Appeal decision

Appeal No. 2016-16232

The Netherlands Appellant

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ASAMURA PATENT OFFICE

The case of appeal against the examiner's decision of refusal for Japanese Patent Application No. 2014-128784, titled "ENGINE LUBRICANT WITH ENHANCED THERMAL STABILITY" [Published on September 25, 2014 as Japanese Unexamined Patent Application Publication No. 2014-177646], has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

No. 1 History of the procedures

The present application is a divisional application filed on June 24, 2014, having its origin in Japanese Patent Application No. 2007-329193 with an application date of December 20, 2007 (claiming priority benefit under the Paris Convention for the Protection of Industrial Property from the receipt date of December 21, 2006 in the United States), and the history of the procedures after the filing is summarized as below:

July 1, 2014	Submission of written amendment (voluntary)
April 13, 2015	Notice of reasons for refusal
October 14, 2015	Submission of a written opinion and a written amendment
January 13, 2016	Notice of reasons for refusal
June 15, 2016	Submission of written opinion
June 29, 2016	Decision of refusal
October 31, 2016	Filing of appeal

No. 2 The Invention

The inventions according to Claims 1 to 6 of the present application should be specified by the matters recited in Claims 1 to 6 of the Claims that have been amended by the written amendment dated October 14, 2015. Further, the invention according to Claim 1 (hereinafter referred to as "The Invention") is set forth as below: "[Claim 1]

A lubricant composition for a vehicle engine comprising a mixture of the following components on the basis of the total mass of the lubricant composition, a sulfur content of 0.3 mass% or less, a phosphoric content of 0.09 mass% or less, and a sulfuric acid ash content of 1.6 mass% or less:

(a) at least 60 weight% of one or more kinds of Fischer-Tropsch synthetic base

oils, each Fischer-Tropsch synthetic base oil comprising a paraffin-based hydrocarbon with an alkyl branch of 12 or fewer per 100 carbons;

(b) one or more kinds of ashless dispersing agent;

(c) a mixture of a low ultrabasic cleanser with a total basic number (TBN) of 100 or less and a high ultrabasic cleanser with a TBN of 100 or more, with the proviso that TBNs of both of basic cleansers are not simultaneously 100;

(d) one or more kinds of abrasive resistant additives comprising a dihydrocarbyl dithiophosphoric acid metal salt, said additives constituting a phosphorus content of 0.03 to 0.075 mass% of said lubricant composition; and

(e) one or more kinds of antioxidants selected from the group consisting of a phenol-based antioxidant and an amine-based antioxidant."

No. 3 Outline of reasons for refusal stated in the examiner's decision

The reason of the examiner's decision is "Reason 1" described in the notice of reasons for refusal on January 13, 2016. In summary, the Invention was easily conceivable by a person skilled in the art on the basis of the invention described in the following publications that had been published in Japan or any other foreign country before the priority date of the application. Thus the appellant should not be granted a patent for these inventions under the provision of Article 29(2) of the Patent Act.

<List of Cited Documents>

Cited Document 1: Japanese Unexamined Patent Application Publication No. 2005-306913

Cited Document 2: Japanese Unexamined Patent Application Publication No. 2002-53888

Cited Document 3: International Publication No. 2005/037964 (The body's note: see the patent family of National Publication of International Patent Application No. 2007-508441 for Japanese translation)

No. 4 Judgment by the body

The body determines that the reasons for the above original decision have not yet been overcome since the Invention was still easily conceivable by a person skilled in the art on the basis of the inventions described in Cited Document 1 and the matters described in Cited Documents 1 and 3 even if the grounds which the appeal is based on are taken into consideration.

The reason is set forth below.

1 Described matters in Cited document 1

The above Cited Document 1 discloses the following matters:

- "[Scope of Claims]

[Claim 1]

A composition for engine lubricant in which the following components are dissolved or dispersed into a lubricant base oil on the basis of the total amount of the composition for lubricant:

a) 0.02 to 0.3 mass% of nitrogen-containing ashless dispersing agent on the basis of the nitrogen content equivalent;

b) 0.02 to 0.4 mass% of metal-containing cleanser on the basis of the metal

content equivalent;

c) 0.005 to 0.3 mass% of alkali metal borate hydrate on the basis of the alkali metal content equivalent; and

d) 0.01 to 0.12 mass% of dihydrocarbyl zinc dithiophosphate on the basis of the phosphorus content basis, with the proviso that 52 to 98 mol% of hydrocarbyl group in the dihydrocarbyl zinc dithiophosphate is a secondary alkyl group, and the remaining 2 to 48 mol% is a primary alkyl group or an alkyl aryl group.

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[Claim 8]

The composition for engine lubricant of Claim 1, wherein said lubricant base oil is a mineral oil with a vapor loss (ASTM D5800) of 15 mass% or less, an aromatic content of 10 mass% or less, and a sulfur content of 0.01 mass% or less, or a base oil mixture comprising 10 mass% or more of said mineral oil.

[Claim 9]

The composition for engine lubricant of Claim 1, further comprising 0.01 to 5 mass% of an antioxidant selected from the group consisting of a phenol compound, an amine compound, and a molybdenum compound.

... [Claim 11]

The composition for engine lubricant of Claim 1, wherein each component is selected so as to have a sulfuric acid content of 0.1 to 0.6 mass%, a sulfur content of 0.01 to 0.3 mass%, and a phosphorus content of 0.01 to 0.08 mass% on the total weight basis of the composition.

...

[Claim 13] The composition for engine lubricant of any one of Claims 1 to 12 for lubricating a

diesel engine. [Claim 14]

The composition for engine lubricant of any one of Claims 1 to 13 for lubricating an engine, to an exhaust system of which a cleaning catalyst and/or a particulate filter is attached."

- "[Problem to be solved by the Invention]

[0009]

The present invention has an objective to provide a composition for engine lubricant with less adverse effects on exhaust gas cleaning apparatus equipped for automobiles such as a particulate filter and an oxidation catalyst for oxidizing unburned soot and fuel and lubricant, as well as excellent high-temperature cleaning property and abrasion resistance, and capable of fully coping with exhaust gas regulation to be implemented in the near future.

[0010]

The present invention has an objective to provide an environment-responsive composition for engine lubricant with a low ash content, a low phosphorus content, and a low sulfur content, particularly suitable for the use in vehicles using a hydrocarbon fuel having a sulfur content of about 0.005 mass% or less, in particular 0.001 mass% or less, as a fuel for running, in particular diesel engine-mounted vehicles equipped with an exhaust gas cleaning apparatus (in particular a particulate filter, and an oxidation catalyst or a reduction catalyst).

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[Advantage of the Invention] [0015]

The lubricant composition of the Invention exhibits high-temperature cleaning ability and abrasion resistance comparable to or higher than those of commonly-used diesel engine oils with a high sulfuric acid ash content, a high phosphorus content, and a high sulfur content regardless of a low ash content (low sulfuric acid ash content), a low phosphorus content, and a low sulfur content. Therefore, the lubricant composition of the Invention is particularly suitable for the use in vehicles using a hydrocarbon fuel with a low sulfur content as a fuel for running, in particular diesel engine-mounted vehicles equipped with an exhaust gas cleaning apparatus (in particular a particulate filter, and an oxidation catalyst or a reduction catalyst)."

- "[Best Mode for Carrying Out the Invention]

[0016]

For a lubricant base oil in the lubricant composition of the Invention there are commonly used mineral oils and synthetic oils with a kinetic viscosity at 100°C of 2 to 50 mm²/s. The kinds of these mineral oils and synthetic oils or any other properties are not particularly limited, but the sulfur content is preferably 0.1 mass% or less, further preferably 0.03 mass% or less, particularly preferably 0.005 mass% or less. [0017]

Mineral oil-based base oils are preferably treated by subjecting a mineral-oilbased lubricant residue to, if necessary, a combination of treatment methods such as solvent purification or hydrogenation treatment. In particular, a highly hydrogenated purification (hydrogenolysis) base oil (e.g. a base oil with a viscosity index of 100 to 150, an aromatic content of 5 mass% or less, and nitrogen and sulfur contents of 50 ppm or less, respectively) is preferably used. The oils may include high viscosity index base oils produced by the isomerization and hydrogenolysis processes using a raw material of a mineral oil-based slack wax (crude wax) or a synthetic wax synthesized Hydrogenolysis base oil is preferable for the purpose of the from natural gas. Invention in terms of its low sulfur content, low volatility, less residual carbon content A most preferable lubricant base oil is a mineral oil with a vapor loss (ASTM etc. D5800) of 15 mass% or less, an aromatic content of 10 mass% or less, and a sulfur content of 0.01 mass% or less, or a base oil mixture comprising 10 mass% or more of said mineral oil.

[0018]

Synthetic oils (synthetic lubricant base oil) may include, for example, a polymer of α -olefin with a carbon number of 3 to 12 of poly- α -olefin, dialkyldiesters including dioctylsebacate, which is an ester of a dibasic acid such as sebacic acid, azelaic acid, or adipic acid and an alcohol with a carbon number of 4 to 18, polyolesters, which are esters of a monobasic acid with a carbon number of 3 to 18 and 1-trimethylolpropane or pentaerythritol and an alkylbenzene with an alkyl group having a carbon number of 9 to 40.

[0019]

In general, synthetic oil contains substantially no sulfur content, but has excellent oxidative stability and heat resistance. Once combusted, it produces less residual carbon or soot, and it is thus excellent for a base oil of a lubricant composition. [0020]

Mineral oil-based base oils and synthetic-based base oils may be respectively used solely, or if desired, two or more mineral oil-based base oils or two or more synthetic-based base oils may be used in combination. Further, mineral-based base oil and synthetic-based base oil may be used in combination if desired in any proportion."

- "[0033]

Conventionally, it is known that zinc dihydrocarbyl dithiolinate with a secondary alkyl group of a hydrocarbyl group has excellent abrasion resistant effects, whereas zinc dihydrocarbyl dithiolinate with a primary alkyl group of a hydrocarbyl group or alkyl aryl group has excellent heat resistance. The present invention utilizes this zinc dihydrocarbyl dithiolinate with the former (zinc dihydrocarbyl dithiolinate with a secondary alkyl group of hydrocarbyl group) being a major component, thereby being particularly suitable for the purpose of the Invention."

- "[Examples]

[0042]

(1) Production of lubricant composition

The lubricant composition according to the Invention and the lubricant composition for comparison were produced by use of the following additive components and base oil components. These lubricant compositions were prepared so that the addition of viscosity index improver might result in the viscosity grade of 10W30 (SAE viscosity grade).

