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D E C I S I O N
of 28 July 1998

Case Number: T 0547/94 - 3.3.3

Application Number: 89850405.5

Publication Number: 0371939

IPC: C08K 7/08

Language of the proceedings: EN

Title of invention:
An artificial key material

Patentee:
Yamaha Corporation

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54(2), 56, 123(2)

Keyword:
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0547/94 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 28 July 1998

Appellant: Yamaha Corporation
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 14 February 1994 refusing European patent application No. 89 850 405.5 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: C. Gérardin
Members: R. Young
J. A. Stephens-Ofner

Summary of Facts and Submissions

I. European patent application No. 89 850 405.5, for "An artificial key material", with nine claims, filed on 17 November 1989, claiming a Japanese priority of 29 November 1988 (JP 301896/88) and published under No. 0 371 939 was refused by a decision of the Examining Division dated 14 February 1994.

II. The decision was based on a set of Claims 1 to 9 filed on 7 September 1993, with a letter dated 2 September 1993, Claim 1 of which read as follows:

"An artificial key material in which ceramic whiskers are dispersed in and throughout a matrix resin, characterized in

- that substantially all of said whiskers are arranged in clusters, and

- that each of said clusters includes a plurality of sub-micron size interspaces left between said ceramic whiskers."

Claims 2 to 9 were directed to elaborations of the key material according to Claim 1.

According to the decision, the subject-matter of Claim 1 could not be regarded as novel over the prior art teaching of

D2: FR-A-2 210 641,

which referred to a composition consisting of polyester and 1 to 10 wt% of potassium titanate whiskers, since in both cases the whiskers would inevitably form clusters. This was confirmed in D4: Additives for Plastics, volume 1, 1978, Academic Press, pages 79 to 122, which stated that with ordinary mixing techniques the fibres nearly always remained in the clustered state (page 96).

Furthermore, it could be concluded, in relation to

D3: EP-A-0 291 056,

which referred to an artificial key material consisting of polybutylene terephthalate (PBT) and monocrystalline fibres of potassium titanate, that the fibres formed clusters here also, for similar reasons, so that the subject-matter of Claim 1 was anticipated by this teaching also. Even if, for the sake of argument, a distinction could be seen in the feature of "sub-micron size interspaces", there would still remain a strong objection under Article 56 EPC, since the comparative tests filed with the submission dated 2 September 1993 did not demonstrate any relevant advantages for the application.

III. On 11 April 1994, a Notice of Appeal was filed against the above decision, together with payment of the prescribed fee.

In the Statement of Grounds of Appeal, filed on 15 June 1994, the Appellant argued that, whilst the art of

clustering was generally known in the field of polymer chemistry, the idea of controlled clustering was contrary to the broadly recognised concept in the conventional production of composite synthetic products. Furthermore, prior to the proposal of the application in suit, nobody had made any suggestion of the idea of clustering whiskers in order to obtain improvements in the physical properties of an artificial key material. In the latter connection, it was very important that clusters of whiskers were oriented in the longitudinal direction of the product, since this brought about a texture of a key, which was dependent on friction, quite similar to that of an ivory key. The directionally controlled orientation of clusters was not to be found in any of the prior art cited.

Following the issue, on 3 April 1998, together with a summons to oral proceedings, of a communication by the Board, in which various further objections were raised to the claims, the Appellant filed, on 27 July 1998, i.e. one day before the date set for oral proceedings, an amended single claim forming a sole request.

At the oral proceedings, held on 28 July 1998, the Appellant replaced this version by an amended single claim, forming his main request. The claim reads as follows:

"Use, in a keyboard musical instrument, of an artificial key material, in which

- ceramic whiskers are dispersed in a matrix resin,

- the whiskers are arranged in the form of clusters of filaments,

- the material is in the form of a shaped piece having a surface to which polishing has been applied to remove the surface skin

- the clusters of whiskers appear on the polished surface of the shaped piece, and

- submicron size interspaces are left between whiskers in the clusters."

IV. The Appellant requested that the decision under appeal be set aside and a patent granted on the basis of the single claim filed as the main request during the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

2. *Admissibility of amendments*

The claim is supported by the text of Claim 1 as originally filed, which read "An artificial key material comprising matrix resin, and ceramic whiskers dispersed in said matrix resin in the form of clusters of filaments", in conjunction with the opening paragraph on page 1 of the description as filed

(page 2, lines 3 to 5 of the printed application), and page 4, lines 14 to 16 and 21 to 25 of the originally filed application (page 3, lines 8, 9 and 12 to 14 of the printed specification). The former passage of description refers to "an artificial key material, and more particularly ... a synthetic key material used for key board musical instruments...", and thus provides a basis for the "use" claim. The latter passages refer to the necessary polishing step and that "submicron size interspaces are left between whiskers...", respectively. They thus provide a basis for the process step by which the material is obtained.

Hence, the amended claim meets the requirements of Article 123(2) EPC.

