Trial decision

Correction No. 2018-390088

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The case of trial for correction relating to Japanese Patent No. 5674066 has resulted in the following appeal decision.

Conclusion

As for Claim 4 after correction, correction of the scope of claims of Japanese Patent No. 5674066 as the corrected scope of claims attached to the written demand for trial of the case shall be approved.

The demand for trial of the case regarding the correction of Claims [2, 3] after correction is groundless.

Reason

No. 1 Object of the demand

As for Claim 2, Claim 3, and Claim 4 after correction, correction of the scope of claims of Japanese Patent No. 5674066 as to each claim, shall be approved as the corrected scope of claims attached to the written demand for trial of the case.

No. 2 History of the procedures

Japanese Patent No. 5674066 (hereinafter, referred to as "the Patent") is a patent relating to a divisional application (Japanese Patent Application No. 2013-94289) filed on April 26, 2013, which is a part of a patent application (Japanese Patent Application No. 2008-322847) filed on February 18, 2008 (hereinafter, referred to as "the filing date of the case"), and the establishment of patent right was registered on January 9, 2015.

The demandant demanded a trial for correction (hereinafter, referred to as the "trial of the case") regarding the correction of the scope of claims attached to the application of the Patent, on May 25, 2018.

Against this, the chief administrative judge notified reasons for rejecting a demand for correction on August 2, 2018, and the demandant submitted a written opinion on September 5, 2018.

No. 3 Contents of correction

The trial of the case is demanded with respect to Claim 2 and Claim 3 before the correction, which are a unit of claims. Then, the demandant alleges, in the written opinion, that the demand for trial of the case includes a set of corrections aimed at the matter (the dissolution of a citation relation) prescribed in item (iv) of the proviso to Article 126(1) of the Patent Act, and demands that if the correction of claims referring is approved, it be treated as a separate correction unit from claims refered.

1 The matters of correction

The matters of correction described in the written demand of the trial of the case (the written demand for trial of the case) are as follows.

(1) Correction A

Although Claim 2 before correction referred to Claim 1 before correction, it is changed to an independent claim to be Claim 2 after correction.

Furthermore, it is limited by the matter "the connecting means displays in time series measurement results obtained by sequentially connecting the three-dimensional measurement results."

(2) Correction B

Claim 3 before correction referred to Claim 1 or Claim 2 before correction. Among these two inventions (the inventions relating claim 3 before correction which refer to Claim 1 before correction or Claim 2 before correction), the one which referred to Claim 1 before correction is changed to an independent claim to be Claim 3 after correction.

Further, it is limited by the matter "the connecting means includes a determining means for determining mutual positions of the three-dimensional measurement results having a common region mutually, and among the plurality of three-dimensional measurement results, the three-dimensional measurement result having no common region mutually is included in the measurement result in which the plurality of three-dimensional measurement results are sequentially connected."

(3) Correction C

Claim 3 before correction referred to Claim 1 or Claim 2 before correction. Among these two inventions (the inventions relating to Claim 3 before correction which refers to Claim 1 before correction or Claim 2 before correction), the one which referred to Claim 2 before correction is changed to an independent claim to be Claim 4 after correction.

2 Descriptions of the scope of claims before/after correction

The descriptions of the scope of claims before/after correction are specifically as follows. Underlines were provided by the body and represent corrected portions.

Further, hereinafter, the inventions relating to Claim 1 to Claim 3 before correction are referred to as "Invention 1" to "Invention 3", and "Invention 1" to "Invention 3" are collectively referred to as the "respective inventions of the case." Also, the inventions relating to Claim 1 to Claim 4 after correction are referred to as "Corrected invention 1" to "Corrected invention 4."

(1) Before correction

"[Claim 1]

An ultrasonic measurement device comprising:

a transmitter for transmitting ultrasonic waves;

a receiver for receiving reflected waves from an object of ultrasonic waves transmitted from the transmitter; and

a processing means for processing information of the reflected waves from the object as three-dimensional measurement results, wherein

a connecting means for sequentially connecting the three-dimensional measurement results is included; and

the connecting means includes a determining means for determining mutual positions of the three-dimensional measurement results.

[Claim 2]

The ultrasonic measurement device according to Claim 1, wherein the three-dimensional measurement results of the object are measurement results of the object within a measurement region that extends farther from the transmitter.

[Claim 3]

The ultrasonic measurement device according to Claim 1 or 2, wherein a distance from the transmitter to the object is obtained by a propagation sound speed of ultrasonic waves and a round-trip propagation time from a wave transmission time to a wave reception time.

(2) After correction

"[Claim 1]

An ultrasonic measurement device comprising:

a transmitter for transmitting ultrasonic waves;

a receiver for receiving reflected waves from an object of ultrasonic waves transmitted from the transmitter; and

a processing means for processing information of the reflected waves from the object as three-dimensional measurement results, wherein

a connecting means for sequentially connecting the three-dimensional measurement results is included; and

the connecting means includes a determining means for determining mutual positions of the three-dimensional measurement results.

[Claim 2]

An ultrasonic measurement device comprising:

a transmitter for transmitting ultrasonic waves;

a receiver for receiving reflected waves from an object of ultrasonic waves transmitted from the transmitter; and

a processing means for processing information of the reflected waves from the object as three-dimensional measurement results, wherein

a connecting means for sequentially connecting the three-dimensional measurement results is included;

the three-dimensional measurement results of the object are measurement results of the object within a measurement region that extends farther from the transmitter;

the connecting means includes a determining means for determining mutual positions of the three-dimensional measurement results; and

the connecting means displays in time series measurement results obtained by sequentially connecting the three-dimensional measurement results.

[Claim 3]

An ultrasonic measurement device comprising:

a transmitter for transmitting ultrasonic waves;

a receiver for receiving reflected waves from an object of ultrasonic waves transmitted from the transmitter; and

a processing means for processing information of the reflected waves from the

object as three-dimensional measurement results, wherein

a connecting means for sequentially connecting the three-dimensional measurement results is included;

a configuration is adopted to obtain a distance from the transmitter to the object by a propagation sound speed of ultrasonic waves and a round-trip propagation time from a wave transmission time to a wave reception time;

the connecting means includes a determining means for determining mutual positions of the three-dimensional measurement results; and

among the plurality of there-dimensional measurement results, the three-dimensional measurement result having no common region mutually is included in the measurement result in which the plurality of three-dimensional measurement results are sequentially connected.

[Claim 4]

An ultrasonic measurement device comprising:

a transmitter for transmitting ultrasonic waves;

a receiver for receiving reflected waves from an object of ultrasonic waves transmitted from the transmitter; and

a processing means for processing information of the reflected waves from the object as three-dimensional measurement results, wherein

a connecting means for sequentially connecting the three-dimensional measurement results is included;

the three-dimensional measurement results of the object are measurement results of the object within a measurement region that extends farther from the transmitter;

a configuration is adopted to obtain a distance from the transmitter to the object by a propagation sound speed of ultrasonic waves and a round-trip propagation time from a wave transmission time to a wave reception time; and

the connecting means includes a determining means for determining mutual positions of the three-dimensional measurement results."

No. 4 Outline of the reason for refusal of correction

Among the corrections concerning the demand for trial of the case, Correction A regarding Claim 2 after correction and Correction B regarding Claim 3 after correction correspond to a set of corrections aimed at the matter prescribed in items (i) and (iv) of the proviso to Article 126(1) of the Patent Act.

However, Corrected invention 2 and Corrected invention 3 could have been easily made by a person skilled in the art based on the invention described in International Publication No. WO99/66343 (hereinafter, referred to as " Cited Document 1") internationally published on December 23, 1999 (Heisei 11) prior to the filing date of the case, and thus the appellant should not be granted a patent for it independently at the time of patent application under the provisions of Article 29(2) of the Patent Act.

Therefore, the demand for trial of the case does not comply with the provision of Article 126(7) of the Patent Act.

No. 5 The demandant's allegation

The outline of the demandant's allegation in the written opinion is as follows.

1 Regarding Corrected invention 2

(1) In Cited Document 1, there is no description about the matter that "a three-dimensional image" is provided by sequentially connecting "composite images" partially overlapped with each other, which is the matter that after combining partially overlapping first and second images, the second image is made to be a new first image, and processing for combining the new first image and a new second image partially overlapping is repeated.

According to the descriptions of Cited Document 1 (No. 6-4 (1) A (C), (F), (J), (K), (M), and (N) described later), the matter described in the document is that the number of the second images partially overlapping with the first image is increased to reduce an error from a real object. For example, after obtaining the first image, if the plurality of second images are obtained in a time series order, a three-dimensional image (composite image) in a region where the first image and all the plurality of second images are partially overlapped is generated. Therefore, the vicinity of a predetermined region (region of the first image) is imaged, and the predetermined region can be intensively measured in three dimensions, and on the other hand, since the range where the three-dimensional image can be generated is limited to the vicinity of the first image, it becomes difficult to efficiently generate the three-dimensional image over a wide range.