[0043]

(2) Additives and base oils

Ashless dispersing agent A: Boron-containing succinimide dispersing agent [produced from polybutene with nitrogen content: 1.95 mass%, boron content: 0.66 mass%, chloride content: less than 5 mass ppm, number average molecular weight: about 1300 (at least 50% or more has a methylvinylidene structure) and maleic acid anhydride by a heat reaction method, and reacts the product with polyalkylenepolyamine with an average nitrogen atom number of 6.5 (per one molecule) and then subjects the resultant bis-type succinimide to the reaction treatment with boric acid]

[0044]

Ashless dispersing agent B: Ethylene carbonate-treated succinimide dispersing agent [produced from polybutene with nitrogen content:1.0 mass%, chloride content: 30 mass ppm, number average molecular weight: about 2300 (at least 50% or more has a methylvinylidene structure) and maleic acid anhydride by a heat reaction method, and reacts the product with polyalkylenepolyamine with an average nitrogen atom number of 6.5 (per one molecule) and then subjects the resultant bis-type succinimide to reaction treatment with ethylene carbonate]

[0045]

Cleaning agent A: Calcium sulfide phenate (Ca: 9.3 mass%, S: 3.4 mass%, TBN: 255 mg KOH/g)

[0046]

Cleaning agent B: Calcium sulfonate (Ca: 2.4 mass%, S: 2.9 mass%, TBN:17 mg KOH/g)

[0047]

Zinc dihydrocarbyl dithiolinate (ZnDTP)-1: zinc dialkyl dithiolinate (P: 7.2 mass%, Zn: 7.85 mass%, S: 14 mass%, produced by use of a raw material of a

secondary alcohol with a carbon number of 3 to 8) [0048]

Zinc dihydrocarbyl dithiolinate (ZnDTP)-2: zinc dialkyl dithiolinate (P: 7.3 mass%, Zn: 8.4 mass%, S: 14 mass%, produced by use of a raw material of a primary alcohol with a carbon number of 8)

[0049]

Zinc dihydrocarbyl dithiolinate (ZnDTP)-3: zinc dialkyl dithiolinate (P: 2.85 mass%, Zn: 3.15 mass%, S: 5.9 mass%, produced by use of a raw material of dodecyl phenol)

[0050]

Antioxidant A: Amine-based compound [Dialkyldiphenylamine (alkyl group: a mixture of C4 to C8), N: 4.6 mass%, TBN: 180 mg KOH/g]

[0051]

Antioxidant B: Phenol-based compound [3-(3,5-di-t-butyl-4-hydroxypheyl)octyl propionate]

[0052]

Antioxidant C: Molybdenum (Mo) compound [oxymolybdenum-succinimide complex compound containing sulfur (Mo: 5.5 mass%, S: 0.2 mass%, TBN: 10 mg KOH/g)

[0053]

Alkali metal borate: fine particle dispersion of potassium borate hydrate (Experimental formula $KB_3O_5H_2O$, K: 8.3 mass%, B: 6.8 mass%, S: 0.26 mass%, TBN: 125 mg KOH/g)

[0054]

Viscosity index improver (VII): Non-dispersive type ethylene-propylene copolymer

[0055]

Pour-Point Depressant (PPD): polymethacrylate-based compound

[0056]

Base oil: Base oil in which hydrogenolysis mineral oil A (kinetic viscosity at 100° C of 6.5 mm²/s, viscosity index of 132, a vapor loss (ASTM D5800) of 5.6 mass%, a sulfur content of less than 0.001 mass%, an aromatic content of 9 mass%) and hydrogenolysis mineral oil B (kinetic viscosity at 100°C of 4.1 mm²/s, viscosity index of 127, a vapor loss (ASTM D5800) of 15 mass%, a sulfur content of less than 0.001 mass%, an aromatic content of less than 0.001 mass%, a sulfur content of les

[0057]

[Example 1]

(1) To a base oil, the following components were added and mixed (the additive amounts are on the total weight basis of lubricant composition) to prepare the lubrication agent composition of the Invention (The body's note: it is recognized as a typo of the lubricant composition.).

[0058]

Ashless dispersing agent A (additive amount: 0.51 mass%, nitrogen content equivalent additive amount: 0.01 mass%)

Ashless dispersing agent B (additive amount: 6.0 mass%, nitrogen equivalent additive amount: 0.06 mass%)

Metal-containing cleaning agent A. (additive amount: 0.75 mass%, calcium equivalent additive amount: 0.07 mass%)

Metal-containing cleaning agent B (additive amount: 0.83 mass%, calcium equivalent additive amount: 0.02 mass%)

ZnDTP-1 (Additive amount: 0.69 mass%, phosphorus content equivalent additive amount: 0.05 mass%)

ZnDTP-2 (Additive amount: 0.34 mass%, phosphorus content equivalent additive amount: 0.025 mass%)

Antioxidant A (Additive amounts: 0.2 mass%)

Antioxidant B (Additive amounts: 0.2 mass%)

Antioxidant C (Additive amounts: 0.2 mass%)

Alkali metal borate hydrate (Additive amounts: 0.24 mass%, potassium equivalent additive amounts: 0.02 mass%)

VII (Additive amounts: 4.2 mass%)

PPD (Additive amounts: 0.3 mass%)

[0059]

(2) Chemical properties of the obtained lubricant composition are set forth as below:

Sulfuric acid ash content: 0.49 mass%

Phosphorus (P) content: 0.075 mass%

Sulfur (S) content: 0.3 mass%

Chloride (Cl) content: less than 5 mass ppm

Phosphorus content of ZnDTP-1/phosphorus content of ZnDTP-2=67/33 (mass ratio)

Alkali metal of alkali metal borate/ nitrogen of ashless dispersing agent=1/3.5 (mass ratio)

[0073]

...

[Performance Evaluation of Lubricant Composition]

(1) Diesel engine test (JASO cleaning level test: JASOM336-98): Cleaning level of top ring groove of piston (Evaluation of occurrence % of groove clogging (average): lower is preferable)

The performance of lubricant compositions prepared in the examples and comparative examples were tested by use of a water-cooling, four-cylinder, 2500-cc combustion subchamber-type diesel engine. Engine test was conducted for 200 hours (oil exchange in 100 hours) at an oil temperature of 120°C with an engine rotation number of 4300 rpm in a full load operation, and the evaluation of piston after the test was conducted by Japan Petroleum Institute method. For a fuel there was used a light diesel oil with a sulfur content of 0.05 mass%.

[0074]

(2) Diesel engine test (JASO valve train abrasion test: JASO M354-99): Evaluation of cam abrasion (lower is preferable)

The performance of lubricant compositions prepared in the examples and comparative examples were tested by use of a water-cooling, four-cylinder, 3900-cc, fuel direct injection-type diesel engine equipped with an intercooled turbocharger. Engine test was conducted for 160 hours at an oil temperature of 105°C with an engine rotation number of 3200 rpm in full load operation, and the evaluation of piston after the test was conducted by the Japan Petroleum Institute method. For a fuel there was

used a light diesel oil with a sulfur content of 0.05 mass%. [0075] [Evaluation test results]

JASO cleaning abi	JASO valve train abrasion test	
[Top ring groove c	[Cam abrasion (average): µm]	
Example 1	41	45
Example 2	46	32
Example 3	39	45
Comparative Example 1	65	30
Comparative Example 2	40	229
Comparative Example 3	48	67

[0076]

As is evident from the above evaluation test results, the lubricant compositions of the Invention (Examples 1 to 3) showed a low rate of occurrence of top ring groove clogging in a test for the evaluation of high-temperature cleaning ability, and further a low cam abrasion also in a valve train abrasion test. Specifically, the lubricant composition of the Invention exhibits balanced, excellent high-temperature cleaning ability and abrasion resistance regardless of its low ash content, low phosphorus content, and low sulfur content."

2 Described matter of the Cited Document 3

The above Cited Document 3 discloses the following matters (Note that the corresponding part of National Publication of International Patent Application No. 2007-508441, which is a patent family member of Cited Document 3, is described as it includes the paragraph numbers as the Body's translation.).

*"WHAT IS CLAIMED IS:

1. A lubricant base oil comprising paraffinic hydrocarbon components in which the extent of branching is less than 8 alkyl branches per 100 carbons and less than 20 wt% of the alkyl branches are at the 2 position; the lubricant base oil having a pour point of less than -8°C; a kinematic viscosity at 100°C of about 3.2 cSt or greater; and a Viscosity Index greater than a Target Viscosity Index as calculated by the following equation: Target Viscosity Index = $22 \times \ln(\text{Kinematic Viscosity at } 100^{\circ}\text{C}) + 132$.

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...

11. The lubricant base oil of claim 1, wherein the lubricant base oil is derived from a Fischer-Tropsch synthesis process.

25. A finished lubricant comprising: the lubricant base oil of claim 1; and one or more lubricant additives." (Page 35, line 1 to Page 38, line 7)

[0056]

*"Feedstock

According to the present invention, the feed to the process to produce lubricant base oils with optimized branching is a waxy hydrocarbon feed. The waxy hydrocarbon feedstocks useful in the processes disclosed herein may be synthetic waxy feedstocks, such as Fischer Tropsch waxy hydrocarbons, or may be derived from natural sources, such as petroleum waxes. Accordingly, the waxy feedstocks to the processes may comprise Fischer Tropsch derived waxy feeds, petroleum waxes, waxy distillate stocks such as gas oils, lubricant oil stocks, high pour point poly α olefins, foots oils, normal α olefin waxes, slack waxes, deoiled waxes, and microcrystalline waxes, and mixtures thereof. Preferably, the waxy feedstocks are derived from Fischer Tropsch waxy feeds. A substantial proportion of the waxy feed comprises molecules with a carbon number of C 20+ and has a boiling point generally above about 600°F (316°C). The majority of the molecules in the waxy feed are higher molecular weight n-paraffins and slightly branched paraffins which contribute to the waxy nature of the feed.

The waxy hydrocarbon feedstock may be hydrotreated prior to the process as described herein if desired.

[0057]

Fischer-Tropsch Synthesis

Preferably, the waxy feedstocks of the present invention are derived from Fischer Tropsch waxy feeds. In Fischer-Tropsch chemistry, syngas is converted to liquid hydrocarbons by contact with a Fischer-Tropsch catalyst under reactive conditions. Typically, methane and optionally heavier hydrocarbons (ethane and heavier) can be sent through a conventional syngas generator to provide synthesis gas. Generally, synthesis gas contains hydrogen and carbon monoxide, and may include minor amounts of carbon dioxide and/or water. The presence of sulfur, nitrogen, halogen, selenium, phosphorus, and arsenic contaminants in the syngas is undesirable." (Page 14, line 20 to Page 15, line 15)

[0067]

*"Hydroisomerization

According to the present invention, the waxy hydrocarbon feedstock is subjected to hydroisomerization in a hydroisomerization zone, producing an intermediate oil isomerate.

[0068]

Hydroisomerization is intended to improve the cold flow properties of a lubricant base oil by the selective addition of branching into the molecular structure. Hydroisomerization dewaxing ideally will achieve high conversion levels of waxy feed to non-waxy iso-paraffins while at the same time minimizing the conversion by cracking." (Page 17, line 28 to Page 18, line 13)

[0084]

*"Solvent Dewaxing

According to the present invention, the intermediate oil isomerates are subjected to solvent dewaxing, producing lubricant base oils comprising paraffinic hydrocarbon components with optimized branching properties. Therefore, the solvent dewaxing produces lubricant base oils comprising paraffinic hydrocarbon components having low amounts of branching overall with branching concentrated toward the center of the molecules." (Page 21, lines 18 to 24)

[0094]

*"Hydrofinishing

The lubricant base oil comprising paraffinic hydrocarbon components with optimized branching, or optionally the intermediate oil isomerate, may be hydrofinished in order to improve product quality and stability. During hydrofinishing, overall LHSV is about 0.25 to 2.0, preferably about 0.5 to 1.0. The hydrogen partial pressure is greater than 200 psia, preferably ranging from about 500 psia to about 2000 psia. Hydrogen recirculation rates are typically greater than 50 SCF/Bbl, and are preferably between 1000 and 5000 SCF/Bbl. Temperatures range from about 300°F to about 750°F, preferably ranging from 450°F to 600°F." (Page 23, line 29 to Page 24, line 4)

[0097]

*"Lubricant Base Oils with Optimized Branching

The lubricant base oils of the present invention comprise paraffinic hydrocarbon components in which the branching is optimized. The lubricant base oils comprising paraffinic hydrocarbon components with optimized branching have high viscosities, low pour points, and exceptionally high VFs. The lubricant base oils of the Invention have kinematic viscosities at 100°C greater than about 3.2 cSt, preferably between about 3.2 cSt and about 20 cSt. In addition, the lubricant base oils of the Invention comprise paraffinic hydrocarbon components having average carbon numbers of greater than about 27, preferably greater than about 30, and more preferably greater than about 27 and less than about 70.

