Datasheet for the decision
of 15 June 2016

Case Number: T 0431/12 - 3.3.01
Application Number: 03746927.7
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Title of invention:
METHOD FOR LUBRICATING A DUAL CLUTCH TRANSMISSION

Patent Proprietor:
The Lubrizol Corporation

Opponent:
Afton Chemical Corporation

Headword:
Dual clutch transmission/LUBRIZOL

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

Keyword:
Amendments - extension beyond the content of the application as filed (no)
Inventive step - non-obvious solution
Decisions cited:

Catchword:
Case Number: T 0431/12 - 3.3.01

DECISION
of Technical Board of Appeal 3.3.01
of 15 June 2016

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Composition of the Board:
Chairman: A. Lindner
Members: G. Seufert
L. Bühler
Summary of Facts and Submissions

I. The opponent (appellant) lodged an appeal against the interlocutory decision of the opposition division on the amended form in which European patent No. 1 499 701 could be maintained.

II. The present decision refers to the following documents:

(1) WO 02/083825
(2) US 5,344,579
(5) US 6,372,696
(7) EP 0 761 805
(8) Barry Campbell, DCT Fluids, Lubes'N'Greases Magazine, 2010, pages 1 to 4
(11) Excerpt from Lubrizol web site www.DCTFACTS.com providing questions and answers from Lubrizol in an AEI DCT webcast, pages 1 to 3, 2010
(12) Malcolm Brown, Smoother transmission, Frontiers, December 2008, pages 34 to 38
(25) US 4,857,214
(26) Affidavit of H. Maelgar, dated 21 November 2011, submitted by the appellant with the statement of grounds of appeal, one page
(27) Annex A, Tables 1A and 2A, submitted by the appellant with the statement of grounds of appeal, two pages
(28) Annex C, 31P-NMR spectra (Samples 1 and 2) submitted by the appellant with the statement of grounds of appeal, two pages
III. Notice of opposition was filed by the appellant requesting revocation of the patent in suit, in its entirety, on the grounds of lack of novelty, lack of inventive step, insufficiency of disclosure and added matter (Article 100(a), (b) and (c) EPC). The objections of lack of novelty, insufficiency of disclosure and added matter were subsequently withdrawn (see minutes of the oral proceedings before the opposition division, page 1, point 4 and decision under appeal, page 3, point 8).

IV. The opposition division decided that the main request (set of claims as granted) did not involve an inventive step in view of the teaching of document (2). The first auxiliary request was held to comply with Article 56 EPC. Its subject-matter was considered not to be obvious in view of document (2) alone or in combination with documents (5) or (7).

Claim 1 of the first auxiliary request reads as follows:

"1. A method for lubricating a transmission having a plurality of wet clutches and a plurality of partial power transmission shafts, wherein shifting of gears occurs by a process comprising synchronization of an engaged and a non-engaged partial transmission shaft and engagement of a wet clutch; said method comprising supplying to said transmission a lubricating composition comprising:

(a) an oil of lubricating viscosity;
(b) 2,5-dimercapto-1,3,4-thiadiazole (DMTD), a derivative of DMTD, or mixtures thereof;
(c) a friction modifier other than a species of (b),
said friction modifier being a condensation product
of a C₆ to C₂₄ aliphatic carboxylic acid with a
polyalkylenepolyamine;
(d) a dispersant other than a species of (b), and
wherein the lubricating composition further
comprises an inorganic phosphorous acid."

V. With the statement of grounds of appeal, the appellant
maintained its objection of lack of inventive step and
filed a number of additional documents, including
document (25) (document (24) according to the
appellant's list of documents) and documents (26)
to (28).

VI. With its reply to the statement of grounds of appeal,
the respondent (patent proprietor) defended the patent
in suit on the basis of the first auxiliary request
underlying the decision under appeal (main request) and
filed auxiliary requests 1 and 2.

In a communication accompanying the summons to oral
proceedings, the board expressed its preliminary
opinion. In particular, it drew attention to certain
issues that would have to be discussed, such as the
number of distinguishing features between the claimed
subject-matter and document (2) - the closest state of
the art according to the decision under appeal - and
the formulation of the problem to be solved.

