APPEAL DECISION

Appeal No. 2016-2135

The United States
Appellant OFS FITEL LLC.

Tokyo, Japan
Patent Attorney OKABE, Yuzuru

The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2013-556846, entitled "Method and System for Ultrashort Pulse Fiber Delivery Using Higher Order Mode Fiber" [international publication on September 7, 2012, International Publication No. WO2012/118937; national publication of the translated version on May 29, 2014, National Publication of International Patent Application No. 2014-513411] 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 was originally filed on March 1, 2012 as an international application (claiming priority under the Paris Convention based on applications received by the foreign receiving office on March 1, 2011, US and February 13, 2012, the US), and the history of the further procedures is as follows:

November 6, 2014 Notice of reasons for refusal (dispatch date: November 11, 2014)
May 11, 2015 Submission of written amendment and written opinion
October 6, 2015 Examiner's decision of refusal (date of delivery of a certified copy: October 13, 2015)
February 12, 2016 Appeal against the examiner's decision of refusal, submission of written amendment

March 24, 2016 Submission of written amendment (formality)
September 14, 2016 Notice of reasons for refusal (dispatch date: September 15, 2016)
December 15, 2016 Submission of written amendment and written opinion

No. 2 Summary of the reasons for refusal of the body

The summary of the reasons for refusal notified by the body on September 14, 2016 (hereafter, referred to as "the reasons for refusal by the body") is as follows:

[Reason 1]

The inventions according to Claims 1 to 5 in this application are inventions described in the publications below that had been distributed in Japan or a foreign country or the inventions that had become available to the public through electric communication lines prior to the priority date. Thus, the appellant should not be granted a patent for the inventions under the provisions of Article 29(1)(iii) of the Patent Act. In addition, the inventions according to Claims 1 to 5 in this application could have been easily made by a person ordinarily skilled in the art of the inventions based on the inventions described in the following publications that had been distributed in Japan or a foreign country or inventions that had become available to the public through electric communication lines prior to the priority date. Thus, the appellant should not be granted a patent for the inventions under the provisions of Article 29(2) of the Patent Act.

Description

"Novel concept for large distance ultrashort pulse fiber delivery without pre-chirping", T. Le ET AL, Proc. SPIE 7912, Solid State Lasers XX: Technology and Devices, 791214 (February 15, 2011); doi 10.1117/12.873584 Pages 1-8

[Reason 2]

In this application, the description of the scope of claims for patent does not meet the requirements stipulated in Article 36(6) (i) and (ii) of the Patent Act in the following points:

Description

(1) The "relative dispersion slope equal to a dispersion slope of the first fiber" in Claims

1 and 5 refers to the "relative dispersion slope equal to the relative dispersion slope of the first fiber" according to the written appeal; however, the meaning of the "relative dispersion slope" is unclear and therefore, it cannot be said that the invention is clear.

In addition, the detailed descriptions of the inventions in the specification include neither the description of the "relative dispersion slope" nor the description that "the relative dispersion slope of the first fiber" and "the relative dispersion slope of the higher order mode fiber" are equal. Therefore, it cannot be said that the inventions according to the claims of the present application are ones described in the detailed descriptions of the inventions.

(2) In Claims 1 and 5, the descriptions of "to achieve a fundamental mode output beam" and "for producing resulting higher order mode light as a free-space output" are provided, in which it is ambiguous whether a beam output from the all-fiber delivery system according to the claims is one of a fundamental mode or one of a higher order mode.

(3) In Claim 5, the description of "a single mode fiber with normal dispersion" is provided, in which the relationship between this "single mode fiber" and a "first fiber" is unclear and thus, the invention is not clear.

In addition, if this "single mode fiber" is a "first fiber," it is not consistent with "the first fiber comprises one of a microstructured fiber and a multi-mode fiber" in Claim 5.