Further, in Cited Document 1, although it is described that processing of replacing the point of the first image to the point of the second image is carried out, if the processing is carried out, a view field of the first image does not widen, but rather narrows, so that no matter how many times the processing is repeated, the view field of the first image is not expanded. (The written opinion p. 6 l. 3 - l.25)

(2) In Cited Document 1, there is no description of the matter "the connecting means displays in time series measurement results obtained by sequentially connecting the three-dimensional measurement results." (The written opinion, p. 6 l. 27 -last line)

(3) In Cited Document 1, there is a description about a problem of a two-dimensional sonar that is the prior art, and it is also described that when a two-dimensional sonar and a three-dimensional solar are compared, the three-dimensional sonar is less susceptible to the motion of the hull and can obtain a wide three-dimensional image. However, there is not description that the imaging region (view field) of the three-dimensional sonar is further expanded. (The written opinion, p. 7 l. 2 -l. 7)

2 Regarding Corrected invention 3

(1) Corrected Invention 3 comprises "a connecting means for sequentially connecting the three-dimensional measurement results," and "the connecting means" includes "a determining means for determining mutual positions of the three-dimensional measurement results having a common region mutually," so that during the movement of a hull mounted with an ultrasonic measurement device, by sequentially obtaining three-dimensional measurement results, continuous three-dimensional measurement results of the seabed can be efficiently obtained over the wide range. However, such a matter is not described or mentioned in Cited Document 1.

The matter described in Cited Document 1 is that the number of the second images partially overlapping with the first image is increased to reduce an error from a

real object, an error from a real object is reduced, and after obtaining the first image, if the plurality of second images is obtained in a time series order, the three-dimensional image (composite image) of the region where the first image and all the plurality of second images are partially overlapped is generated, and thus it becomes difficult to efficiently generate the three-dimensional image over the wide range. (The written opinion, p. 7 l. 17 - p. 8 l. 5)

(2) According to reasons for refusal of correction, in the Cited invention, it is recognized that it is accepted that "each new image" does not overlap with some "previous images," whereas the matter described in Cited Document 1 is a technology that images the vicinity of the predetermined region from various angles to measure the predetermined region in three dimensions so as to solve a problem of generating a composite image that compensates for fluctuations in the position or movement of the acoustic transducer. Therefore, it is not accepted that "each new image" does not overlap with some "previous images." (The written opinion, p. 8 l. 7 - l. 19)

No. 6 Judgment by the body
1 Purpose of correction
(1) Correction A
Correction A is a correction regarding Claim 2 after correction.

A In Correction A, the correction which deletes the description "the ultrasonic measurement device according to Claim 1, wherein" from the description of Claim 2 before correction, and adds to the description of Claim 2 before correction the descriptions "an ultrasonic measurement device comprising: a transmitter for transmitting ultrasonic waves; receiver for receiving reflected waves from an object of ultrasonic waves transmitted from the transmitter; and a processing means for processing information of the reflected waves from the object as three-dimensional measurement results, wherein a connecting means for sequentially connecting the three-dimensional measurement results is included," and "the connecting means includes a determining means for determining mutual positions of the three-dimensional measurement results," (hereinafter, referred to as "Correction AA") is a correction which specifically writes the matters described in Claim 2 before correction as they are to be the description of the description of Claim 2 after correction by referring to the description of Claim 1 before correction.

Then, Correction AA is a correction that makes the description of Claim 2 before correction not refer to the description of Claim 1 before correction. The invention relating to Claim 2 before correction and the invention relating to Claim 2 after correction have a one-to-one correspondence, and in Claim 2 before correction and Claim 2 after correction, the contents of the descriptions are not changed at all.

Therefore, Correction AA is a correction for the purpose of the matter (the dissolution of a citation) prescribed in item (iv) of the proviso to Article 126(1) of the Patent Act.

B In Correction A, the correction which adds the description "the connecting means displays in time series measurement results obtained by sequentially connecting the three-dimensional measurement results" to the description of Claim 2 before correction

(hereinafter, referred to as "Correction AB") is a correction which limits "the connecting means" to the one that "displays in time series measurement results obtained by sequentially connecting the three-dimensional measurement results."

Therefore, Correction AB is a correction for the purpose of the matter (restriction of the scope of claims) prescribed in item (i) of the proviso to Article 126(1) of the Patent Act.

(2) Corrections B and C

Correction B is a correction regarding Claim 3 after correction, and Correction C is a correction regarding Claim 4 after correction.

A In Correction B, the correction which deletes the description "the ultrasonic measurement device according to Claim 1 or Claim 2, wherein" from the description of Claim 3 before correction, and adds to the description of Claim 3 before correction the descriptions "an ultrasonic measurement device comprising: a transmitter for transmitting ultrasonic waves; a receiver for receiving reflected waves from an object of ultrasonic waves transmitted from the transmitter; and a processing means for processing information of the reflected waves from the object as three-dimensional measurement results, wherein a connecting means for sequentially connecting the three-dimensional measurement results is included," "the connecting means" "includes a determining means for determining mutual positions of the three-dimensional measurement results" (hereinafter, referred to as "Correction BA") is a correction which specifically writes the matters described in Claim 3 before correction as they are to be the description of the description of Claim 3 after correction, by referring to the description of Claim 1 before correction, of the matters described in Claim 3 before correction by referring to the description of Claim 1 or Claim 2 before correction.

Further, Correction C is a correction which deletes the description "the ultrasonic measurement device according to Claim 1 or Claim 2, wherein" from the description of Claim 3 before correction, and adds to the description of Claim 3 before correction the descriptions "an ultrasonic measurement device comprising: a transmitter for transmitting ultrasonic waves; a receiver for receiving reflected waves from an object of ultrasonic waves transmitted from the transmitter; and a processing means for processing information of the reflected waves from the object as three-dimensional measurement results, wherein a connecting means for sequentially connecting the three-dimensional measurement results is included; the three-dimensional measurement results of the object are measurement results of the object within a measurement region that extends farther from the transmitter" and "the connecting means includes a determining means for determining mutual positions of the three-dimensional measurement results". This is a correction which specifically write the matters described in Claim 3 before correction as they are to be the description of Claim 4 after correction by referring to the description of Claim 2 before correction, of the matters described in Claim 3 before correction by referring to the description of Claim 1 or Claim 2 before correction, in the description of Claim 3 before correction.

Then, Correction BA and Correction C are corrections that make the description of Claim 3 before correction not refer to the descriptions of Claim 1 and Claim 2 before correction. The inventions relating to Claim 3 before correction and the inventions relating to Claim 3 and Claim 4 after correction have a one-to-one correspondence, and

in Claim 3 before correction and Claim 3 and Claim 4 after correction, the contents of the description are not changed at all.

Therefore, Correction BA and Correction C are corrections for the purpose of the matter (the dissolution of a citation) prescribed in item (iv) of the proviso to Article 126(1) of the Patent Act.

B In Correction B, the correction which adds the description "having a common region mutually" to the description of Claim 3 before correction (hereinafter, referred to as "Correction BB") is a correction which limits "the three-dimensional measurement results" that are objects for "determining" "mutual positions" by "the determining means" to the one "having a common region."

Therefore, Correction BB is a correction for the purpose of the matter (restriction of the scope of claims) prescribed in item (i) of the proviso to Article 126(1) of the Patent Act.

C In Correction B, the correction which adds to the description of Claim 3 before correction the description "among the plurality of three-dimensional measurement results, the three-dimensional measurement result having no common region mutually is included in the measurement result in which the plurality of three-dimensional measurement results is sequentially connected" (hereinafter, referred to as "Correction BC") is a correction which limits "the measurement result in which the plurality of three-dimensional measurement results are sequentially connected" obtained by "a connecting means for sequentially connecting the three-dimensional measurement results" to the one in which "among the plurality of three-dimensional measurement results, the three-dimensional measurement result having no common region mutually is included."

Therefore, Correction BC is a correction for the purpose of the matter (restriction of the scope of claims) prescribed in item (i) of the proviso to Article 126(1) of the Patent Act.

(3) Summary of the purpose of correction

As described above, Correction A and Correction B are corrections for the purpose of the matters prescribed in item (i) and item (iv) of the proviso to Article 126(1) of the Patent Act, and Correction C is a correction for the purpose of the matter prescribed in item (iv) of the proviso to Article 126(1) of the Patent Act.

2 Regarding addition of new matter

(1) Statements of the description and the drawings of the Patent

In the description and the drawings of the Patent (hereinafter, "the Description, etc."), there are described the following matters. Underlines were provided by the body.

"[0037]

As shown in FIGS. 6 (a) and 6 (b), the ultrasonic measurement device 1 according to the present embodiment is installed on the hull 2, and the ultrasonic beam 21 is transmitted from the bottom of the hull 2 toward the object 30 on the seabed. By receiving the reflected waves, measurement results as shown in FIG. 6 (c) can be

obtained.
[0038]

Here, assuming that the viewing angle α from the bottom of the hull is about 30 degrees as shown in FIG. 6 (b), the length of one side of the measurement result in FIG. 6 (c) is half the water depth. For example, at a water depth of 100 m, a bottom condition of 50 m on a side can be obtained as a single measurement result depicted three-dimensionally including the degree of unevenness. Here, a single measurement result can indicate an accurate three-dimensional shape of the seabed without being affected by geometrical distortion due to the movement of the hull 2 and the like, because the required time for measurement is short.
[0039]

Here, although the measurement result shown in FIG. 6 (c) is correct as the bottom shape, it is based on the hull coordinate system (x-y-z) indicating the relative positional relationship from the hull 2, and it does not correspond to the fixed coordinate system on the ground surface like Japan's geodetic system. Hereinafter, a rectangular coordinate system fixed to the ground surface, such as the Japan geodetic system (reference ellipsoidal coordinate system), will be expressed as X-Y-Z.
[0040]

As shown in FIG. 6, when executed at each of positions a, b, and c in FIG. 7, if the hull 2 is accurately performing constant velocity linear motion, it can be obtained as measurement results 60a, 60b, and 60c at each position. These measurement results 60a, 60b, and 60c are the correct bottom condition in the hull coordinate system."