[0098]

The American Petroleum Institute (API) has classified base oils according to their chemical composition. As defined by the API, Group III oils are very high viscosity index oils (>120) having a total sulfur content less than 300 ppm and a saturates content of greater than or equal to 90%. API Group III oils also are traditionally manufactured by severe hydrocracking and or wax isomerization. Lubricant base oils of the Invention are generally classified as API Group III base oils. When they are made from waxy feeds with a low total sulfur content, such as a Fischer-Tropsch feeds, the lubricant base oils will also have a total sulfur content less than 300 ppm.

[0099]

Lubricant base oils according to the present invention made from Fischer-Tropsch waxy feeds generally have total sulfur contents of less than about 5 ppm, saturates contents of greater than 95%, and total naphthene contents of between zero and about 8%, preferably between zero and about 5%. Total sulfur is determined using ultraviolet fluorescence by ASTM D 5453-00.

[0100]

In particular, the lubricant base oils comprise paraffinic hydrocarbon components having fewer than 8 alkyl branches per 100 carbons, preferably fewer than 7 alkyl branches per 100 carbons, and more preferably fewer than 6.5 alkyl branches per 100 carbons. The branching at the two position, as determined by NMR branching analysis,

is less than 20 wt%, preferably less than 15 wt%. The branching at the two plus three positions is less than 25 wt%, preferably less than 20 wt%. In addition the branching at the five or greater positions is greater than 50 wt%, preferably greater than 60 wt%. The free carbon indexes of the lubricant base oils of the present invention are generally greater than about 3, and preferably greater than about 5.

[0104]

The viscosity indexes of the lubricant base oils comprising paraffinic hydrocarbon components with optimized branching are extremely high and are greater than the Target Viscosity Index of the lubricant base oil, preferably greater than the Target Viscosity Index of the lubricant base oil plus 5. The range of kinematic viscosities of the lubricant base oils with optimized branching are greater than 3.2 cSt at 100°C and may be between about 3.2 cSt and about 20 cSt at 100°C.

[0107]

...

Since the lubricant base oils of the present invention have extremely low amounts of aromatics and multi-ring naphthenes, the lubricant base oils have superior oxidation stability." (Page 24, line 19 to Page 26, line 30)

[0109]

*"<u>Blends</u>

The lubricant base oils of the present invention may be used alone or may be blended with additional base oils selected from the group consisting of conventional Group I base oils, conventional Group II base oils, conventional Group III base oils, isomerized petroleum wax, polycolefins (PAO), poly internal olefins (PIO), diesters, polyol esters, phosphate esters, alkylated aromatics, and mixtures thereof.

...

[0113] Finished Lubricants

Lubricant base oils are the most important component of finished lubricants, generally comprising greater than 70% of the finished lubricants. Finished lubricants comprise a lubricant base oil and at least one additive. Finished lubricants may be used in automobiles, diesel engines, axles, transmissions, and industrial applications. Finished lubricants must meet the specifications for their intended application as defined by the concerned governing organization. [0114]

The lubricant base oils of the present invention are useful in commercial finished lubricants. As a result of their excellent VFs and low temperature properties, the lubricant base oils of the present invention are suitable for formulating finished lubricants intended for many of these applications. In addition, the excellent oxidation stability of the lubricant base oils of the present invention makes them useful in finished lubricants for many high temperature applications. [0115]

Additives, which may be blended with the lubricant base oil of the present invention to provide a finished lubricant composition, include those which are intended to improve select properties of the finished lubricant. Typical additives include, for example, anti-wear additives, EP agents, detergents, dispersants, antioxidants, pour point depressants, VI improvers, viscosity modifiers, friction modifiers, demulsifiers, antifoaming agents, corrosion inhibitors, rust inhibitors, seals, swell agents, emulsifiers, wetting agents, lubricity improvers, metal deactivators, gelling agents, tackiness agents, bactericides, fluid-loss additives, colorants, and the like." (Page 27, line 17 to Page 28, line 26)

3 The invention described in Cited Document 1 (Cited Invention)

Cited Document 1 discloses in Scope of Claims a composition for engine lubricant. The lubricant composition of [Example 1] is exemplified as one specific example (see [0056] for base oil, [0058] and in detail [0043] to [0055] for additive components, and [0059] for chemical properties of the obtained lubricant composition, respectively. Further, it can be found that the contents of the additive components in [Example 1] add up to 14.46 mass% (=0.51+6.0+0.75+0.83+0.69+0.34+0.2+0.2+0.2+0.24+4.2+0.3) and the content of the base oil is 85.54 mass% (=100-14.46).).

Further, as described in [0009], [0010], and [0015], the engine lubricant composition is intended for an environment-responsive engine lubricant composition with a low ash content (low sulfuric acid ash content), a low phosphorus content, and a low sulfur content suitable for the use in vehicles, in particular diesel engine-mounted vehicles equipped with an exhaust gas cleaning apparatus. This can be seen from the description of [0073] to [0076] that the lubricant composition of the above [Example 1] was actually served for diesel engine tests for vehicles of JASO cleaning level test (M336-98) and JASO valve train abrasion test (M354-99) (Note that "JASO cleaning level test (M336-98)" and "JASO valve train abrasion test (M354-99)" are the quality standards of diesel engine oil for vehicles, which is referred by "Operation manual of diesel engine lubricant standard for vehicles (JASO M355:2017)" (q.v. URL: "http://www.jalos.or.jp/onfile/pdf/DH_J1706.pdf"), "3. 2 History of establishment of standard").

Consequently, Cited Document 1 discloses in [Example 1] the following invention (hereinafter referred to as "Cited Invention").

"A diesel engine lubricant composition for vehicles prepared by adding the following additives to the following base oil and mixing (the content is on the total amount basis of lubricant composition, and the contents of base oils and additives add up to base oil: 85.5 4 mass%; and additives: 14.46 mass%), wherein the chemical properties of the lubricant composition sulfuric acid content: 0.49 mass%, phosphorus (P) content: 0.075 mass%, sulfur (S) content: 0.3 mass%, chloride (Cl) content: less than 5 mass ppm, phosphorus content of ZnDTP-1/phosphorus content of ZnDTP-2=67/33 (mass ratio), alkali metal of alkali metal borate/nitrogen of ashless dispersing agent=1/3.5 (mass ratio).

<Base oil>

Base oil in which hydrogenolysis mineral oil A (kinetic viscosity at 100°C of 6.5 mm^2 /s, a viscosity index of 132, a vapor loss (ASTM D5800) of 5.6 mass%, a sulfur content of less than 0.001 mass%, an aromatic content of 9 mass%) and hydrogenolysis mineral oil B (kinetic viscosity at 100°C of 4.1 mm²/s, a viscosity index of 127, a vapor loss (ASTM D5800) of 15 mass%, a sulfur content of less than 0.001 mass%, an aromatic content of less than 0.001 mass%, an aromatic content of 8 mass%) are mixed with each other at a mass ratio of 65:35 <Additives>

Ashless dispersing agent A (additive amount: 0.51 mass%, nitrogen content equivalent additive amount: 0.01 mass%)

Ashless dispersing agent B (additive amount: 6.0 mass%, nitrogen equivalent additive amount: 0.06 mass%)

Metal-containing cleaning agent A (additive amount: 0.75 mass%, calcium equivalent additive amount: 0.07 mass%)

Metal-containing cleaning agent B (additive amount: 0.83 mass%, calcium equivalent additive amount: 0.02 mass%)

ZnDTP-1 (Additive amount: 0.69 mass%, phosphorus content equivalent additive amount: 0.05 mass%)

ZnDTP-2 (Additive amount: 0.34 mass%, phosphorus content equivalent additive amount: 0.025 mass%)

Antioxidant A (Additive amounts: 0.2 mass%)

Antioxidant B (Additive amounts: 0.2 mass%)

Antioxidant C (Additive amounts: 0.2 mass%)

Alkali metal borate hydrate (Additive amounts: 0.24 mass%, potassium equivalent additive amounts: 0.02 mass%)

VII (Additive amounts: 4.2 mass%)

PPD (Additive amounts: 0.3 mass%)

Here, the details of each additive component are set forth as below:

- Ashless dispersing agent A: Boron-containing succinimide dispersing agent [produced from polybutene with nitrogen content: 1.95 mass%, boron content: 0.66 mass%, chloride content: less than 5 mass ppm, number average molecular weight: about 1300 (at least 50% or more have a methylvinylidene structure) and maleic acid anhydride by a heat reaction method, and reacts the product with polyalkylenepolyamine with an average nitrogen atom number of 6.5 (per one molecule) and then subjects the resultant bis-type succinimide to the reaction treatment with boric acid]

- Ashless dispersing agent B: Ethylene carbonate-treated succinimide dispersing agent [produced from polybutene with nitrogen content:1.0 mass%, chloride content: 30 mass ppm, number average molecular weight: about 2300 (at least 50% or more have a methylvinylidene structure) and maleic acid anhydride by a heat reaction method, and reacts the product with polyalkylenepolyamine with an average nitrogen atom number of 6.5 (per one molecule) and then subjects the resultant bis-type succinimide to the reaction treatment with ethylene carbonate]

- Metal-containing cleaning agent A: Calcium sulfide phenate (Ca: 9.3 mass%, S: 3.4 mass%, TBN: 255 mg KOH/g)

- Metal-containing cleaning agent B: Calcium sulfonate (Ca: 2.4 mass%, S: 2.9 mass%, TBN:17 mg KOH/g)

- ZnDTP-1 (Zinc dihydrocarbyl dithiolinate): zinc dialkyl dithiolinate (P: 7.2 mass%, Zn: 7.85 mass%, S: 14 mass%, produced by use of a raw material of a secondary alcohol with a carbon number of 3 to 8)

- ZnDTP-2 (Zinc dihydrocarbyl dithiolinate): zinc dialkyl dithiolinate (P: 7.3 mass%, Zn: 8.4 mass%, S: 14 mass%, produced by use of a raw material of a primary alcohol with a carbon number of 8)

- Antioxidant A: Amine-based compound [Dialkyldiphenylamine (alkyl group: a mixture of C4 to C8), N: 4.6 mass%, TBN: 180 mg KOH/g]

- Antioxidant B: Phenol-based compound [3-(3,5-di-t-butyl-4-hydroxypheyl)octyl propionate]

- Antioxidant C: Molybdenum (Mo) compound [oxymolybdenumsuccinimide complex compound containing sulfur (Mo: 5.5 mass%, S: 0.2 mass%, TBN: 10 mg KOH/g)

- Alkali metal borate hydrate: fine particle dispersion of potassium borate hydrate (Experimental formula $KB_3O_5H_2O$, K: 8.3 mass%, B: 6.8 mass%, S: 0.26 mass%, TBN: 125 mg KOH/g)

- VII (Viscosity index improver): Non-dispersive type ethylene-propylene copolymer

- PPD (Pour-Point Depressant): polymethacrylate-based compound"

4 Comparing the Cited Invention to the Invention

The lubricant composition of the cited invention is compared to the lubricant composition of the Invention.

(1) Correspondence between the two

A Regarding uses of the two inventions, since the cited invention is a lubricant composition of diesel engine for vehicles, the use of the Invention, which is for a vehicle engine, includes the use of the cited invention.

