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Bezeichnung der Erfindung: Rear projection screen

Title of invention:

Titre de l'invention :

Klassifikation / Classification / Classement : G03B 21/62

ENTSCHEIDUNG / DECISION

vom / of / du 25 September 1990

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /

Titulaire du brevet :

MITSUBISHI RAYON CO., LTD

Einsprechender / Opponent / Opposant :

N.V. Philips' Gloeilampenfabrieken

Stichwort / Headword / Référence :

EPO / EPC / CBE Articles 54(1) and 56

Schlagwort / Keyword / Mot clé :

"Novelty - main request: no; inventive step -
first and fourth auxiliary requests: no;
second and third auxiliary requests: not
admissible"

Leitsatz / Headnote / Sommaire



Case Number : T 334/89 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 25 September 1990

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Decision under appeal : Decision of the Opposition Division of the European
Patent Office dated 17 March 1989 revoking
European patent No. 0 114 395 pursuant to
Article 102(1) EPC.

Composition of the Board :

Chairman : E. Turrini

Members : W. Hofmann

C. Payraudeau

Summary of Facts and Submissions

- I. European patent No. 0 114 395 was granted on the basis of European patent application No. 83 113 077.8.
- II. The Respondent (Opponent) filed an opposition based on Article 100(a) EPC against this patent and, in support of his opposition, cited the following documents:

FR-A-2 276 605 (D1),
DE-A-2 320 762 (D2),
EP-A-0 063 317 (D3),
US-A-3 523 717 (D4).
- III. The patent was revoked by a decision of the Opposition Division.
- IV. The Appellant (Patentee) lodged an appeal against this decision.
- V. After a communication pursuant to Article 11(2) of the Rules of Procedure of the Boards of Appeal setting out the provisional view of the Board, the Appellant submitted further arguments and a proposal for a further amendment of Claim 1 as a further auxiliary measure.
- VI. Oral proceedings were held at the end of which the Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of sets of claims, handed over at the oral proceedings, according to a main request and four auxiliary requests in the given order of precedence.

The Respondent requested that the second and third auxiliary requests of the Appellant be rejected as inadmissible and that the appeal be dismissed.

- VII. (a) Claim 1 according to the main request reads as follows:

"1. A rear projection screen comprising a projection surface (2) upon which light from a projector impinges and a viewing surface (3), at least either one of the screen surfaces serves as a lens structure producing on said viewing surface (3) a multiplicity of bright stripe portions (3a) where the light is transmitted and a multiplicity of dark stripe portions (3b) where no light is transmitted, characterized in that a plurality of elongated grooves (31) is formed along the dark stripe portions (3b) of the viewing surface (3) and a corresponding plurality of thread-like members (32) is disposed in the elongated grooves (31) as light-absorbing means."

Claims 2 to 12 are appended to this Claim 1.

- (b) Claim 1 according to the first auxiliary request differs from that according to the main request in that in the characterising part the text "a plurality of elongated.....viewing surface (3) and" is replaced by "said viewing surface (3) is provided with a lenticular lens means including a multiplicity of elongated lenses, the side surfaces of which form total reflection surfaces for forming the dark stripe portions (3b) of the viewing surface (3), and a plurality of elongated grooves (31) being formed by

the total reflection surfaces provided on both sides of the elongated grooves (31) and that".

Claims 2 to 9 are appended to this Claim 1.

- (c) As compared with Claim 1 according to the first auxiliary request, Claim 1 according to the second auxiliary request comprises the additional word "adhesive" between "plurality of" and "thread-like members (32)" near the end of the claim.

Claims 2 to 8 are appended to this Claim 1.

- (d) In addition to Claim 1 according to the second auxiliary request, Claim 1 according to the third auxiliary request reads at the end:

"wherein said rear projection screen is made of acrylic resin and the inclination of each total reflection surface is more than about 69°."

Claims 2 to 8 (after correction of obvious errors in the numbering of Claims 5 to 8) are appended to this Claim 1.