No. 3 Descriptions of the scope of claims of the present application

The descriptions of Claims 1 and 2 of the scope of claims of the present application which were amended on December 15, 2016 are as follows:

"[Claim 1]

An all-fiber delivery system for femtosecond laser pulses without pulse pre-chirping, comprising:

a first fiber with normal dispersion; and

a higher order mode fiber with anomalous dispersion, the higher order mode fiber having a relative dispersion slope equal to a dispersion slope of the first fiber and having an effective area of about 14.9 μm^2;

wherein the all-fiber delivery system is free of bulk optics and is suitable for producing resulting higher order mode light as a free-space output,

the higher order mode comprises one of LP_{02}, LP_{03}, and LP_{04}, and

the first fiber comprises one of a microstructured fiber and a multi-mode fiber."

[Claim 2]

The all-fiber delivery system of Claim 1, wherein the first fiber comprises a single mode fiber."

No. 4 Regarding description requirements (Article 36(6) (i) and (ii) of the Patent Act)

1. Regarding Claim 1

(1) History of the description of Claim 1

A. Indication of the notice of reasons for refusal dated November 6, 2014

"In Claim 1 of the present application, 'a higher order mode fiber with anomalous dispersion, the higher order mode fiber having a relative dispersion slope substantially equal to a dispersion slope of the first fiber' is described.

However, the meanings and ranges of the phrases of 'substantially equal' and 'a relative dispersion slope' are unclear, and the technical meaning of 'having a relative dispersion slope substantially equal' is not clear."

B. Allegation in the written opinion submitted on May 11, 2015

"In independent claims after the amendment, 'substantially' has been deleted. Therefore, it is considered that it has become clear that the dispersion slope of the first fiber is equal to the relative dispersion slope. It should be noted that 'the relative dispersion slope' itself is a well-known technical term and clear, and therefore, it is considered that amendment is not necessary."

C. Indication in the examiner's decision of refusal

"Although it is not a reason of this examiner's decision of refusal, also take the following reason for refusal into consideration: ...

In Claims 1 and 13, 'a higher order mode fiber (omitted) having a relative dispersion slope equal to a dispersion slope of the first fiber' is described. However, the 'dispersion slope' and 'relative dispersion slope' (= dispersion slope/wavelength dispersion) are parameters of different dimensions, and the meaning of both being 'equal' cannot be understood.

Therefore, the inventions according to Claims 1 to 13 are not clear."

D. Description in the written appeal

"It is considered that 'the relative dispersion slope equal to a dispersion slope of the first fiber' in Claims 1 and 5 after the amendment should be amended to 'the relative

dispersion slope equal to a relative dispersion slope of the first fiber'; however, in view of Article 17-2(5)(iv) of the Patent Act, it is kept unamended. We sincerely hope that we can have an opportunity to amend the above description."

E. Indication of the notice of reasons for refusal drafted on September 14, 2016
""The relative dispersion slope substantially equal to a dispersion slope of the first fiber' in Claims 1 and 5 allegedly refers to 'the relative dispersion slope substantially equal to the relative dispersion slope of the first fiber' according to the written appeal; however, the meaning of 'the relative dispersion slope' is not clear and therefore, it cannot be said that the invention is clear.

In addition, the detailed descriptions of the inventions in the specification include neither the description of 'the relative dispersion slope' nor the description that 'the relative dispersion slope of the first fiber' and 'the relative dispersion slope of the higher order mode fiber' are equal. Therefore, it cannot be said that the inventions according to the claims of the present application are ones described in the detailed descriptions of the inventions."

F. Allegation in the written opinion submitted on December 15, 2016
"In the specification of the present application, the following is described regarding the 'dispersion slope' of 'relative dispersion slopes.'