B When it comes to the sulfur content, phosphorus content, and sulfuric acid ash content of the two, the sulfur content, phosphorus content and sulfuric acid ash content of the cited invention are respectively "0.3 mass%," "0.075 mass%," and "0.49 mass%," and thus satisfies the numerical ranges of "0.3 mass% or less," "0.09 mass% or less," and "1.6 mass% or less" as specified in the Invention.

C When it comes to base oils of the two, "at least 60 weight% of one or more kinds of Fischer-Tropsch synthetic base oils, each Fischer-Tropsch synthetic base oil comprising a paraffin-based hydrocarbon with an alkyl branch of 12 or fewer per 100 carbons" of the Invention and "base oil" of the cited invention have in common that they are both base oils.

D When it comes to the additives of the two, it can be said that "ashless dispersing agent A (Boron-containing succinimide dispersing agent)" and "ashless dispersing agent B (Ethylene carbonate-treated succinimide dispersing agent)" of the cited invention correspond to "one or more kinds of ashless dispersing agent" of the Invention in view of the fact that [0064] of the present specification exemplifies "succinimide dispersing agent" as an ashless dispersing agent.

In view of the fact that [0058] of the present specification exemplifies that "A low ultrabasic calcium sulfonate cleanser with a TBN of about 17 and a high ultrabasic calcium sulfide phenate cleanser with a TBN of about 260 are two typical ultrabasic cleansers in the lubricant composition of the Invention.," it can be said that the "metal-containing cleaning agent A (calcium sulfide phenate)" (TBN=255) and "metal-containing cleaning agent B (calcium sulfonate)" (TBN=17) of the cited invention respectively correspond to "a high ultrabasic cleanser with a TBN of 100 or more" and "a low ultrabasic cleanser with a total basic number (TBN) of 100 or less" of the Invention.

"ZnDTP-1 (zinc dihydrocarbyl dithiolinate)" and "ZnDTP-2 (zinc dihydrocarbyl dithiolinate)" of the cited invention are encompassed into "dihydrocarbyldithiolinate metal salt" of the Invention, as [0076] of the present specification discloses that "a metal

salt of dihydrocarbon dithiolinate is frequently used as abrasion resistant additives and antioxidants. Metals may be an alkali or an alkali earth metal, or aluminum, lead, tin, molybdenum, manganese, nickel or copper. Zinc salt is the most commonly used for lubricant, and the amount is about 0.1 to about 10 mass%, preferably about 0.2 to about 2 mass% on the total mass basis of lubricant composition." and in particular it can be said that "ZnDTP-1" produced by use of a secondary alcohol corresponds to "one or more kinds of abrasive resistant additives" of the Invention since it was added in anticipation of abrasion resistant effects as described in [0033] of Cited Document 1. Further, phosphorus equivalent additive amount of the "ZnDTP-1" is 0.05 mass%. Thus it satisfies the provision of phosphorus content of the Invention of "0.03 to 0.075 mass%" (Note that if both the "ZnDTP-1" and "ZnDTP-2" are construed as "abrasion resistant additives," the phosphorus equivalent additive amounts add up to be 0.075 mass%, and thus it still satisfies the provision of the phosphorus content of the Invention).

"Antioxidant A (amine-based compound)" and "antioxidant B (phenol-based compound)" of the cited invention respectively correspond to "amine-based antioxidant" and "phenol-based antioxidant" of the Invention.

As seen above, it can be said that the cited invention includes all the additives corresponding to component (b), component (c), component (d), and component (e) in the Invention.

(2) Corresponding features

As discussed in the above item (1), the Invention and the cited invention have the following point in common:

"A lubricant composition for vehicle engine comprising a mixture of the following components on the basis of the total mass of the lubricant composition, a sulfur content of 0.3 mass% or less, a phosphoric content of 0.09 mass% or less, and a sulfuric acid ash content of 1.6 mass% or less:

(a) base oil;

(b) one or more kinds of ashless dispersing agent;

(c) a mixture of a low ultrabasic cleanser with a total basic number (TBN) of 100 or less and a high ultrabasic cleanser with a TBN of 100 or more, with the proviso that TBNs of both of basic cleansers are not simultaneously 100;

(d) one or more kinds of abrasive resistant additives comprising a dihydrocarbyl dithiophosphoric acid metal salt, said additives constituting phosphorus content of 0.03 to 0.075 mass% of said lubricant composition; and

(e) one or more kinds of antioxidant selected from the group consisting of phenol-based antioxidant and amine-based antioxidant."(3) Different features

Further, the inventions are different from each other in the following points:

- Difference: For a base oil, the Invention uses "(a) at least 60 weight% of one or more kinds of Fischer-Tropsch synthetic base oils, each Fischer-Tropsch synthetic base oil comprising a paraffin-based hydrocarbon with an alkyl branch of 12 or fewer per 100 carbons," whereas the cited invention uses "base oil in which hydrogenolysis mineral oil A (kinetic viscosity at 100°C of 6.5 mm²/s, viscosity index of 132, a vapor loss (ASTM D5800) of 5.6 mass%, a sulfur content of less than 0.001 mass%, an aromatic content of 9 mass%) and hydrogenolysis mineral oil B (kinetic viscosity at

100°C of 4.1 mm²/s, a viscosity index of 127, a vapor loss (ASTM D5800) of 15 mass%, a sulfur content of less than 0.001 mass%, an aromatic content of 8 mass%) are mixed with each other at a mass ratio of 65:35."

5 Examination on Different Features

(1) Regarding a conventional method for deriving a lubricant base oil via synthetic wax from natural gas

A First, summarizing the common method for deriving lubricant base oil via synthetic gas from natural gas, when finally deriving lubricant base oil from a starting material of natural gas, a synthetic gas is firstly produced from natural gas, and the synthetic gas is subjected to Fischer-Tropsch synthesis to produce a synthetic wax (Fischer-Tropsch wax), and the synthetic wax is subjected to the treatment such as hydrogenolysis, isomerization, and dewaxing to produce a lubricant base oil.

It should be noted that the following reference documents are considered in summarizing the common method.

<Reference Document 1> (Attached at the end of the document)

Journal of the Japanese Association for Petroleum Technology, Vol. 70, No. 2 (March, 2005), pages 177 to 186 (see, in particular, "3. Summary of GTL process", "4.1 Representative GTL products", FIG. 2, Table 1)

Reference document 1 describes the production technique of lubricant base oil (GTL lubricant base oil) by narrowly defined GTL (Gas To Liquids) (Fischer-Tropsch synthetic process). Specifically, it discusses the process of producing a base oil including the steps of obtaining a synthetic gas from a natural gas, and subjecting the synthetic gas to Fischer-Tropsch synthesis, and subjecting the produced wax to hydrogenolysis, and it discloses in Table 1 that the GTL lubricant base oil has no sulfur content and high viscosity index as well as excellent heat stability.

<Reference Document 2>

National Publication of International Patent Application No. 2004-528413 (In particular, see [0003] to [0005], [0037])

Reference document 2 describes the conversion of methane in natural gas into synthetic gas and subjects the synthetic gas to Fisher-Tropsch synthesis, and subjects the obtained wax to hydrogenolysis to produce a lubricant base oil.

B Here, when it comes to the production method of Fischer-Tropsch synthetic base oil of the Invention, the specification of the present application discloses the production method as in the following:

- "[0015]

... To produce a lubricant base oil from a natural gas, it is necessary to convert natural gas mostly consisting of methane into a synthetic gas of a mixture of carbon monoxide and hydrogen or "synthetic gas (syngas)". ...

[0016]

To specifically convert a synthetic gas into a product stream including a lubricant base oil, Fischer-Tropsch method is used. ..."

- "[0033]

[Oil of lubricant viscosity]

1) Fisher-Tropsch synthetic base oil

•••

[0034]

At least one kind from one or more kinds of base oils used for engine lubricant composition of the Invention is FTBO. As aforementioned, Fischer-Tropsch synthetic base oil is originally derived from natural gas by the Fischer-Tropsch chemical method."

- "[0040]

Preferable FTBO may be produced by methods known in the art. Many of them include the step of hydrogenation isomerization of any Fischer-Tropsch synthetic product and the subsequent dewaxing step of high boiling point residues."

The production method of Fischer-Tropsch synthetic base oil explained in these paragraphs is nothing but a common method for deriving lubricant base oil from natural gas via synthetic wax as summarized in A above. Thus it can be seen that the Invention also adopts the common method.

(2) Matters described in Cited Document 1 (Teaching of base oil and matter relating to properties required for base oil)

A Teaching of base oil

Base oil of the cited invention is a mixture of hydrogenolysis mineral oil A and hydrogenolysis mineral oil B. Cited Document 1 mentions about the hydrogenolysis mineral oil in [0017] as set forth below (Underlined by the body):

"Mineral oil-based base oils are preferably treated by subjecting a mineral-oil-based lubricant residue to, if necessary, a combination of treatment methods such as solvent purification or hydrogenation treatment. In particular, a highly hydrogenated purification (hydrogenolysis) base oil (e.g. a base oil with a viscosity index of 100 to 150, an aromatic content of 5 mass% or less, nitrogen and sulfur contents of 50 ppm or less, respectively) is preferably used. The oils may include high viscosity index base oils produced by the isomerization and hydrogenolysis processes using a raw material of mineral oil-based slack wax (crude wax) or synthetic wax synthesized from natural gas. Hydrogenolysis base oil is preferable for the purpose of the Invention, in terms of low sulfur content, low volatility, less residual carbon content, etc. Most preferable lubricant base oil is a mineral oil with a vapor loss (ASTM D5800) of 15 mass% or less, an aromatic content of 10 mass% or less, and a sulfur content of 0.01 mass% or less, or a base oil mixture comprising 10 mass% or more of said mineral oil."

It can be seen from the description that Cited Document 1 shows a highlyhydrogenated purification (hydrogenolysis) base oil as a preferable example of mineral oil-based base oil, and specifically includes a high viscosity index base oil produced by the isomerization and hydrogenolysis processes using a raw material of mineral oilbased slack wax (crude wax) or synthetic wax synthesized from natural gas.

Furthermore, it is reasonable to believe that "high viscosity index base oils produced by the isomerization and hydrogenolysis processes using a raw material of synthetic wax synthesized from natural gas" used herein refer to lubricant base oils derived by this common method; i.e., "Fischer-Tropsch synthetic base oil" of the Invention in view of the common method for deriving a lubricant base oil via a synthetic wax from natural gas, which was summarized in the above item (1).

Consequently, a person skilled in the art who read the description of the [0017] of Cited Document 1 would regard "Fischer-Tropsch synthetic base oil" corresponding to hydrogenolysis mineral oil as a teaching of preferable mineral oil-based base oil.

B Properties required for base oil (Problem underlying base oil of the cited invention)

Further, when consideration is given to properties required for base oil, the above [0017] of Cited Document 1 shows properties such as "high viscosity index" and "low sulfur content." It can thus be said that the base oil of the cited invention is expected to have such properties.

Furthermore, Cited Document 1 discloses in [0019] that "In general, synthetic oil contains substantially no sulfur content, but has excellent oxidative stability and heat resistance. Once combusted, it produces less residual carbon or soot, and it is thus excellent for a base oil of lubricant composition." Thus it is reasonable to believe that the base oil of the cited invention is expected to have excellent "oxidative stability" and "heat resistance (thermal stability)."

Further, it can be said that these properties are common properties required for base oil of lubricant composition.