- (e) Claim 1 according to the fourth auxiliary request differs from Claim 1 according to the main request in that in the preamble part "either one of the screen surfaces" is replaced by "said projection surface (2)".

Claims 2 to 11 are appended to this Claim 1.

VIII. The arguments presented by the Appellant are in substance as follows:

The subject-matter of Claim 1 according to the main request comprises in particular two different embodiments, one including lenticular lenses on the projection surface and ordinary grooves on the viewing surface, and the other including lenticular lenses and grooves with totally reflecting flanks both on the viewing surface. In both of these cases the dark and bright stripes are solely produced by means of the lens configuration.

Document D1 does not anticipate the subject-matter of Claim 1 since from document D1 it is not known to produce a plurality of bright and dark stripe portions on the viewing surface solely by means of a lens configuration. The teaching of document D1 is restricted to producing on the viewing side dark stripe portions by means of specific members which are light reflecting on the one side and light absorbing on the other side. In the known case, the rhombic elements are not arranged at positions predetermined by a given light distribution, but at random. Therefore, the structure of the screen according

to document D1 is basically different from that defined in Claim 1. The idea according to document D1 of adding to the screen a specific element having light reflecting properties does not match at all with the present concept of providing a total internal reflection area adjacent to those additional elements.

The subject-matter of the present invention achieves the following advantages over the prior art:

High image contrast with few light losses;

an easy and low cost manufacturing process since the thread-like members need no special orientation or exact positioning with respect to the screen;

an easier optimisation of the absorbing function of the thread-like members since these members need not fulfil additional tasks;

avoiding high cost (reflective) coating of the thread-like members.

These advantages provide an additional indication for the presence of an inventive step.

A combination of the documents D4 and D1 - leading in direction of the first one of the above-mentioned embodiments, corresponding to Claim 1 according to the fourth auxiliary request - is not obvious since document D1 contained many additional features which would not seem compatible with the features of document D4.

The view of the Appellant regarding the disclosure of document D1 is supported by the "opinions" of two independent U.S. patent attorneys filed by the Appellant. Moreover, U.S. interference proceedings based on a claim wording identical to that according to present Claim 1 (main request) were concluded in favour of the Patentee.

The second and third auxiliary requests should be admissible since the discussion during the oral proceedings led to the possible desirability of a limitation relating to the process of manufacture.

IX. The Respondent's arguments may be summarised as follows:

Document D1 discloses a rear projection screen having all the features according to Claim 1 (main request). In particular, radiation incident uniformly on the projection side of this known screen will be redistributed such that

at the front side the radiation emerges mainly from the high level portions and the amount of radiation emerging from the troughs in between is greatly reduced. The concept of forming the grooves in the dark stripe portions is not missing in document D1 since in a screen with a lens structure on the viewing side the dark stripe portions are caused by the grooves so that the positions of grooves and dark stripe portions match automatically. Therefore, Claim 1 according to the main request is not allowable in view of Articles 52 and 54 EPC.

No inventive step could be seen in the subject-matter of Claim 1 according to the first auxiliary request since this subject-matter is identical with the subject-matter

disclosed in document D1, with the obvious replacement of the reflective layer mentioned there by the total reflection known from document D3.

The second and third auxiliary request of the Appellant should not be admitted since at the oral proceedings it should be too late to introduce a modification into Claim 1 (the feature "adhesive") which goes in a direction not previously followed.

Moreover, using acrylic resin and an inclination of the total reflection surface of more than 69° (Claim 1 according to the third auxiliary request) is known from document D3.

The subject-matter of Claim 1 according to the fourth auxiliary request of the Appellant is not inventive since document D2 as well as D4 discloses a rear projection screen having a lens structure on the projection side producing dark stripe portions on the viewing side (document D4 even showing recesses on the viewing side)

and stripes of absorbing material covering the dark stripe portions. Using thread-like members as absorbing material is known from document D1.

The "opinions" of two U.S. attorneys filed by the Appellant are not relevant in the present case since they do not contain any information which is not already available from document D1 itself. Moreover, there is no reason why the Appellant filed the two "opinions" so late. They should, therefore, be disregarded under Article 114(2) EPC.

