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D E C I S I O N
of 19 March 2002

Case Number: T 0337/00 - 3.2.5

Application Number: 91102760.5

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IPC: B41J 2/045

Language of the proceedings: EN

Title of invention:
Drop-on-demand ink-jet printing head

Patentee:
SEIKO EPSON CORPORATION

Opponent:
Océ-Nederland B.V.

Headword:
-

Relevant legal provisions:
EPC Art. 84, 123(2), 56

Keyword:
"Clarity (yes)"
"Addition of subject-matter (no)"
"Inventive step; main request, first auxiliary request (no);
second auxiliary request (yes)"

Decisions cited:
-

Catchword:
-



Case Number: T 0337/00 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 19 March 2002

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Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 2 February
2000 concerning maintenance of European patent
No. 0 443 628 in amended form.

Composition of the Board:

Chairman: W. Moser
Members: W. R. Zellhuber
H. M. Schram

Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal against the interlocutory decision of the Opposition Division maintaining the European patent No. 0 443 628 in amended form.
- II. In the decision under appeal, it was held that the grounds of opposition submitted by the appellant under Article 100(a) EPC (lack of novelty, Article 54 EPC, and lack of inventive step, Article 56 EPC) did not prejudice the maintenance of the patent as amended.
- III. Oral proceedings were held before the Board of Appeal on 19 March 2002.
- (i) The appellant requested that the decision under appeal be set aside and that the European patent No. 0 443 628 be revoked.
- (ii) The respondent (patentee) requested that the decision under appeal be set aside and that the patent be maintained on the basis of the following documents submitted during oral proceedings:
- (a) claims 1 to 18 as main request; or
- (b) claims 1 to 17 as first auxiliary request;
or
- (c) claims 1 to 12 as second auxiliary request;
or
- (d) claims 1 to 12 as third auxiliary request.

IV. Claim 1 of the main request reads as follows:

"1. A drop-on-demand ink-jet printing head, comprising:

a nozzle plate (8; 43; 266) having an array of a plurality of nozzle apertures (10, 10'; 41, 42; 262; 280); an array of plurality of piezoelectric elements (12, 12'; 45, 46; 258, 260) arranged at regular intervals and fixed at one end thereof to a base (2; 44; 240; 282), the other ends of said respective piezoelectric elements (12, 12'; 45, 46; 258, 260) being free ends which are in opposition to respective ones of said nozzle apertures (10, 10'; 41, 42; 262; 280), ink reservoir portions (6a, 6b) being formed between said nozzle apertures (10, 10'; 41, 42; 262; 280) and said free ends;

characterized in that

said piezoelectric elements (12, 12'; 45, 46; 258; 260) are formed by cutting into divided pieces, at predetermined width, a piezoelectric plate (25; 274) obtained by a lamination of at least two layers of piezoelectric material and at least two layers of conductive material stacked alternately in layers (21, 23, 22; 68, 69), and

a vibration plate (4) is driven by said piezoelectric element array (12, 12'; 45, 46; 258, 260) and interposed between said nozzle plate (8; 43; 266) and said piezoelectric element array,

whereby the ink droplets are ejected in the same direction as the main vibration direction of said

vibration plate (4)."

V. Claim 1 of the first auxiliary request reads as follows:

"1. A drop-on-demand ink-jet printing head, comprising:

an array of a plurality of nozzle apertures (10, 10'; 41, 42; 262; 280); an array of plurality of piezoelectric elements (12, 12'; 45, 46; 258, 260) arranged at regular intervals and fixed at one end thereof to a base (2; 44; 240; 282), the other ends of said respective piezoelectric elements (12, 12'; 45, 46; 258, 260) being free ends which are in opposition to respective ones of said nozzle apertures (10, 10'; 41, 42; 262; 280), ink reservoir portions (6a, 6b) being formed between said nozzle apertures (10, 10'; 41, 42; 262; 280) and said free ends;

a vibration plate (4) driven by said piezoelectric element array (12, 12'; 45, 46; 258, 260),

characterized by

a nozzle plate (8; 43; 266) having said array of said plurality of said nozzle apertures (10, 10'; 41, 42; 262; 280)

said vibration plate (4) being interposed between said nozzle plate (8; 43; 266) and said piezoelectric element array, and

said piezoelectric elements (12, 12'; 45, 46; 258; 260) being formed by cutting into divided pieces, at

predetermined width, a piezoelectric plate (25; 274) obtained by a lamination of at least two layers of piezoelectric material and at least two layers of conductive material stacked alternately in layers (21, 23, 22; 68, 69),

whereby the ink droplets are ejected in the same direction as the main vibration direction of said vibration plate (4),

and in which said piezoelectric plate is obtained by firing or burning said lamination of piezoelectric material and conductive material stacked alternately in layers (21, 23, 22; 68, 69)."

