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D E C I S I O N
of 17 July 1997

Case Number: T 0392/95 - 3.3.1

Application Number: 91200407.4

Publication Number: 0444752

IPC: C07C 19/08

Language of the proceedings: EN

Title of invention:

Agents affording sliding characteristics

Applicant:

ENICHEM SYNTHESIS S.p.A.

Opponent:

Headword:

Sliding agents/ENICHEM

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step - yes"

"Remote field - different context"

Decisions cited:

T 0039/82

Catchword:

-



Case Number: T 0392/95 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 17 July 1997

Appellant: ENICHEM SYNTHESIS S.p.A.
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Representative: Fusina, Gerolamo
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Decision under appeal: Decision of the Examining Division of the
European Patent Office dated 22 November 1994
refusing European patent application
No. 91 200 407 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: A. J. Nuss
Members: P. P. Bracke
S. C. Perryman

Summary of Facts and Submissions

I. The appeal lies from the Examining Division's decision, dispatched on 22 November 1994, refusing European patent application No. 91 200 407.4, published as EP-A-0 444 752, due to lack of inventive step over the teachings of

- (1) EP-A-0 132 879 and
- (2) DE-A-3 816 467.

II. This decision was based on a set of 15 claims filed with letter of 6 June 1994, with the independent claims reading:

"1. Use, as an agent affording sliding characteristics (i.e. as a ski-wax) for skis, of a compound or mixture of compounds with formula (I):



wherein:

- n is a numeral comprised within the range of from 3 to 15;
- m is a numeral comprised within the range of from 5 to 23;
- n+m is a numeral equal to, or higher than 18;
- with the chain of carbon atoms being either linear or substantially linear."

"7. Composition affording sliding characteristics, which comprises:

- a paraffinic wax, and
- a compound or mixture of compounds with formula (I):



wherein:

- n is a numeral comprised within the range of from 3 to 15;
- m is a numeral comprised within the range of from 5 to 23;
- n+m is a numeral equal to, or higher than 18;
- with the chain of carbon atoms being either linear or substantially linear."

"11. Use of the composition affording sliding characteristics according to any of claims 7 to 10 as sliding agent for the skis."

"12. Ski characterized in that it bears inside its sole a compound or mixture of compounds with formula (I), as defined in claim 1 or 2."

"13. Ski characterized in that it bears inside its sole the composition defined in any of claims from 7 to 10."

"14. Process for endowing a ski with sliding characteristics, in which a compound or a mixture of compounds with formula (I) as defined in claim 1 or 2 is applied onto the sole of said ski and/or is incorporated inside the sole of said ski."

"15. Process for endowing a ski with sliding characteristics, in which onto the sole of the ski a composition affording sliding characteristics as defined in any of claims from 7 to 10 is applied."

III. More particularly, the Examining Division found that, in view of the teachings provided in documents (1) and (2), a compound having both a perfluorocarbon segment and a hydrophobic hydrocarbon segment could be expected to combine good sliding characteristics with a good compatibility with paraffinic waxes and with the polyethylene used as ski sole component.

IV. In the statement setting out the grounds of appeal the Appellant argued that it was unpredictable *a priori* that by using a compound of formula (I) a suitable sliding effect combined with suitable compatibility properties towards the sole component and conventional waxes would be obtained.

In this connection, it was pointed out that document (2) was in the field of magnetic tapes for recording systems and that the solid lubricant was used there to guarantee the persistence of the sliding agent on the magnetic tape.

V. The Appellant requested that the appealed decision be set aside and that a patent be granted on the basis of the claims annexed to that decision.

Reasons for the Decision

1. The appeal is admissible.
2. *Amendments*

Present Claim 1 is a combination of the use as sliding agent mentioned on page 5, lines 17 to 19 of the application as originally filed (page 3, lines 29 and 30, of the published version) with the product features described in original Claims 1 and 2 and each of

present Claims 2 to 6 is a combination of the use mentioned above with the features described in original Claims 3 to 7 respectively. The subject-matter claimed in each of present Claims 7 to 15 corresponds with the one described in each of original Claims 9 to 17 respectively.

Therefore, Claims 1 to 15 do not contravene Article 123(2) EPC.

3. *Novelty*

Having examined the prior art cited in the European Search Report, the Board has reached the conclusion that the subject-matter of none of the present claims is disclosed in any thereof.

The Board therefore concludes that the subject-matter of Claims 1 to 15 is novel, which was not contested by the Examining Division.

4. *Inventive step*

4.1. The Board considers that document (1), mentioned on page 2, line 8 of the published application in suit, is representative for the closest state of the art. This has never been contested.

4.2. Document (1) relates to solid lubricants consisting of solid perfluorocarbons, with a linear or substantially linear carbon atom chain, which may be represented by the formula $C_{2n}F_{4n+2}$ with n ranging mainly from 8 to 16 (page 2, lines 20 to 22, and page 3, line 22, and page 4, lines 25 and 26) and which are able, thanks to their reduced friction coefficient, high chemical inertness and water and oil repellent characteristics, to increase the sliding properties of sliding surfaces, such as ski soles formed by polymeric materials (e.g.

polyethylene) (page 6, lines 3 to 12, and page 7, lines 25 to page 8, line 1). Moreover, it is taught on page 10, lines 17 to 22, that the perfluorocarbons may be dissolved in normal paraffinic waxes by using suitable surfactant agents, as exemplified in example 4, and that they increase the sliding and resistance characteristics of the paraffinic waxes (page 10, lines 8 to 12). The ski wax described in example 4 is a mixture of normal paraffins, perfluoroparaffins and $C_8F_{17}-CH=CH-(CH_2)_5-CH_3$ as emulsifier.