Reasons for the Decision

1. The appeal is admissible.
2. Admissibility of the requests

Although the Board in its communication annexed to the summons to the oral proceedings had invited the parties to file any new submissions or requests at least one month before the date of the oral proceedings, the Appellant has submitted during these oral proceedings a new main request and four new auxiliary requests without giving any reason or explanation for justifying this late filing.

The Boards of Appeal have always insisted on the fact that "it is only in the most exceptional circumstances, where there is some clear justification both for the amendment and for its late submission, that an amendment not submitted in good time before oral proceedings will be considered on its merits in those proceedings by a Board

of Appeal" (T 95/83, point 8, OJ EPO 1985, 75; see also in the same sense T 153/85, OJ EPO 1988; T 406/86, OJ EPO 1989, 302 and T 644/89 of 11 September 1990 Nikkiso Co. Ltd, unpublished).

The parties to proceedings before the Boards of Appeal have also been generally reminded by the "Official Guidance for Appellants and their Representatives", published in 1981 (OJ EPO 1981, 176), republished in 1984 (OJ EPO 1984, 376 and amended in 1989 (OJ EPO 1989, 395) that if it is desired to submit amendments to a patent application or a patent this should be done at the earliest possible moment, the parties being specifically warned that a Board may disregard amendments not submitted in good time.

In the present case, the main request and the first and fourth auxiliary requests only differ by a minor amendment (addition of the word "structure" after "lens" in Claim 1) from the corresponding main and first and second auxiliary requests filed with the Grounds of Appeal.

The Board has, therefore, decided to consider these requests, although they were late submitted.

The Respondent has also not raised any objection against the admissibility of these requests.

On the contrary, the new second and third auxiliary requests differ from these earlier requests in that in Claim 1 the thread-like members are now specified as being adhesive.

This feature has never before played any particular role in the opposition or appeal procedure. Moreover, the Board cannot see any reason why this feature could not

have been introduced at an earlier stage of the proceedings since the argumentation on both sides had essentially been the same from the opposition procedure up to the appeal procedure. At the oral proceedings, moreover, the discussion did not take an unexpected turn which might have necessitated an answer in the form of such new requests.

Furthermore, the Board does not consider that the amendment of Claim 1 corresponding to the second and third auxiliary requests could have led to the maintenance of the patent in an amended form, since fixing two objects on to each other by means of an adhesive is usual and could not contribute to an inventive step of the claimed subject-matter.

Therefore, the Board refuses to admit the second and third auxiliary requests. They will be disregarded in the following.

3. Claim 1 according to the main request differs from the granted version (and essentially also from the original Claim 1) only in that "lens" is replaced by "lens structure". The Board cannot see any difference in meaning between the two terms in the present case since in the claim the term "lens" had anyway to be interpreted in a broad sense in order to be compatible with the remaining features. There are, therefore, no objections against this amendment under Article 123(2) and (3) EPC.

Claim 1 according to the first auxiliary request corresponds to a combination of granted (or original) Claims 1, 3 and 4 supplemented with the feature "elongated lenses" disclosed on the original page 11, lines 21 to 22.

Claim 1 according to the fourth auxiliary request is limited to one of the alternatives ("at least said projection surface") which had already been explicitly contained in the granted (and original) Claim 1.

The dependent claims and the description according to all requests have essentially not been modified as compared with the corresponding parts of the original documents.

Therefore, the documents according to the main request and the first and fourth auxiliary requests do not contravene Article 123(2) and (3) EPC.