'As shown, the HOM LP_{02} dispersion at about 770 nm is found to be about D=+112.7 ps/(nm km) with a dispersion slope of about S=-2.542 ps (nm^2 km). This corresponds to a second and third order dispersion (TOD) of about β_2=-0.0355 ps^2/m and about β_3=-0.0002229 ps^3/m, respectively. ... the fundamental LP_{01} mode ... The SMF dispersion slope and TOD are about S=+0.591 ps/(nm^2 km) and about β_3=+0.0000236 ps^3/m, respectively. ... the second order dispersions of the LP_{02} and the SMF are approximately of the same magnitude with opposite signs ... are of approximately the same magnitude and equal sign such that ... the higher order dispersion is partly compensated ... .' (Paragraphs [0034] to [0036])

Thus, 'the dispersion slope' corresponds to 'the second' order dispersion and 'the second order dispersions' of two fibers 'are approximately of the same magnitude with opposite signs.' Such a state in which the dispersion slope values are approximately of the same magnitude with opposite signs is expressed as 'the relative dispersion slopes are equal' in the Invention."

(2) Judgment by the body

A. There is no description about the matter of the "relative dispersion slope" in the section of the detailed descriptions of the inventions in the specification.

In the written opinion submitted on May 11, 2015, the appellant just referred to the "relative dispersion slope" as a "well-known technical term" and did not provide any detailed description; and even now, the description has not been provided. Therefore, it cannot be said that its meaning is clear.

Referring to technical term glossaries, for example, in the section of "Dispersion Compensating Fiber" in "Commentary on Keywords: Comprehensive Encyclopedia of Optical Technology" by Editorial Department of Optronics (Optronics Co., Ltd. December 12, 2004, First Edition, First Printing, pages 370-371), there is a description of "RDS (relative dispersion slope)," and "The RDS is represented as S/D assuming that the wavelength dispersion is D and the dispersion slope is S" is described. Accordingly, the "relative dispersion slope" as a "well-known technical term" which was alleged by the appellant can be considered as one that means this RDS; however, in this case, as the examiner's decision of refusal indicates that "the 'dispersion slope' and 'relative dispersion slope' (= dispersion slope/wavelength dispersion) are parameters of different dimensions, and what it means that both are 'equal' cannot be understood," even if the "relative dispersion slope" is construed as the RDS, it cannot be said that the invention specified by the matters specifying the invention is clear.

The appellant claims in the written appeal, "It is considered that the 'relative dispersion slope equal to a dispersion slope of the first fiber' should be amended to the 'relative dispersion slope equal to the relative dispersion slope of the first fiber'; however, in view of Article 17-2(5)(iv) of the Patent Act, it is kept unamended. We sincerely hope that we can have an opportunity to amend the above description." However, such amendment was not made in the amendment dated December 15, 2016, and the invention according to Claim 1 takes the matter of the "relative dispersion slope equal to a dispersion slope of the first fiber" as a matter specifying the invention, as described above. Therefore, it cannot be said the invention is clear.

B. As described above, in the amendment dated December 15, 2016, the amendment to replace with the "relative dispersion slope equal to the relative dispersion slope of the first fiber" was not made, and the invention according to Claim 1 of the present application takes "a higher order mode fiber ... having a relative dispersion slope equal to a dispersion slope of the first fiber" as a matter specifying the invention. Therefore,

whether this is described in the detailed descriptions of the inventions in the specification will be examined.

The description for "a dispersion slope of the first fiber" in the specification is only the dispersion slope of an SMF (brand name "ClearLite 780-11," comprising matched clad fiber type having a dispersion characterized by the material dispersion of silica), approximately S=+0.591 ps/(nm^2 km), which is described in [0035] cited by the appellant in the written opinion submitted on December 15, 2016.

In addition, regarding the "higher order mode fiber," only a dispersion slope S=-2.542 ps(nm^2 km) and dispersion D=+112.7 ps/(nm km) for the HOM LP_{02} mode are described in [0034] and there is no description of the term "relative dispersion slope" in the detailed descriptions of the inventions in the specification. If the RDS is calculated, (-2.542)/112.7=-0.0226; and there is no description indicating a numeric value equal to the above dispersion slope of the SMF, S=+0.591.

Accordingly, it cannot be said that one including "a higher order mode fiber ... having a relative dispersion slope equal to a dispersion slope of the first fiber" according to Claim 1 of the present application is described in the detailed descriptions of the inventions in the specification.