VII. With letter of 8 February 2016, the respondent filed
auxiliary requests 1 to 5.

Auxiliary requests 1 to 3 differ from the main request
in that the friction modifier (feature (c)) is further
specified as being the condensation product of a
"C₈ to C₂₄ fatty acid with a polyalkylene polyamine"
(auxiliary request 1), or the condensation product of "isostearic acid with tetraethylenepentamine" (auxiliary request 2), or a condensation product of "isostearic acid with tetraethylenepentamine and wherein the amount of friction modifier is 0.1 to 1.5 percent by weight" (auxiliary request 3). Auxiliary requests 4 and 5 differ from the main request in that the inorganic phosphorous acid is further defined as being "phosphoric acid" (auxiliary request 4) or "85% phosphoric acid at a level of 0.01-0.3 weight percent based on the weight of the composition" (auxiliary request 5).

VIII. The appellant's arguments, as far as they concern the decisive issues, can be summarised as follows:

- Amendments (Article 123(2) EPC)

The subject-matter of claim 1 of the main request was the result of a selection from two lists, namely the list of friction modifier classes disclosed on page 7, line 34 to page 8, line 14 of the description as originally filed and the list of further components disclosed in claim 9 as originally filed.

- Inventive step (Article 56 EPC)

Document (7) was the closest state of the art. It described lubricant compositions comprising components (a), (b), (d), a friction modifier and phosphoric acid (see examples 1 and 2 and Table II). The compositions were used in automatic and manual transmissions. The problem to be solved was to provide a further application of an obvious lubricant. Document (7) already indicated on page 9, section 4, the use of fatty acid imidazolines and fatty acid amides as
friction modifiers. Since it had not been shown that new properties were required for dual clutch transmission, the skilled person would have expected the compositions of document (7) to be suitable for this kind of transmission. Moreover, the scuffing test on page 12, lines 22 to 26 of document (7) showed that the automatic transmission lubricants of examples 1 and 2 also passed a manual transmission test. In addition, at the time the invention was made, the skilled person was aware that automatic transmission fluids were employed in dual clutch transmission (see documents (1), (8) and, particularly (14)). He would therefore consider known automatic transmission fluids to be in principle suitable for dual clutch transmission. The subject-matter of claim 1 of the main request was therefore obvious in view of document (7).

The problem described in paragraph [0008] of the patent in suit was not solved. The patent contained only a single example of a composition which, under the conditions used for the tests (see paragraph [0064]), was outside the scope of the compositions claimed for use in the method of claim 1. This was shown in an experiment conducted by the appellant (see page 3 of the statement of grounds of appeal), in which two samples - one consisting of phosphoric acid and a base oil (sample 1), the other consisting of phosphoric acid, a base oil and a succinimide dispersant (sample 2) - were heated to 40°C and kept at that temperature for 45 minutes. Subsequently, the $^{31}$P-NMR spectrum of both samples was measured (see document (28)). No reaction occurred between the phosphoric acid and the base oil, since in the spectrum for sample 1 there was no signal for the phosphorous acid, because phosphoric acid was not soluble in the base oil. The broad signal in the spectrum of sample 2
indicated the in situ formation of phosphorylated dispersant, which was soluble in the base oil. This type of reaction was also described in document (25). In testing and using the claimed lubricating compositions much higher temperatures were reached, thus providing more than enough heating for phosphorylation to take place. As a consequence, the test results in paragraph [0064] could not demonstrate that a lubricant composition as claimed in claim 1 of the main request was capable of solving the problem defined in the patent in suit.

Furthermore, the problem according to the patent in suit was not solved over the whole breadth of the claims. A single example was not sufficient for the skilled person to conclude that all of the practically infinite number of compositions encompassed by the claims would be suitable for dual clutch transmission. No comparison had been made with the closest state of the art and no improvement in frictional durability had been shown. The lubrication requirements for every dual clutch transmission were different in order to compensate for the use of different types of friction material (see documents (11) and (12)). The composition of example 1 of the patent in suit contained a number of additional components, which were not required according to claim 1 of the main request but which certainly influenced the properties of the tested compositions and might be responsible for the test results.

