released it to a greater degree into the air passing through, owing to the fact that its surface is enlarged by the pores. This large surface allowed absorption of a large portion of infrared radiation, thereby protecting the display panel from undesired heating.

(d) In order to proceed from the prior art known from documents D1 and D4 to the subject-matter of Claim 1 of the contested patent, the person skilled in the art had not merely to replace the screen foil (7) in Figure 1 of document D1 with the sieve (17) known from document D4, but also had to carry out the following technical steps: remove the sieve from the light source and the display panel, provide the light-box with openings underneath and on top, and design the inner surface of the light-box so as to be light-reflecting. The plurality of these steps formed a functional combination which seems obvious only as a result of an inadmissible *ex post facto* analysis.

IX. The respondent essentially contradicted the arguments made by the appellant as follows:

(a) Even the illuminating device in accordance with document D1 achieved gradient-free, uniform transillumination of the display panel by means of a reflecting sieve structure made of copper. The thermoplastic polycarbonate sieve of the contested patent aluminised on the lamp side had the same light-optical properties and merely represented an obvious alternative embodiment of the screen foil used in document D1 with locally variable transparency. The use of the light-reflecting surface of a light-box known from document D2, in addition to shading by means of a reflecting sieve structure, was left to the obvious discretion of the person skilled in the art that involved no inventive step since it merely entailed a simple aggregation of technically known working materials.

(b) It was generally known that filament lamps are heat radiators and that, for this reason, their technical environment had to be ventilated. Ventilating openings were a normal constituent part of a lamp. Since it was a generally known law of physics that hot air rises, the application of ventilating openings in the top and bottom sides of the light-box when in the assembled state was a trivial action of a craftsman. For this reason, it was repeatedly omitted in lamp representations and also only mentioned in the margin of document D6 as plainly self-evident.

(c) Document D4 did not merely disclose a cover sieve integrated into a modular unit but, in Figure 6, also disclosed a micromesh filter (24) arranged in isolation. A person skilled in the art was, moreover, able to identify that the light-reflecting bars of this sieve also had a shadow effect for infrared light. The thermal protection action of these known sieves on the display panel was thus immediately comparable with that of the contested patent.

(d) Since the contested patent in column 4, lines 53 to 55 disclosed that the ventilating openings are provided "in order to carry away the heat collected *first and foremost* in the sieve 8", the omission of the words "first and foremost" in Claim 1 violated Article 123 (2) EPC.

X. At the end of the oral proceedings, the decision was pronounced to dismiss the appeal.

Reasons for the Decision

1. Inventive step

1.1 The previous instance was presented with claims geared to the light-optical properties of the cover sieve such that document D2, with its light-reflecting light-box, was to be seen as the technical starting point for the invention. As point III, in conjunction with point VIII (b), (c), acknowledges the appellant sees the features of the now effective Claim

1 substantiating an inventive step first and foremost in the thermal protection action of the sieve. The Board therefore regards as the closest prior art the illuminating device known from document D1, the light-box of which does not in fact reflect light, but whose light source cover for this is designed to absorb and reflect infrared light.

From the closest prior art according to document D1, the following features defined by the wording of Claim 1 are known:

Illuminating device intended for the transillumination of a display panel (*cf.* D1, 4 in Fig. 1), in particular a liquid crystal display (D1, p. 4, l. 11), which device has a ... light-box (Fig. 1) in which a light source (8) is arranged which, facing the display panel, is provided with a cover reflecting and absorbing infrared light emitted by the light source (7 in Fig. 1, 16 and 17 in Fig. 4, and p. 4, l. 18 in relation to the sample made of a copper coating, whose infrared light-absorbing and reflecting surface property is generally known) made of a transparent material.

1.2 The subject-matter of Claim 1 differs from the illuminating device known from document D1 in that:

- (a) the light-box is "light-reflecting";
- (b) "the cover is a sieve (8)"; and
- (c) "the light-box (3) has ventilating openings (13, 14) on its top and bottom sides when in the assembled state through which ventilating openings the air can flow in order to carry away the heat collected in the sieve (8)".

1.3 According to the contested patent, column 1, lines 42 to 49, the present invention sets itself the technical object of transilluminating the display panel as intensively and evenly as possible and of protecting it from undesired heating. To determine the (objective) problem on which the contested patent is based, it has to be examined in accordance with the invariable practice of the Boards of Appeal to what extent the effects of the above-mentioned distinguishing features (a), (b) and (c) deducible from the contested patent influence this object compared with the closest prior art.