Further, the invention according to Claim 1 is such that "the first fiber" "comprises one of a microstructured fiber and a multi-mode fiber," whereas, in the specification, the description for "the dispersion slope of the first fiber" is only the dispersion slope of an SMF (comprising matched clad fiber type having a dispersion characterized by the material dispersion of silica), and the dispersion slopes of a microstructured fiber and multi-mode fiber are not described. Therefore, it cannot be said that the invention according to Claim 1; that is, one comprising "the first fiber" that "comprises one of a microstructured fiber and a multi-mode fiber" and "a higher order mode fiber ... having a relative dispersion slope equal to a dispersion slope of the first fiber" is described in the detailed descriptions of the inventions in the specification.

C. The appellant alleges in the written opinion submitted on December 15, 2016, "Thus, the 'dispersion slope' corresponds to 'the second' order dispersion and 'the second order dispersions' of two fibers 'are approximately of the same magnitude with opposite signs.' In addition, such a state in which the dispersion slope values are approximately of the same magnitude with opposite signs is expressed as 'the relative dispersion slopes are equal' in the Invention."

However, in [0035] of the specification, "has a high normal dispersion of about

D=-456.9 ps^2/(nm km) (corresponding to about β_2=+0.144 ps^2/m)" and "the dispersion of the SMF at about 770 nm is measured to be about D=-135.71 ps^2/(nm km) (corresponding to about β_2=+0.0427 ps^2/m)" are described, and there is a description that one corresponding to "the second order dispersion β_2" is "the dispersion D." Therefore, the above allegation by the appellant that "the dispersion slope" and "the second order dispersion β_2" are correspondent with each other cannot be adopted.

D. As described above, it cannot be said that the invention according to Claim 1 is clear, and it cannot be recognized that the invention according to Claim 1 is described in the detailed descriptions of the inventions in the specification, either. Thus, the present application does not meet the requirements stipulated in Article 36(6) (i) and (ii) of the Patent Act and therefore, the present application should be rejected.

2. Regarding Claim 2
(1) The invention according to Claim 2 of the present application is "the all-fiber delivery system of Claim 1, wherein the first fiber comprises a single mode fiber," wherein, in the all-fiber delivery system of Claim 1, "the first fiber comprises one of a microstructured fiber and a multi-mode fiber." The relationship between the "microstructured fiber" or "multi-mode fiber" of Claim 1 and the "single mode fiber" of Claim 2 is unclear and it cannot be said that the invention according to Claim 2 is clear.

(2) In view of "the first fiber comprises one of a microstructured fiber and a multi-mode fiber" in Claim 1, it can be considered that in the invention according to Claim 2 "wherein the first fiber comprises a single mode fiber," the "first fiber " refers to the "microstructured fiber" and "single mode fiber," or that the "first fiber" refers to the "multi-mode fiber" and "single mode fiber." However, the "single mode fiber," "microstructured fiber," and "multi-mode fiber are described in parallel in [0020] of the specification of the present application, as "In certain embodiments, the first fiber with normal dispersion may comprise a single mode fiber, a microstructured fiber, or other multi-mode fiber, capable of providing a similar function; i.e. having normal dispersion." In addition, regarding the "single mode fiber," [0028] describes "in many embodiments, the first fiber 120 comprises a single-mode fiber (SMF). In some embodiments, the first fiber 120 comprises a silica-core fiber having a cladding and/or coating thereon. In one exemplary embodiment, the first fiber 120 comprises a silica-core fiber having a silica cladding and acrylate coating thereon, and is commercially

sold by OFS Fitel, of Norcross, G A, under a "ClearLite 780-11" trademark," wherein only the one that "comprises a silica-core fiber having a cladding and/or coating thereon" is described; and there is no description about the one that is a "microstructured fiber" and "single mode fiber" or the one that is a "multi-mode fiber" and "single mode fiber." Therefore, it cannot be said that the invention according to Claim 2 of "The all-fiber delivery system of Claim 1, wherein the first fiber comprises a single mode fiber" is described in the detailed descriptions of the inventions in the specification of the present application.