VI. The independent claims 1 and 5 of the second auxiliary request read as follows:

"1. A drop-on-demand ink-jet printing head, comprising:

an array of a plurality of nozzle apertures (10, 10'; 41, 42; 262; 280); an array of plurality of piezoelectric elements (12, 12'; 45, 46; 258, 260) arranged at regular intervals and fixed at one end thereof to a base (2; 44; 240; 282), the other ends of said respective piezoelectric elements (12, 12'; 45, 46; 258, 260) being free ends which are in opposition to respective ones of said nozzle apertures (10, 10'; 41, 42; 262; 280), ink reservoir portions (6a, 6b) being formed between said nozzle apertures (10, 10'; 41, 42; 262; 280) and said free ends;

a vibration plate (4) driven by said piezoelectric element array (12, 12'; 45, 46; 258, 260),

characterized by

a nozzle plate (8; 43; 266) having said array of said plurality of said nozzle apertures (10, 10'; 41, 42; 262; 280)

said vibration plate (4) being interposed between said nozzle plate (8; 43; 266) and said piezoelectric element array, and

said piezoelectric elements (12, 12'; 45, 46; 258; 260) being formed by cutting into divided pieces, at predetermined width, a piezoelectric plate (25; 274) obtained by a lamination of at least two layers of piezoelectric material and at least two layers of conductive material stacked alternately in layers (21, 23, 22; 68, 69),

whereby the ink droplets are ejected in the same direction as the main vibration direction of said vibration plate (4),

and in which said vibration plate (4) plate has concave portions (4a) in the vicinity of portions where the vibration plate (4) contacts the piezoelectric elements (12)."

(Remark of the Board: the last mentioned feature, correctly, should read "...said vibration plate (4) has ...")

"5. Method for forming vibrators in a drop-on-demand ink-jet printing head comprising the steps of:

forming a nozzle plate (8; 43; 266) having an array of

a plurality of nozzle apertures (10, 10'; 41, 42; 262; 280);

forming an array of plurality of piezoelectric elements (12, 12'; 45, 46; 258, 260) arranged at regular intervals and fixed at one end thereof to a base (2; 44; 240; 282) from a lamination of at least two layers of piezoelectric material and at least two layers of conductive material stacked alternately in layers (21, 23, 22; 68, 69), according to the following process:

- (a) applying a thin coating of a piezoelectric material in paste-like form on a surface plate to thereby form a first piezoelectric material layer;
- (b) forming a first conductive layer on the surface of the first piezoelectric material layer while a part of the first piezoelectric material layer is left as an exposed portion;
- (c) applying a thin coating of a piezoelectric material on the respective surfaces of the first conductive layer and the exposed portion of the first piezoelectric material layer to thereby form a second piezoelectric material layer,
- (d) forming a second conductive layer on the other surface of the second piezoelectric material layer opposite the surface on which the conductive layer has been formed;
- (e) drying the lamination;
- (f) firing or burning the lamination thereby obtaining

a plate-like member;

- (g) coating the plate-like member where conductive layers are exposed with a conductive paint to thereby form collecting electrodes to thereby form a piezoelectric plate;
- (h) fixing the piezoelectric plate onto a base preferably through a conductive bonding agent; and
- (i) cutting the piezoelectric plate in the vicinity of the surface of the base, to thereby divide it in predetermined widths into a plurality of vibrators;

arranging said piezoelectric elements (12, 12'; 45, 46; 258, 260) such that their free ends are located in opposition to respective ones of said nozzle apertures (10, 10'; 41, 42; 262; 280), and ink reservoir portions (6a, 6b) are formed between said nozzle apertures (10, 10'; 41, 42; 262; 280) and said free ends;

forming a vibration plate (4) which is driven by said piezoelectric element array (12, 12'; 45, 46; 258, 260) and arranging it interposed between said nozzle plate (8; 43; 266) and said piezoelectric element array, such that the ink droplets are ejected in the same direction as the main vibration direction of said vibration plate (4), and in which said vibration plate (4) plate has concave portions (4a) in the vicinity of portions where the vibration plate (4) contacts the piezoelectric elements (12)."