(3) Matter described in Cited Document 3 (matter relating to Fischer-Tropsch synthetic base oil with a specific structure)

A "Lubricant base oil" of [Claim 1] of Cited Document 3 (which is, for convenience, substituted by the corresponding part of National Publication of International Patent Application No. 2007-508441 used as a body's translation. The same shall apply hereinafter when any corresponding part of Cited Document 3 is pointed out.) is assumed to be a base oil derived by the Fischer-Tropsch synthetic method in view of the recitation of [Claim 11]. It is thus recognized that Cited Document 3 discloses the following base oils (hereinafter referred to as "base oils described in Cited Document 3"):

"A lubricant base oil derived by Fischer-Tropsch synthetic method, the base oil comprising a paraffin-based hydrocarbon having a degree of branches of fewer than eight alkyl branches per 100 carbons, and having less than 20 weight % of alkyl branches at 2-position, wherein said lubricant base oil has a flow point of lower than - 8°C; a kinetic viscosity at 100°C of about 3.2 cSt or more; and a viscosity index greater than a target viscosity index calculated by the following formula:

Target viscosity index= 22 x ln(kinetic viscosity at 100°C) + 132."

B Consequently, it can be said that Fischer-Tropsch synthetic base oils comprising a paraffin-based hydrocarbon with an alkyl branch of 12 or fewer per 100 carbons used in the Invention (hereinafter referred to as "Fischer-Tropsch synthetic base oil with a specific structure according to the Invention") itself had already been disclosed in Cited Document 3.

In addition, in view of the description of production method of base oil in the Cited Document 3, specifically [0056] (Feedstocks), [0057] (Fischer-Tropsch synthesis), [0067] (hydrogen isomerization and hydrogenolysis), [0084] (solvent dewaxing) and [0094] (hydrogen finishing), the above "base oil described in Cited Document 3" is construed as being produced by a method similar to the common method summarized in the above item (1)A, and this corresponds to "a high viscosity index base oil produced by the isomerization and hydrogenolysis processes using a raw material of synthetic wax synthesized from natural gas" as taught by Cited Document 1 described in the above item (2)A.

C Further, when it comes to the use form or properties of the above "base oil described in Cited Document 3," "base oil described in Cited Document 3" may be used solely as a lubricant base oil ([0109]), and ultimately used as a finishing lubricant (corresponding to the lubricant composition of the Invention) that can be applied to use

in vehicles, etc. by mixing additives, and it can be seen that it may occupy more than 70% of the finishing lubricant ([Claim 25], [0113]).

Further, the "base oil described in Cited Document 3" is categorized into API group III base oil (hydrogenolysis mineral oil), which realizes a low sulfur content of "total sulfur content of less than about 5 ppm" ([0098], [0099]), and has characteristics of "extremely high viscosity index" ([0104]) and "lubricant base oil has excellent oxidation stability due to extremely low amount of aromatics and multi-ring naphthenes" ([0107]).

(4) Determination as to whether the constitution of the Invention according to the Difference is easily conceivable

In view of the above items (1) to (3), consideration is given as to whether the matters specifying the invention according to the above difference (the constitution of base oil) are easily conceivable.

A Cited invention uses hydrogenolysis mineral oil as a base oil, but its production process is not specified. Thus it is indefinite as to whether or not this is a "Fischer-Tropsch synthetic base oil" corresponding to hydrogenolysis mineral oil as taught in Cited Document 1 (see the above item (2)A).

B Cited Document 1 discloses, however, a teaching that "a high viscosity index base oil produced by the isomerization and hydrogenolysis processes using a raw material of synthetic wax synthesized from natural gas" is suitable for a base oil (Fischer-Tropsch synthetic base oil) (see the above item (2)A), and moreover, it shows that the properties such as "high viscosity index," "low sulfur content," "oxidation stability," and "heat resistance (heat stability)" are required for the base oil (see the above item (2)B). Therefore, it is hard to find any particular difficulty in seeking a base oil with properties that match the teaching of the cited document, since it is an exercise of ordinary ability for a person skilled in the art.

Further, it is recognized that, in specifically selecting a base oil with properties that match the teaching of the cited document, a person skilled in the art could easily conceive of selecting "base oil of Cited Document 3" of the above item (3)A (corresponding to "Fischer-Tropsch synthetic base oil with a specific structure according to the Invention").

Specifically, the "base oil described in Cited Document 3" matches with the base oil taught by Cited Document 1 as is discussed in the above item (3)B, and it has been found that the base oil satisfies the properties of base oil required in Cited Document 1, as discussed in the above item (3)C. Therefore, in view of the teaching and properties of Cited Document 1 (motivated by them), it must be said that a person skilled in the art would easily conceive of selecting "base oil of Cited Document 3" that had been found to match with the above teaching and properties as a base oil of the cited invention. Furthermore, there is no disincentive to select it.

Further, the base oil of the Invention is specified as "at least 60 weight% of one or more kinds of Fischer-Tropsch synthetic base oils," and the content is also specified. The base oil of the cited invention has already occupied almost 85 mass% of lubricant composition, and its substitute of "base oil of Cited Document 3" may be used in a similar level (see the above item (3)C). Thus it cannot be said that the provision of the content makes a substantial difference from the cited invention, nor does it make the Invention inventive.

C Further, when it comes to the function and effect caused by adopting

"Fischer-Tropsch synthetic base oil with a specific structure according to the Invention," it falls within a range where a person skilled in the art would expect. It cannot be said that it is sufficient to find the inventive step of the Invention.

Specifically, the specification of the present application lacks any description sufficient to find the effects of the number of alkyl branch on the properties of lubricant base oil (lubricant composition) even when referring to in particular [0038]. Further, when referring to [Examples], [0104] where base oil is elaborated, it is completely silent about the number of alkyl branch of actually used FTBO (Fischer-Tropsch synthetic base oil). Therefore, it cannot be accepted that the test result of Table 2 of [0108] (Note that the test evaluates heat stability, particularly focuses on oxidation and deposition accumulation in view of the description of [0106]) is attributed to the Invention (particularly "Fischer-Tropsch synthetic base oil with a specific structure according to the Invention").

Even if the test result was attributed to the Invention, (i) Cited Document 3 discloses that "base oil of Cited Document 3" has excellent oxidation stability, and furthermore, a person skilled in the art has already understood that "Fischer-Tropsch synthetic base oil" generally has excellent heat stability, (ii) The difference between sample oils A and B in the test result is attributed to the difference in properties of base oils used since the additives of both are common, whereas the specification of the present application only explains about the properties of base oil, in particular the mechanism of heat stability (oxidation stability) of base oil in [0039] that "Due to extremely small amount of aromatic hydrocarbons and multi-ring naphthenes in FTBO, FTBO shows excellent oxidation stability." (But it is construed that the description refers to the common Fischer-Tropsch synthetic base oil, not the one with a specific number of alkyl branch.) Furthermore, such mechanism is only a matter that has already been mentioned as a mechanism of oxidation stability of "base oil of Cited Document 3" in [0107] of Cited Document 3. Taking them into consideration, the function and effect of heat stability (oxidation stability) in the Invention may be expected by a person skilled in the art as an effect that can be surely obtained if "base oil of Cited Document 3" of Cited Document 3 is adopted.

D Regarding the Appellant's allegation in the notice of appeal, the Appellant insists on the significant function and effect of the Invention from the results of Panel Coker deposition test of Table 2 of [0108] in the specification of the present application; however, comprehensively taking the following facts into consideration, the result of the deposition test was expected by a person skilled in the art. Thus it is impossible to accept the argument and find the inventive step of the Invention.

(i) As discussed in the above item (4)C, it cannot be asserted that the result was attributed to the Invention.

(ii) The deposition test was conducted as a part of heat stability tests, whereas a person skilled in the art has already understood that "Fischer-Tropsch synthetic base oil" generally has excellent heat stability (see the column of "GTL lubricant base oil" described in Table 1 of reference document 1 of the above item (1)A).

(iii) In view of the description of [0061] of the specification of the present application ("dispersing agent is generally used for maintaining insoluble materials produced while in use by oxidation in a suspended state, thereby preventing the aggregation or precipitation of sludge or the deposition onto a metal part"), the deposition takes place due to oxidation. As a result, the result of the deposition test is attributed to the relative merits in oxidation stability, whereas Cited Document 3 already discloses that "base oil of Cited Document 3" has excellent oxidation stability.

Further, the Appellant argues that there is no motivation to replace the base oil of Cited Document 1 (base oil of the cited invention), nor it is simple to formulate a lubricant composition, and it is difficult to formulate a novel lubricant for engine. There is the motivation, however, as discussed in the above item (4)B. Further, indeed the formulation of novel lubricant takes enormous time and faces great challenges, but it does not directly become a reason for reversing the determination of the above easily-conceivable circumstances (the determination of the inventive step of the Invention). Thus the argument is not acceptable.

E Summary

For the above reasons, even if taking into account the Appellant's argument in the notice of appeal, it is recognized that a person skilled in the art could have easily conceived of the Invention on the basis of the matters described in the cited invention and Cited Documents 1 and 3, and thus the appellant should not be granted a patent for the inventions under the provision of Article 29(2) of the Patent Act.

No. 5 Closing

As described above, the appellant should not be granted a patent for the invention according to Claim 1 of the present application under the provision of Article 29(2) of the Patent Act.

Therefore, the present application should be rejected without examining the inventions according to the other remaining claims of the present application.

Therefore, the appeal decision shall be made as described in the conclusion.

Reference 1:

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8 8

最近の GTL プロジェクト動向および GTL 発展の可能性*

ー上液事業者にとってのGTL ビジネス=

前木信市"

(Restrict December 22, 2004 | accepted January 12, 2005)

Recent Movements of GTL Prejects and Its Possibility of Evolution

Shinishi Sundai

Abstract GTL as a new tool to develop the gas merves is a very imported means he upsknew somp because it has a possibility to lessen the bundles to explore the gas fields. This is defined from that the GTL suchnologies can change a gas into prival-new products new well level and it can make ofter gas business into all Inserves despite gas field development. In this serve, GTL (as the different value for spotress comparies from redy other advanced gas field development technologies as GRS, NGU, DMS, GTW and so forth, in which technologies the chain from queryan and downstream has to be ensurrated before the field development in order to apply them to ges reservoirs, like in each conventional gas field development technologies as pipeline, 1393.

GTL project will be carried out for the coming 10 years in the hillowing :

> GTL parject will be led by opennion companies not by downstream companies because the oreds on the GTL products in the nucleit are law

> Application of GTL process will be limited in large gas reserviers, fields with associated gas and high wet gas hermize the CAPEX is relatively high and it requires a gas with low and to acquire reand the

» GTL project players will be confined to each four groups as Shell, Secul-DevronTonnon, EccoeMobil, Devco/Haligs because GTL is an energing technology and has a high title.

- Countries for GTL projects to be developed will be saidly in the bliddle East area contering on Qutor On these basis, the answards of GTL products from new plants are anticipated to be 140,000 Moliclay by 2010 and 550.888 (MObblidey for 2020)

Key words : GTL, gas to liquids, gas, gas marries, DMI, LNG, amply and domand summption; Shell, Sand, Executiviti ConscePhilles, ChevronTenana

1. 本演演のポイント

どうもご紹介ありがとうございます。 資源機構の資本 ました。 と申します。 私の本日の満知は「最近のGN プロジェ

ディストル・レージースト、ディストル・デス Galith Wind Chill ディスター シースタル、The locates was defined as the 1984 JAPT Assesses Macross below in Tables, Japan Contact 20, 2020.