(3) As described above, it cannot be said that the invention according to Claim 2 is clear, and it cannot be said that the invention is described in the detailed descriptions of the inventions, either. Thus, the present application does not meet the requirements stipulated in Article 36(6) (i) and (ii) of the Patent Act as indicated regarding the invention according to Claim 5 in the scope of claims amended on February 12, 2016.

No. 5 Regarding the inventive step (Article 29(2) of the Patent Act)
1 The Invention

The description of Claim 1 of the present application is as described in [Claim 1] of "No. 3 Description of the scope of claims of the present application" above and is shown again as follows:

"[Claim 1]

An all-fiber delivery system for femtosecond laser pulses without pulse pre-chirping, comprising:

a first fiber with normal dispersion; and

a higher order mode fiber with anomalous dispersion, the higher order mode fiber having a relative dispersion slope equal to a dispersion slope of the first fiber and having an effective area of about 14.9 μm^2;

wherein the all-fiber delivery system is free of bulk optics and is suitable for producing resulting higher order mode light as a free-space output,

the higher order mode comprises one of LP_{02}, LP_{03}, and LP_{04}, and

the first fiber comprises one of a microstructured fiber and a multi-mode fiber."

Here, as described in "1. Regarding Claim 1" of No. 3 above, the invention according to Claim 1 of the present application is not clear and the allegation of "Thus, the 'dispersion slope' corresponds to 'the second' order dispersion and 'the second order

dispersions' of two fibers 'are approximately of the same magnitude with opposite signs.' In addition, such a state in which the dispersion slope values are approximately of the same magnitude with opposite signs is expressed as 'the relative dispersion slopes are equal' in the Invention." in the written opinion submitted by the appellant on December 15, 2016 cannot be adopted. However, the following examination will be made supposing that an interpretation is made as alleged by the appellant; that is, that the "dispersion slope" in Claim 1 of the present application refers to "the second order dispersion β_2" and the "relative dispersion slope equal to a dispersion slope of the first fiber" in Claim 1 refers to the "second order dispersion β_2 whose value is approximately of the same magnitude as the second order dispersion β_2 of the first fiber, with an opposite sign."

Hereinafter, the invention according to Claim 1 is referred to as "the Invention."

2. Cited Document

(1) The following is described in "Novel concept for large distance ultrashort pulse fiber delivery without pre-chirping", T. Le ET AL, Proc. SPIE 7912, Solid State Lasers XX: Technology and Devices, 791214 (February 15, 2011); doi 10.1117/12.873584, pages 1 to 8 (hereinafter, referred to as "Cited Document.") which is a publication distributed before the priority date of the present application and is cited in the reasons for refusal by the body.

A (Title) "Novel concept for large distance ultrashort pulse fiber delivery without pre-chirping"

B (Page 2, lines 14 to 1 from the bottom) "3. LASER PULSE FIBER DELIVERY An mode-locked Ti: Sapphire laser with a repetition rate of 264 MHz, a spectral bandwidth of 6 nm FWHM, and an average output power of 210 mW is used as the pulsed light source. The laser light is centered at 770 nm which is essentially given by the properties of the available HOM fiber that shows optimal anomalous second and third order dispersion at 770 nm.

...

The solid-silica fiber module consists of a single-mode fiber (SMF) and the anomalous dispersion HOM fiber with a long-period-grating (LPG) mode converter in between. Figure 1 shows a diagram of the fiber module. The effective area of the HOM fiber is calculated from pre-form data to be 14.9 μm^2 at 770 nm."