4. Main request; novelty

- 4.1 In accordance with present Claim 1, document D1 discloses a rear projection screen comprising a projection surface upon which light from a projector impinges, and a viewing surface. Although in document D1 the "protuberances" (cf. e.g. Claim 1) provided on the viewing surface are not explicitly referred to as "lenses", it nevertheless is clear from the convex shape of these protuberances and from the corresponding directions of propagation of the beams of light shown in the drawings (see in particular Figures 4 and 9), and has also not been seriously contested by the Appellant, that the protuberances (and thus the viewing surface of the screen) serve as a lens structure.
- 4.2 As far as the wording of Claim 1 "producing on said viewing surface no light is transmitted" is concerned, the Appellant submits that it must be interpreted in the sense that the transparent material of the body of the screen alone by means only of its surface profile produces dark stripe portions. However, this narrow interpretation does not necessarily follow from the

actual wording of the claim. The interpretation of the Appellant might be plausible if the alternative according to which the lens structure is on the projection surface were the only one contained in Claim 1. However, if the lens structure is only on the viewing surface (which in Claim 1 is explicitly mentioned as another alternative), it is clearly necessary to provide some special features on this lens structure which help produce the dark stripes since normally a (lenticular) lens structure would not produce on the same surface a pattern of dark stripes. What these special features are is left open in Claim 1; they could as well relate to an additional absorbing material on this surface as to a particular shape of the surface.

4.3 According to document D1, the lens structure including threads ("brins") produces on the viewing surface a multiplicity of bright stripe portions where the light is transmitted and a multiplicity of dark stripe portions where no light is transmitted (cf. page 4, lines 10 to 11 and 19 to 30, Claim 1 and Figures 2, 4 to 6 and 8 to 10). Thus, the lens structure according to Claim 1 is anticipated by the lens structure disclosed in D1.

4.4 Furthermore, the screen described in document D1 has a plurality of elongated grooves (see page 4, lines 26 to 30, and Figures 4 and 5) formed automatically along the dark stripe portions of the viewing surface since it is the grooves themselves together with the thread-like members contained therein which produce the dark stripe portions. The light-absorbing thread-like members which, according to page 4, lines 10 to 11, are placed at the base of the protuberances are, according to Figures 4 and 5, disposed in the elongated grooves.

4.5 Thus, the subject-matter of Claim 1 is, in the Board's opinion, known from the disclosure of D1.

4.6 The "opinions" of two independent U.S. patent attorneys were submitted by the Appellant together with the Grounds for Appeal on 26 July 1989. In the view of the Board, the beginning of the appeal procedure was not too late for filing such documents. The Board, therefore, will not disregard these documents under Article 114(2) EPC. However, the Board does not consider these "opinions" to be relevant in the present case. They relate to what is in the view of the authors the main idea of document D1. However, it is not only a subjective view of the main idea of a document, but its whole content which has to be taken into account when judging novelty or inventive step of claimed subject-matter.

The Appellant has also filed copies of documents from U.S. interference proceedings concerning a claim identical to that according to the main request in the present case. However, opinions or judgments given in U.S. proceedings are not binding to the EPO; the Board has to find its own position in accordance with the provisions of the European Patent Convention.

Therefore, these documents are also not considered relevant in the present case.

4.7 For the reasons given above, the subject-matter of Claim 1 (main request) lacks novelty (Article 54(1) EPC).

4.8 It is apparent that this finding of lacking novelty results from a claim whose subject-matter (cf. point 4.2) goes beyond the scope of the embodiments disclosed in the description. However, the Board has to base its decision on the wording of the claim as it has been filed by the

Patentee, and this wording does cover subject-matter beyond the scope of the embodiments.

Less generalised versions of main claims, each relating more directly to one of the two alternative basic embodiments disclosed in the description, form the basis of the first and fourth auxiliary requests of the Appellant.

5. First auxiliary request

5.1 Novelty

- 5.1.1 It has already been shown above (points 4.1 to 4.3) that the screen disclosed in document D1 has all the features according to the preamble of Claim 1 (first auxiliary request). Moreover, the viewing surface of this known screen is provided with a lenticular lens means including a multiplicity of elongated lenses, a plurality of elongated grooves and a corresponding plurality of thread-like members disposed in the elongated grooves as light-absorbing means (page 4, lines 10 to 11 and 19 to 30, page 5, lines 34 to 38, Figures 4, 5, and 8).

According to document D1, the reflection at the place of the side surfaces of the elongated grooves and thus the dark stripe portions of the viewing surface are produced by the reflecting (e.g. metallised) surface of the thread-like members which are in contact with said side surfaces (cf. page 5, line 5, page 6, line 18, Figure 9).