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Deprints C 2005, JAPT

未譲渡では、上皮事業者にとってGTLほどのような ケト動作れよびGTL発展の可能性」ということで、お 直接を持つか、という視点から、次のことを除じるデ まです。すなわち、GTLは、井戸元で可想点又を石油 製品に変換する注意でありまして、二のため、GTLは 上版事業者の光然ガスビジネスの影響を変える可能性 を有するのではないか、ということです。これをきらけ 許しく途べると、洗れとおりです。上渓合社にとって白 GTLという新しいガス団道発手程は、従来のガス目開

油枝同協会ということですので、副師は「上純事業者に

とうての石孔、ビジキス」ということときせていただき

発手続てあらバイプラインや136、あるいは刺しい間 発手続てある他の広義のGTL技能、すなわち36所や メタノールなどとは風なる価値を許っているのではない か、その用自は、GTLが、どこにでも、だれにでも転 たし得る灯油製品を生産できることによる、これことに よって、GTLは、ドスは簡単に必要でかったドス的か らマーケットまでのチェーンというビジネス開発の多量 作を、不必要にする可能性を有している。

しかしながら、671.がこかようながス目開墾予約と なるためには、当然、671.プロセスが低コストになら ないというない。しかし、低コストになれば、上述会社 は271.という構築を目によって方く280株を9日向であ りましたアーケットまでのチェーン構成、点もいは投稿 が中華に個人なこと、そのような天地方スは観察に開始 られたからを回避することができて、方ス日間第三通信 開始よど地球業者にとって対象形成に扱い得るちのとな るのではないか。

品上を講師のポイントとして、次のような風野で報告を当せていただきます。まずイントログラションということで、またGTL機能でのつて、拉灸 製品、および経路作を発見た感べます。次いて、田子のGTLプロジェクトにおいてはべます。また、GTLプロジェクトとついてはべます。また、GTLプロジェクトとDGL DMEグロジェクトの制限にはついておいてGTLの影響を通っき他の提供 だついておいては、ALOTGTLの影響を通っき他の意味 だついておいてはます。

2. ガスお開発の特徴

実営ガスはガス林工会与ギーということであることから、単位体積当たりカエネルギー接着が低い、したがっ

マ、輸送に非常にコストル時かります。このようなこと から、目1のように、上国事業者におけるガス目供作の 第1歳代というのは、近期のローカルマーケットに対す のようなローガルマーケットがない場合には、天然丸、 のスネルギー画型を集めて本地にクロと大きることにな うれけです。そのエネルギー画型を含める方法として、 特徴性化によって高めるか、あるいは足学会化によって 高かるかというざつの力法があるといてすめ、天然丸、 を用いて化学者によって前の特徴に実施して自時に フラをえずるという方法を、最もにいま味での「GTL」 といいます。

器法、6円、というプロジェクトが使用されるようになった理由は、6円、プロセスのコストが成成して開発 フールとして認知できるようになってきたという理由が あるからです。相当から申しませた、大規模で入損な対 来とする6円、プロジェクトと1060 プロジェクトは、は 次回移発展の性変化をすれたいうだだけになってきつつ あら、ただし、向プロジェクトと1060 プロジェクトは、は 以同移発展の性変化ですたいうだだになってきつつ あら、ただし、向プロジェクトコストをお板する有化、 0円、プロジェクトは、先校やしましたとから、アニニ ンビジネスであるまだんが、1060 プロジェクトでは チェーンビジキスが必要であることから、プロジェクト つストと言めております。

年なわち、7元5800188886606日、プロジェクト(ポ 大生産業100 MACERF では、611.0年のウスト(単年 コストというかはこAFRX 手生産細力で加った金融) 2月14月1日の時代現分かれば、プロジェクト教育部 は1後半人となります。一方,同学等後の10名 プロジェ タト4回 Sトン/年(分え品業数600 MACF01 のプラ



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8.4.11.8

シトコストは本盤 2000 万トル程度で、は55 3000 m² 20 1NG 株正和中本を必要であれば輸送コストは5度 2000 万ドルとなり、プロジェクト級投資額は約 店 使下らと なら、以上により、GTL プロジェクトと 106 プロジェ クトは、油球同等程度の金額になっているということ です。

GTL プロセスの概要

次然行文を続体開料にすると、回2のように大利して 2つの方法があります。合成方文を経由する問題法と 合成方文を抽体しない可提出です。この合成方文を経由 しない面接法というのは研究開発法との方法ですので、 適応はこの合成方文を経由する次派をGTLといいます。 GTL TL 合成方式第五の先 上ならのとして、フィッ

5+・・トロプシュ合成(国下)で含成(メタノール 会は、100円合成という1つのプロセスで異なるものに 転換されます。まず、FT合成では、FT合成先さらによ お比分知して打判面にする、メタノール合成では、メタ ノールに下る、メタノールは比較的反応性の高いと含効 ですので、これるMethand ToGamberでガリウンにし たり、あるいはMachand ToGamberでガリウンにし たり、あるいは、構成して100円にする。また、合成 ガスから高度10回ににする方はもあります。最高の意味 ガスから高度10回にであるたちあります。最高の意味 なから高度10回にする方はもあります。最高の意味 見たればは、FT合成プロセスのみを能しています。本 調査では、構成の意味でGTLという消費を使います。

4 GTLBS

41 代表的なGTL製造 GTLの特徴の1つとして、GTLでは単晶ができない ということが明ずられます、すたわち、GTL気能では、 働々の設た水準の社合物の設合地が生成します、実効 に、GLからCSMにくらいまでの効果能の設た水果ができ あわけですが、このように、GTLでは自動性が制定で



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きないというような好像を持っております。C回目との 頃化木道が登録で開始だするワックスですので、灯発油 優分を増やしたいときにはこのワックスを木道化分楽し てく知から 知ら彼化木道にしていきます。

その結果 6年、プラントからは様々の製品ができる こととなります。代表的なちのとして、表1のように、 6年、クラ、6年し日連、6年、日本のように、6日、クランス、長 滑油の6日、バースオイル、6日、人をアルバラフォンが あります。ナフサはごから1日の能大来であり、エク レン協称や水油製品目の契約に始われる。これは、石油 長のナフサビに比べてエチン2年をがあから15パーセン トぐらい違いというような物質を持っております。

町油はな日から15日間化未進であり、米国目標料や ジェット使用などに使われる、開始性をおす見なが高い。 信用、物油は自らから20です。これが目も6日、製造の 中空重要なわめですが、ディー生に恐怖なとして使う。そう から、ワックスは12日はの間的水車であり、ホット メルト開着剤や何期得インキなどに塗ら、これは単同に 特別な営業件かっておりますことから、お毎時の高加に間 たてため、開創剤やペースオイルは利用数」用使のイ ロバラフィンであり、ワックスを本来に効果の発見であ たてため、コンジンオイルやギアオイルに行う ことができまして、石油等の開始色あるには含く調整件 の話向話品と同等物性、あるいはそれ以上の作用やある いは容易読化剤の明和に使われます。 42 676.485

洗程作しましたとおり、GTL 解決というものがGTL 製品の中で組も進行です。GTL 解決は、装置など寄存 法分析書言に外ない、セタン値が非常に高いたいう外的 を作っております。実際に、GTL 解決とな過ぎの保険 を自動車の割料として低った形合の構成でみ組成を比較 すると、炭化水素、一酸化尿素、常素化合物、SNIF

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#1 112 GTL N-5

			LUFT BARA	ALC: UNK	AND SALE (DOMES)		
_	1910	20.038	8.6		a annanani		
001.979 930M	ദ~വ	1940 - 1 235	2.732308 - 未非指定用原料	・ 単純液化水油であることから、エアビ 化率が活起点ナラモに取べて15-25点 ・次回発展を経済しない。			
des etais	410 CH ~ CH	999 - 8135	- 市場市営利 - ジェット団科	 市時日本公主催点が高い 発気が良い 			
971. 0 10	880.03 < 08	$(r_{\rm H}) \in [0,1]$	71-23.894	$\sim 2^{\circ} \tau \sim \pm 2^{\circ} h$, 10	の構造性を言すセタン値が高		
en 95 32	A 8 C71 ~	413)	 ネットメスト協員者 - 征転場インク - スピー能トホー - 福田工利, 相外化為 - 信田屋木湾 - なジェックバインダー 	- 18月1日 - 1871-1882月1日 - 18月1日 - 18月1日 - 18月1日			
671.850 (6.94 (6	前希知(3) 前(3)() インバルフィン	ひっつ(2.8) 単位(19) - 取時	1595474 #7144	 当時目前数 第自己回道来 希望室時 後未完時間 	enn		
GTL 7.4 7.6 (9.7 4.5	83 CS - TH	5:9K + 85 (B	 ・ 2月一二ング相称用 ・ 法身相能用(アルトに話 35) ・ インク相当用 ・ ボログルキロペンゼンス ・ ボログルキロペンゼンス ・ 水田(大学・シーレー) ・ 水田(大学・レー) ・ 水田(大学・レー) 	 液の転換です。 一次取得すす。 分光しやす。 分光しやす。 分光しやす。 分光の行う。 会洗完合す。 細胞に対する。 	851 (151)市岡山口の県市県 10日前日中市町ににています。 2010 10日前の6月10		

ペイにおいて、CLL経過を使ったときのはちが行動を 構成させいたいためになった場合となった場合となった場合となった場合ではないたいです。 という記載がお行います。 という記載がお行います。 は時はGLL経過の目的を定面を見た見てあらるようと構成さ れることとなります。それでもGLL経過の影響はプラ という記載がお行います。 にたか、のに、

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一点 認識的となれ、単語の情報に登場を与えられば、 ドゥーゼルの情報に開いて、ディービルの特別を開いて 単なな思想は、前週かと2%数分の規制があります。 非 でに大規制にいろく、確認から知知があります。 ま でいた規制にいろく、確認から知知があり、それから、 可能能から知っていてらいうことです、それから、 可能能から知っていてらいうことです、それから、 可能能から知っていてらいうことです。 それから、 可能能から知っていてらいうことです。 それから、 では能から知っていてらいうことです。 それから、 このような確認かられていない。 そのから、この何 別の規制では、それにとなり、時期の必要が利用しない となえられます。 ただし、ボイーゼルの意味可能能は認知に かたがに知ることでは確定であり、そのような規制をか ロアードをためのり、ディブルのように下での物的情報能 の利用では、その時には、相能の利用。 の利用できったから、 相比の利用。

4.5 GTL 製品の性実と物質的のまとめ

GTL 製品の住宅と内積点の構想を含とのますと、次 のともりです。GTL ジロセストもの製造製品は早高す はなくなず選邦品ができる。GTL 製品のである数数 な製品は、単加がたきくGTL 製品のライントを含かせ きのTL 製造すある。したがって、GTL プラントでは、

THREESE THREE OVER

れることとなります。それでもられ、単純の数年はフラ ントの生産協力のパーセント構成です。ほからのパー モントはナフタなどとなってしまう。 のれ、我のは生きしての時の見たままからなり、また

総合社会営業務が会営まない、お信令の報道は、ご作じ のとから、ナフラン部合営業状況を含み、さらに等任時 総合営業会している、このような構成などの特徴であっ て、671 第点社社会学会省通知品にためして代表が利 のように対応へてきています、学なたも、はまが利い、 セクン値の高い、プム部への修業者が高い、周期性が 低い。

このように、GTL制品からな最も単数な単体に関しては、後に副称な200ペーセントGTL制品(コート 特にしては、後に副称な200ペーセントGTL制品(コート 特にしていたます)では、単数の単語のシギュレー かっつになって、サフスペック「以高か扱い」もの時間や あらます。このよういうのは動物を開始して記述され てありますので、副信したいということで時間最近の可 自然なる。また、副作用です。一切えこういとはキン。 個分類的なる、また、目的目前で、一切えことでからは本ン。 個分類的なる。また、目的目前で、一切えことでからは本ン。 個分類素の個点を新た調整を開始したことから、 GTL制品のたかとと知道する。