IX. The respondent's arguments, as far as they concern the decisive issues, can be summarised as follows:

- Amendments (Article 123(2) EPC)
The amendment in claim 1 of the main request was not the result of a selection from two lists. Claim 2 as originally filed explicitly mentioned the claimed friction modifier. The feature "inorganic acid" could be found in claim 9 as originally filed.

- Inventive step (Article 56 EPC)

Document (7) focused essentially on automatic transmission lubricants. Dual clutch transmission was not mentioned. The problem to be solved was the provision of smooth and efficient lubrication of dual clutch transmission, as mentioned in paragraph [0008] of the patent in suit. This problem was credibly solved using the compositions claimed in claim 1 of the main request, as could be seen from paragraphs [0061] and [0064] of the patent in suit. The tests referred to in paragraph [0064] were a combination of standard tests for automatic and manual transmission. At the time the invention was made, they were the best model to demonstrate that a lubricant was suitable for dual clutch transmission. Specific tests were not yet available, since dual clutch transmission was still in its infancy (see document (12)). Examples 1 and 2 of document (7) were automatic transmission lubricants and the presence of phosphoric acid was disclosed only for automatic transmission fluids (see page 11, line 32 to 33). Moreover, they contained a completely different friction modifier. Although imidazolines were mentioned in document (7), they were not preferred and, more importantly, no information about their structure was given. Nor was there any indication that the automatic transmission fluids of document (7) passed standard manual transmission tests, as required for dual clutch transmission. There was also no evidence that the skilled person at the filing date knew that automatic
transmission fluids were suitable for dual clutch transmission, particularly since document (14) had apparently not been publicly available at the date indicated on the document. The presently claimed subject-matter was therefore not obvious from document (7).

The appellant's experiment with respect to in situ phosphorylation of the dispersants was not significant, since it had not been carried out on a composition according to the invention. With regard to the appellant's attack on the breadth of the claims, no data had been provided that compositions falling within the scope of the claims did not work. The appellant's experimental evidence (see document 27) was not relevant in this respect, since the compositions employed therein did not comprise an inorganic phosphorous acid. Furthermore, it was sufficient to demonstrate that the compositions referred to in claim 1 were suitable for lubricating dual clutch transmission. There was no need to show any improvement over known lubricants for automatic or manual transmission.

X. The appellant requested that the decision under appeal be set aside and that the European patent No. 1 499 701 be revoked.

The respondent requested that the appeal be dismissed, or, alternatively, that the patent be maintained on the basis of one of auxiliary requests 1 to 5, all filed with letter of 8 February 2016.

XI. At the end of the oral proceedings, the decision of the board was announced.
Reasons for the Decision

1. The appeal is admissible.

Main request

2. Amendments (Article 123(2) EPC)

2.1 Claim 1 differs from claim 1 as granted in that the lubricating composition to be used in the claimed method further comprises an inorganic phosphorous acid.

According to the appellant, the subject-matter of claim 1 of the main request was the result of a selection from two lists (see point VIII above) and therefore gave rise to subject-matter which extended beyond the application as originally filed.

2.2 The board does not agree. Claim 1 of the application as originally filed refers to a lubricant composition comprising components (a) to (d). According to the application as originally filed, a variety of additional components can be present in the lubrication composition. Preferred components such as a viscosity modifier, an inorganic acid or a detergent are mentioned in claim 9 as originally filed. The board concurs with the appellant that the introduction of the feature "inorganic phosphorous acid" into claim 1 of the main request is the result of a selection from this list. However, no such selection is required for component (c) in view of claim 2 as originally filed. This claim clearly and unambiguously discloses the friction modifier (c) to be a condensation product of a C₆ to C₂₄ aliphatic carboxylic acid and a polyalkylene polyamine. Hence, in the board's judgement the skilled person is not provided with novel information which
extends beyond the content of the application as originally filed.

