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DECISION
of 12 June 2003

Case Number: T 0937/00 - 3.4.2
Application Number: 92302512.6
Publication Number: 0507487
IPC: G03B 27/53, G03F 9/00
G03F 7/20
Language of the proceedings: EN

Title of invention:

Optical projection exposure method and system using the same

Patentee:

NIPPON TELEGRAPH AND TELEPHONE CORPORATION

Opponent:

Firma Carl Zeiss

Headword:

-

Relevant legal provisions:

EPC Art. 104
EPC R. 63

Keyword:

"Multiple independent claims filed in response to the notice
of opposition and subsequent amendments"
"Apportionment of costs (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 0937/00 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 12 June 2003

Appellant: NIPPON TELEGRAPH AND TELEPHONE CORPORATION
(Proprietor of the patent) 19-2 Nishi-Shinjuku 3-chome
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Tokyo 163-19 (JP)

Representative: Rees, Alexander Ellison
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London W1G 8ER (GB)

Respondent: Firma Carl Zeiss
(Opponent) Patentabteilung
D-73446 Oberkochen (DE)

Representative: -

Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 17 July 2000
revoking European patent No. 0507487 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: E. Turrini
Members: A. G. Klein
V. Di Cerbo

Summary of Facts and Submissions

- I. European patent 0 507 487 (application number 92 302 512.6), based on 14 Japanese priority applications, was granted with a set of 68 claims comprising only two independent claims, one for an optical projection exposure method (claim 1) and the other for an optical projection exposure apparatus (claim 28). The two independent claims covered a large number of specific embodiments set out in detail in the dependent claims.
- II. An opposition was filed against the patent, founded on the ground of lack of novelty in view in particular of the contents of document JP-A-61-91 662 (D5), which is an earlier Japanese patent application in the name of the proprietor of the patent in suit and was referred to in the introductory portion of the description of the original patent application, and - for the designated contracting states DE and GB - of an earlier European patent application EP-A-0 496 891 relevant under Article 54(3) and (4) EPC.

In response to the opposition the patentee dropped the granted set of claims with the only two generic independent claims and filed instead two separate sets of claims, one for the designated contracting states DE and GB and one for the remaining designated contracting states FR and NL, these sets respectively comprising eighteen and twenty-one independent claims directed to the various specific embodiments defined earlier in the dependent claims.

The opposition division objected to the number of independent claims under Article 84 EPC (lack of conciseness) but it did not pursue this objection (see point 2 of the Reasons of the decision dated 17 July 2000), concentrating instead on the allowability of the first independent claim of each set of claims, numbered claim 2 (the amended claims are not numbered consecutively).

In the course of the opposition procedure, the patentee filed four different versions of his main request each comprising a further amended independent claim 2, the last main request being supplemented with two auxiliary requests (see the letters dated 30 April 1998, 9 March 1999, 18 November 1999 and 22 February 2000 and the minutes of the oral proceedings of 23 March 2000).

Eventually the opposition division revoked the patent on the grounds that claim 2, the first independent claim of the first set in accordance with the patentee's main request did not meet the requirements of Article 123(2) EPC, that the subject matter of this claim as amended in accordance with the first auxiliary request lacked novelty in view of the patentee's own earlier Japanese patent application D5 and that the subject matter of this claim as amended in accordance with the second auxiliary request lacked an inventive step.

III. The appellant (proprietor of the patent) lodged an appeal against the revocation of the patent.

With its statement of the grounds of appeal he filed a further amended version of the two sets of claims for the different groups of designated contracting states. A further amended version of the main request was finally filed with the letter of 7 February 2003.

The set of claims for the designated contracting states FR and NL in accordance with the main request now comprises twenty-four independent claims and a number of dependent claims. Several claims of this set are missing from the set of claims for the designated contracting states DE and GB, which still comprises twenty-one independent claims and a number of dependent claims.

Independent claims 2, 5, 29, 58 and 69 of both sets in accordance with the appellant's main request read as follows:

"2. An optical projection exposure method of a micropattern, comprising the steps of inclining illumination light for illuminating a mask having the micropattern thereon by an angle having a sine equal to the numerical aperture observed from the centre of the optical axis of the mask plane of an optical projection lens located below said mask with respect to the optical axis, and causing the illumination light to be obliquely incident on said mask to expose the micropattern on an object located below said optical projection lens, wherein the illumination light is obtained by superposing a plurality of rays from a

multipoint light source consisting of a plurality of light sources which are spatially incoherent to each other, the light sources being assymmetrically (*sic*) arranged relative to the optical axis and none of the light sources being located on the optical axis.