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したがって、GTL単価値、各面が見、な品をか構成 と目的して用いることに入ります。しかしながら、GTL 単価は自動時の特別とないが知らるために、用なく目 合すたち時間に時間がある人たられておりまして、その 自分はなTL単価が目から面パーセントの範疇になり ていります。

3. GTL プロジェクトの経済性

(日本プロジェクトの経営性を簡単にご紹介します。 ほうは、GTLのごP価格の感覚を解却したものです。 総合わり取り進行は、ShideのGTLプロセス (SNR) であり、ペールは1.5 months/ap, 合加は更同アジア、 受けられは目をすす。 総合部分化力は、方と加キキル て代わら社相目10ペーセントとなるためのGTLの利用 個形を目的して、それにフレーキを見せて信用値格を用 信したということです。

第2455年、お知ら時に、ガス信味に2557/MMHのの場合のグラント展開に対する611.000年間時であり、 自動の信に、ブラント開発15年の時間がありたかり、 自動の信に、ブラント開発15年の時間がありたまで パス酸酸に対する611.000年後期です。また、この時 には歴まり年期の後が300年後期にす。また、この時 には歴まり年期の後が300年後期にす。また、この時 には近まり年期の後が300年後期にす。また、この時 には近まり年期の後が300年後期にす。また、この時 には近まり年期の後が300年後期にす。また、この時 あり、当時の表現がてあります。ご知らなって行きる とのり、低齢のとたたがら、ガラント開発がたきである。 4111.000年まではくたいが、また、スケーも行

したがって、GTL単語は、当時の見、日本品の構成 - おすちメリットというのは、地球のの計算からか、は新 設計して用いることになります。しかしながら、GTL - 用やさいということが分かります。

E.C. Mann OF BIACLERTAL: 07888/05 Pro-MMINGAL SULTON NUMBER (1008/05) UNITABLE AL: 7735 HIMPS (1008000/04) INEQUIDING (0) PRO-MMING (FT-0) (12) MINGA MARCH (FT-0) PRO-MMING (FT-0) (12) MINGA MARCH (FT-0) PRO-MMINGA (FT-0) (12) MINGA (FT-0) PRO-MMINGA (FT-0) (12) MINGA (FT-0) (12

1. 世界の存在 プロジェクト

※1 職券のプロジェクト GTL GREL 開発さりの長で生産されておりまして、 プレイヤーは、SRL Saok PresSA (日外細胞の) の 3 七でキ、Saolia、マレーシアのビングルという場合で GTL を生産しております、加速職務は13 44,0008/100 すず、Saolia、パレーシアのビングルという場合で すず、Saolia、パレーシアのビングルという場合で Stonda T GTL 生活用しておりまして、自該職 おり SAI day の生産業でて、前時は自由ですが、基成、モザ ンピークからがたが個人が利くなりままでとから、パス に開発からりたかの分から見いております。それか りましして、2018/1000 (中国があれています。)

43 611 に開発する合性の動向

671、に取り組んでいる含素の数をもまえのたちのが、 数1です。671、の数量素の回びは、1つのグレープにお デゴライズであたいう認識がなられています。



2 MONNESS ANNO, PETROL TECHNOL, Vol. 76, No. 2, 10007

- 18		- 構造の128、プロジェナト動産的な少な3、影響の可能数
		第2 GTL用资品社会 GTLへの地力規算
F	ARB.	総合の後考 ・ ロターム GTL デビジェブト (Part デビジェブト) 30110 GF 2 (10) 単語 (30) 年 第1947年3月21日の5月3
第十年に一日	Sand Cherron Trease	・シテールでは、プロジェクト 2013 Todayのとめかりませんで見たがあいは、1000年 11 次も10 ・ディジェリアは11、プロジェクト 104年後の 107(コントトラクター通道学校であい やさくぶんしい 2013 をタール回転 0000年の5月65日の10月1日に、 2013 日のスタールの11、プロジェクト 1040年11月1日に、そした時間
	Rosettland	2 2004/01197 222200 1-02-3-022 2009 2011 20042 QF 2 1004/000 2011 10 104/15/10 - 02204022 2009 200922 117 2 4000
10	GrootPolips	・ おめりの PF 支援支援 (1分成51.8 GPR・1961年34, PT そうなか会社プロセン2960 第400 のタームでのプロジェクト分割取り 10009年 第1441第合計 H たんけ、モデムD D GTL グラント相関数 15 数 P のく (2次) P の あり >
18	9F.	- 20160 0 19 823 18 12001 - 20012 1262 43 12 2017 10 17 17 - 7 -1
15	Skol	 1000月10日70月9日総合総合の1005月10日、2005年まで総合会、Cremitaと41日 イタン会の次回発行、プロジェクト計画は、Band スキャングにつたび中ま。
1.2	Manathan	- ウタールでのプロジェクトが死、Funisheesの目前。
1.5	En:	> 36.0 m PF 法定书籍(PFF 注意问题书,作成书书系 29.6)
-404.00	Berninch .	- ゴリビア、インドキングはてブロジェクト改善者に、
	(All second second	- Photo Physical (DOR, Mandows Colling R) - 回転通信だとの利用時代ではなったもの。 - ロシア、またけでにててはなったとは読みれ、

まず第1プループに属する点表は、Bell Souli Chevenfirmen, ReisellAUTT, STRATTEN, D. タートのなれ プロジェクトに取り組んでおり、1000年 10 8 A.F.-A.D.B. (OF) E-Book-it Agroment 24840 后来的现在分词

RUCSani / Derenfesse: 2 T.F. Shit ARU S.S. #-REGILTERATIONATIONS, Sed のプロジェクトは高速からのよりもリングエーズ表明 LITTLET, TEAM, AND RATE BERRING して2005年3月190日、3月24000161146年3月前してプ ラントを建設やです。 また、ナイジェリアル GRL プロ ジェクトというものに知り組んで作りまして、 約4年 IICコントラテナーの建定り集に入るというアナラン 风起来多重的在时,重花天与西北和多量制动种学校学家 また、LCがって、387年により 08114116# 7世産 何助というナイジェリア GTL プロジェスト計画以降す. もだろうと思われます。また、カターらの文方 4000 日日 Like 在PETFALE 医骨骨膜 医肾髓肌结束 在于各种菌的 お飲があります。また、このプロジェクトに特に誘導 のカタールにて、プロジェクトというちのちありまして、 その説明社、次位年から15万10日/あかの注意離という 2296.

Record Add 22 202 Mill (day 10/11/10/2017 17/2017 Fill) 実証実験を行っております。やはりたきールでのGEL

CONTRACT THE POP.

プロジェクトに取り組んでありまして、2000年7月、 QP & Heale in Agreement SIGA (DIVER), CONDINE ULMBOSH&LINALSOTHILLS, 10 取得特許によって簡単の研究に対して単則をするという ような、自由に特色のある動きまする合化です。

第3ダローブの単語にGenerHilles TALL IN M (dep-0)(110))トブラントの実証実験を行っておりま ず、このプロセスでは、金属材スのに粉色がありまして、 自動部分働化という事業に充満的な技術を使っている。 ※水ブロセムのパイロットブラントの単調用数が、2005 今回も時を続から始まっております。また、カタールで のプロジェクトの評価もあります。

1014L 301461 day (011-010-5-1-7-9-5-4-00332008 各3000年12月1日で約ります。この会社はプロセスの特 商は、谷油県大阪に水市家設備の食噌に設まれませた方 法定ありますはシバタトリスォーマーありり自手使って の方大多様って、DateSA と見回て2004年3月から行っ ている、おはちまで実施をする予定です。イクンと行 お利用作、プロジェクト計画というものがありましたが. Stand がイランでスキャングルを起こしたということで 中止に追い込まれております。Manshonは、中国市市 タームでのプロジェクトの設備があります。 Harden

27/31

40.00 M.A.A.

の情報は1mmledownのライモンスを受けた時期です。 No.12、101001/agy のパイロットプラントの実営支援を サランス同で行っている、合成ガス系が、やほり生産的 合体のである接触部分物化です。

A3 カタールでのGTLプロジェクト

カナームというためGEL プロジェクトの続えしての キーワードになりつきんちはマイか、このネタールで た時で時代がまた(おいプロジェクトには、Soot Soot Excended 03 つのプロジェクトです、この3つを注 ししたかみ、このありてす。

●構成とは影響させていただきます。まずなrys プロジェ シトは、生産障碍13 4000 0547 day です。これにおし て Paule プロジェントは、集工業・集工業ともにて方 054 1 day の含語 14 /5 067 day の含素描です。Recording プ ロジェントは、15 70 4000 0547 day の含素描です。Re 参照的内容は、Geory プロジェントは2005 年後、Paul プロジェントは第1 面が 2009 年、第1回が 2011 年、 EncarMadel プロジェントは2011 年になっての手ます。

プロジェクトのステージはそれぞれようて、大い計算 なってありまして、Des プロジェクトはもう500歳時 で意識をでありまして、Part プロジェクトはもう500歳時 で意識をであります。Part プロジェクトは発展1993、 そなれら基本語が対象されている。EcondMod HT レドレキャアしたはかりにつうことです。

(1)の投資金額は、Genプロジェクトは種与の数学 がいろいろおさくるわけですが、取得点では、身分利 億万キというのだー番組からしい数学だと思われます。 そうすると、知知能かで知りますとブラントの単位つス。 1.0

トラルフルドドル・Mini Ang ということになります。使用 GTL プルジェアトはエロックエロスMIN ドルノSN Ang であいとアロジェアトがまたいという外でありました の、その数字からはつますと、ポンジ用いという問題を 切ります。

一次、内田グロジェクト、他のの話点をクロジェクトは上来と一条化した事業であり、GTL事業だがら期 ドルシットは上来と一条化した事業であり、GTL事業だがら期 ドルシットものはなく、また、そういうことを出す意味 もれなのかどうなのかよいう問題をありますと、よ時事 当と一条化した気候がで、されずれかどかり、の合い ドルシーを取りたけてあります。GNLグロジェクトには、 しのもありにかったりコン・スカブロジェクトでした スパで酸ドル付いてあります。

LA SHE OF SECOND

支付をしましたよから、GTL 単語にも連載な単語に いたのに対す通うということで、中国時間をすると思い あります、このようなことで、5million とううみでき 用しているGTLを思いて、GTL 単語の多句語時にを行っ ていります。

Sedid 創作、タイ、ギリシア、ドイツモ GTL プレンド構造を通信しております。また、ユーザーよ GTL 物量を用いたエンジン提供やフリード調整を実施 しております。学なわち、フォルタスローゲン、ダイム ケー・タタイスターなどとニートGTL パフリート調測 というのを開発しました。彼が知てし、二番時末、コー 学習工作を開発と、前期間で下し、二番時末、コー 学習工作を開発した。彼が知てし、二番時末、コー 学習工作を開発した。彼が知てし、二番時末、コー 学習工作を開発した。彼が知てし、二番時末、コー 学習工作を開発した。彼が知てし、二番時末、コー 学習工作を開発した。彼が知てし、二番時末、コー 学習工作を開発した。この、二番時末、コー 学習工作を見た。この、二番時末の、この、この、この、この、この、この、 この、この、二番の、小酒の食用した。この、この、この人のや 二番にため、この、二番の食用した。この、この人のや 二番にため、この、二番の食用した。この、このたいや 同したがスのクリントの読み実施していたという名称。 での、

1. GTL と LNG, DME プロジェクトの出現

T3 4NG プロジェクトとの記載 G3L と10G プロジェクトとの記載 ARA体がて出来してみます。オロジュクトマスタです。 地にマスクネルシスは、そのプロジェクトの時間だれの してきて、おちゃブリオスルパフォーマンスが開発の 能力を必ずかとしらりスクです。当然 G7L と10G 2 目的の反映像があらって、定てリスクを取取了さらろけ 書う。10G 4、 グロジェクトサーマをスジー ウスターでもファイクンサービル、250 でもおしと ウスターでもファイクンサービル、250 でもおしと ウスターでもファイクンサービル、250 でもおしと ファ イトンサージズ211 スク後期というの24年間です。

3 JAPANESE ASSOC PETROL TECHNOL VILTUNE 2: 0007

REPORT THEFT HERBITIST REPORT

and a second second And the system in the IN IN INCOME.