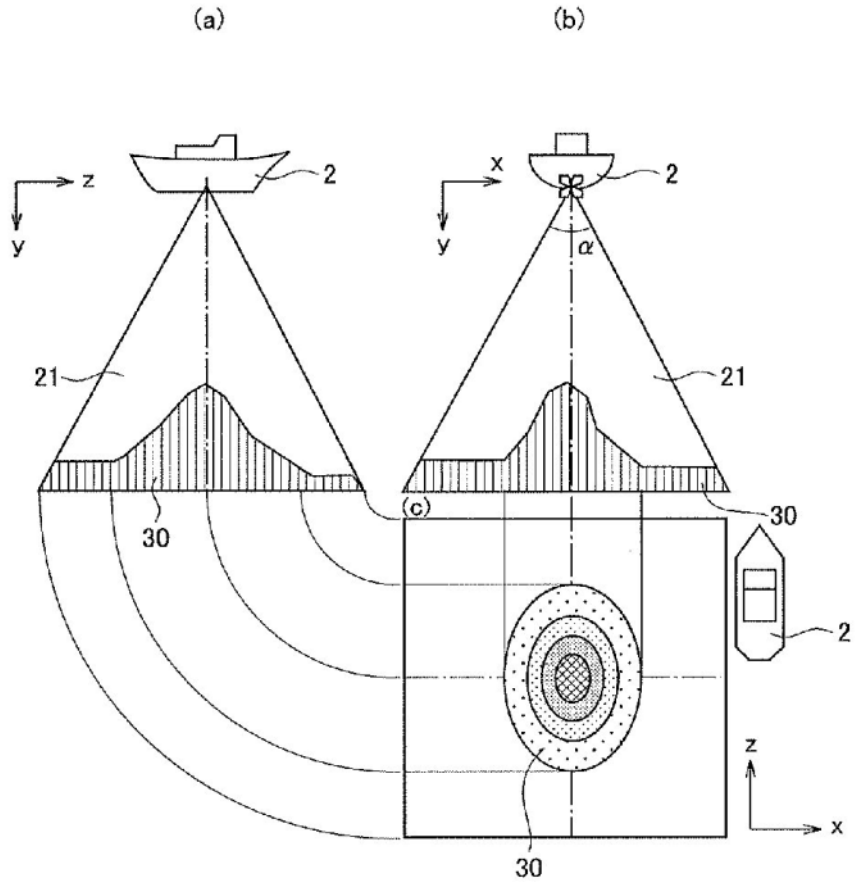
"[0042]

As described above, the measurement results 60a, 60b, and 60c shown in FIG. 7 represent the correct bottom condition in the hull coordinate system, but navigation of the hull 2 is different from constant velocity linear motion, and fluctuates by various factors. Here, in general, when the two congruent three-dimensional structures become linear and the three points coincide with each other, they are overlapped as a whole. Thus, the measurement results 60a, 60b, and 60c in FIG. 7 can be connected on the rectangular coordinate system X-Y-Z fixed on the ground surface without knowing the position of the hull 2 by overlapping the feature points 70a, 70b, and 70c in the measurement result 60a shown in FIG, 8 and the feature points 70a', 70b', and 70c' in the measurement result 60b, and similarly, overlapping the feature points 70d, 70e, and 70f in the measurement result 60b and the feature points 70d', 70e", and 70f' in the measurement result 60c."

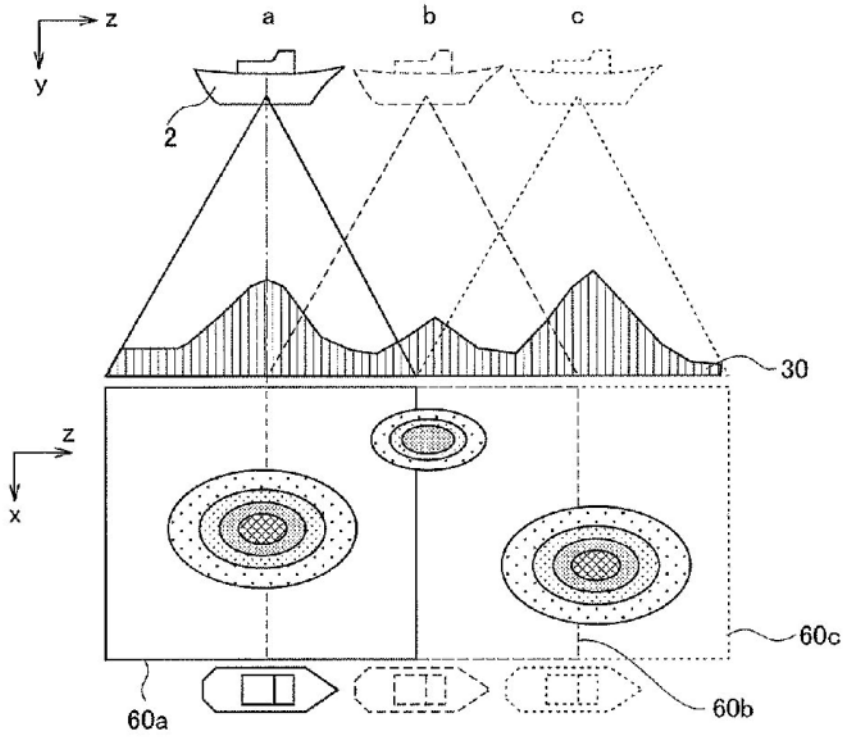
"[0044]

The measurement result 61 connected by the connecting means 51 is obtained by being displayed as shown in FIG. 9, and is connected as a correct wide seabed shape. As described above, since the ultrasonic measurement device 1 according to the present embodiment does not require information on the position of the hull, it is possible to obtain measurement results connected and displayed as the correct seabed shape on the rectangular coordinate system X-Y-Z fixed on the ground surface without being affected by motion and the like even when the hull 2 is moved."

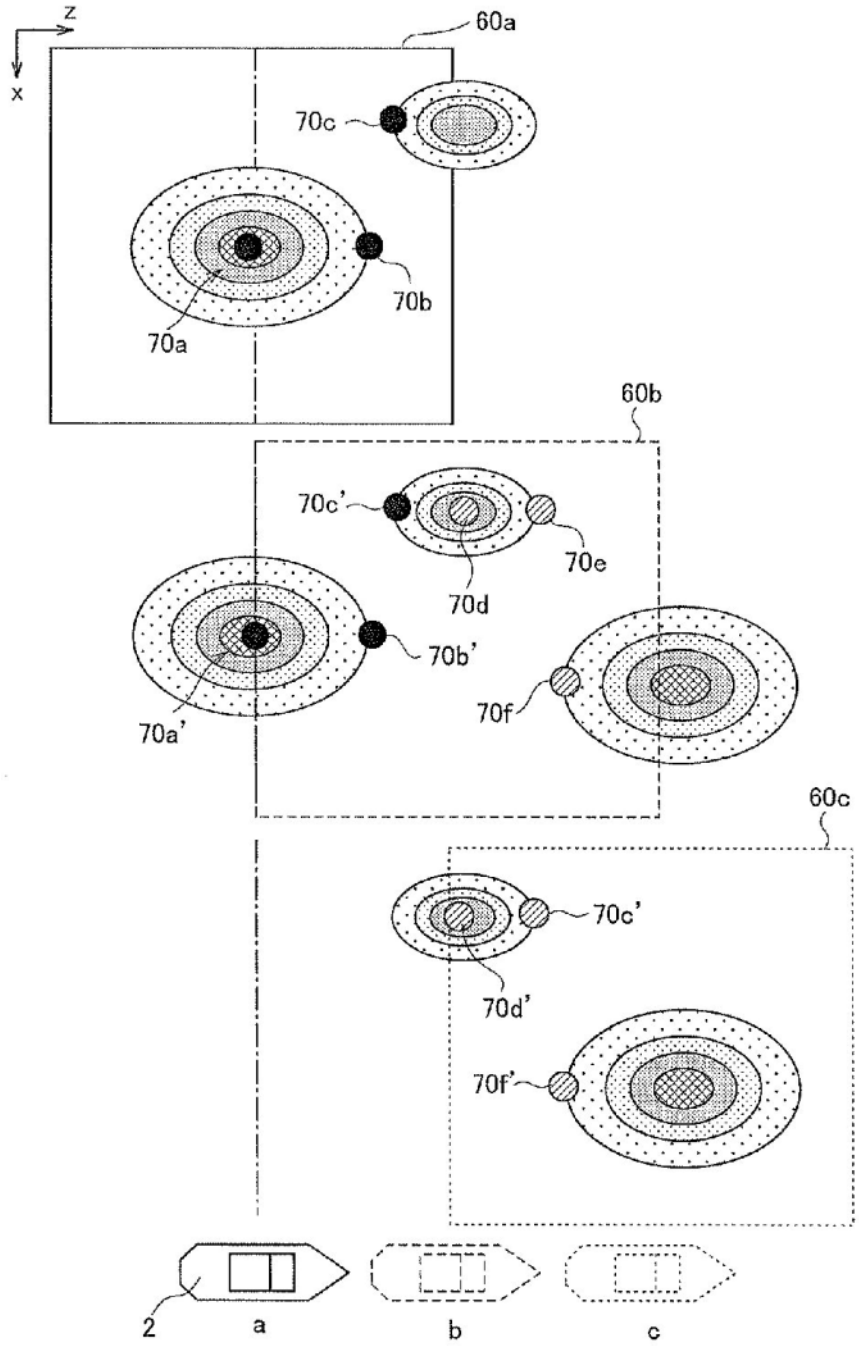
[FIG. 6]