(Remark of the Board: the last mentioned feature,

correctly, should read "... said vibration plate (4) has ...").

VII. In the course of the appeal procedure, the following documents have, *inter alia*, been referred to:

D1: US-A 4 072 959;

D2: JP-A 60-90770 with English translation;

D3: PAJ Patent Abstracts of Japan; Section E, No. 588;
Volume 12, No. 72, page 49 & JP-A 62-213399;

D4: PAJ Patent Abstracts of Japan; Section E, No. 347;
Volume 9, No. 248, page 130 & JP-A 60-98691;

D5: PAJ Patent Abstracts of Japan; Section E, No. 136;
Volume 3, No. 107, page 78 & JP-A 54-84992;

D7: US-A 4 459 601.

VIII. In the written procedure and during oral proceedings, the appellant argued essentially as follows:

Claim 1 of the main request was directed to a drop-on-demand ink-jet printing head comprising a vibration plate wherein the free ends of the piezoelectric elements of the printing head were in opposition to respective ones of the nozzle apertures.

Printing heads, which comprise a vibration plate, were disclosed only with respect to the embodiments shown in Figures 1, 2 and 5 of the patent in suit. However, the free ends of the piezoelectric elements of these printing heads were not located in opposition to

respective ones of the nozzle apertures. The subject-matter of claim 1 of the main request was thus not in accordance with the description of the patent in suit and, thus, lacked clarity (Article 84 EPC).

As regards the question of inventive step, document D2 represented the closest prior art. The subject-matter of claim 1 of the main request differed from the closest prior art only in that the ink droplets were ejected in the same direction as the main vibration direction of the vibration plate. However, the selection of the direction of ejection of the ink droplets was a matter of choice. Ink-jet printing heads, in which the ink droplets were ejected parallel to the main vibration direction of the vibration plate, represented a generally known type of printing head (cf. documents D1 (Figure 4) and D7).

The subject-matter of claim 1 of the main request, therefore, did not involve an inventive step.

The same applied to claim 1 of the first auxiliary request. The formation of a piezoelectric plate by firing or burning a lamination comprising layers of piezoelectric and conductive material was a known technique in the field of making piezoelectric elements, as shown in documents D3, D4 and D5.

Document D5 further suggested processing the piezoelectric substances for a final shape after calcining. If a printing head comprising a plurality of piezoelectric elements were to be manufactured, it would be very unlikely that a person skilled in the art would consider, firstly, cutting a piezoelectric laminate into a plurality of single piezoelectric

elements, then firing or burning the elements, and, finally, assembling all the single elements into a printing head.

The appellant did not submit any comments on the subject-matter of the claims according to the second auxiliary request.

IX. In the written procedure and during oral proceedings, the respondent argued essentially as follows:

The term "in opposition to" of claim 1 of the main request had to be construed as meaning that the nozzle apertures were on the side of the nozzle plate opposite to the side where the free ends of the piezoelectric elements were, which was in line with the embodiment shown in Figure 2 of the patent in suit. The term "in opposition" did not require that the nozzle aperture had to be arranged exactly on a central axis of extension of the corresponding piezoelectric element. The subject-matter of claim 1 of the main request thus met the requirements of Article 84 EPC.

The subject-matter of claim 1 of the main request also involved an inventive step.

Document D2, which represented the closest prior art, disclosed neither a nozzle plate, nor a vibration plate placed between a nozzle plate and piezoelectric elements, nor the ejection of droplets in the direction of the main vibration direction of the vibration plate. Furthermore, the embodiment shown in Figure 2 of document D2 did not concern a printing head comprising a lamination of layers of piezoelectric material and conductive material. Figures 2 and 3 of document D2

showed two different embodiments of a printing head.