5. An optical projection exposure method of a micropattern, comprising the steps of inclining illumination light for illuminating a mask having the micropattern thereon by an angle having a sine equal to the numerical aperture observed from the centre of the optical axis of the mask plane of an optical projection lens located below said mask with respect to the optical axis, and causing the illumination light to be obliquely incident on said mask to expose the micropattern on an object located below said optical projection lens, wherein the illumination light is obtained by superposing a plurality of rays from a multipoint light source consisting of a plurality of light sources which are spatially incoherent to each other, wherein the rays consisting the illuminating light are obliquely incident in axial symmetry with respect to the optical axis and none of the light sources are located on the optical axis.

29. An optical projection exposure apparatus of a micropattern comprising:
a light source;
a mask on which the micropattern is drawn;
an optical protection lens located below said mask; and
characterised by
means for obliquely illuminating the micropattern on said mask with illumination light inclined with respect to the optical axis at an angle having a sine equal to

the numerical aperture observed from the centre of the optical axis of the mask plane of said optical projection lens,
wherein the illumination light is obliquely incident on said mask to expose the micropattern on an object located below said optical projection lens, and the illumination light is obtained by means for superposing a plurality of rays from a plurality of light sources which are spatially incoherent to each other, the light sources being assymmetrically (*sic*) arranged relative to the optical axis and none of the light sources being located on the optical axis.

58. An optical projection exposure apparatus of a micropattern comprising:
a light source;
a mask on which the micropattern is drawn;
an optical projection lens located below said mask; and
characterised by
means for obliquely illuminating the micropattern on said mask with illumination light inclined with respect to the optical axis at an angle having a sine equal to the numerical aperture observed from the centre of the optical axis of the mask plane of said optical projection lens,
wherein the illumination light is obliquely incident on said mask to expose the micropattern on an object located below said optical projection lens, and said means for obliquely illuminating the micropattern on said mask comprises at least one diaphragm (132; 135) located at a position outside the optical axis, so that the illumination light is obliquely incident on said mask through said diaphragm.

69. An optical projection exposure method of a micropattern, comprising the steps of inclining illumination light for illuminating a mask having the micropattern thereon by an angle having a sine equal to the numerical aperture observed from the centre of the optical axis of the mask plane of an optical projection lens located below said mask with respect to the optical axis, and causing the illumination light to be obliquely incident on said mask to expose the micropattern on an object located below said optical projection lens, wherein when a radius of an entrance pupil is normalized with the numerical aperture of said optical projection lens and is defined as 1, rays focused at an aperture stop of a projection optical system on which the illumination light is obliquely incident constitute an annular light source having inner and outer radii, a zero-order light intensity adjustment filter having the same inner radius as that of the image of the rays focused at said aperture stop of said projection optical system and an outer radius of 1 is arranged at said aperture stop of said optical projection lens, and when the inner and outer radii of the annular light source are also normalized with the numerical aperture of said optical projection lens, the average of the inner and outer radii is in the range 0.63 to 0.8."

With letter of 12 May 2003 the appellant filed two further versions of the sets of claims as a basis of his first and second auxiliary requests.

The two sets of claims - i.e. one set for the designated contracting states FR and NL and one set for the designated contracting states DE and GB - of the first auxiliary request correspond to those of the main request after deletion of independent claim 69.

The sets of claims of the second auxiliary request correspond to those of the first auxiliary request after deletion of independent claim 58.

- IV. Oral proceedings were held on 12 June 2003 at which the appellant as a basis of a third auxiliary request filed a still further version of his claims, which differs from that of the second auxiliary request by the deletion of independent claims 2 and 29.

The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of either his main or his first to third auxiliary requests.

The respondent requested that the appeal be dismissed and that the costs for the oral proceedings be apportioned in his favour.

As announced in the communication annexed to the summons to the oral proceedings the discussion at these proceedings concentrated on the question of the admissibility of the amended claims.

