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Datasheet for the decision of 12 February 2019

Case Number: T 0726/14 - 3.3.02

Application Number: 04251794.6

Publication Number: 1471133

IPC: C10M141/10

Language of the proceedings: EN

Title of invention:
Gear oil having low copper corrosion properties

Patent Proprietor:
Chevron Oronite Company LLC

Opponents:
Lubrizol Limited
Afton Chemical Corporation

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step

Decisions cited:

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 0726/14 - 3.3.02

D E C I S I O N
of Technical Board of Appeal 3.3.02
of 12 February 2019

Appellant: (Patent Proprietor)	Chevron Oronite Company LLC 6001 Bollinger Canyon Road Bldg. T 3rd Floor San Ramon, CA 94583-2324 (US)
Representative:	Haseltine Lake LLP Redcliff Quay 120 Redcliff Street Bristol BS1 6HU (GB)
Appellant: (Opponent 2)	Afton Chemical Corporation 500 Spring Street Richmond, Virginia 23219 (US)
Representative:	J A Kemp 14 South Square Gray's Inn London WC1R 5JJ (GB)
Party as of right: (Opponent 1)	Lubrizol Limited The Knowle Nether Lane Hazelwood Derby Derbyshire DE56 4AN (GB)
Representative:	D Young & Co LLP 120 Holborn London EC1N 2DY (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 16 January 2014 concerning maintenance of the European Patent No. 1471133 in amended form.**

Composition of the Board:

Chairman	M. O. Müller
Members:	A. Lenzen
	L. Bühler

Summary of Facts and Submissions

I. This decision concerns the appeals filed by the proprietor of European patent No. 1 471 133 and by opponent 2 against the interlocutory decision of the opposition division according to which the patent in amended form and the invention to which it relates met the requirements of the EPC.

II. In their notices of opposition, opponents 1 and 2 requested the revocation of the patent in its entirety on the grounds that the claimed subject-matter was neither novel nor inventive (Article 100(a) EPC, opponents 1 and 2) and that the patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC, only opponent 1).

The documents submitted during the opposition proceedings included:

D10 WO 95/20592 A1,

D13 EP 0 531 000 A1,

D14 US 3,533,943,

D15 Lubricant Additives - Chemistry and Applications, L. R. Rudnick, 2003, pages 265, 266, 273-275 and 572,

D16 US 5,571,445,

D17 US 5,576,372,

D21 WO 01/66677 A1, and

D24 Material Safety Data Sheet of TBPS 454.

III. The decision of the opposition division was based on the patent as granted (main request) and sets of claims of auxiliary request 1 filed by letter of 25 October 2013, auxiliary request 2 filed during the oral proceedings on 26 November 2013, and auxiliary request 3 filed by letter of 25 October 2013 as auxiliary request 2 and renumbered during the oral proceedings.

Only auxiliary request 3 was deemed to meet the requirements of the EPC. The opposition division held that its subject-matter involved an inventive step vis-à-vis D10 as the closest prior art.

IV. This decision was appealed by the patent proprietor and opponent 2. As these two parties are appellants and respondents at the same time, they are referred to herein as the patent proprietor and opponent 2. Opponent 1 (party as of right) is referred to as opponent 1.

V. The patent proprietor's statement of grounds of appeal contained comparative experimental data (shown on pages 10-12 therein, "appendix 1" hereinafter).

VI. Opponent 2's statement of grounds of appeal included comparative experimental data (discussed on pages 3 to 5 therein, "experimental evidence" hereinafter).

VII. In its communication to the parties pursuant to Article 15(1) RPBA, the board indicated that it considered the composition of the example 5 in table III of D14 as the closest prior art.