The problem was to provide a printing head wherein the force of ink drop jetting was high without the necessity of applying high voltages. Document D2 gave a hint by suggesting a layered structure. However, such a structure had been disclosed only in relation with the embodiment shown in Figure 3, which represented a single piezoelectric element. Document D2 was silent about forming a plurality of piezoelectric elements by cutting into divided pieces a piezoelectric plate obtained by a lamination of layers of piezoelectric material and conductive material.

Document D7 suggested a printing head comprising a nozzle plate. However, the structure of that printing head was very complicated and involved special considerations with respect to the Helmholtz frequency. The piezoelectric elements were coupled to the ink chamber via a small area thus acting as a point source of energy. That incompatibility between the printing heads of documents D2 and D7 did not allow combining the teachings of these documents.

The subject-matter of claim 1 of the main request thus involved an inventive step.

The same applied to the subject-matter of claim 1 of the first auxiliary request. Document D2 was silent about the process of making the piezoelectric elements and, in particular, of cutting a multilayer piezoelectric plate obtained by firing or burning a lamination of layers of piezoelectric and conductive material stacked alternately.

Document D5 did not concern an ink-jet printing head. Moreover, contrary to the teaching of claim 1 of the first auxiliary request, document D5 suggested cutting a piezoelectric substrate obtained by lamination of layers of piezoelectric and conductive material into a prescribed size and, after that, firing or burning the thus formed pieces. Since the amount of shrinkage during that process was not always predictable and reproducible, firing before cutting gave rise to an increased precision.

The subject-matter of independent claims 1 and 5 of the second auxiliary request involved an inventive step, since none of the cited documents disclosed a printing head comprising concave portions in the vicinity of portions where the vibration plate contacted the piezoelectric elements.

Reasons for the Decision

Main request

1. *Formal requirements*

- 1.1 Claim 1 is directed to a printing head comprising an array of piezoelectric elements and a nozzle plate having an array of a plurality of nozzle apertures, wherein the free ends of the piezoelectric elements are in opposition to respective ones of the nozzle apertures.

No support can be found in the patent in suit for the allegation that the term "... in opposition to ..." has to be construed as meaning that the nozzle apertures

are placed exactly on a line defined by the central axis of piezoelectric elements. A person skilled in the art would read and understand the term "in opposition of" in the context of the whole disclosure of the patent in suit. He or she would consider that, in a printing head comprising a vibration plate and a nozzle plate with ink reservoirs and ink channels formed therein, the nozzle apertures do not need to be placed exactly on a line defined by the central axis of the respective piezoelectric element, as shown in Figures 1, 2 and 5 of the patent in suit. On the contrary, in such type of printing head, "... it is possible to shorten the distance between the two arrays of nozzle apertures 10 and 10' independently of the distance between the two arrays of piezoelectric elements 12 and 12'", cf. column 7, lines 3 to 6 of the patent in suit. Therefore, he or she would consider that, in the present context, the term "in opposition to" used in claim 1 has to be construed as meaning that the nozzle apertures are on the opposite side of the nozzle plate.

Moreover, that term had already been used in claim 1 of the patent in suit as granted which was directed to a printing head including the embodiments of printing heads shown in Figures 1, 2 and 5 of the patent in suit.

The subject-matter of claim 1 is therefore supported by the description of the patent in suit, in particular, by the portion of the description relating to the embodiments shown in Figures 1, 2 and 5 of the patent in suit. Thus, claim 1 meets the requirements of Article 84 EPC.

1.2 The subject-matter of claim 1, in particular, a drop-on-demand printing head comprising a vibration plate and wherein the ink droplets are ejected in the same direction as the main vibration direction of the vibration plate is disclosed in column 4, line 40 to column 7, line 48 and Figures 1 to 5 of the application as filed (published version).

Since these above-mentioned features have been added, the scope of protection conferred by independent claim 1 is more limited than that of independent claims 1 of the patent in suit as granted.

Claim 1 thus meets the requirements of Article 123(2) and (3) EPC.

2. *Inventive step*

2.1 Document D2, which is considered to represent the closest prior art, concerns a drop-on-demand ink-jet printing head, cf. English translation, page 1, third paragraph under the headline "Field of technology".