The subject-matter of Claim 1 according to the first auxiliary request differs from this known screen in that it is not the surface of the thread-like members, but the totally reflecting side surfaces of the grooves that reflect the light.

5.1.2 Document D3 (cf. "abstract", page 7, lines 3 to 25, Claims 1 and 2, and Figures 1 to 13) discloses a rear projection screen the viewing surface of which is provided with a lenticular lens means including a multiplicity of elongated lenses. The side surfaces of these lenses are total reflection surfaces which thus, on the viewing surface, form dark stripe portions where no light is transmitted. A plurality of elongated grooves is formed by the total reflection surfaces provided on both sides of these grooves. As light-absorbing means a corresponding plurality of stripes consisting of a light-absorbing layer is disposed in the elongated grooves (cf. page 8, lines 25 to page 9, line 5, page 18, line 14 to page 19, line 2, Claims 8 and 9, Figures 8 and 9).

The subject-matter of Claim 1 according to the first auxiliary request differs from this known screen in that it comprises not stripes of a light-absorbing layer, but light-absorbing thread-like members that are disposed in the grooves.

5.1.3 The documents D2 and D4 do not come closer to the subject-matter of Claim 1 according to the first auxiliary request.

5.1.4 For these reasons the subject-matter of Claim 1 according to this request is novel in the sense of Article 54 EPC.

5.2 Inventive step

5.2.1 As shown above, the present subject-matter differs from the screen described in document D1 only in the type of reflection used. Even the geometrical distribution of the reflected light beams must be the same in both cases since the metallised surfaces of the thread-like members

used in the known screen are in full contact with the side walls of the grooves (cf. Figures 4, 8 and 9). Therefore, in accordance with column 2, lines 64 to 65 of the description, the technical problem is to be seen in improving the contrast of the image since a higher rate of reflection may increase the brightness of the bright parts of the image and consequently increase the contrast.

This problem in itself does not contribute to the inventive step of the present subject-matter since it goes in the same direction as the intentions already expressed in document D1 (improvement of the contrast, cf. page 2, lines 12 to 13 and page 6, line 35; improvement of transmission by increasing the rate of reflection, cf. page 6, lines 13 to 17 and 37 to 38) and the skilled person will always try to further improve those points which are known to be important.

5.2.2 Using total internal reflection at the side surfaces of the grooves of a rear projection screen is disclosed in document D3. Since the construction of this screen is basically the same as that according to document D1, and since it is well known that the reflection coefficient of total reflection is the highest achievable, it was obvious for a skilled person to replace the metallic reflection used in document D1 by the total reflection described in D3.

5.2.3 Concerning the assertions of the Appellant regarding advantages of the present subject-matter over the subject-matter of document D1, the Board wishes to make the following remarks:

It appears plausible that the light losses might be reduced and thus the image contrast somewhat increased. However, this effect was to be expected from the

properties of the totally reflecting surfaces used according to document D3.

The Board is not convinced that the difficulty and cost of the manufacturing process is so much reduced since the special orientation or positioning of the thread-like members is now replaced by the special orientation or positioning of the totally reflecting side surfaces of the grooves.

It may be left open whether the optimisation of the absorbing function of the thread-like members according to document D1 was really difficult. In any case, it was evident that replacing the reflecting function of the thread-like members by the reflection of the side walls would relieve the thread-like members from this additional task and, additionally, save the cost of a reflective coating on these members.

5.2.4 For these reasons, the subject-matter of Claim 1 according to the first auxiliary request does not involve an inventive step in the sense of Article 56 EPC.

6. Fourth auxiliary request

6.1 Novelty

6.1.1 Claim 1 according to the fourth auxiliary request differs from that according to the first auxiliary request in so far as it is now the projection surface which is specified to serve as a lens structure producing on the viewing surface bright and dark stripe portions, and that the viewing surface is only specified as having a plurality of elongated grooves (the profile of which is left open) along the dark stripe portions and a corresponding

plurality of thread-like members disposed in the elongated grooves as light-absorbing means.