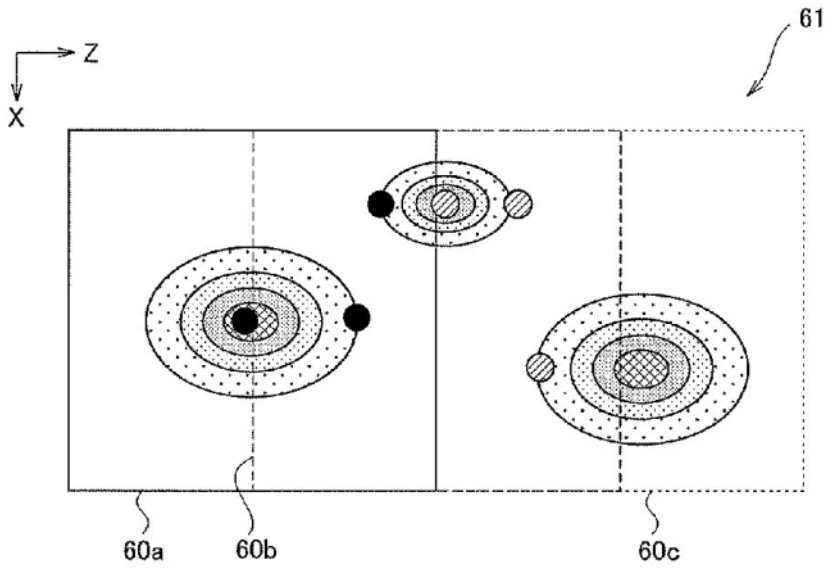
[FIG. 7]



[FIG. 8]


z
x
60a
70c
70b
70a
60b
70c'
70e
70d
70b'
70a'
70f
60c
70c'
70d'
70f'
2
a
b
c

[FIG. 9]



(2) Correction A

A Correction AA

Correction AA, as described in 1 (1) A above, is a correction which specifically writes the matters described in Claim 2 before correction as they are to be Claim 2 after correction by referring to the description of Claim 1 before correction, and does not change the contents of the description, so that it is obvious that the correction is made within the range of the matters described in the description, scope of claims, or drawings attached to the application of the Patent.

B Correction AB

(A) According to the description of (1) above in the Description, etc., the following matters are recognized.

a The ultrasonic measurement device 1 installed on the hull 2 transmits an ultrasonic beam 21 toward the object 30 on the seabed, and by receiving the reflected waves, a single measurement result that indicates an accurate three-dimensional shape of the seabed measurement results can be obtained ([0037] to [0039], and FIG. 6 (c)).

b When measurement is executed at a plurality of positions (a, b, and c in FIG. 7), if the hull 2 is accurately performing constant velocity linear motion, the results can be obtained as measurement results 60a, 60b, and 60c at each position. However, navigation of the hull 2 fluctuates by various factors, and thus in actuality it does not become constant velocity linear motion ([0040], [0042], and FIG. 7).

c The measurement results 60a, 60b, and 60c can be connected by the connecting means 51, and the measurement result 61 connected is connected as a correct wide seabed shape and displayed as shown in FIG. 9 ([0042], [0044]).

d Referring to FIG. 9, it can be seen that the connected measurement result 61 is the

one connecting and displaying the measurement results 60a, 60b, and 60c in this order.

(B) In summary, the Description, etc. describe that the measurement results 60a, 60b, and 60c obtained at a plurality of positions and indicating the three-dimensional seabed shape are connected by the connecting means 51, and the connected measurement result 61 is displayed as the correct wide seabed shape. Here, since the measurement results 60a, 60b, and 60c are obtained during the navigation of the hull 2, even if the hull 2 actually does not perform constant velocity linear motion, it is obvious that they are obtained in time series. Then, since the connected measurement result 61 connects and displays the measurement results 60a, 60b, and 60c in this order, it sequentially connects the measurement results 60a, 60b, and 60c obtained in time series. Then, displaying the connected measurement result 61 is nothing other than displaying in time series the measurement result obtained by sequentially connecting the three-dimensional measurement results.

Therefore, it is recognized that the Description, etc. describe that the measurement result obtained by sequentially connecting the plurality of the three-dimensional measurement results by the connecting means is displayed in time series.

(C) Correction AB, as described in 1 (1) B above, is a correction which limits "the connecting means" to the one that "displays in time series measurement results obtained by sequentially connecting the three-dimensional measurement results," and thus in view of (B) above, it is recognized that it is a correction within the range of the matters described in the description, scope of claims, or drawings attached to the application of the Patent.

(3) Correction B

A Correction BA

Correction BA, as described in 1 (2) A above, is a correction which specifically writes the matters described in Claim 3 before correction as they are to be the description of the description of Claim 3 after correction, by referring to the description of Claim 1 before correction, of the matters described in Claim 3 before correction by referring to the description of Claim 1 or Claim 2 before correction, and does not change the contents of the description. Therefore, it is obvious that the correction is made within the range of the matters described in the description, scope of claims, or drawings attached to the application of the Patent.

B Corrections BB and BC

(A) According to the description of (1) above of the Description, etc., the measurement results 60a, 60b, and 60c obtained at each position are connected by overlapping the feature points 70a, 70b, and 70c in the measurement result 60a and the feature points 70a', 70b', and 70c' in the measurement result 60b, and similarly, overlapping the feature points 70d, 70e, and 70f in the measurement result 60b and the feature points 70d'', 70e', and 70f' in the measurement result 60c, and then the connected measurement result 61 is obtained ([0040], [0042], [0044], FIG. 7, and FIG. 8).

Therefore, it is obvious that the measurement result 60a and the measurement result 60b respectively have a common region with the measurement result 60b and measurement result 60c. Then, it can be seen that by overlapping the feature points

70a, 70b, and 70c in the measurement result 60a and the feature points 70a', 70b', and 70c' in the measurement result 60b, the positional relationship between the measurement result 60a and the measurement result 60b is determined, and similarly, the positional relationship between the measurement result 60b and the measurement result 60c is determined.

Here, it is obvious that obtaining a single measurement result that indicates an accurate three-dimensional seabed shape ([0037] to [0039], and FIG. 6 (c)) can be repeated at any position during the navigation of the hull 2, and it is also obvious that additional measurement results obtained in such a way can be connected with the measurement results 60a, 60b, and 60c in the same procedure. Then, when the additional measurement results are sequentially connected and the connected measurement result 61 is obtained, the plurality of measurement results included therein are obtained during the navigation of the hull 2, so that it can be understood as a matter of course by a person skilled in the art that as a navigation distance becomes longer, they do not necessarily have a common region with each other.

Therefore, it is recognized that the Description, etc. describe that mutual positions of the three-dimensional measurement results having a common region mutually are determined, and that the three-dimensional measurement result having no common region mutually is included in the measurement result in which the plurality of three-dimensional measurement results are sequentially connected.

(B) Correction BB is a correction which limits "the three-dimensional measurement results" that are objects for "determining" "mutual positions" by "the determining means" to the one "having a common region." Also, Correction BC is a correction which limits "the measurement result in which the plurality of three-dimensional measurement results are sequentially connected" obtained by "a connecting means for sequentially connecting the three-dimensional measurement results" to the one in which "among the plurality of three-dimensional measurement results, the three-dimensional measurement result having no common region mutually is included."

Therefore, in view of (A) above, it is recognized that Correction BB and Correction BC are corrections made within the range of the matters described in the description, scope of claims, or drawings attached to the application of the Patent.

(4) Correction C

Correction C, as described in 1 (2) A, is a correction which specifically writes the matters described in Claim 3 before correction as they are to be the description of the description of Claim 4 after correction, by referring to the description of Claim 2 before correction, of the matters described in Claim 3 before correction by referring to the description of Claim 1 or Claim 2 before correction, in the description of Claim 3 before correction, and does not change the contents of the description at all. Therefore, it is obvious that it is a correction made within the range of the matters described in the description, scope of claims, or drawings attached to the application of the Patent.

(5) Summary of addition of new matter

As described above, Correction A to Correction C are corrections made within the range of the matters described in the description, scope of claims, or drawings attached to the application of the Patent, and fall under the provisions of Article 126(5)

of the Patent Act.

3 Substantial enlargement and alteration
(1) Contents of the invention relating to the Patent
A The Description, etc., describe the following matters.

"[Problem to be solved by the invention]
[0012]
However, according to the above-described conventional measurement method, the radiation direction of the thin ultrasonic beam 120 transmitted in a fan-shape in the azimuth direction x varies depending on the six conditions: the three-dimensional positions and roll, pitch, and yaw of the hull 2. Therefore, the accuracy of the measurement position is lowered, and in order to obtain a measurement result with higher accuracy, it is necessary to grasp all these six conditions and correct the measurement result by the grasped conditions, and there was a problem that the apparatus became large scale.
[0013]
Moreover, there was also a problem that the conventional measuring device 100 is applicable only to the case of measuring the shape of the object 131 in the observation field of the front (z-x plane) of the measuring device, and may not be applied to continuous measurement in a wide range.
[0014]
Furthermore, in the conventional measurement method, since the propagation speed of ultrasonic waves is about 1500 m/s, if the water depth is 75 m, it requires 0.1 seconds for the transmitted ultrasonic waves to be reflected by the object 131 and reciprocated. For this reason, in order to measure the seabed shape with an accuracy of 10 cm, the maximum operating speed of the hull 2 is limited to 10 cm/0.1 s=1 m/s (2 knots), and there was also a problem that the working efficiency is drastically lowered.
[0015]
Therefore, the present invention has been made in view of the above problems, and it is a main object to provide an ultrasonic measurement device that can continuously measure the seabed shape even at high speed operation without grasping the six conditions: the three-dimensional positions and roll, pitch, and yaw of the hull.
[Means for solving the problem]
[0016]
An ultrasonic measurement device according to the present invention comprises a transmitter that transmits ultrasonic waves, a receiver that receives reflected waves from an object of ultrasonic waves transmitted from the transmitter, and a processing means for processing information of the reflected waves from the object as three-dimensional measurement results, and includes a connecting means for sequentially connecting the three-dimensional measurement results, wherein the connecting means includes a determining means for determining mutual positions of the three-dimensional measurement results.
[0017]
Further, in the ultrasonic measurement device according to the present invention, the three-dimensional measurement result may be a measurement result of the object in a measurement region which expands as it goes farther from the transmitter.