The printing head, cf., in particular, pages 3 and 4 of the English translation and Figures 1 and 2 of document D2, comprises a nozzle plate 1 having an array of a plurality of nozzle apertures 11 and an array of a plurality of piezoelectric elements 6 arranged at regular intervals. One end of each of these piezoelectric elements 6 is fixed to a base 9, and the other end of each of them is in contact with a vibration plate. Nozzle apertures 11, ink channels and ink reservoir portions 2 are formed and associated to respective ones of the piezoelectric elements.

The vibration plate 3 is driven by the piezoelectric element array 6 and interposed between the nozzle plate 1 and the piezoelectric element array, whereby the ink droplets are ejected in a direction perpendicular to the main vibration direction of the vibration plate, cf. Figures 1 and 2 of the drawings of document D2.

The piezoelectric elements 6 are formed by cutting into divided pieces, at predetermined width, a piezoelectric plate, cf. page 5, lines 19 to 22 of the English translation of document D2.

According to the embodiment shown in Figure 3 and described on page 5, lines 23 to 34 of the English translation of document D2, a piezoelectric element 20 is obtained by a lamination of a plurality of layers of piezoelectric material and a plurality of layers of conductive material (electrodes) stacked alternately in layers. Such a construction requires lower driving voltages which is mentioned as being particularly advantageous when driving a large number of nozzles.

2.2 The subject-matter of claim 1 differs from the printing head disclosed in document D2, Figures 1 and 2 in that

- the piezoelectric elements are formed by cutting into divided pieces a piezoelectric plate obtained by a lamination of at least two layers of piezoelectric material and at least two layers of conductive material, and in that

- the ink droplets are ejected in the same direction as the main vibration direction of the vibration plate.

2.3 The problem underlying the patent in suit is to provide a printing head wherein it is not necessary to apply a high voltage to the piezoelectric elements in order to obtain a sufficient jetting force for printing, cf. column 1, lines 35 to 43.

2.4 In order to avoid the necessity of applying high voltages, document D2, cf. Figure 3 and page 5, lines 23 to 34 of the English translation, suggests the use of a piezoelectric plate obtained by a lamination of at least two layers of piezoelectric material and of two layers of conductive material.

Since the advantages of piezoelectric elements obtained by a lamination are particularly seen in relation with printing heads comprising a large number of nozzles (cf. page 5, lines 31 to 34 of the English translation of document D2), it was obvious to make the printing head shown in Figures 1 and 2 of document D2, which may comprise up to 2000 nozzles (cf. page 4, lines 20 to 22 of the English translation of document D2), by cutting a piezoelectric plate obtained by a lamination comprising layers of piezoelectric and conductive material.

Furthermore, printing heads, wherein the nozzles are arranged on the side of the nozzle plate opposite to the side where the piezoelectric elements are, had been known at the priority date of the patent in suit, cf. document D1, Figure 4 and document D7, Figure 8. A person skilled in the art selects the arrangement of the nozzles, ink reservoirs and the ink channels in the nozzle plate of a printing head, and, thus, the ejection direction of the ink droplets, in accordance with the prevailing conditions and the type of the

printing head to be manufactured.

Therefore, the subject-matter of claim 1 does not involve an inventive step within the meaning of Article 56 EPC, and, consequently, the main request of the respondent is not allowable.

First auxiliary request

3. According to the first auxiliary request of the respondent, the following feature is added to claim 1 of the main request: "... and in which said piezoelectric plate is obtained by firing or burning said lamination of piezoelectric material and conductive material stacked alternately in layers (21, 23, 22; 68, 69)"

This feature represents a generally known process step which is above all carried out when it comes to manufacture piezoelectric plates obtained by a lamination of piezoelectric material and conductive material, cf. document D3, last sentence of the abstract, document D4 last sentence of the abstract, and document D5, penultimate sentence of the abstract.

Admittedly, document D5 suggests cutting a lamination of layers of piezoelectric material and conductive material before burning. However, this process is not disclosed in document D5 with regard to the preparation of a printing head comprising a large number of relatively small piezoelectric elements.

In the Board's view, the process of preparing an array of a plurality of piezoelectric elements for a printing head belongs to the final shaping of a piezoelectric

laminate, which, in document D5, is disclosed as a process to be carried out after calcining, cf. abstract, penultimate sentence. For practical reasons, it is very unlikely that a person skilled in the art would even consider preparing and burning each element separately, and, after that, assembling the individual elements in order to produce the printing head, in particular, when printing heads comprising a large number of nozzles and piezoelectric elements are to be produced. Moreover, document D2 already suggests forming an array of piezoelectric elements by cutting a piezoelectric plate.