2.3 Article 123(2) EPC is therefore complied with.

3. Inventive step (Article 56 EPC)

3.1 Claim 1 is directed to a method for lubricating a transmission having a plurality of wet clutches and a plurality of partial power transmission shafts, wherein shifting of gears occurs by a process comprising synchronisation of an engaged and a non-engaged partial transmission shaft and engagement of a wet clutch. The method comprises supplying to said transmission a lubricating composition comprising five components: an oil of lubricating viscosity, 2,5-dimercapto-1,3,4-thiadiazole (DMTD), derivatives and mixtures thereof, a friction modifier, which is the condensation product of a C₆ to C₂₄ fatty acid with a polyalkylene polyamine, a dispersant and an inorganic phosphorous acid (see point IV above).

3.2 At the oral proceedings before the board, documents (2) and (7) were presented as a suitable starting point for the assessment of inventive step.

3.2.1 Document (2) is concerned with the lubrication of frictionally engageable surfaces, which during operation are periodically brought into frictional engagement with each other, such as in a wet clutch in automatic transmission (see column 1, first paragraph and lines 23 to 31). It discloses in its broadest aspect a lubricant additive composition comprising a hydroxyalkyl aliphatic imidazoline, in which the hydroxyalkyl group contains from 2 to 4 carbon atoms and the aliphatic group is an acyclic hydrocarbyl group
containing from about 10 to about 25 carbon atoms, and a dihydroxyalkyl aliphatic tertiary amine in which the hydroxyalkyl group and the aliphatic group are defined as in the imidazoline component. A variety of other components, such as dispersants, corrosion inhibitors, etc. can also be present. An inorganic phosphorous acid is not mentioned as a component.

Particularly, document (2) describes automatic transmission fluids comprising, amongst other components, a mineral oil (an oil of lubricating viscosity), 2-tert-dodecyldithio-5-mercapto-1,3,4-thiadiazole (a DMTD derivative), 1-hydroxyethyl-2-heptadecenyl imidazoline (the condensation product of a C\textsubscript{18} fatty acid with a polyalkylene polyamine) and a phosphorylated and boronated ashless dispersant (see examples 1-6).

3.2.2 Document (7) relates to lubricating and functional fluid compositions for use in automatic transmission fluids, tractor hydraulic fluids, manual transmission fluids, wet brake and wet clutch fluids etc. (see page 2, lines 7 to 10). In its broadest aspect, it discloses functional/lubricating fluid compositions comprising an oil of lubricating viscosity having a particular kinematic viscosity as a major component, DMTD or a derivative thereof and an antifoam agent.

Particularly, document (7) discloses automatic transmission fluids comprising, amongst other components, a base oil, DMTD or a DMTD derivative, ethoxylated fatty acid amine as a friction modifier and phosphoric acid (see page 11, lines 32 to 33; examples 1 and 2; Table II). On page 9, lines 5 to 20 of document (7) other friction modifiers are mentioned, such as fatty acid amides and fatty imidazolines, which
can be considered as condensation products of fatty acids and amines. However, neither the fatty acid nor the amine is defined in this passage; particularly, polyalkylene polyamines are not mentioned. A friction modifier according to feature (c) of the main request is therefore not disclosed in document (7).

3.2.3 The board notes that both documents (2) and (7) relate to the field of transmission lubrication, although neither of them discloses dual clutch transmission. Taking into account that lubrication of a dual clutch transmission requires lubrication of a gear box and a gear synchroniser typical of a manual transmission, as well as lubrication of the wet clutch typical of an automatic transmission (see patent in suit, paragraph [0008]), the board considers that document (7), which refers to lubricants for use in automatic and manual transmission, constitutes closer prior art than document (2), which is directed solely to automatic transmission lubricants.

3.3 According to the patent in suit, the problem to be solved by the present invention is the provision of a method for a smooth and efficient lubrication of dual clutch transmission (see paragraph [0008] of the patent in suit). In the light of document (7), the board sees no reason to reformulate that problem.