[0018]

Further, in the ultrasonic measurement device according to the present invention, a distance from the transmitter to the object can be obtained by the propagation velocity of ultrasonic waves, the propagation velocity of sound, and the round-trip propagation time from the transmission time to the reception time.

[Advantage of the Invention]

[0019]

The ultrasonic measurement device according to the present invention includes the connecting means for sequentially connecting three-dimensional measurement results, and therefore, it is also able to perform continuous measurement of the seabed shape at high-speed operation, without grasping the six conditions: the three-dimensional positions and roll, pitch, and yaw of the hull.

[0020]

Further, in the ultrasonic measurement device according to the present invention, the three-dimensional measurement result measures an object in the measurement region which expands as it goes farther from the transmitter, and the three-dimensional measurement result is sequentially connected by the connection means. Therefore, the three-dimensional shape of the object can be accurately grasped. That is, since the three-dimensional measurement result includes the measurement result from the oblique direction of the object, for example, even when the object is in a floating state from the seabed surface, it is possible to accurately measure the floating state."

B According to the description of A above of the Description, etc., regarding the respective inventions of the case, the following matters are recognized.

That is, the respective inventions of the case are made in view of problems that it is necessary to grasp he three-dimensional position of the hull 2 and all these six conditions of roll, pitch, and yaw and correct the measurement result by the grasped conditions, so that the apparatus became large scale; it cannot be applied to continuous measurement in a wide range; and the working efficiency is drastically lowered because the maximum operating speed of the hull is limited. It is a main object to provide an ultrasonic measurement device that can continuously measure the seabed shape even at high speed operation without grasping the six conditions: the three-dimensional positions and roll, pitch, and yaw of the hull ([0012] to [0015]).

Then, in order to solve these problems, the respective inventions of the case include a determining means for determining mutual positions of the three-dimensional measurement results in the connecting means, and adopt a means for proving a connecting means for sequentially connecting the three-dimensional measurement results ([0016]).

As a result, the respective inventions of the case include the connecting means for sequentially connecting the three-dimensional measurement, and thus have an effect that it is possible to perform continuous measurement of the seabed shape at high-speed operation, without grasping the six conditions: the three-dimensional positions and roll, pitch, and yaw of the hull ([0019]).

Also, Invention 2 has an effect that since the three-dimensional measurement result is a measurement result of an object in the measurement region which expands as it goes farther from the transmitter, the three-dimensional shape of the object can be

accurately grasped ([0017] and [0020]).

Furthermore, Invention 3 can obtain a distance from the transmitter to the object by the propagation velocity of ultrasonic waves, the propagation velocity of sound, and the round-trip propagation time from the transmission time to the reception time ([0018]).

In view of the above, Correction A to Correction C will be examined.

(2) Correction A

A Correction AA

Correction AA, as described in 1 (1) A, is a correction which specifically writes the matters described in Claim 2 before correction as they are to be the description of the description of Claim 2 after correction, by referring to the description of Claim 1 before correction, and does not change the contents of the description at all. Therefore, it is obvious that it is not a correction that substantially enlarges or alters the scope of claims.

B Correction AB

Correction AB, as described in 1 (1) B, is a correction which limits "the connecting means" to the one that "displays in time series measurement results obtained by sequentially connecting the three-dimensional measurement results."

This is merely limits the specific form in which "the connecting means" displays "measurement results obtained by sequentially connecting the three-dimensional measurement results" as a result of "sequentially connecting the three-dimensional measurement results," and thereby cannot be recognized as one solving a new problem that is not included in the problems of Invention 2. Therefore, it can be said that it is not a correction that substantially enlarges or alters the scope of claims.

(3) Correction B

A Correction BA

Correction BA, as described in 1 (2) A, is a correction which specifically writes the matters described in Claim 3 before correction as they are to be the description of the description of Claim 3 after correction, by referring to the description of Claim 1 before correction, of the matters described in Claim 3 before correction by referring to the description of Claim 1 or Claim 2 before correction, and does not alter the contents of the description. Therefore, it is obvious that it is not a correction that substantially enlarges or alters the scope of claims.

B Corrections BB and BC

Correction BB, as described in 1 (2) B, is a correction which limits "the three-dimensional measurement results" that are objects for "determining" "mutual positions" by "the determining means" to the one "having a common region," and Correction BC is a correction which limits "the measurement result in which the plurality of three-dimensional measurement results are sequentially connected" obtained by "a connecting means for sequentially connecting the three-dimensional measurement results" to the one in which "among the plurality of three-dimensional measurement results, the three-dimensional measurement result having no common region mutually is included."

These merely limit the mutual specific relationship of the plurality of "there-

dimensional measurement results" included in "measurement results obtained by sequentially connecting the three-dimensional measurement results" obtained as a result of "sequentially connecting the three-dimensional measurement results" by "the connecting means", and thereby cannot be recognized as one solving a new problem that is not included in the problems of Invention 3. Therefore, it can be said that it is not a correction that substantially enlarges or alters the scope of claims.

(4) Correction C

Correction C, as described in 1 (2) A, is a correction which specifically write the matters described in Claim 3 before correction as they are to be the description of Claim 4 after correction by referring to the description of Claim 2 before correction, of the matters described in Claim 3 before correction by referring to the description of Claim 1 or Claim 2 before correction, in the description of Claim 3 before correction, and does not alter the contents of the description. Therefore, it is obvious that it is not a correction that substantially enlarges or alters the scope of claims.

(5) Summary of substantial enlargement and alteration

As described above, Correction A to Correction C are not corrections that substantially enlarge or alter the scope of claims, and fall under the provisions of Article 126(6) of the Patent Act.

4 Judgment on independent requirements for patentability

As described in 1 above, Correction A and Correction B are corrections for the purpose of the matters prescribed in item (i) and item (iv) of the proviso to Article 126(1) of the Patent Act, and thus Corrected invention 2 and Corrected invention 3 must be ones which should be independently patentable at the time of the patent application.

Then, they are examined as follows.

(1) Invention described in Cited Document 1

A Cited Document 1 describes as follows. Underlines were provided by the body.

(A) (Page 1, lines 2 to 28)

"This invention relates to a method for producing an image of a submerged object, e.g. a shipwreck or the sea bottom.

Acoustic sensors have become increasingly more common in systems for underwater sensing and imaging. Sonars are often used, ranging from simple systems detecting echoes of an emitted pulse, to side scan sonars or two-dimensional multibeam sonar systems emitting and receiving signals along a line within a chosen angle and three-dimensional acoustic cameras, such as described in the articles "3D ACOUSTIC CAMERA FOR UNDERWATER IMAGING" by Rolf Kahrs Hansen and Poul Arndt Andersen in Acoustical Imaging, vol. 20, Plenum Press, New York, 1993, and "A 3D UNDERWATER ACOUSTIC CAMERA - PROPERTIES AND APPLICATIONS" by R.K. Hansen and P.A. Andersen in Acoustical Imaging, vol. 22, Plenum Press, New York, 1996.

In imaging larger objects the two-dimensional sonar is normally used by moving the sonar over e.g. the sea bottom and scanning at an angle essentially perpendicular to the direction of the movement. The data sampled along each line are combined to

provide a segmented picture of the sea floor. A problem inherent in this solution is the difficulties in controlling the exact position of the sensor. A sonar unit being moved over the sea bottom is subject to drift because of current and wind, and if the sonar is carried by a boat, inaccuracies in the control system of the vessel."

(B) (Page 1, lines 29 to 31)
"It is an object of this invention to provide a method for generating an image of the sea floor or underwater objects using a 3D acoustic imaging system."

(C) (Page 1, lines 32 to 35)
"It is also an object of this invention to provide a method for generating a composite image of underwater structures being compensated for variations in the position or the movement of the acoustic transducers."

(D) (Page 1, line 38 to Page 2, line 4)
"The advantageous features of the invention related to the use of a 3D acoustic transducer system are thus that each 3D segment contains data being virtually insensitive to movements of the recording transducer unit, that the 3D segments have been combined in order to provide a larger 3D image."

(E) (Page 2, lines 5 to 9)
"Another advantageous feature is that the 3D segments have a coordinate accuracy which is better than the accuracy of the position measurement system, due to corrections based upon the information content in the separate 3D image elements."

(F) (Page 2, lines 10 to 20)
"Yet another advantageous feature of this invention is that each underwater object, due to the overlapping images, is detected by sonar several times, from different angles of incidence. If one angle of incidence does not cause transmission of reflected energy back to the transducer unit, the next angle of incidence might, thus providing a 3D image of the objects to a certain degree comprising views of the insides or back sides of the objects. Therefore, much more detail will be available in the combined image than in one separate 3D image, or images composed of measurements from side scan sonars."