Document D4 discloses a rear projection screen of the type having lenticular lenses on the projection surface, these lenticular lenses producing dark and bright stripes on the viewing surface (cf. in particular "abstract", column 2, lines 25 to 31 and 42 to 43, column 4, lines 19 to 28, and Figures 2 to 6). The lenticular lenses formed on the viewing surface (cf. column 2, lines 31 to 33 and lines 65 to 67, column 3, lines 4 to 8, and Figures 2 to 6) are in optical registry with the lenticular lenses of the projection surface. The grooves which necessarily result along the lines where each lenticular lens abuts against the next one, are positioned along the dark stripe portions outside the focus lines of the lenses on the projection surface. The dark stripe portions on the viewing surface are covered with a light-absorbing means, i.e. a dark overcoating (cf. column 1, lines 52 to 55, column 2, lines 33 to 35 and 71 to 72, column 4, lines 33 to 37 and Figures 2 to 6).

The subject-matter of Claim 1 according to the fourth auxiliary request differs from this known projection screen in that the plurality of light-absorbing means are thread-like members.

- 6.1.2 The disclosure of document D2 is similar to that of document D4. It lacks, however, the lenticular lenses, and, thus, the grooves, on the viewing surface.
- 6.1.3 As already mentioned above, the screen disclosed in document D1 has light-absorbing, thread-like members disposed in elongated grooves on the viewing surface. However, it has no projection surface serving as a lens

structure producing on the viewing surface bright and dark stripe portions.

6.1.4 Document D3 is less relevant for Claim 1 according to this request.

6.1.5 The subject-matter of Claim 1 according to the fourth auxiliary request is, therefore, novel in the sense of Article 54 EPC.

6.2 Inventive step

6.2.1 The Board considers D4 to be the prior art document which is closest to Claim 1 according to the fourth auxiliary request.

In view of the remaining difference which lies in replacing the light-absorbing coating by a light-absorbing thread-like member and of the fact that the coating described in document D4 already achieves high image contrast (cf. column 2, line 71 to column 3, line 2), the technical problem to be solved by the subject-matter of Claim 1 (fourth auxiliary request) is not so much directed to obtaining a higher degree of absorption of ambient light, but to providing a rear projection screen which can be manufactured easily and at low cost (cf. column 2, line 65 to column 3, line 1 of the description). This is also in agreement with the discussion of the prior art given in column 2, lines 39 to 52 of the present patent specification.

This problem in itself is not inventive since easy and low cost manufacture is quite generally desired for every technical product.

- 6.2.2 Document D1 discloses the feature which corresponds to the above-mentioned difference, i.e. a thread-like member positioned in the grooves.

It is stated in this document not only that the thread-like members achieve high absorption of the ambient light (page 2, lines 32 to 33, page 4, lines 13 to 15, page 5, lines 33 to 38, page 6, lines 6 to 8 and 35 to 36), but also that the screen can be manufactured easily and at low cost (page 4, line 30 and page 6, line 39). A person skilled in the art could, therefore, expect that a combination of the features of document D1 with those of document D4 would be suitable for solving the above mentioned problem without impairing the contrast of the image.

The Appellant submitted that the teachings of document D1 as a whole would not seem compatible with the features of document D4. However, the Board cannot see any reason which could have kept the skilled person from trying this combination. On the contrary, the thread-like members which according to document D1 are pressed into or molded together with the body of the screen, could, for example, very well in the same way be connected with the body of the screen disclosed in document D4 since this screen also consists of thermoplastic material and is molded (cf. column 4, line 9 and column 7, lines 20 to 21). Thus, it follows that combining the teachings of documents D4 and D1 was obvious for a person skilled in the art.

- 6.2.3 For these reasons the subject-matter of Claim 1 according to the fourth auxiliary request does not involve an inventive step either.

7. Thus, the grounds for opposition mentioned in Article 100(a) EPC prejudice the maintenance of the patent.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

P. Martorana

E. Turrini