- 4.3. According to the application in suit those perfluorocarbons have the disadvantage that they are poorly compatible with paraffinic waxes, so that a compatibilizer agent must be used (page 2, lines 11 to 13).

Therefore, in view of the teaching of document (1), the problem underlying the invention must be seen in providing compounds, for the use as efficient sliding agents for skis, whether applied to or incorporated inside the ski sole, which are compatible with conventional paraffinic ski waxes, so that they can be mixed therewith without the aid of a compatibilizer agent (page 2, lines 14 to 22).

The application in suit claims to solve this problem by using a compound of formula (I) as an agent affording sliding characteristics for skis.

- 4.4 Therefore, the question arises whether it can be accepted that the problem as defined above is effectively solved by the claimed uses, compositions, skis and processes.

4.5 It has been shown in examples 5, 6 and 7 that with skis treated with compositions **consisting of** a conventional ski-wax and a compound of formula (I), i.e. without the aid of a compatibilizer agent, an efficient sliding performance is obtained. Moreover, it has been shown in example 8 that the contact angle of a surface of a band obtained by extruding a mixture of high-density polyethylene and a compound of formula (I) is increased, which, according to the application in suit, is evidence for a decrease of the surface tension (page 3, lines 55 to 57), which allows the skis to slide more easily on the water film which is formed, due to pressure and friction phenomena, at the interface between the sole and the underlying snow (page 3, lines 32 to 35).

The Board therefore accepts that it has been made credible that the compounds of formula (I) solve the problem defined in point 4.3 above.

4.6 It remains to be decided, whether, in the light of the teachings of the documents cited in the European Search Report, a skilled person looking to solve the problems as mentioned in point 4.3, would have chosen a compound of formula (I).

4.7 The Examining Division was of the opinion that a skilled person would have done so, since it was well known in the art that perfluoroalkyl groups provide inherently strong hydrophobic properties and that (longer) hydrophobic alkyl chains in a molecule improve the compatibility of such molecules with other hydrocarbon compounds. Moreover, the Examining Division alleged that "there seems to be no doubt that the perfluoroalkyl group contained in the so-called "surfactant agent" ... also necessarily contributes to the sliding properties of the agent **per se**".

However, the Examining Division did not provide any evidence supporting its allegation that there is no doubt that the compound $C_8F_{17}-CH=CH-(CH_2)_5-CH_3$ would contribute to the sliding properties of the wax. Since also no support for such allegation can be found in document (1), which merely mentions that in the preparation of the lubricant compositions the perfluorocarbons can be dissolved in the normal paraffinic waxes by means of the use of suitable surfactant agents (see page 10, lines 17 to 22), the Board considers that this unsubstantiated allegation is to be disregarded.

Moreover, independently thereof whether it was the general knowledge that perfluoroalkyl groups provide hydrophobic properties and that hydrophobic groups improve the compatibility of molecules with other hydrocarbon compounds, in the Board's view a skilled person would not have found any hint in document (1), that by using a compound of formula $C_8F_{17}-CH=CH-(CH_2)_5-CH_3$, let alone, a compound of formula (I), as defined in present Claim 1, sliding characteristics could be provided to skis.

- 4.8 Furthermore, the Examining Division was of the opinion that the essence of the present invention was implicitly described in document (2), since compounds of formula (I) as defined in present Claim 1 with the same or comparable physical properties were described there.

However, the Board must point out that document (2) essentially concerns **the reduction of the abrasion of the surface of a magnetic film** (page 2, lines 55 to 57) and, in this connection, it proposes the use of a lubricant film composed of a solid semifluorinated compound and a liquid perfluoropolyether, thus reducing

the amount of solid lubricant lost due to the contact with a magnetic head (page 5, lines 56 to 59). The sliding characteristics mentioned in document (2), which concern the sliding of the magnetic film over a magnetic head, are thus clearly not comparable with the sliding characteristics of skis, which relate, according to the application in suit (page 3, lines 32 to 35), to the sliding of the skis on the water film formed, due to pressure and friction phenomena, at the interface between their soles and the underlying snow. Therefore, in the Board's view, a skilled person looking for improving the sliding characteristics of skis would not even take the teaching of document (2) into consideration (cf T 39/82, OJ EPO 1982, 419 reasons 7.3).

- 4.9 The Board therefore concludes that solution of the present technical problem according to Claim 1 is not obvious in the light of the teachings of documents (1) and (2).

Claims 2 to 6, which represent preferred embodiments of Claim 1, the composition Claims 7 to 10, the use Claim 11 and the Claims 12 to 15, which relate to ski and to processes for endowing a ski with sliding properties, derive their patentability from the same inventive concept.

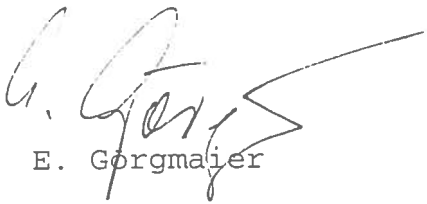
5. Since Claims 1 to 15 comply with the requirements of the EPC, a European patent may be granted on the basis of this set of claims.

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 Claims 1 to 15 filed with letter of 6 June 1994 and **a description to be adapted thereto.**

The Registrar:



E. Gorgmaier

The Chairman:



A. Nuss