(G) (Page 2, lines 29 to 33)
"The camera 1 in figure 1 emits a number of pulses toward a selected volume 2. The pulses are reflected by different objects 3 and the receiver is capable of receiving the reflected pulses at a number of different sensors in a sensor matrix 4."

(H) (Page 2, lines 34 to 39)
"The sensors are capable of sensing the phase, time, and amplitude of the received signal from a chosen angular sector defined by $\alpha_{//}$ and $\alpha_{\perp}$ (see figure 2). Comprised in the transducer unit 1 is also computing means for, based on the measurements of each sensor, calculating the direction, strength, and time of arrival for the reflected waves."

(I) (Page 2, the last line to Page 3, line 10)
"The signal received from each direction, defined by the angular segments $\Delta\alpha_{//}$ and $\Delta\alpha_{\perp}$ including $\alpha_{//}$ and $\alpha_{\perp}$, respectively, is analyzed to detect the arrival of the peak amplitude or amplitudes of the signals received within the angular segment. The time of arrival of the peak amplitude indicates distance to the object. Thus, a composite image may be obtained from the direction of the received signal and the distance to the reflected object within each angular segment, as is indicated in Figure 1 where the measured volume comprises a number of planes 5 referring to different distances from the sensor array 4."

(J) (Page 3, lines 27 to 37)
"We refer now to figure 2. Having registered a first image 2 the process may be repeated to produce a second acoustic image 6 at least partially overlapping the first image. By analyzing the two images, certain common features 3 in the common volume 7 may be found, e.g., an object protruding towards the transducer. Assuming that the features 3 are stationary, the scale and relative positions of the images may be adjusted to provide a unitary three-dimensional image from the two images. In this way, any errors due to variations in the position or movement of the transducer unit may be reduced or eliminated."

(K) (Page 3, lines 38 to 40)
"Preferably three or more common features 3 are used when combining the images, thus reducing the chances of error if one of the chosen features turns out to be moving."

(L) (Page 4, lines 17 to 20)
"The three-dimensional image produced by a single acoustic pulse has a time tag which is applied to all the points in the image. This three-dimensional image is called a 3D image element."

(M) (Page 4, line 21 to Page 5, line 12)
"Referring to Figure 3, the preferred method for combining two images is as follows :
...(Omitted)...
S8. The neighborhood of points in image I are checked for the presence of points from image II. All points are checked - above or below the intensity threshold.
S9. If such image II points are present in the neighborhood [of points in image I], the maximum of their intensity is found, and if it is higher than the intensity of the image I point, it replaces the intensity of the corresponding image I point."

(N) (Page 5, lines 15 to 22)
"When surveying an underwater object by using a plurality of over-lapping images, the process is repeated by moving the transducer unit as smoothly as possible and obtaining new images partially overlapping the previous image. As increasing the number of over-lapping images will reduce the noise in the resulting composite image, each new image is preferably partially overlapping more than one of the previous images."

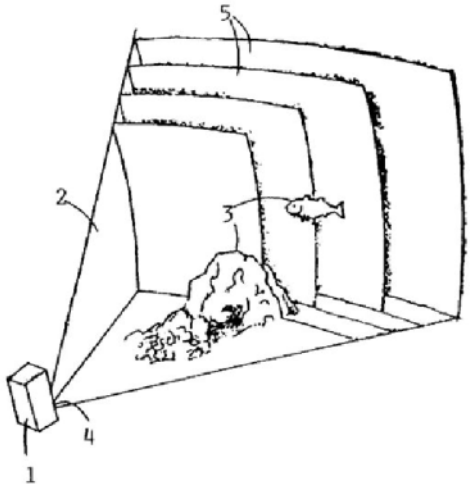
(O) (Page 6, lines 32 to the last line)
"Also the possible side lobes of the acoustic transducers may be controlled by choosing

the distance between the transducers depending on the frequency used in the measurements.

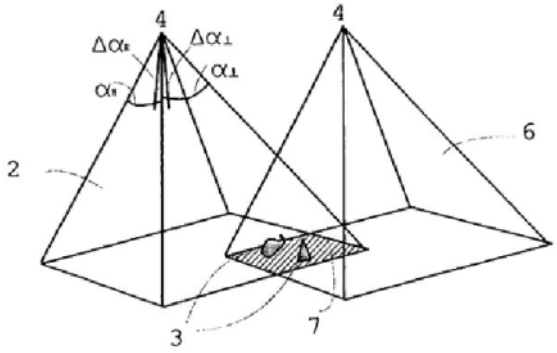
Thus the number of transducers and the size of the transducer array, as well as the frequency used, affect the measurements and may be chosen according to the specific use of the invention. The relationships between these parameters are well known in the related technical art."

(P) (Page 7, lines 12 to 17)
"In the preferred embodiment of the invention the source and the receiver array are separate transducers, preferably positioned in the same transducer or sensor unit. It is, however, within the scope of this invention to provide a transducer array being capable of both emitting and receiving the acoustic waves."

(Q) (FIG. 1)



(R) (FIG. 2)



B According to A above of Cited Document 1, the following matters are recognized.
(A) Cited Document 1 describes a 3D acoustic imaging system for generating an image of the sea floor or under water objects (A (B) above).

(B) The 3D acoustic imaging system includes a camera that emits a number of pulses toward a selected volume, and a receiver that has a number of different sensors in a sensor matrix for receiving the pulses reflected by different objects (A (G)).

(C) Cited Document 1 describes that the source and the receiver arrays are positioned in the same transducer or sensor unit (A (P)), and the camera and the receiver of the 3D acoustic imaging system are positioned in one unit.

(D) The sensors are capable of sensing the phase, time, and amplitude of the received signal from a chosen angular sector (A (H)).

(E) The camera that is also the transducer unit includes a computing means for, based on the measurements of each sensor, calculating the direction, strength, and time of arrival for the reflected waves (A (H)).

(F) The signal received from each direction is analyzed to detect the arrival of the peak amplitude or amplitudes of the signals received within the angular segment. The time of arrival of the peak amplitude indicates distance to the object. Thus, a composite image may be obtained from the direction of the received signal and the distance to the reflected object within each angular segment (A (I)).

(G) Having registered a first image, the process may be repeated to produce a second acoustic image at least partially overlapping the first image. By analyzing the two images, common features in the common volume may be found. Assuming that the features are stationary, the scale and relative positions of the images may be adjusted to provide a unitary three-dimensional image from the two images (A (J)).

(H) When surveying an underwater object by using a plurality of over-lapping images, the process is repeated by moving the transducer unit as smoothly as possible and obtaining new images partially overlapping the previous image. Each new image is partially overlapping more than one of the previous images (A (N)).

(I) When the above matters are summarized, Cited Invention 1 describes the following invention (hereinafter, referred to as "the Cited Invention").

"A 3D acoustic imaging system generating an image of the sea floor or underwater objects: comprising

a camera that emits a number of pulses toward a selected volume; and

a receiver that has a number of different sensors in a sensor matrix for receiving the pulses reflected by different objects, wherein

the camera and the receiver are positioned in one unit;

the sensors are capable of sensing the phase, time, and amplitude of a received signal from a chosen angular sector;

the camera that is also the transducer unit includes a computing means for, based on measurements of each sensor, calculating the direction, strength, and time of arrival of reflected waves;

the signal received from each direction is analyzed to detect the arrival of the peak amplitude or amplitudes of the signals received within an angular segment, the time of arrival of the peak amplitude indicates distance to the object, and thus a composite image may be obtained from the direction of the received signal and the

distance to a reflected object within each angular segment;

having registered a first image, the process may be repeated to produce a second acoustic image at least partially overlapping the first image, by analyzing the two images, common features in the common volume may be found, and assuming that the features are stationary, the scale and relative positions of the images may be adjusted to provide a unitary three-dimensional image from the two images; and

when surveying an underwater object by using a plurality of over-lapping images, the process is repeated by moving a transducer unit as smoothly as possible and obtaining new images partially overlapping a previous image, and each new image is partially overlapping more than one of the previous images."

(2) Regarding Corrected invention 2

A Comparison

In comparison of Corrected invention 2 and the Cited Invention, the following is found.

(A) The Cited Invention is "a 3D acoustic imaging system," and thus it is obvious that "a number of pulses" "emitted" by "the camera" are sound pulses.

On the other hand, in the Description, etc., there is the description "it may be formed to transmit short ultrasonic signals in the direction of the ultrasonic beam 21a, and realize high distance resolution," ([0019]) it is recognized that the expression "short ultrasonic signals in the direction of the ultrasonic beam 21a" means ultrasonic pulses. Then, "ultrasonic waves" that "a transmitter" "transmits" of Corrected invention 2 also include the ultrasonic pulses. Also, "ultrasonic waves" are "sound waves with a frequency of about 20,000 Hz or more and cannot be heard as a steady sound" ("KOJIEN, 6th edition DVD-ROM edition", Iwanami Shoten), and thus are a kind of sound wave.

In light of the above, "pulses" of the Cited Invention and "ultrasonic waves" of Corrected invention 2 are common in a point that the two are "sound waves." Then, "transmit" of the Cited Invention corresponds to "transmit" of Corrected invention, and thus "a camera that emits a number of pulses toward a selected volume" of the Cited Invention and "a transmitter for transmitting ultrasonic waves" of Corrected invention 2 are common in a point that each is "a transmitter for transmitting sound waves."