The board announced its decision at the end of the oral proceedings.

V. The appellant in respect of the admissibility of the amended claims submitted that the subject matter of independent claims 2 and 29, in particular the feature of the asymmetrical arrangement of a plurality of light sources relatively to the optical axis, was adequately disclosed in the application documents as originally filed. Figures 55(d), 60(c) and (d), 61(a) to (c) and 62(a) to (c) indeed showed two such asymmetrically arranged light sources, a plurality of light sources was defined in dependent claim 2 as originally filed and the skilled person knew that any light source could always be replaced by an indefinite number of light sources.

Independent claims 5 and 58 not being limited to an asymmetrical arrangement of the light sources, they were admittedly broader in scope than amended independent claims 2 and 29, but these claims were necessary to insure an adequate protection for the appellant, after the limitation brought to independent claims 2 and 29 in response to the opposition division's objections.

The late filing of an additional independent claim 69 was justified because the appellant had not felt the desirability of such claim until he filed his statements of the grounds of appeal.

The apparent lack of structure in the sets of claims on file directly resulted from the history of the case, in particular from the necessity to properly overcome the grounds of opposition raised against the only two independent claims of the set of claims as granted, and it should be excused in the circumstances.

Concerning the respondent's request for apportionment of the costs for the oral proceedings, the appellant submitted that it was not clear whether any further oral proceedings would actually be necessary during the further prosecution of the opposition procedure, that the request could have been filed earlier and that it should not be allowed, accordingly.

VI. The respondent objected to the admissibility of amended independent claims 2, 29 and 69 under Article 123(2) EPC. An asymmetrical arrangement of the light sources in relation to the optical axis as set out in claims 2 and 29 was disclosed in certain figures in conjunction only with two light sources, not with "a plurality" of such sources. Moreover, the arrangement of the two sources shown in the figures was not simply asymmetrical since it comprised a symmetry plane, which is not defined in the claims. The numerical value "0.63" for the average of the inner and outer radii as set out in claim 69 was not disclosed in the application documents as originally filed either, and contrary to the appellant's submission it cannot be clearly derived from the sketchy graph representation of Figure 74.

The respondent also questioned the clarity of the claims as a whole. The structure of the claims concealed the fact that a number of independent claims like claims 5 and 58 did not comprise the limitations brought to independent claim 2, which made it extremely difficult for third parties to assess the true scope of the patent.

In respect of the third auxiliary request filed by the appellant at the end of the oral proceedings, in which all the claims contested earlier had been deleted, the respondent submitted that the remaining claims still comprised major deficiencies in respect of Articles 54, 56, 84 and 123 EPC and that further oral proceedings would certainly be necessary if the case was remitted to the first instance for further prosecution. The responsibility for this situation entirely lying with the appellant, it was only fair that the costs incurred by the respondent for the present oral proceedings be borne by the appellant.

Reasons for the Decision

1. The appeal complies with the provisions of Articles 106 to 108 and of Rules 1(1) and 64 EPC and it is therefore admissible.

2. Observations concerning the filing of multiple independent claims in response to an opposition, the admissibility of subsequent amendments and the conduct of the opposition procedure in such cases
 - 2.1 Decision G 1/91 (OJ EPO 1992, 253) of the Enlarged Board of Appeal establishes that unity of invention does not come under the requirements which a European Patent must meet. Accordingly the board sees no objection of principle to a patentee amending its claims in response to an opposition so that they comprise several independent claims directed to different objects originally covered by a single

generic claim of a given category, when such claim cannot be maintained.

- 2.2 However, the filing of multiple independent claims directed to different inventions may unduly complicate and delay the opposition procedure, in particular when this filing is followed by a series of further amendments. An efficient and possibly complete examination of the opposition may for instance become virtually impossible if subsequent amendments are proposed in a piecemeal way rather than addressing all the objections raised by the other party as soon as these objections arise, if they manifestly give rise to new issues, in particular when they introduce new claims which do not result from any combination of the claims in the granted version or if they introduce features for which there is no unambiguous support in the application documents as originally filed.

The opposition division, which in the interest both of the parties concerned and of the public has the duty to conduct proceedings in an efficient manner, should therefore in such cases be particularly careful not to admit any subsequent amendment which is not clearly appropriate and necessary having regard to the particular circumstances of a given case.