C (Page 3, lines 2 to 14) "In Figure 1 (note of Appeal decision: "Figure 1" is found to be an error of "Figure 2") the dispersion curves of the LP_{01} and LP_{02} modes and the single-mode fiber ClearLite 780-11(OFS product) are shown. The dispersions of the LP_{01} and LP_{02} modes are calculated from the index profile of the relevant pre-form portion using a scalar mode solver. The HOM LP_{02} dispersion at 770 nm is found to be D=+112.7 ps/(nm· km) with a dispersion slope of S=-2.542 ps (nm^2· km). This corresponds to a second and third order dispersion (TOD) of β_2 =-0.0355 ps^2/m and β_3=-0.0002229 ps^3/m, respectively. The fundamental LP_{01} mode has a high normal dispersion D=-456.9 ps^2/(nm· km) (β_2=+0.144 ps^2/m) due to the combination of high material dispersion and high normal waveguide dispersion. For comparison, the dispersion of the SMF at 770 nm is measured to be D=-135.71 ps^2/(nm· km) (β_2=+0.0427 ps^2/m). The SMF dispersion slope and TOD are S=+0.591 ps/(nm^2· km) and β_3=+0.0000236 ps^3/m, respectively. The SMF is a match-clad fiber type with a dispersion dominated by the material dispersion of silica. The second order dispersion of the LP_{02} and that of the SMF are approximately of the same magnitude with opposite signs. Furthermore, it is seen that the dispersion slopes are of opposite sign such that when combining fiber sections of LP_{02} and SMF the higher order dispersion is partly compensated."

D (Page 4, lines 1 to 3) "In our setup, light from the fs-laser is coupled into the single-mode end of the fiber module (Figure 1). After traveling through 9 m single-mode fiber it is coupled into the HOM fiber by the mode converter and exits the fiber module in an LP_{02} mode."

E Figure 1 is as follows:

"

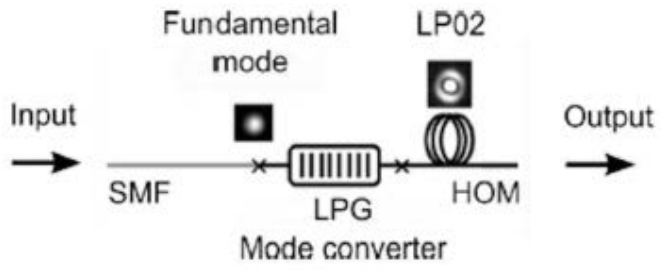

Figure 1. Solid-silica fiber module for femtosecond pulse delivery.

"

F Figure 2 is as follows:

"

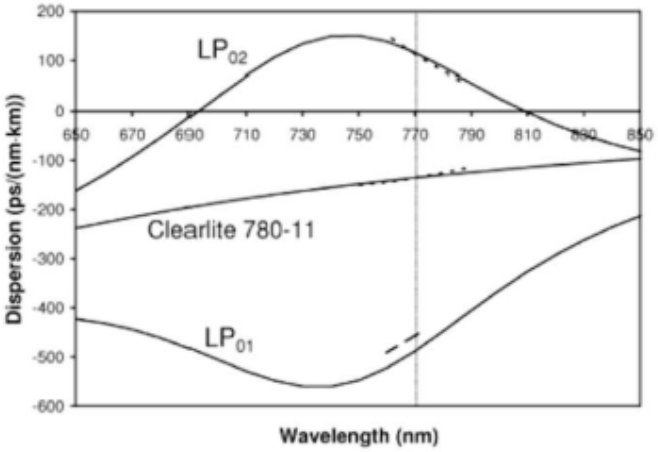

Figure 2. Dispersion curves as calculated from the refractive index profile of the fiber pre-form of LP_{02} HOM and LP_{01} fundamental mode. Also shown is the calculated dispersion of the single mode fiber ClearLite 780-11. Dotted curves are corresponding dispersion curves measured with a white light interferometer.

(2) Cited Invention

According to the descriptions of (1) A to F above, the following points can be understood regarding the fiber module described in Figure 1 of the Cited Document.

A. The fiber module is free of pre-chirping.

B. The fiber module consists of a single-mode fiber and the anomalous dispersion HOM fiber with a long-period-grating mode converter in between.