	プロジェクト的	0m 700 1 1 1	Fiel 70 V x 7 F	Economic GTL 70.9191		
	学校学生产于电路机	OP/Somi	Sult	FipseMittil		
上海	0.48	Nach Field Official (A.S. - LEOR REP.) 1 Series 3 EcosorMatul REC		-		
	自然時間のなった。	Frank Maled	the literature of the literatu	Reservation.		
	時代、プラントへの営 入業総合成	$T'(I) > F_{i}(I) L_{i}$	Helli 10000-534	EconoMetrial Example 5.4		
	6月1、ブラントへまだ スタ20日	200006211	(ARRAY) (第1-2-80) 25月1日第41	LOORMATE		
	+ 040		当業リスからの3575セ ート・110単数 60万64単 通知(住在ガスモリボスンデンセート など始め		
77	735140	Realizing O.S. Kitter h	-	Ben Street and St		
	011.非原因	QPUX/SeedBill	fiel .	Francistatia		
	GTL PERSONAL PARAMANAN R	Autoria Carlo Chesori PT Ind. Collegest - Millip B Decel Millip V Alternal	NGUX: MBGENBE Deb FTDR: CoRMENSER GE SHO SECON Deb	RAUXIAN Geochide FT frid - General 200-18 1028 Hereditett SAUD 4 (Excellent		
	1.6194	34,86541年79シ2の生 建築を20000 印日に引き 上がも計断80,0	第1月1日 7500 kd 第2月 (2010) : 76,000 kd 第1~月月11日 - 10,000 kd	isionivi		
	6.845 B	2414-8	國主國主國的國際主國主要目	2011		
ļ	第四のプロジェクト の取用	EK.	2011年末:プレ75-87 2014年初のより1980元告 19	2004 (FIFIE) : 71- PS 10 7		
600. H-M	(17)、技術会感	mi - 30 首次ドル 1一県 には 58 首次ドル	1.006 白ガドちの一曲 (上記書句につこ、上向用発書・ コンデンセート検索・171、 プラントを含む)	7.000 W N P & ct = 40 (1000 MT P & (4, 1.1)(1 + 670, 1030)		
	CAPEGAND	state 7.5 hand	00000 FA-MILTEEPE 0 > 3.0	5 R		
and the second second second	274+23	NW WS 1916 Recal Dark of Revised 1979 1612 (# 5 15 JBP) 10	812	*E		
	IIX 32 1 5 5 5 -	Technique Collection Michigae Collection F.A., 1994 Michigae Collection F.A. (1994) Michigae Collection F.A. (1994)	10	4.2		
	na.	97 e 9274 + 26,000 hod 97 27 97 7 9,000 hod DPG + 1,000 hod	毎0月世紀11日5 ナラゼイ205 その他(国際活動社、共正 国社(国際)につい。	 41歳 - 325 255 25		
	11.25	1-5分化-1, 日本, 104	4.07	4.02		

次と、信仰定地、自己部時の世界のサイヤアす。これ
 は、しかとらびしの説真部時の世界サイヤアすーの物格
 目前とらびしの説真部時の世界サイヤアすーの物格
 目子は、もっとボクサイ・ワキィーが大きい、いわかちへいしているということです。GTLはま
 からいは美的ごとに思想の無料があり使きなですか。
 やて人事悪にいろば、日本は、日本の個人な読むだい
 ビストレーリング目的が確認されていて、あらなまでのす
 ビストレクションされらというような知道になっている。例如で
 ビストレクションされらというような知道になっている。例如で

108081046 718212 000

104

10.102 (61.10)

には、他的は単数が2×3次わりつつあるのですが、第 とねるであろう。GTL単品のマーナットホニーズが話 本法チータンがアンペイ社会話期期時でありまして、 コー サーがこれによって上述単語小品具もある相単品用して 1-8、されに対して自己の場合、データ・オフィベオ 村老規則市いうはは素調用には不可能ではないかと思い trit.

73 10世 7日ジェクトとの注意

後に有圧と16年の海学にジェクトの構造について 検討してみます。 尚書はな過られ として一くくうにき おてありますが、上海市業者にとって希知能という間 なから考えると、約者は異なきものです。すねわら、 G的,10石油制品相当好生用于含态化的, 对方强制快上 市場とのインクが回避できる可能性を有している。一次 1882年11日の日時時後後の注意されるため、月二回用 見とな場とのリンクが絶対反響であり、プロジェジトと しては、DMERIALEからDIG におているというのが年 AMPROVE

それから非確定確定、存在は存储製造ではないまで、 市産保護として調整したいと必要できません。これに対 して、加速は熱却の豊からの問題であります。すなわれ、 国際利用供給インプラ整備や利用技術開発です。主要 FREEDLER, GERMANNER, DER. からところ、抱力、輸送、USC先用なビターゲットが 计专行专用表, 让你让我想得, 我们没有许可能, 我说 プロジェクト 守正 他の市場がキーであるということで す。今日からプロジェクトのプレーヤーです。これはプ 12.0%。如果你不能是可以有多少的~~的MODDATE QUL 法服务には、Said は別として、Chevin Team, Shill Excellent Countrilies 2115 Till 427+ 对我希望的宝衣印度了。一次, 1940年7月17日来中年 6001, CO-6-O12, Lagi C&-0 Tipes CB-9, #449 过行最优大的学习出行 网络学会委会公会工会学、 新学会 もメジューズではない。メジャーズで 図話にある程度 ARREST. THERE BY THE TY.

8、6日、の開始予想

671.の情報予想は、使んのものを含めて、いくつか 12852月1785ます。本法は、時間の発展から長の開始 中部内与古希腊来自世下行之后自己下, 我可当相 (外後 (1年段前) (1)(7))、明白学校(1)明学会美术的是考え方で 10. まデルーと、GTL 単品ボヤーキットのニーズは 聞いるいうことです。なぜかというと、内容の慣用説材 にはリースナプルなコストで動産所の登録が回販である 55月空午, また、赤江、GTL 総連邦利用に関しては、 調査的には、当他、時後プレンドで始める付着であるう。 さけプレンドキモ はから おりちーセントの範疇での読み いということから、心理学びがまたとの成立の可能性 は上級時の事件のほうが非常だということです。すなわ ちよ無難の事物といいますと、まだプラントコストが成 いことから、原料が含価がありインプラが使用されてい 水場所にしかなれ デおデスタトはできない。したがっ 化,对我们正して注,无理我的公理理想风外,再起诉。 は触かてたエットなが大同した、のには利用するない。 個長しては、カチームを中心とするや東洲島かゆる内に ならでありまということです。

671.プロジェクトルプレーナーは、活動の開き、相 抱力、プロジェクトの進行能力、ファイナンスカな ぶから確定されたメンバーしかできないがちう。 浜 FA1E (27-2) CRE20.6. TODS Sold theres/Icasos Shell, ErnorMobil, GenoroPhilips T-B る。これらの会社が目開的な後望見通しをどの根面で見 ているかということはあからないたけですが、多分用品 的过程的保证你在25个方式的现在。我们也能能知道你 ち 20 約年からかしか、プロジェクトまして読んでいた State 6.

そのような曲様を見に、私が出したなれの際能を削 HAITT. CHE. AFTARBORNET. T なわち、鹿谷のGTS, プロジェタト、網道の優性のあち なれ プロジェクトと分類に、影響可能性のものは、2080 キまでに、あるもの注意さして、あるもの注意さしない 通知资源者的数据代数的重要。

被国がけやしますと、これは筋がからと思せて 如果你们们的我们的。"他们的问题,我们们就是你们的人们的问题。 MITCHE & GTL MALETTER 8. O'S GTL MUNCHING. たさののパーセントのみと知道しますと、 時間年まで 1.12164.136g、2021年まで有当から初2564.136gとい 生存は、単体が市場とはていく、 上古 2010年月 GTL 種 油醤給着は、2001年の世界の利用港を設たおして3パー セント教育であり、CRCD達回のみの経過情報算法目し ててパーセント時期となります。

9、まとめと今後の展開

就在专家上的, 传播的预留考证代系上, 这次会会行 22.

まず、土井市第者にとっての以口、プロジェクトの意 直ですめ、右口 すびをえという知らいがえ出現物シー 5は10歳後期後にとって触めて簡単です。その期間は、 プロジェクト会どにかかわる意味が多からたガスビジネ ステ、健康のよりをないまくみどがまれに含える用品料 を有しているということであるからです。しかしながら、 GTL MEGADAY-ACABEMCE GTL 701

LINPANER ABOUTETHE TELEVEL IN TASK I CONT

最近の GTL プロジェクト動向および GTL 発展の可能性

表4 GTL供給予想

		D. G.	現在	計画数量		生産予想	
		47.95		当初	最終	~ 2010 頃	~ 2020 40
137	南ア Sasol	生産中	150			150	150
	南ア PetroSA	生産中	30			30	30
存	マレーシア Shell	生産中	15			15	15
	カタール Sasol	建設中	34	34	100	34	100
1.27	ナイジェリア SasolChevron	FEED 終了 EPC ビット計画		34	34	34	34
新期	カタール Shell	FEED 実施中		70	140	70	140
140	カタール ExxonMobil	ブレ FS 終了 FEED 計画中		154	154		80 - 154
可	カタール ConocoPhillips	意向表明		80	160		80 - 160
服	カタール SasolChevron	意向表明		130	130		80 - 130
1.11	カタール Marathon	意向表明		60	120		
	(イラン) Shell	構想		(70)	(140)		70 - 140
合計			195	632	978	333	779 - 1053
内GTL 軽油(今後のプロジェクトに 対して GTL 油の 60%を仮定)			不明 (α)	379	587	83 + α	467 - 632 + α
軽油	消費量実績@ 2001						· · · · · · · · · · · · · · · · · · ·
OECD		12,340					
非 OECD 8,430							
世界	21	20,770					

スの大幅なコスト削減が必要であり、GTL製品の石油 きるガス田はガス価の安い大ガス田、随伴ガス田、極め 製品としての調整も必要です。

次に GTL の当面の間の将来性に関しては、次のとお わです。 GTL 要品はマーケットのニーズが弱いという が成立し得る地域は、カタールを中心とする中東諸国が 中心となるだろう。 最後に、 GTL の当路・列目に関しては、新規 GTL プロ ジェクト送行能力、ファイナンス力などから、Sasol ジェクトからの GTL 製品生産量は、2010 年までに 14万 ひbbl / day. 2020 年までに (2010 年までの新規分を含めて) 社 (グループ) に限定されるだろう。長期油度見通しが わち いたい かしかした たっと思いのでの「「「なっち なっ」」 30 ドル / バレル以上にでもならない限り GTL が適応で

製品としての調整も必要です。 てウエットなガス田に限定される。すなわち、中小ガス 次に GTL の当面の間の将来性に関しては、次のとお 田への適応は、当面の間、困難です。GTL プロジェクト

()))((行:千B/D))

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October 12, 2017

Chief administrative judge: KUNISHIMA, Akihiro Administrative judge: HIBINO, Takaharu Administrative judge: INOUE, Yoshihiro

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