The board is well aware of the fact that strict application of the above principles might considerably reduce the appellant's flexibility in responding to the grounds of opposition invoked by the respondent. In the present case however, taking into consideration the exceptionally high number of independent claims introduced at the opposition stage and also the facts

that the granted patent is based on no less than fourteen priority applications and that the subject matter of the only two generic independent claims as granted lacked novelty in view of one of the appellant's own earlier patent application, such reduction of flexibility does not appear to be unduly unfair in the circumstances.

- 2.3 Concerning the conduct of the present opposition procedure, the board notes that the opposition division in its decision dealt only with the first of the twenty-one or eighteen independent claims filed by the patentee in response to the notice of opposition for the respective two groups of designated contracting states. The questions of the allowability of all the other claims and of the patentability of their subject matter thus remains entirely open.

If in the same way each of the other independent claims considered unallowable by the opposition division resulted in a decision dealing with this claim only, and possibly in a subsequent appeal procedure, complete examination of all the independent claims could take a totally unacceptable amount of time and resources from the instances of the EPO.

Therefore, in the particular circumstances where multiple independent claims directed to different inventions are filed in response to an opposition, the opposition procedure should be conducted with the aim of arriving at a decision dealing with as many of the claims and different inventions as is reasonably possible. Such decision could then be reviewed in a single appeal procedure, thus avoiding an unending

succession of appeals, remittals to the first instance and further prosecutions.

3. *Appellant's main request*

As compared to the claims of the narrowest request considered by the opposition division (then the second auxiliary request), the claims of the present main request have been amended as follows.

The first independent method claim, numbered claim 2, of each set of the main request corresponds to claim 2 of the second auxiliary request the subject matter of which was considered to lack an inventive step in the decision under appeal, the feature of the light source "consisting of an even number of 2 to 8 light sources" having been replaced by the indication that the light sources are asymmetrically arranged relative to the optical axis". The corresponding independent apparatus claim, numbered 29, was amended in a similar way. The other independent claims of this former second auxiliary request were maintained, former dependent claim 5 as appended to independent claim 2 was replaced by an independent claim of similar scope, with a feature specifying an axial symmetry of the light sources, and a still further independent claim 69 having no counterpart in the set of claims defended before the opposition division was added.

New independent claim 69 which defines an "average of the inner and outer radii ... in the range 0.63 to 0.8" having no counterpart in the set of claims as granted or defended before the opposition division, the patentability of its subject matter has never been

considered. Its support by the application documents is also highly questionable, since the newly defined range can at best be derived from a measurement made on the sketchy graph representation of Figure 74.

The filing at such a late stage of a new independent claim 69 thus gives rise to entirely new issues and in consideration in particular of the more than twenty other independent claims already present comes close to an abuse of the procedure. In any case such filing does certainly not meet the conditions applicable in the particular circumstances of the present case as set out in paragraph 2 above.

The appellant's main request is not admissible, accordingly.

4. *Appellant's first auxiliary request*

The claims of the appellant's first auxiliary request no longer comprise independent claim 69 as objected to above.

As compared to the corresponding claims considered to define non-inventive subject matter in the decision under appeal, independent claims 2 and 29 of the appellant's first auxiliary request were supplemented with the limitation that the light sources are arranged asymmetrically relative to the optical axis and the appellant in its statement of the grounds of appeal extensively discussed the contribution of this limitation to the patentability of the claimed subject matter.

The claims of the appellant's first auxiliary request however also comprise independent claims 5 and 58 which are broader in scope than and do not comprise the above allegedly essential limitation of independent claims 2 and 29. Independent claim 5 in particular explicitly requires a symmetrical arrangement of the light sources, the other features being in substances the same as those of independent claim 2.

The maintenance of independent claims 5 and 58 thus in effect counters any positive effect on the patentability of the claimed subject matter which might be expected from the limitation made to independent claim 2 and 29, and the filing of the amended set of claims as a whole cannot therefore be considered as a genuine effort to overcome the objections raised in the decision under appeal.

For that reason already the appellant's first auxiliary request is not admissible.

5. *Appellant's second auxiliary request*

The claims of the appellant's second auxiliary request no longer comprise independent claims 5 and 58 as objected to above.