C. The fiber module is a solid-silica module for femtosecond pulse delivery.

D. Pulse light from the fs-laser (femtosecond laser) is coupled into the single-mode end.

E. "ClearLite 780-11 (OFS product)" is used as a single-mode fiber.

F. The anomalous dispersion HOM fiber is a fiber operable in the LP_{02} mode.

G. The second order dispersions of the LP_{02} and the single mode fiber are approximately of the same magnitude with opposite signs.

H. The anomalous dispersion HOM fiber has an effective area of 14.9 μm^2.

I. The light exits from the fiber module in the LP_{02} mode.

As described above, it is recognized that in the Cited Document, the following invention (hereinafter, referred to as "the Cited Invention") is described as the fiber

module shown in Figure 1.

"A fiber module,

which is a solid-silica module for femtosecond pulse delivery without pre-chirping, comprising:

a single-mode fiber and an anomalous dispersion HOM fiber with a long-period-grating mode converter in between; wherein

the single mode fiber is ClearLite 780-11 (OFS product);

the anomalous dispersion HOM fiber is a fiber operable in the LP_{02} mode;

the second order dispersions of the LP_{02} and the single mode fiber are approximately of the same magnitude with opposite signs;

the anomalous dispersion HOM fiber has an effective area of 14.9 μm^2;

pulse light from a femtosecond laser is coupled into the single-mode end; and

the light exits from the fiber module in the LP_{02} mode."

2. Comparison

The invention according to Claim 1 of the present application (hereinafter, referred to as "the Invention") and the Cited Invention are compared.

The Cited Invention is a "fiber module" "which is a solid-silica module for femtosecond pulse delivery without pre-chirping" and in which "pulse light from a femtosecond laser is coupled into the single-mode end;" and therefore, it is in common with the Invention in terms of being "an all-fiber delivery system for femtosecond laser pulses without pulse pre-chirping."

"ClearLite 780-11 (OFS product)" which is a "single mode fiber" in the Cited Invention has a "negative" dispersion value (refer to Figure 1) and therefore, it is a fiber having normal dispersion. Accordingly, the above "ClearLite 780-11 (OFS product)" corresponds to the "first fiber with normal dispersion" in the Invention.

In the Cited Invention, "the anomalous dispersion HOM fiber" "is a fiber operable in the LP_{02} mode" and also "has an effective area of 14.9 μm^2." In addition, in the Cited Invention, "the second order dispersions of the LP_{02} and the single mode fiber are approximately of the same magnitude with opposite signs." Further, it is obvious that "LP_{02}" in the Cited Invention is a kind of the higher order mode. Therefore, based on the supposed interpretation described in the above 1, "the anomalous dispersion HOM fiber" in the Cited Invention corresponds to "a higher order mode fiber with

anomalous dispersion, the higher order mode fiber having a relative dispersion slope equal to a dispersion slope of the first fiber and having an effective area of about 14.9 μm^2" in the Invention.

The "all-fiber delivery system" in the Invention may include a long-period-grating mode converter between the "single-mode fiber" and "higher order fiber" (refer to [0025] and [0030] in the specification of the present application and [Claim 3] and [Claim 4] of the scope of claims of the patent). Accordingly, it can be said that "the fiber module" that "consists of a single-mode fiber and an anomalous dispersion HOM fiber with a long-period-grating mode converter in between" in the Cited Invention is in common with the Invention in terms of the concept of the "all-fiber delivery system" and in addition, the fiber module in the Cited Invention "is free of bulk optics and is suitable for producing resulting higher order mode light as a free-space output" as with "the all-fiber delivery system" of the Invention.

Consequently, the Invention and the Cited Invention are in correspondence in the following points.