3. *The application in suit; the technical problem*

The application in suit is concerned with a problem arising from the replacement, following the international trend for protection of natural animals, of natural key materials, such as ivory, in keyboard instruments, by artificial key materials (description as filed page 1, second paragraph; printed specification, page 2, lines 6 to 11). In this context, the sole use of thermoplastic resins tends to cause undesirable slippage of players' fingers on keys during performance due to the relatively low sweat absorption of the thermoplastic resins (description as filed, page 1, penultimate line to page 2, line 2; printed specification, page 2, lines 13 to 16). The object of the application in suit is therefore to provide an artificial key material which is highly hygroscopic for rich absorption of human sweat and still provided with a texture quite close to that of natural key materials (description as filed, page 2, lines 4 to 8; printed specification, page 2, lines 21 to 23).

Of the two documents relied upon in the decision under appeal, however, only one, D3 concerns an artificial key material. It must therefore be considered to represent the closest state of the art.

3.1 According to D3, there is disclosed a switch member having a "key touch feel", which is formed by injection moulding a superhigh molecular weight polyethylene resin, which may contain 1 to 40 wt% of a potassium titanate fibre (Claims 1, 2). The switch comprises a keytop which transfers a press down force downward, a

stem integrated with and/or connected to the keytop, an electrical contact and a housing which guides and contains the stem (Claim 3). To fully manifest the "key touch feel" of the switch, the static and dynamic friction coefficients between the stem of the key and the housing should both be small, so that there is no stickiness, and the abrasion wear between the stem and the housing small (page 2, lines 12 to 17). According to an illustrative example, a keyboard switch having a composition of 70 wt% superhigh molecular weight polyethylene and 30 wt% potassium titanate fibre incorporated as the stem, and a composition of 80 wt% PBT and 15 wt% potassium titanate fibre incorporated as the housing, was subjected to a "key touch test" at a speed of 5 Hz for 20 million times, with the first scratches being evident only after ten million times (Example 8; Table 4, in conjunction with Table 1, compositions C, D).

3.1.1 Thus, the provision of a "key touch feel" in D3 is equated with the lowest possible friction between internal moving parts within the key. There is no mention of musical instruments, nor of providing a texture close to that of natural key materials, let alone of absorbing human sweat. Thus, the disclosure of D3 has nothing to do with the problem addressed by the application in suit. On the contrary, it has, if anything, the opposite tendency, since the latter seeks, in contrast, to increase the friction properties of the surface of the key material, so as to prevent slippage of players' fingers on the keys.

3.1.2 In summary, the relevant technical problem addressed by

the application in suit is not recognisable by the skilled person, starting from D3.

3.1.3 Furthermore, whilst D3 admittedly discloses a resin reinforced with ceramic whiskers, there is no mention of the formation of clusters, let alone of clusters with submicron size interspaces left between the whiskers of a cluster. Even taking into account the disclosure of D4, according to which "With ordinary mixing techniques, the fibers nearly always remain in the clustered state and produce poor composites." (page 96), relied upon for the finding of lack of novelty (cf. decision under appeal; Reasons for the decision, point 2.1), there is no mention of the surface being polished to expose such clusters. On the contrary, the purpose of D3 is to avoid increasing the coefficients of friction (section 3.1.1, above). The provision of such clusters appearing at the surface, according to the Claim of the application in suit is, however, the means for giving the requisite key surface texture and sweat absorption properties.

3.1.4 Consequently, the features of the solution defined in the claim of the application in suit are not disclosed. In other words, the subject-matter of the Claim is novel in the light of D3.

3.2 The remaining document referred to in the decision under appeal, as disclosing a resin reinforced with ceramic whiskers, D2, is more remote, since it makes no reference to a key material of any kind, let alone for musical instruments. On the contrary, it is primarily concerned with improving internal characteristics of a

polyester, such as its strength, bending modulus and heat distortion temperature without loss of toughness (page 1, lines 1 to 7). It in any case does not make available clusters of whiskers appearing at the surface of the product (cf. section 3.2, above). Consequently, the subject-matter of the Claim is novel in the light of D2.

3.3 Hence, the subject-matter claimed in the application in suit is novel.

4. *Inventive step*

It follows from the finding, that the neither the problem nor the solution presented in the closest state of the art D3 is closely oriented to the claimed subject-matter (sections 3.1.2, 3.1.4, above), that such a teaching, taken on its own, can neither point in the relevant direction (problem) nor, *a fortiori*, provide an obvious route to the relevant modification necessary to obtain the features forming the solution claimed (T 0410/93 of 16 July 1996, not published in OJ EPO; Reasons for the decision, point 3.6.8).

4.1 Furthermore, even if the problem addressed by the application in suit were "taken as read", and the disclosure of D3 considered in connection with it, there is no hint to the relevant solution, since the disclosure of D3 is not concerned with that problem. Nor, for the reasons given, does D3 disclose, or otherwise suggest the relevant elements of the solution (section 3.1.4, above). On the contrary, the low friction solution provided by D3 is the diametric

opposite of that proposed according to the application in suit.

4.2 Consequently, the claimed subject-matter does not arise in an obvious way, starting from D3.

4.3 The disclosure of the remaining document D2 is, moreover, more remote than that of D3 (section 3.2, above). It cannot, therefore, assist the skilled person to the solution claimed.

4.4 Consequently, the claimed subject-matter does not arise in an obvious manner from the cited state of the art. The claim therefore involves an inventive step in the sense of Article 56 EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division with the order to grant a patent on the basis of the main request filed during oral proceedings and after any consequential amendment of the description.

The Registrar: The Chairman:

E. Görgmaier C. Gérardin