In the oral proceedings before the board, the appellant formulated the problem to be solved as the provision of a further application of obvious lubricants. However, the finding as to whether or not a solution is obvious concludes the assessment of inventive step and therefore cannot form part of the definition of the problem to be solved. The appellant's formulation of the technical problem is therefore not accepted.
3.4 The proposed solution of the technical problem as defined in the patent in suit is the use of a lubricant composition comprising the claimed components (a) to (d) and an inorganic phosphorus acid.

As evidence that the technical problem as defined in point 3.3 above has been solved, the respondent relied on a number of test results provided in the patent in suit (see paragraph [0064]).

It was common ground that these tests are standard tests for automatic transmission lubricants (for example the Ford Mercon V Wear Tests) and manual transmission lubricants (for example the synchronising and pitting tests). No specific tests for dual clutch transmission lubricants are described. However, at the time the invention was made, dual clutch transmission was still a relatively new and unexplored field (see document (12), page 37, left-hand column, first complete paragraph). No standard tests specifically designed for the evaluation of dual clutch transmission lubricants were available. In fact, according to the evidence on file (see document (26), paragraphs 2 and 3), a suitable (standard) test was not developed until several years after the filing date of the patent in suit. Taking into account the multiple requirements which a dual clutch transmission lubricant must satisfy (see paragraph [0008] of the patent in suit), the board agrees with the opposition division and the respondent that the combination of standard tests described in the patent in suit was the best available model for establishing whether a composition was suitable for smooth and efficient lubrication of dual clutch transmission. In view of the test results provided in the patent in suit (see paragraph [0064]) and in the
absence of any evidence to the contrary, the board considers that the problem as formulated in point 3.3 above is plausibly solved.

3.5 According to the appellant, the test results described in the patent in suit could not be used as evidence that the claimed compositions efficiently lubricated dual clutch transmission, because in these tests the inorganic phosphorous acid reacted with the succinimide dispersant. Hence, the test results were achieved by a composition which did not fall within the scope of the claims.

3.6 The experimental evidence provided by the appellant in support of its contention (see statement of grounds of appeal, page 3, samples 1 and 2) is however not considered to be convincing for the following reasons:

The appellant did not conduct its experiment with the composition described in paragraph [0064] of the patent in suit. Instead, it used a very simple composition (sample 2) with an undefined - except for the molecular weight - succinimide, the results of which cannot be extended to the rather complex composition according to example 1 of the patent in suit. Furthermore, the board is not convinced that the signal which appears in the $^{31}$P-NMR spectrum of sample 2 (see document (28)) conclusively shows that the phosphoric acid has indeed reacted with the succinimide dispersant and was not merely dispersed. Lastly, when asked by the board, the appellant could not confirm that the peak in the $^{31}$P-NMR-spectrum of sample 2 was characteristic for P-N bonds, which would be expected when a dispersant with basic nitrogen groups like that in example 1 of the patent in suit reacts with phosphoric acid.
The board does not dispute that such a reaction is theoretically possible and takes place under certain conditions, as shown in document (25). However, in the absence of conclusive evidence that such a reaction takes places with a composition according to example 1 in the tests described in paragraph [0064] of the patent in suit, the appellant's contention is not accepted.

3.7 Furthermore, the appellant argued that it had not been shown that the technical problem was solved over the whole scope of the claims (see point VIII above).

However, in the absence of any evidence in support of its assertion, the appellant's argument cannot succeed. As set out in point 3.4 above, the performance tests for example 1 demonstrate that a composition comprising the claimed friction modifier (c) and an inorganic phosphorous compound plausibly solve the technical problem. The experimental data provided by the appellant (see document (27)) are not relevant in this context, in view of the fact that none of the compositions employed by the appellant falls inside the scope of claim 1 of the main request (see document (27), comparative examples 1 and 2). Furthermore, the appellant's argument with respect to the unique and different lubricating requirements for each particular dual clutch transmission and friction material is based on documents which were published several years after the invention was made (see documents 11, dated 2010 and document 12, published 2008). They do not reflect the common general knowledge of the skilled person at the filing date of the patent. The board also concurs with the respondent that in view of the prior art it is sufficient to provide evidence that compositions as defined in claim 1 of the main
request are suitable for lubricating dual clutch transmission. It is not necessary to establish improvements.