1.3.1 Contrary to the view of the appellant in accordance with point VIII (a), a person skilled in the art is not able to deduce from the contested patent that distinguishing feature (a), in other words the light-reflecting design of the light-box, renders even the transillumination of the display panel. The sole functional statement in this context in the specification of the contested patent, column 4, lines 29 to 31, reads verbatim as follows: "Since the light-box (3) naturally may not be transparent, it has a reflecting layer (7) on its inner side ...". From this it is clear to the person skilled in the art that feature (a) is disclosed only as a means to boost the intensity of the transillumination.

1.3.2 The rendering even of the display panel transillumination is, both in the case of the claimed sieve (distinguishing feature (b)) and in the screen foil (7, 16 and 17) known from document D1, based on the principle of preventing part of the radiation emanating from the light source from impacting on the display panel by superficially alternating shading. Apart from the indication of a "sieve", Claim 1—like the description of the contested patent—discloses no other specifications of the shadow-

generating components of the sieve. For this reason, it is to be assumed in all probability that the person skilled in the art, in relation to the first technical object of the contested patent, as with the closest prior art, initially selects a shading pattern which—adapted to suit the angular distribution of the radiation intensity released by the light source—optimally evens the transillumination of the display panel. With regard to the optical effect, the deficient specification of the shading pattern in the contested patent therefore merely allows the replacement of the screen foil with a sieve to be seen as the exchange of equivalent working materials, which does not improve the degree to which the transillumination is made even.

1.3.3 As soon as the degree of evening out to be achieved has been set, the geometric structure of the shading pattern is determined and is no longer variable. However, at the same time, the thermal protection action of the sieve and the screen foil is quantified. The angular distribution of the radiation intensity of a filament lamp reveals no spectral differences, as is known. Moreover, the directional distribution of the radiation paths is identical for visible light and for infrared radiation. Spectrally selectively reflecting sieve coatings do not form part of the subject-matter of Claim 1. The integral of the intensity of visible light interspersing through the sieve holes or the copper-free film surfaces is thus in a fixed relationship with the thermal radiation interspersing through the sieve and screen foil and impacting on the display panel. Sieve (distinguishing feature (b)) and screen foil have, then, to be seen as equivalent working materials in relation to the second technical object of the contested patent as well, *i.e.* in relation to the thermal protection for the display panel. The surface enlargement caused by the screen pores and claimed by the appellant in point VIII (c) has no influence on the shading pattern generated by the sieve and is thus—contrary to the view of the appellant—no means to protect the display panel from thermal radiation. The above considerations of equivalence are, in the view of the Board, based on a general basic knowledge of physics to be expected of a person skilled in the art of illumination.

1.3.4 The effects of the sieve claimed by the appellant in point VIII (c) are based on column 2, lines 15 to 18 of the specification of the contested patent, having the following text: “The intrinsic heat of the sieve which develops due to infrared absorption is distributed across a large surface such that it can be released effectively into the air in the light-box”. The Board, in any event, is therefore able to acknowledge that the dissipation of heat into the surrounding air may be better from a sieve than from a pore-free screen foil.

1.3.5 For the reasons cited above, the object forming the basis of the contested patent, compared with the closest prior art in accordance with document D1, restricts itself to intensifying the transradiation of the display panel and to creating an illuminating device with an effectively coolable light-source cover of equivalent optical action. One of the standard tasks of a person skilled in the art of illumination is to increase the luminous efficiency of a light source for illumination purposes. A person skilled in the art can in practice identify without hesitation, from

thermal damage such as deformation or decomposition, whether a light-source cover needs to be cooled. Thus, the wording of the objective problem forming the basis of the contested patent does not contribute to the support of an inventive step.

1.4 The partial problem of intensifying transradiation on the display panel in the case of the illuminating device known from document D1 is solved by distinguishing feature (a) cited in point 1.2, *i.e.* by a “light-reflecting” light-box. Such reflectors which cause a concentration of the light-source emission are not only generally known, but their use in the illumination of a display panel is also suggested in document D2; *cf.* on this point also point II and 1.2.