VIII. Oral proceedings before the board were held on 12 February 2019.

IX. The patent proprietor requested that the decision under appeal be set aside and that the patent be maintained on the basis of the claims of the main request filed with its statement of grounds of appeal or alternatively, on the basis of the claims of auxiliary requests 1, 1A or 2, all filed with its response of 13 October 2014 to opponent 2's statement of grounds of appeal or, alternatively, that opponent 2's appeal be dismissed, implying the maintenance of the patent on the basis of auxiliary request 3 before the opposition division.

The patent proprietor also requested that documents D52 to D54, D56 and opponent 2's objection under Article 123(3) EPC not be admitted into the appeal proceedings. Should this objection be admitted, the patent proprietor requested that the case be remitted to the opposition division.

Lastly, the patent proprietor requested that Mr Nelson be allowed to speak on technical issues which may arise in the course of the oral proceedings.

Opponent 2 requested that the patent proprietor's appeal be dismissed, that the appealed decision be set aside and that the contested patent be revoked.

Opponent 2 further requested that the main request and auxiliary requests 1, 1A and 2 not be admitted into the appeal proceedings.

Opponent 2 also requested that the opposition division's decision to admit D47 to D50 be set aside and that the documents be taken out of the proceedings.

Opponent 2 further requested that D51 not be admitted. Lastly, opponent 2 requested that Mr Jacoby be allowed to speak during the oral proceedings.

Opponent 1 requested that the patent proprietor's appeal be dismissed.

Opponent 1 further requested that the main request and auxiliary requests 1, 1A and 2 not be admitted into the proceedings.

Opponent 1 additionally requested that document D32 be entered into the proceedings.

It also requested to hear Mr Jacoby (from opponent 2) and Mr Nelson (from the patent proprietor).

X. Claim 23 of the main request reads as follows:

"*A gear oil composition comprising:*
a) a major amount of a base oil of lubricating viscosity; and
b) a minor amount of a gear oil additive composition comprising:
(i) an organic polysulfide containing greater than 30 wt% of a dialkyl polysulfide compound or mixture of dialkyl polysulfide compounds of the formula:
$R_1-(S)_x-R_2$
wherein R_1 and R_2 are independently an alkyl group of 4 to 6 carbon atoms and x is 4 or greater;

(ii) a thiadiazole; and
(iii) at least one ashless phosphorus-containing wear inhibitor compound;
wherein the composition comprises from 0.1 to 3.6 wt% of the organic polysulfide, 0.01 to 0.6 wt% of the thiadiazole, and 0.1 to 2.5 wt% of the ashless phosphorus-containing wear inhibitor compound."

Claim 22 of auxiliary request 1 differs from claim 23 of the main request only insofar as the organic polysulfide (i) contains **at least 40 wt%** of the indicated dialkyl polysulfide compound(s).

Claim 21 of auxiliary request 1A differs from claim 23 of the main request only insofar as the organic polysulfide (i) contains **at least 50 wt%** of the indicated dialkyl polysulfide compound(s).

Claim 22 of auxiliary request 2 differs from claim 23 of the main request only insofar as both R_1 and R_2 are each a **tertiary-butyl group**.

Claim 15 of auxiliary request 3 differs from claim 23 of the main request only insofar as the organic polysulfide (i) is defined as follows:

"*(i) an organic polysulfide which is a mixture of di-tertiary-butyl tri-, tetra- and penta-sulfide having greater than 50 wt.% di-tertiary-butyl tetra-sulfide*".

XI. The opponents' arguments as to the lack of an inventive step, insofar as they are relevant to the present decision, can be summarised as follows:

The composition of the example 5 in table III of D14 was the closest prior art. The "experimental evidence" showed that the content of ditertiary butyl tetra- and pentasulfides had no significant influence on wear. The problem was thus the provision of an alternative gear oil composition. D24 showed TBPS 454, i.e. the organic polysulfide used in the patent in suit, to have been commercially available long before the priority date of the patent in suit. The composition of the example 5 in table III of D14 contained a significant amount of tetrasulfide and still achieved a very good copper corrosion rating. Thus, there was no technical prejudice in D14 against the increase of its content. Similarly, D10 showed that very good copper corrosion rating could be achieved using pentasulfides.