(B) "An object" of Cited Invention corresponds to "an object" of Corrected invention 2; in view of (A) above, "the pulses reflected by objects" of the Cited Invention and "reflected waves from an object of ultrasonic waves transmitted from the transmitter" of Corrected invention 2 are common in a point that the two are "reflected waves from an object of sound waves transmitted from the transmitter." Also, "receive" of the Cited Invention corresponds to "receive" of Corrected invention 2.

Therefore, "a receiver that has a number of different sensors in a sensor matrix for receiving the pulses reflected by different objects" of the Cited Invention and "a receiver for receiving reflected waves from an object of ultrasonic waves transmitted from the transmitter" of Corrected invention 2 are common in a point that each is "a receiver for receiving reflected waves from an object of sound waves transmitted from the transmitter."

(C) In light of (B) above, "measurements of each sensor" of the Cited Invention correspond to "information of the reflected waves from the object" of Corrected invention 2, and thus "a computing means for, based on measurements of each sensor, calculating the direction, strength, and time of arrival for reflected waves" of the Cited Invention corresponds to "a processing means for processing" "information of the reflected waves from the object" of Corrected Invention 2.

Then, in the Cited Invention, since "the signal received from each direction is analyzed to detect the arrival of the peak amplitude of the signals received within an angular segment, the time of arrival of the peak amplitude indicates distance to the object, and thus a composite image may be obtained from the direction of the received signal and the distance to a reflected object within each angular segment," it is recognized that "a composite image" may be obtained by "a computing means" "for, based on measurements of each sensor, calculating the direction, strength, and time of arrival for reflected waves," and that the "composite image" thereof includes information on "the direction of the received signal" and "the distance to a reflected object within each angular segment." That is, it is recognized that "a composite image" of the Cited Invention includes three-dimensional information, and thus it corresponds to "three-dimensional results" of the Corrected Invention 2.

When the above matters are summarized, "a computing means for, based on measurements of each sensor, calculating the direction, strength, and time of arrival for reflected waves" of the Cited Invention corresponds to "a processing means for processing information of the reflected waves from the object as three-dimensional measurement results" of Corrected invention 2.

(D) In light of (A) to (C) above, "a 3D acoustic image system" of the Cited Invention and "an ultrasonic measurement device" of Corrected invention 2 are common in a point that each is "a sound wave measurement device."

(E) In the Cited Invention, "having registered a first image, the process may be repeated to produce a second acoustic image at least partially overlapping the first image," "a unitary three-dimensional image is provided from the two images," and "when surveying an underwater object by using a plurality of over-lapping images," "the process is repeated by obtaining new images partially overlapping the previous image." The term "image" used herein means "composite image," and thus the Cited Invention repeats the process of providing a unitary three-dimensional image from the two images, by obtaining a new composite image partially overlapping the previous composite images. This is nothing other than "composite images" partially overlapping mutually are sequentially connected to provide "a unitary three-dimensional image." Then, as described in (C) above, "a composite image" of the Cited Invention corresponds to "the three-dimensional measurement result" in Corrected invention 2.

Then, "a unitary three-dimensional image" of the Cited Invention corresponds to "the measurement result obtained by sequentially connecting the three-dimensional measurement results" of Corrected invention 2, and therefore, it can be said that the Cited Invention includes means corresponding to "a connecting means for sequentially connecting the three-dimensional measurement results" of Corrected invention 2.

(F) "The sensors" of the Cited Invention "are capable of sensing the phase, time, and

amplitude of the received signal from a chosen angular sector." Here, it is obvious that "a chosen angular sector" is a region which expands as it goes farther from "the sensor." Then, "the sensors" of the Cited Invention are those which "the receiver" "has" as "a number of different sensors in a sensor matrix," and in the Cited Invention, "the camera and the receiver are positioned in one unit," and thus are actually at the same position. Then, "a chosen angular sector" is nothing other than a region which expands as it goes farther from "the camera." That is, "the camera" of the Cited Invention is the one "sensing the phase, time, and amplitude of the received signal" from the region which expands as it goes farther from "the camera." "A composite image" of the Cited Invention, as described in (C) above, is provided by "based on measurements of each sensor, calculating the direction, strength, and time of arrival for the reflected waves," so that it includes information in the region which expands as it goes farther from "the camera."

Therefore, in light of (A) to (C) above, it can be said that "a composite image" of the Cited Invention, similarly to "the three-dimensional measurement result" of Corrected invention 2, is "a measurement result of the object within a measurement region that expands farther from the transmitter."

(G) In the Cited Invention, while "having registered a first image, the process may be repeated to produce a second acoustic image at least partially overlapping the first image," "a unitary three-dimensional image is provided from the two images," and "when surveying an underwater object by using a plurality of over-lapping images, the process is repeated by moving the transducer unit as smoothly as possible and obtaining new images partially overlapping the previous image," "by analyzing the two images, common features in the common volume may be found, and assuming that the features are stationary, the scale and relative positions of the images may be adjusted." Here, the fact that "by analyzing the two images, common features in the common volume may be found, and assuming that the features are stationary, the scale and relative positions of the images may be adjusted" is nothing other than determining mutual positions of "composite images" partially overlapping mutually.

That is, in the Cited Invention, in the process of sequentially connecting "composite images" partially overlapping mutually to provide "a unitary three-dimensional image" ((E) above), the mutual positions of "composite images" partially overlapping mutually are determined, so that it can be said that the means corresponding to "a connecting means for sequentially connecting the three-dimensional measurement results" of Corrected invention 2 included in the Cited Invention includes a means corresponding to "a determining means for determining mutual positions of the three-dimensional measurement results" of Corrected invention 2.

B Corresponding features and different features

When the results of the comparison of A above are summarized, the corresponding features and different features of Corrected invention 2 and the Cited Invention are as follows.

(A) Corresponding features

"A sound wave measurement device comprising:

a transmitter for transmitting sound waves;

a receiver for receiving reflected waves from an object of sound waves transmitted from the transmitter; and

a processing means for processing information of the reflected waves from the object as three-dimensional measurement results, wherein

a connecting means for sequentially connecting the three-dimensional measurement results is included;

the three-dimensional measurement results are measurement results of the object within a measurement region that expands farther from the transmitter; and

the connecting means includes a determining means for determining mutual positions of the three-dimensional measurement results."

(B) Different features

a Different feature 1

In Corrected invention 2, "sound waves" are "ultrasonic waves," whereas in the Cited Invention, it is unclear that "sound waves" are "ultrasonic waves."

b Different feature 2

In Corrected invention 2, "the connecting means" "displays in time series measurement results obtained by sequentially connecting the three-dimensional measurement results," whereas although the Cited Invention includes a means corresponding to "the connecting means," it is unclear that it displays in time series "a unitary three-dimensional image" sequentially connecting "composite images" (corresponding to "measurement results obtained by sequentially connecting the three-dimensional measurement results").

C Judgment on the different features

(A) Regarding Different feature 1

Since Cited Document 1 describes that frequency used may be chosen according to the specific use of the invention ((1) A (O) above), frequency of sound waves used in the Cited Invention is a matter that a person skilled in the art can appropriately select according to use. Then, whether or not sound waves are ultrasonic waves entirely depends on human circumstances of whether or not the sound waves can be heard in the ear, and thus it is obvious that it is not directly relevant to the purpose of the cited invention of generating an image of the sea floor or underwater objects.

Therefore, making sound waves used in the Cited Invention be ultrasonic waves is merely a matter that a person skilled in the art can appropriately implement.

(B) Regarding Different feature 2

Generally, "image" is "picture" or "image transferred onto photosensitive materials, paper, screens, or TV-CRT by mechanical processing" ("KOJIEN, 6th edition DVD-ROM edition", Iwanami Shoten), and thus it is recognized that it is assumed to be seen by human eyes.

The Cited Invention is the one "generating an image of the sea floor or underwater objects," and specifically one providing "a unitary three-dimensional image." Then, since "the unitary three-dimensional image" is "an image," it is recognized that it is assumed to be seen by human eyes.

Accordingly, in Cited Invention, it is obvious for a person skilled in the art to

make "a unitary three-dimensional image" visible to human eyes; that is, to display "a unitary three-dimensional image." Then, it is merely design matter that a person skilled in the art can appropriately implement to add such a function to a means corresponding to "the connecting means."

Here, the Cited Invention provides "a unitary three-dimensional image" by sequentially connecting "composite images" partially overlapping mutually (A (E) above), "composite images" partially overlapping mutually are obtained "when surveying an underwater object by using a plurality of over-lapping images, by moving the transducer unit as smoothly as possible and obtaining new images partially overlapping the previous image," and thus "a unitary three-dimensional image" of the Cited Invention is nothing other than "composite images" aligned in time series.

Therefore, it is obvious that if "a unitary three-dimensional image" is displayed, the Cited Invention is equipped with a constitution of Corrected invention 2 relating to Different feature 2.

D Summary of Corrected invention 2

As described above, Corrected invention 2 could have been easily invented by a person skilled in the art on the basis of the invention described in Cited Document 1.

(3) Regarding Corrected invention 3

A Comparison

In comparison of Corrected invention 3 and the Cited Invention, the following is found.

(A) (2) A (A) to (E) above in comparison of Corrected invention 2 and the Cited Invention are similarly applied to comparison of Corrected invention 3 and the Cited Invention.

(B) "distance to the object" of the Cited Invention is a distance from "a camera that emits a number of pulses toward a selected volume" to "the object," and it is obvious that it is "distance to the reflected object," so that it corresponds to "a distance from the transmitter to the object"of Corrected invention 3.