As compared to the corresponding claims considered to define non-inventive subject matter in the decision under appeal, independent claims 2 and 29 of the appellant's second auxiliary request were supplemented with the limitation that a plurality of light sources are arranged asymmetrically relative to the optical axis.

The feature of an asymmetrical arrangement was not set out in any of the claims so far. It has not therefore been subjected to any search and its contribution to patentability has never been assessed by the opposition division either. If the so amended claims 2 and 29 were admitted into the procedure, the case would probably have to be remitted to the first instance to avoid the loss of an instance. The opposition procedure would then start again for consideration of claims still comprising a large number of independent claims - and still including independent claims 2 and 29 - and hardly any progress would have been achieved in the present appeal procedure.

This situation is all the more unsatisfactory as a large number of inventions remain to be considered, and it could have been avoided, had the appellant timely filed the amended version of independent claims 2 to 29 e.g. in the context of an auxiliary request filed before the opposition division.

Moreover it is highly questionable whether the additional feature of an asymmetrical arrangement of a plurality of light sources relative to the optical axis is adequately supported by the application documents as originally filed as required by Article 123(2) EPC. As was convincingly submitted by the respondent, an asymmetrical arrangement of the light sources within the meaning of claims 2 and 29 can at best be derived from certain figures, which however show only two light sources rather than a plurality. The asymmetrical arrangements relative to the optical axis shown in these figures also consistently comprise a symmetry

relative to a plane including the optical axis, which is omitted from the amended claims 2 and 29.

The amendments brought to independent claims 2 and 29 thus also give rise to entirely new issues and they do not therefore meet the conditions for their admissibility in the particular circumstances of the present case as set out in paragraph 2 above.

For these reasons the appellant's second auxiliary request is not admissible.

6. *Appellant's third auxiliary request*

The claims of appellant's third auxiliary request no longer comprise any of the claims objected to above, which have simply been deleted.

The amendments thus brought to the claims considered by the opposition division thus clearly overcome all the objections raised earlier, without raising any new issues. These amendments are therefore considered admissible in the light of the general principles set out in paragraph 2.2 above.

None of the remaining claims has been considered so far by the opposition division so that the board deems it appropriate to remit the case to the first instance for further prosecution on the basis of the appellant's third auxiliary request.

For the sake of clarity, the respondent having submitted that in its view the remaining claims still exhibited formal and substantial deficiencies which made them non-admissible, the board notes that these

issues have not been consider yet and that they will have to be decided by the opposition division, in consideration *inter alia* of the general principles set out in paragraph 2 above.

7. *Apportionment of costs*

Concerning the respondent's request for an award in his favour of the costs incurred for his participation to the oral proceedings, the board notes that all the requests presented by the appellant by writing in advance of the oral proceedings, namely his main, first auxiliary and second auxiliary requests were clearly inadmissible and their filing can hardly be considered as appropriate in the circumstances of the present case, in which the appellant chose to file an exceptionally high number of independent claims in response to the notice of opposition: he presented amended independent claims 2, 5, 29 and 69 at the appeal stage only, after having filed no less than six different versions of the claims during the opposition procedure, and independent claims 5 and 58 in effect countered the limitations brought to independent claims 2 and 29. Then, right at the end of the oral proceedings, he still filed a third auxiliary request by which all the claims which had been contested in the appeal procedure were simply abandoned, leaving the board with no other choice than either to remit the case to the first instance since none of the remaining claims had ever been considered by the opposition division, or to reject this auxiliary request as late-filed.

Had the board rejected the appellant's third auxiliary request, the appeal would have been dismissed and the revocation of the patent would have become final.

The board having eventually decided to admit the appellant's late-filed third auxiliary request and to remit the case to the first instance, it deems it appropriate for reasons of equity to order an apportionment of the costs of the oral proceedings such that the appellant shall bear fifty percent of the costs incurred by the respondent for attending the oral proceedings, i.e. of the travel expenses and of the remuneration for one day of his representative, Mr Müller-Rißmann.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance for further prosecution on the basis of the appellant's third auxiliary request.
3. The appellant shall bear fifty percent of the costs incurred by the respondent in the oral proceedings of 12 June 2003.

The Registrar:

The Chairman:

P. Martorana

E. Turrini