1.5 The other partial problem of creating an illuminating device with an effectively coolable light-source cover of equivalent optical action is solved by distinguishing features (b) and (c), mentioned in point 1.2.

1.6 As already stated in points 1.3.2 and 1.3.3, a person skilled in the art can identify without hesitation that a screen foil and a sieve are equivalent working materials with regard to the rendering even of transillumination and the thermal protection of the display panel. From document D4, the person skilled in the art knows to use a sieve as a light-source cover in an illuminating device for a display panel (*cf.* document D4, Fig. 2, in particular the sieve (17, 18)). For this reason, the substitution of the screen foil (7, 16, 17) of document D1 with the sieve (17, 18) of document D4 should be seen as a replacement of two equivalently acting working materials known in the same special technical field and justifying no inventive step. The Board thus agrees with the generally recognised legal purpose of Article 56 EPC, where it states that it must be left up to the person skilled in the art as part of the normal development of the art to resort to known, alternative working materials of equivalent effect. In this case, the person skilled in the art has, moreover, to exchange a technical motive, the screen foil for a sieve, as part of the protective definition of “sieve”. Document D4 discloses the possibility of providing sieve pores at an incline and thereby causing an additional deflection of light (*cf.* p. 8, ll. 33–37). In contrast to the generally summarised view of the appellant in accordance with point VIII (d), the substitution of the screen foil (7, 16, 17) with the sieve (17, 18) automatically results in an illuminating device in which the screen is removed from the light source and the display panel so that the ambient air can pass through the sieve pores. The increased heat dissipation claimed by the appellant in point VII (c) and caused by the additionally provided surfaces of the sieve pores therefore comes easily to the mind of the person skilled in the art as another effect (possibly unpredicted) justifying no inventive step, *i.e.* a “bonus” (*cf.* also Decision T21/81,¹ O.J. EPO 1983, 15).

1.7 In accordance with the invariable practice of the Boards of Appeal, solutions to partial problems based on different technical special fields are geared in each case to the knowledge and ability of the relevant person skilled in the art of solving the problem concerned (*cf.* also Decision

¹ ALLEN-BRADLEY/Electromagnetically operated switch [1979–85] EPOR Vol. B 342.

T32/81,² O.J. EPO 1982, 225). Therefore, in contrast to the generally summarised opinion of the appellant under point VIII (b), a person skilled in the art of cooling and not a person skilled in the art of illumination is relevant for solving the partial problem of cover-plate cooling cited in point 1.3.5. Since—as outlined in point 1.6 in detail above—the person skilled in the art of illumination responsible for rendering even the transradiation substitutes the screen foil of the sieve of document D1 with the sieve of document D4, the question remains, in relation to the arguments of the appellant in point VIII (c), whether the teaching of document D4 to reduce the heat load of the display panel using an electroluminescent cell distracts a person incorporated into the problem-solving team and skilled in the art of cooling from identifying in the illuminating device of document D4 the improved cooling ability of a sieve, compared with an unperforated foil.

1.8 In the view of the Board, a person skilled in the art of cooling knows in practice without hesitation if the sieve used by the person skilled in the art of illumination in the closed light-box of document D1 heats itself and its environment too intensely. The prevention of the heating up of apparatus components in accordance with distinguishing feature (c) cited in point 1.2 by ventilating openings in the appliance housing in such a way that cold air flows in below and warm air flows out above is, in the view of the Board, not only not part of the general technical knowledge of the person skilled in the art of cooling, but is also suggested by document D6. The time of 24 years asserted by the appellant in point VIII (b) would then only be a token of an inventive step if the appellant were to prove that during this time there was an unsatisfied cooling requirement.

1.9 In accordance with the invariable practice of the Boards of Appeal—in contrast to the generally summarised view of the appellant in point VIII (d)—a plurality of obvious individual steps each generating only their predictable individual effects cannot justify an inventive step.

1.10 For the reasons mentioned above in points 1.1 to 1.9, the subject-matter of Claim 1 is not based on an inventive step within the meaning of Article 56 EPC.

2. Claim 1 therefore does not satisfy the requirements of Article 52 (1) EPC in conjunction with Article 56 EPC. The patent cannot therefore be upheld with this claim. The rejection of Claim 1 also brings down the dependent Claims 2 to 10.

Order

For these reasons it is decided that:

The decision under appeal is set aside.