Therefore, the fact "the signal received from each direction is analyzed to detect the arrival of the peak amplitude or amplitudes of the signals received within an angular segment, the time of arrival of the peak amplitude indicates distance to the object" in the Cited Invention, and the fact Corrected invention 3 "is configured to obtain a distance from the transmitter to the object by a propagation sound speed of ultrasonic waves and a round-trip propagation time from a wave transmission time to a wave reception time" are common in a point that "it is configured to obtain a distance from the transmitter to the object."

(C) In the Cited Invention, while "having registered a first image, the process may be repeated to produce a second acoustic image at least partially overlapping the first image," "a unitary three-dimensional image is provided from the two images," and "when surveying an underwater object by using a plurality of over-lapping images, the process is repeated by moving the transducer unit as smoothly as possible and obtaining new images partially overlapping the previous image," "by analyzing the two images,

common features in the common volume may be found, and assuming that the features are stationary, the scale and relative positions of the images may be adjusted." Here, the fact "by analyzing the two images, common features in the common volume may be found, and assuming that the features are stationary, the scale and relative positions of the images may be adjusted" is nothing other than determining the mutual positions of "composite images" partially overlapping mutually.

That is, in the Cited Invention, in the process of sequentially connecting "composite images" partially overlapping mutually to provide "a unitary three-dimensional image" ((2) A (E)), the mutual positions of "composite images" partially overlapping mutually are determined. Partially overlapping mutually, in other words, is having a common region mutually, so that it can be said that a means corresponding to "a connecting means for sequentially connecting the three-dimensional measurement results" of Corrected invention 3, which the Cited Invention includes, includes a means corresponding to "a determining means for determining mutual positions of the three-dimensional measurement results having a common region mutually" of Corrected invention 3.

(D) In the Cited Invention, while "having registered a first image, the process may be repeated to produce a second acoustic image at least partially overlapping the first image," "a unitary three-dimensional image is provided from the two images," and "when surveying an underwater object by using a plurality of over-lapping images, the process is repeated by moving the transducer unit as smoothly as possible and obtaining new images partially overlapping the previous image," it is merely described that "each new image is partially overlapping more than one of the previous images," and it is not described that "each new image" "is partially overlapping" all "the previous images." That is, in the Cited Invention, it is accepted that "each new image" does not overlap some "previous images."

Therefore, it can be said that the Cited Invention is equipped with a constitution corresponding to "among the plurality of there-dimensional measurement results, the three-dimensional measurement result having no common region mutually is included in the measurement result in which the plurality of three-dimensional measurement results are sequentially connected."

B Corresponding features and different features

When the results of the comparison of A above are summarized, the corresponding features and different features of Corrected invention 3 and the Cited Invention are as follows.

(A) Corresponding features

"A sound wave measurement device comprising:

a transmitter for transmitting sound waves;

a receiver for receiving reflected waves from an object of sound waves transmitted from the transmitter; and

a processing means for processing information of the reflected waves from the object as three-dimensional measurement results, wherein

a connecting means for sequentially connecting the three-dimensional measurement results is included;

a configuration is adopted to obtain a distance from the transmitter to the object;

the connecting means includes a determining means for determining mutual positions of the three-dimensional measurement results; and

among the plurality of there-dimensional measurement results, the three-dimensional measurement result having no common region mutually is included in the measurement result in which the plurality of three-dimensional measurement results is sequentially connected."

(B) Different features

a Different feature 3

In Corrected invention 3, "sound waves" are "ultrasonic waves," whereas in the Cited Invention, it is unclear that "sound waves" are "ultrasonic waves."

b Different feature 4

In Corrected Invention 3, "a distance from the transmitter to the object is obtained by a propagation sound speed of ultrasonic waves and a round-trip propagation time from a wave transmission time to a wave reception time," whereas in the Cited Invention, it is just described as "the signal received from each direction is analyzed to detect the arrival of the peak amplitude or amplitudes of the signals received within the angular segment. The time of arrival of the peak amplitude indicates distance to the object."

C Judgment on the different features

(A) Regarding Different feature 3

Different feature 3 is the same as Different feature 1 between Corrected invention 2 and the Cited invention ((2) B (B) a above); as described in (2) C (A) above, it is merely the matter that a person skilled in the art can appropriately implement when selecting a frequency of sound waves to be used according to use.

(B) Regarding Different feature 4

As described in Cited Document 1 ((1) A (A)), the Cited Invention is an invention belonging to a technical field of sonars. Then, it is a matter of technical common sense that sonars are devices for measuring a distance to an object on the basis of a sound speed and a round-trip propagation time of sound waves. Accordingly, also in the Cited Invention, it is recognized that a distance to an object is obtained by a sound speed and a round-trip propagation time of sound waves.

Therefore, Different feature 4 is not a substantial difference.

D Summary of Corrected invention 3

As described above, Corrected invention 3 could have been easily invented by a person skilled in the art on the basis of the invention described in Cited Document 1.

(4) Demandant's allegation

A The demandant, regarding Corrected invention 2 and Corrected invention 3, alleges that the matter described in Cited Document 1 is that the number of the second images partially overlapping with the first image is increased to reduce an error from a real object, and that there is no description about the matter that "composite images"

partially overlapping mutually are sequentially connected to provide "a three-dimensional image."

However, the demandant's allegation, as described below, cannot be accepted.

(A) Cited Document 1 describes that by analyzing the two images that are acoustic images (namely, the first image and the second images at least partially overlapping the first image), certain common features in the common volume may be found, and assuming that the features are stationary, the scale and relative positions of the images may be adjusted to provide a unitary three-dimensional image from the two images, and thus in this way, any errors due to variations in the position or movement of the transducer unit may be reduced or eliminated. ((1) A (J) above).

Here, Cited Document 1 describes that the three-dimensional image produced by a single acoustic pulse is called a 3D image element ((1) A (L) above). Furthermore, it is described that the 3D segments have a coordinate accuracy which is better than the accuracy of the position measurement system, due to corrections based upon the information content in the separate 3D image elements, and that each 3D segment contains data being virtually insensitive to movements of the recording transducer unit ((1) A (D), (E) above)

According to this description, it is recognized that the two images that are acoustic images are 3D image elements. Also, it is recognized that the three-dimensional image which is provided from the two image and from which any errors due to variations in the position or movement of the transducer unit are reduced or eliminated are 3D segments.

Then, Cited Document 1 describes that the 3D segments have been combined in order to provide a larger 3D image. ((1) A (D) above).

Accordingly, it is recognized that the fact "having registered a first image, the process may be repeated to produce a second acoustic image at least partially overlapping the first image," "a unitary three-dimensional image is provided from the two images," and "when surveying an underwater object by using a plurality of over-lapping images," "the process is repeated by obtaining new images partially overlapping the previous image" in the Cited Invention means that the process of providing a unitary three-dimensional image from the two images is repeated by obtaining new composite images partially overlapping the previous image. This is nothing other than sequential connection of "composite images" partially overlapping mutually to provide "a unitary three-dimensional image."

(B) On this point, the demandant further alleges that there is a description in Cited Document 1 that the first image point is replaced with the second image point, and that if this processing is performed, a view field of the first image narrows.

However, this processing is performed as one process of a method of composing the two images ((1) A (M) above), and even if the point of the first image is replaced with the point of the second image, the first image or the second image is not lost. Therefore, the image after the composition includes both of the two images, so that it is obvious that it becomes an image of a wider range.

(C) As alleged by the demandant, according to the descriptions of Cited Document 1 ((1) A (C), (F), (J), (K), (M), and (N) above), there is described in Cited Document 1 the

matter that the number of the second images partially overlapping with the first image is increased to reduce an error from a real object.

However, this is not anything to deny that there is described in Cited Document 1 the matter that "composite images" partially overlapping mutually are sequentially connected to provide "a unitary three-dimensional image."

B Other allegations of the demandant assume that there is no description in Cited Document 1 of the matter that "composite images" partially overlapping mutually are sequentially connected to provide "a unitary three-dimensional image," and thus, as described in A above, are not accepted in the assumption.

(5) Summary of independent requirements for patentability

As described above, Corrected invention 2 and Corrected invention 3 could have been easily invented by a person skilled in the art on the basis of the invention (Cited Invention) described in Cited Document 1, and thus the appellant should not be granted a patent for it independently at the time of patent application under the provisions of Article 29(2) of the Patent Act.

Therefore, Correction A and Correction B do not fall under the provisions of Article 126(7) of the Patent Act.

5 Closing

Correction A and Correction B are corrections for the purpose of the matters prescribed in item (i) and item (iv) of the proviso to Article 126(1) of the Patent Act, and fall under the provisions of Articles 126 (5) and (6) of the Patent Act. However, Correction A and Correction B do not fall under the provisions of Article 126(7) of the Patent Act, and thus the correction regarding Claim 2 and Claim 3 after correction cannot be permitted.

Correction C is a correction for the purpose of the matter prescribed in item (iv) of the proviso to Article 126(1) of the Patent Act, and falls under the provisions of Articles 126 (5) and (6) of the Patent Act. Then, the demandant demands that if the correction of claims referring is approved, it be treated as a separate correction unit from claims refered, and thus the correction regarding Claim 4 after correction shall be approved.

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

November 6, 2018

Chief administrative judge: SHIMIZU, Minoru
Administrative judge: KOBAYASHI, Norifumi
Administrative judge: NAKAMURA, Setsushi