XII. The patent proprietor's arguments as to the presence of an inventive step, insofar as they are relevant to the present decision, can be summarised as follows:

D16 was the closest prior art. D14 did not deal with the problem of gear scoring and was therefore not suitable. Even when starting from D14 as the closest prior art, the claimed subject-matter was inventive. The organic polysulfide used in the patent in suit, i.e. TBPS 454, performed better in terms of copper corrosion and reduction of wear than the organic polysulfide used in D14. Even disregarding this and considering the problem to be the provision of an alternative gear oil composition, the claimed solution was not obvious. D15 taught a general prejudice against the incorporation of tetra- and pentasulfides into lubricating compositions coming into contact with yellow metals. Starting from D14 as the closest prior art, the skilled person would not have increased their content when seeking to provide an alternative.

Reasons for the Decision

Admittance of the main request and auxiliary requests 1, 1A and 2

Both opponents requested that the patent proprietor's main request and its auxiliary requests 1, 1A and 2 not be admitted into the proceedings.

During the oral proceedings, the board decided to admit these requests into the proceedings. In view of their non-allowability (see below), a detailed reasoning as to their admittance does not need to be given.

Main request

1. Inventive step

1.1 Whereas the opponents started, *inter alia*, from D14 as the closest prior art, the patent proprietor was of the opinion that only D16 was the proper starting point for the assessment of inventive step.

The patent in suit relates to a gear oil additive composition and a gear oil composition containing the same. Such compositions typically comprise sulfurized olefins because they protect gears from scoring. However, these sulfur compounds have the drawback that they are extremely corrosive to yellow metals, such as copper and copper alloys. It is this corrosion that the patent in suit tries to mitigate (paragraphs [0001] and [0002] therein).

Similarly, D14 sets out to provide lubricating compositions such as gear oils having improved anti-

corrosion properties (column 1, lines 31-38 and lines 50-60). This object is achieved by the incorporation of a corrosion-inhibiting synergistic mixture of a salt of a dialkyl dithiophosphoric acid and a 2,5-bis(alkyldithio)-1,3,4-thiadiazole (column 1, lines 13-17). In the examples, such synergistic mixtures are incorporated into oils containing sulfurized olefins and their effect on the copper corrosive properties of the oils is examined.

D16 relates to gear oils, more particularly to manual transmission gear oils that have the capability of sharply reducing if not eliminating clashing of gears under low temperature conditions (column 1, lines 6-9). To achieve this aim, D16 employs a special base oil made up of four essential components, namely, one or a mixture of certain synthetic esters, and three different hydrogenated oligomers of specified viscosities, and these components are employed in specified proportions relative to each other (column 2, lines 8-59).

Thus, although D14 and D16 are in the same technical field as the patent in suit, only D14 addresses the problem of corrosion during use in general and the problem of copper corrosion in particular.

The patent proprietor argued that D14 was concerned only with the problem of (copper) corrosion and did not tackle another important problem of the patent in suit, namely, gear scoring (patent in suit, paragraph [0016], last sentence).

The board does not find this argument convincing. D16 does not - at least not explicitly - address the problem of gear scoring either. It does so at the most

implicitly as its compositions contain an oil-soluble organic sulfur-containing antiwear agent (D16: claim 1, component b)) which is commonly known to fight scoring - but so too does D14. Thus, in as much as the problem of gear scoring is concerned, D16 is as close or as remote to the patent in suit as D14.

For these reasons, D14 represents the closest prior art.

1.2 The composition of the example 5 in table III of D14 is considered the most suitable starting point for the discussion of inventive step as it comes closest to the subject-matter of claim 23.

This composition comprises the following components (a) to (d)(in wt%):

(a) SAE 90 Base oil (95.4),
(b) ditertiary butyl trisulfide (4.4), containing approximately 25 wt% of ditertiary butyl tetrasulfide (D2: column 5, lines 39-43),
(c) 2,5-bis(t-octyl dithio) 1,3,4-thiadiazole (0.1), and
(d) oleyl amine salt of diisopropyl dithiophosphoric acid (0.1).