[Corresponding features]
"An all-fiber delivery system for femtosecond laser pulses without pulse pre-chirping, comprising:

a first fiber with normal dispersion; and

a higher order mode fiber with anomalous dispersion, the higher order mode fiber having a relative dispersion slope equal to a dispersion slope of the first fiber and having an effective area of about 14.9 μm^2;

wherein the all-fiber delivery system is free of bulk optics and is suitable for producing a resulting higher order mode light as a free-space output, and

the higher order mode comprises one of LP_{02}, LP_{03}, and LP_{04}."

On the other hand, the two are different in the following point:
[The different feature]

The first fiber is specified as "comprises one of a microstructured fiber and a multi-mode fiber" in the Invention; whereas, in the Cited Invention, the first fiber is a single mode fiber that is "ClearLite 780-11 (OFS product)."

3 Judgment

The above different feature is examined.

It is obvious to a person skilled in the art that as "the single mode fiber" in the Cited Invention, another single mode fiber can be selected instead of "ClearLite 780-11 (OFS product)."

Meanwhile, as a single mode fiber, a microstructured fiber (also referred to as "a holey fiber;" refer to [0045] in the specification of the present application) is well known as described in Well-Known Examples 1 to 3 described later. In addition, no significant difficulty is recognized in adopting the well-known "microstructured fiber" as a "single mode fiber" in the Cited Invention.

Accordingly, a person skilled in the art can easily conceive of the configuration of the Invention related to the above different feature, based on the well-known matter.

Further, it also cannot be recognized that the Invention has a prominent effect that exceeds the prediction of a person skilled in the art.

Thus, the Invention could be easily made by a person skilled in the art based on the Cited Invention and the well-known matter; thus, the appellant should not be granted a patent for the Invention in accordance with the provisions of Article 29(2) of the Patent Act.

[Example 1 of Well-Known Art] Japanese Unexamined Patent Application Publication No. 2009-42523 which was cited in the reasons for refusal of the examiner's decision
[0002] "A holey fiber or a photonic crystal fiber is a new type of an optical fiber that includes a core region at its center and a cladding region arranged on an outer circumference of the core region. The cladding region includes a plurality of air holes around the core region to propagate light in the core region by lowering average refractive index of the cladding region using the air holes and by utilizing the principle of total reflection of light. The holey fiber controls the refractive index using the air holes, so that specific characteristics can be realized, such as an Endlessly Single Mode (ESM), which has been unachievable by conventional optical fibers, zero-dispersion wavelength, which is shifted toward a side of extremely short wavelengths, or the like."

[Example 2 of Well-Known Art] International Publication No. WO2008/093870 which was cited in the reasons for refusal of the examiner's decision
[0002] "A holey fiber is a new type of optical fiber including a core region formed at a center of the optical fiber and a cladding region arranged on an outer circumference of the core region. The cladding region includes a plurality of air holes that are arranged

around the core region at regular intervals, where the air holes reduce the average refractive index of the cladding region. The light is transmitted in the core region by the principle of the total reflection of light. The holey fiber can achieve special characteristics such as an endlessly single mode (ESM), which cannot be achieved by a conventional optical fiber, by controlling the refractive index using the air holes."

[Example 3 of Well-Known Art] In the section of "Photonic Crystal Optical Fiber" in "Commentary on Keywords: Comprehensive Encyclopedia of Optical Technology" by Editorial Department of Optronics (Optronics, Co., Ltd. December 12, 2004, First Edition, First Printing, pages 346-347), "can also be referred to as a holey fiber or a microstructured fiber. The total reflection type photonic crystal optical fiber allows a single mode operation in all wavelength bands ...."

No. 6 Closing

As described above, the present application does not meet the requirements stipulated in Article 36(6) (i) and (ii) of the Patent Act and therefore, the present application should be rejected.

In addition, the appellant should not be granted a patent for the Invention in accordance with the provisions of Article 29(2) of the Patent Act and therefore, the present application should be rejected without examining other claims.

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

April 28, 2017

Chief administrative judge: KOMATSU, Tetsuzo

Administrative judge: KAWAHARA, Hideo

Administrative judge: KONDO, Yukihiro