Therefore, the subject-matter of claim 1 does not involve an inventive step and, consequently, the first auxiliary request of the respondent is not allowable.

Second auxiliary request

4.1 The subject-matter of claims 1 to 12 is clear and supported by the description. In particular, the term "in opposition of" used in claim 1 is supported by the description, as pointed out under point 1.1 above. Furthermore, from the amended pages 3, 5, 7 and 8 of the description it now follows that the embodiments illustrated in Figures 6 to 32 merely concern embodiments of printing heads of a comparative type. The patent in suit as amended thus meets the requirements of Article 84 EPC.

A drop-on-demand printing head comprising the features of claims 1 to 4 is disclosed in column 4, line 40 to column 7, line 48 and Figures 1 to 5 of the application as filed (published version). In particular, the feature of concave portions being formed in the

vibration plate is disclosed in column 4, lines 50 to 55 of the application as filed (published version).

The features of the dependent claims 2 to 4 are disclosed in combination with a printing head comprising a vibration plate. As regards the additional feature of claim 2 ("... firing or burning ..."), reference is made to column 5, lines 44 to 50 of the application as filed (published version). The additional feature of claim 3 ("... recess portions (6a, 6b) in a spacer ...") is shown in Figures 1 and 2 of the application as filed (published version). The additional feature of claim 4 ("... laminated in parallel to said vibration plate") is disclosed in Figures 3a to 3f and column 5, line 24 to column 6, line 6 of the application as filed (published version), wherein the term "in parallel" is to be construed as indicating the direction of lamination of the layers, which is perpendicular to the plane defined by the respective layers of piezoelectric and conductive material.

A method for forming vibrators in a drop-on-demand ink-jet printing head as claimed in claims 5 to 12 is disclosed in column 4, line 40 to column 7, line 48 and Figures 1 to 5 of the application as filed (published version). In particular, the process steps (a) to (i) of claim 5 and the features of dependent claims 6 to 12 are disclosed in column 5, line 24 to column 6, line 6 of the application as filed (published version).

Moreover, since technically limiting features have been added, the scope of protection conferred by independent claims 1 and 5 is more limited than that of the respective independent claims 1 and 23 of the patent in

suit as granted.

Therefore, the patent in suit as amended in accordance with the second auxiliary request meets the requirements of Articles 123(2) and 123(3) EPC.

- 4.2 The subject-matter of independent claims 1 and 5 is novel, since the cited prior art documents discloses neither a printing head nor a method comprising all the features of claims 1 and 5, respectively.

Novelty of the subject-matter of independent claims 1 and 5, in fact, was not in dispute.

- 4.3 Furthermore, a printing head comprising a vibration plate which has concave portions in the vicinity of portions where the vibration plate contacts the piezoelectric elements is neither known nor suggested in the cited prior art. Due to these concave portions, the vibration plate responds easily to the vibration of the piezoelectric elements, thus improving the ejection of the ink droplets, cf. column 5, lines 5 to 9 of the patent in suit.

Consequently, the subject-matter of independent claim 1 involves an inventive step.

The same applies to claim 5, which concerns a method for forming vibrators in a drop-on-demand ink-jet printing head comprising, *inter alia*, the step of forming a vibration plate having concave portions in the vicinity of portions where the vibration plate contacts the piezoelectric elements.

The subject-matter of claims 2 to 4 and 6 to 12 which

are appendant to the claims 1 and 5, respectively, similarly involves an inventive step.

- 4.4 Therefore, the request of the respondent that the patent be maintained in amended form on the basis of the documents filed as second auxiliary request is allowable.

It is, accordingly, not necessary to consider the third auxiliary request of the respondent.

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 with the order to maintain the patent on the basis of the following documents submitted during oral proceedings:
 - (a) claims 1 to 12 according to the second auxiliary request;
 - (b) description, pages 2 to 9, and insert A; and
 - (c) drawings as granted.

The Registrar:

The Chairman:

A. Townsend

W. Moser