It gives a very good copper corrosion rating.

Component (a), the SAE 90 Base oil, is a lubricating oil (D14: column 4, lines 27-34). It accounts for the largest part by far. It corresponds to component a) of the composition of claim 23.

Component (b), the ditertiary butyl trisulfide, is an organic polysulfide. The ditertiary butyl tetrasulfide contained in it can be written as C_4-S_4-C_4 and thus corresponds to the dialkyl polysulfide of claim 23,

which has the formula: R_1-$(S)_x$-R_2 wherein R_1 and R_2 are independently an alkyl group of 4 to 6 carbon atoms and x is 4 or greater (in the following: C_{4-6}-$S_{\geq 4}$-C_{4-6}).

Component (c) is a thiadiazole as required by feature b)(ii) in claim 23 and is contained in an amount falling within the range given for it in claim 23, namely, from 0.01 to 0.6 wt%.

Component (d) is an amine dithiophosphate, the dithiophosphate part of which comprises two isopropyl groups, i.e. two aliphatic C_3-alkyl groups, and hence an ashless phosphorus-containing wear inhibitor compound as required by feature b)(iii) in claim 23, see paragraphs [0025] and [0026] of the patent in suit. It is contained in an amount falling within the range given for it in claim 23, namely, from 0.1 to 2.5 wt%.

1.3 It follows, that the composition of claim 23 is distinguished from D14 in that

(i) it contains less organic polysulfide (0.1 to 3.6 wt% in claim 1 versus 4.4 wt% in D14), and

(ii) the content of C_{4-6}-$S_{\geq 4}$-C_{4-6} is higher (claim 23 requires its content to be greater than 30 wt% based on the organic polysulfide whereas the organic polysulfide in D14 contains approximately 25 wt% of ditertiary butyl tetrasulfide, i.e. C_4-S_4-C_4).

1.4 Distinguishing feature (i)

The patent proprietor did not argue as to a technical effect linked to distinguishing feature (i).

1.5 Distinguishing feature (ii)

1.5.1 With respect to potential technical effects linked to distinguishing feature (ii), the patent proprietor argued that the compositions of example 5 in table I and of example 5 in table III of D14 showed the same copper corrosion rating. These compositions differed from each other only with respect to the organic polysulfide used, namely, sulfurized polyisobutylene (example 5 in table I) and ditertiary butyl trisulfide containing approximately 25 wt% of ditertiary butyl tetrasulfide (example 5 of table III), respectively. Furthermore, the patent in suit (table 1: example 1 versus comparative example M) compared compositions with each other containing the organic polysulfide TBPS 454 according to the invention and sulfurized isobutylene, respectively, and found superior copper corrosion ratings for the former. As the denominations sulfurized polyisobutylene as used in D14 and sulfurized isobutylene as used in the patent in suit were used interchangeably in the art, one could draw the conclusion that the organic polysulfide TBPS 454 of the patent in suit and thus an organic polysulfide as stipulated in claim 23 had to be better than the ditertiary butyl trisulfide containing approximately 25 wt% tetrasulfide of the composition of example 5 in table III of D14 in terms of copper corrosion.

However, this argument is not convincing as the compositions of the sulfurized polyisobutylene of D14 and the sulfurized isobutylene of the patent in suit are not specified, and both are considered to be different from each other in the prior art (D13: page 50, lines 45-48). Furthermore, the improvement in copper corrosion in the patent in suit, i.e. of example

1 relative to comparative example M, is not necessarily due to the TBPS 454 being present instead of sulfurized isobutylene. More specifically, the type of polysulfide is not the only difference between the compositions of example 1 and comparative example M. They also differ in sulfur content: example 1 contains less sulfur (1.3 wt%) than comparative example M (1.7 wt%). Less overall sulfur contents are, however, considered advantageous for copper corrosion (annotation: the sulfur content of the composition of example 1 is based on TBPS 454 having a sulfur content of 53 wt% as derivable from example A in "appendix 1").