3.8 It then remains to be decided whether or not the proposed solution to the technical problem is obvious from the prior art.

As set out in point 3.2.2 above, the compositions in examples 1 and 2 of document (7) are automatic transmission fluids with a friction modifier that is different from the presently claimed modifier. Other modifiers are mentioned, but no reference is made to condensation products of fatty acids with polyalkylene polyamines. For this reason alone, document (7) cannot render the claimed subject-matter obvious. Moreover, document (7) is completely silent as to the performance of the compositions of examples 1 and 2 in standard tests for manual transmission. The ASTM D 5182 test mentioned on page 12, lines 22 to 26 of document (7) is part of the Ford Mercon V test for automatic transmission fluids (see document (9), page 11, point 3.7.2). Although document (7) mentions that the invention relates to lubricating fluids for automatic or manual transmission, it cannot be concluded that for this reason alone the automatic transmission fluids of examples 1 and 2 are equally suitable for manual transmission, in other words that these fluids meet the requirement of both automatic and manual transmission lubricants. The properties (e.g. of friction or wear) required for the lubrication of automatic or manual transmission are not identical and are usually adapted to either use with the help of suitable additives. The appellant’s argument with regard to the apparent suitability of the lubricants disclosed in document (7)
for dual clutch transmission is therefore not convincing.

Nor does the board agree with the argument that the suitability of automatic transmission fluids for dual clutch transmission was known to the person skilled in the art at the filing date of the patent in suit. In this context, the appellant relied on documents (1), (8) and (14). However, document (14) cannot be taken into account since it is questionable whether it was in the public domain at the time the invention was made. The appellant has not provided any evidence to show otherwise. Document (8) has a publication date of April 2010, i.e. seven years after the filing date of the patent in suit. It is not suitable to demonstrate what the skilled person would have considered at the time the invention was made. Document (1) is a patent document published after the priority date of the patent in suit. It is not relevant for the assessment of inventive step, and the statement referred to by the appellant (page 2, lines 16 to 29) does not refer to the suitability of automatic transmission fluids in dual clutch transmission. Rather, it states that the invention of document (1) can be used in automatic transmission as well as in hydraulic and other transmission fluids, including dual transmission.

Lastly, the board concurs with the opposition division that the wording of the claim is directed to the lubrication, by the claimed compositions, of a transmission having a plurality of wet clutches and a plurality of partial power transmission shafts. Lubrication of such a transmission requires lubrication of all parts, as correctly pointed out by the opposition division. Hence, the appellant's argument that the skilled person would consider automatic
transmission fluids to be suitable for dual clutch transmission, because only the lubrication of the wet clutch was required, is not accepted.

3.9 It follows from the above that the person skilled in the art faced with the problem of providing smooth and efficient lubrication for dual clutch transmission could find no incentive in document (7) to select the automatic transmission fluids disclosed therein and, in addition, modify the friction modifier in such a way as to arrive at the presently claimed subject-matter.

Nor can such an incentive be found in document (2). As mentioned in point 3.2.1 above, document (2) discloses a friction modifier which can be considered to be a condensation product of a fatty acid and a polyalkylene polyamine. However, said document relates solely to automatic transmission fluids and would not be considered by a skilled person searching for a dual clutch transmission lubricant that satisfies the additional requirement of adequately lubricating gearing and gear synchronisers typical for manual transmission.

3.10 At the oral proceedings before the board, the appellant, starting from document (7) as the closest prior art, did not rely on any other document in its assessment of inventive step. The board too sees no reason to assume that the claimed subject-matter would be rendered obvious by any other piece of the prior art available.

3.11 Hence, the board concludes that the subject-matter of claim 1 of the main request meets the requirement of Article 56 EPC.
3.12 Since this request is considered to be allowable, there is no need to consider auxiliary requests 1 to 5.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Schalow A. Lindner

Decision electronically authenticated