1.5.2 The patent proprietor also referred to "appendix 1". In tables 1 and 2, the compositions of examples A and B are compared to the compositions of comparative examples A to C. Examples A and B contain the organic polysulfide TBPS 454, i.e. a mixture of di-tertiary-butyl tri-, tetra- and penta-sulfide having greater than 50 wt% di-tertiary-butyl tetra-sulfide (see paragraph [0074] of the patent in suit), and thus an organic polysulfide as stipulated in b)(i) in claim 23. The compositions of comparative examples A to C contain a sulfurized isobutylene. The patent proprietor argued that TBPS 454 gave better results than sulfurized isobutylene in the L-42 wear test when both were used at the same sulfur treat rate (table 1). Similarly, to pass this test with sulfurized isobutylene, much higher amounts had to be used (table 2). That fact that the fully formulated gear oil compositions passed the L-42 wear test could not be ignored (table 3).

The board cannot accept this line of argument either. The sulfurized isobutylene used in comparative examples A to C is not representative of the organic polysulfide used in the composition of example 5 in table III of

D14. It is therefore not possible to derive a technical effect vis-à-vis D14 from the comparisons shown in "appendix 1".

1.5.3 With respect to the influence of organic polysulfides on wear, opponent 2 submitted its "experimental evidence". Composition E described therein contains (in wt%) a base oil (96.2), ditertiary butyl trisulfide (2.4), dimercaptothiadiazole (0.3) and amine dithiophosphate (1.1). Based on the above, this composition differs from the one of claim 23 only in that it contains less or no C_{4-6}-$S_{\geq 4}$-C_{4-6}. Despite this, it passed both the L-42 pinion scoring and ring scoring tests.

The "experimental evidence" also compares oil compositions of examples A to D, which comprise, *inter alia*, the same amount of an organic polysulfide and the same amount of a "core additive". In examples A and B, the organic polysulfide is a mixture of di-, tri-, tetra- and penta-sulfides having more than 30 wt% of tetra- and pentasulfides, i.e. as stipulated in b)(i) in claim 23. In examples C and D, the organic polysulfide is a mixture of di-, tri-, tetra- and penta-sulfides having less than 30 wt% of polysulfides having 4 or more sulfur atoms per molecule, i.e. an organic polysulfide which is outside the scope of b)(i) in claim 23. All the compositions A to D passed the L-42 pinion scoring and ring scoring tests and the differences in the scores obtained in these tests, averaged over two trials, were not statistically significant.

In the board's view these data show that distinguishing feature (ii) has no influence on wear during use of the gear oil composition.

The patent proprietor argued that opponent 2's test results in the "experimental evidence" were not to be taken into account as they were flawed because the ingredients of the "core additive" were not identified. Furthermore, although the "experimental evidence" stated its compositions to be based on example 1 in table 8 of D17, D17 contained no table 8.

Indeed, D17 does not contain a table 8. However, the board did take opponent 2's "experimental evidence" into account for the following reasons: the purpose of comparing the compositions of examples A to D was merely to illustrate the influence of the specific organic polysulfide on wear. Therefore, the organic polysulfide contained in the reference composition referred to by opponent 2, i.e. "SIB", was completely replaced with the organic polysulfide to be examined, and this allows drawing a clear conclusion about the latter. Insofar as the "core additive" comprises other compounds (evidently not being an organic polysulfide), their presence is irrelevant for the comparison shown since they are always present in the same amount and since the presence of such compounds is not excluded by claim 23 (due to the open wording *"composition comprising"*).

1.6 Therefore, a technical effect is not linked to the distinguishing features identified above.

1.7 The objective technical problem is thus the provision of an alternative gear oil composition.

1.8 The solution to this objective technical problem in the form of claim 23 would have been obvious for the skilled person.

1.8.1 As is clear from D24, TBPS 454, i.e. an organic polysulfide containing a mixture of di-tertiary-butyl tri-, tetra- and penta-sulfide and having greater than 50 wt % di-tertiary-butyl tetra-sulfide (see paragraph [0074] in the patent in suit), was available long before the priority date of the patent in suit. This was not contested by the patent proprietor.

Thus, when starting from the composition of example 5 in table III of D14, the skilled person would merely have had to replace the organic polysulfide with another well-known polysulfide, i.e. TBPS 454, and to have slightly changed its amount. This would not have required inventive skill.

1.8.2 The patent proprietor argued that D14 generated a corrosive environment purposefully to demonstrate the effectiveness of its mixture comprising a salt of a dialkyl dithiophosphoric acid and a 2,5-bis(alkyldithio)-1,3,4-thiadiazole. As is clear from D15, there was a general prejudice in the art that tetra- and penta-sulfides exhibited higher activity in terms of copper corrosion than mono-, di- or tri-sulfides. The skilled person would thus not have contemplated increasing the content of the tetra- and penta-sulfides in the composition of the example 5 in table III of D14.

This line of argument is unconvincing. The passage alluded to by the patent proprietor reads as follows (D15: page 275, lines 1-4):

> "*The activity depends mainly on the sulfur chain in the molecule. Mono- and disulfides are not aggressive against yellow metals. Pentasulfides are*

highly reactive and, therefore, suitable for heavy-duty machining of steel. The inhibition of these products against yellow metals is hardly possible."

This passage is clear only with regard to the high reactivity of pentasulfides with yellow metals. It is silent with respect to tetrasulfides. Even if tetrasulfides were also accepted to have a high reactivity with yellow metals, the passage above can still not be understood as reflecting a general prejudice in the art against the incorporation of tetra- and pentasulfides into gear oil compositions coming into contact with yellow metals. More specifically, the prior art shows that both tetra- and pentasulfides can be incorporated into gear oil compositions and that good copper corrosion ratings can still be achieved:

- for tetrasulfides, see the discussion of D14 above,
- for pentasulfides see D10: in example 2, the polysulfide TPS 32 (predominantly di-tertiary dodecyl pentasulfide as is evident from D21: table 1) is incorporated into a gear oil additive composition and, as is clear from example 3, table 1, and page 16, penultimate paragraph, hydraulic fluids comprising this additive composition achieve very good copper corrosion ratings.

Against this prior art, the statement in D15 according to which the inhibition is "***hardly*** *possible*" (emphasis added) has to be understood as referring to difficulties rather than to a generally accepted impossibility.

However, without such a general prejudice, there would have been no reason for the skilled person when starting from a composition already containing a tetrasulfide to not increase its content further.

1.8.3 In the context of D10, the patent proprietor argued that it could not cast doubt on the general prejudice taught by D15 as the polysulfide TPS 32 used in it contained tertiary dodecyl alkyl groups which were very different from the tertiary butyl groups of TBPS 454, i.e. the organic polysulfide used in the patent in suit.

This argument is not valid as D15 deals with organic polysulfides in general, i.e. without restricting or connecting the reactivity of a particular polysulfide to the alkyl groups contained in it.

1.9 Thus, at least the subject-matter of claim 23 does not involve an inventive step. The main request is therefore not allowable.

Auxiliary requests 1, 1A and 3

2. Claim 22 of auxiliary request 1 differs from claim 23 of the main request only insofar as the organic polysulfide contains **at least 40 wt%** of C_{4-6}-$S_{\geq 4}$-C_{4-6}. Claim 21 of auxiliary request 1A is even further restricted in that the organic polysulfide contains **at least 50 wt%** of C_{4-6}-$S_{\geq 4}$-C_{4-6}.

Claim 15 of auxiliary request 3 differs from claim 23 of the main request only insofar as the organic polysulfide (i) is defined as follows:

"(i) an organic polysulfide which is a mixture of di-tertiary-butyl tri-, tetra- and penta-sulfide having greater than 50 wt.% di-tertiary-butyl tetra-sulfide".

3. Distinguishing features

3.1 Based on the argumentation above regarding claim 23 of the main request, the compositions of claims 22, 21 and 15 of auxiliary requests 1, 1A and 3 are also distinct from the composition of example 5 in table III of D14 as the closest prior art in that:

(i) they contain less organic polysulfide (0.1 to 3.6 wt% in claim 1 versus 4.4 wt% in D14).

3.2 Furthermore, these compositions are distinct in that:

3.2.1 In claim 22 of auxiliary request 1:

(ii) the content of C_{4-6}-$S_{\geq 4}$-C_{4-6} is higher (claim 22 requires its content to be at least 40 wt% based on the organic polysulfide whereas the organic polysulfide in D14 contains approximately 25 wt% of ditertiary butyl tetrasulfide).

3.2.2 In claim 21 of auxiliary request 1A:

(ii) the content of C_{4-6}-$S_{\geq 4}$-C_{4-6} is higher (claim 21 requires its content to be at least 50 wt% based on the organic polysulfide whereas the organic polysulfide in D14 contains approximately 25 wt% of ditertiary butyl tetrasulfide).

3.2.3 In claim 15 of auxiliary request 3:

(ii) the content of ditertiary butyl tetra-sulfide is higher (claim 15 requires its content to be greater than 50 wt% based on the organic polysulfide whereas the organic polysulfide in D14 contains approximately 25 wt% of ditertiary butyl tetrasulfide), and;

(iii) it contains ditertiary butyl pentasulfide.

3.3 Distinguishing feature (i) was discussed above. It is not linked to a technical effect. Distinguishing features (ii) and (iii) have not been shown to be linked to a technical effect either.

The objective technical problem is the provision of an alternative gear oil composition.

Thus, the reasoning given above based on a combination of D14 and D24 in view of claim 23 of the main request applies *mutatis mutandis*. As distinguishing features (ii) and (iii) are met by the organic polysulfide TBPS 454 of D24, at least the subject-matter of claims 22, 21 and 15 of auxiliary requests 1, 1A and 3, respectively, does not involve an inventive step. Consequently, these requests are not allowable.

Auxiliary request 2

Claim 22 of auxiliary request 2 differs from claim 23 of the main request only insofar as both R_1 and R_2 are each a **tertiary-butyl group.**

This, however, is not a distinguishing feature vis-à-vis D14 (see above). Thus, the reasoning above as to claim 23 of the main request applies *mutatis mutandis* to claim 22 of auxiliary request 2. At least the subject-matter of claim 22 of auxiliary request 2 does not involve an inventive step, and this request is not allowable.

Admittance of additional objections by opponent 2

During the oral proceedings, opponent 2 put forward a novelty objection against the main request based on D14, which the board decided not to admit into the proceedings. In view of the non-allowability of the main request (see above), a detailed reasoning as to the non-admittance of this objection does not need to be given.

Further requests

In its letter dated 10 January 2019, opponent 2 raised objections under Article 123(3) EPC against the requests then pending. The patent proprietor requested not to admit these into the proceedings. During the oral proceedings, these objections did not need to be discussed. Therefore, no decision as to their admittance was required.

During the oral proceedings, none of the parties referred to documents D32, D51 to D54 or D56. Therefore, no decision as to their admittance was required.

Similarly, none of the parties referred to D47 to D50 during the oral proceedings. Therefore, no decision as

to whether to set aside the opposition division's decision to admit these documents was required.

Also, neither Mr Nelson nor Mr Jacoby wanted to speak or were asked to do so. There was therefore no need to decide on the requests in this regard.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

N. Maslin M. O. Müller

Decision electronically authenticated