Appeal decision

Appeal No. 2020-2822

Appellant Toshiba Mitsubishi-Electric Industrial Systems Corporation

Patent Attorney SAKURA PATENT OFFICE, p.c.

Appellant THE UNIVERSITY OF TOKYO

Patent Attorney SAKURA PATENT OFFICE, p.c.

The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2017-566231, entitled "THREE-DIMENSIONAL SURFACE POTENTIAL DISTRIBUTION MEASUREMENT SYSTEM", [International publication on August 17, 2017: WO 2017/138034, the number of claims (3)], has resulted in the following appeal decision:

Conclusion

The examiner's decision is revoked.

The invention of the present application shall be granted a patent.

Reason

No. 1 History of the procedures

The present application is a patent application filed in Japanese language on February 8, 2016 (Heisei 28) as an international application date, and the history of the procedures thereof is shown as follows.

February 6, 2019 : Submission of a written amendment

As of September 11, 2019 : A written notice of reasons for refusal

November 11, 2019 : Submission of a written amendment and a written opinion

November 21, 2019 : Submission of a written opinion

As of November 29, 2019 : A decision of refusal (the date of delivery thereof on December 3, 2019, and, hereinafter referred to as "Examiner's decision")

March 2, 2020 : Submission of a written request for appeal, and a written amendment

No. 2 Reasons for refusal stated in the examiner's decision

Outline of reasons for refusal stated in the examiner's decision is as follows.

1. The inventions according to Claims 1 and 4-5 of the present application are inventions described in the following Cited Document 1 distributed in Japan before the application was filed, and therefore fall under Article 29(1)(iii) of the Patent Act and the applicant should not be granted a patent for these.

2. The inventions according to Claims 1 and 4-5 of the present application could have been invented with ease by a person ordinarily skilled in the art in the technical field of the inventions before the application was filed based on the invention described in the following Cited Document 1 distributed in Japan before the application was filed, and, therefore, the Applicant should not be granted a patent for these in accordance with the provisions of Article 29(2) of the Patent Act.

3. The invention according to Claim 2 of the present application could have been invented with ease by a person ordinarily skilled in the art in the technical field of the invention before the application was filed based on the inventions described in the following Cited Documents 1-2 distributed in Japan before the application was filed, and, therefore, the Applicant should not be granted a patent for that in accordance with the provisions of Article 29(2) of the Patent Act.

4. The invention according to Claim 3 of the present application could have been invented with ease by a person ordinarily skilled in the art in the technical field of the invention before the application was filed based on the inventions described in the following Cited Documents 1-3 distributed in Japan before the application was filed, and, therefore, the Applicant should not be granted a patent for that in accordance with the provisions of Article 29(2) of the Patent Act.

<List of Cited Documents, etc.>
1. International Publication No. WO 2014/147660
2. Japanese Unexamined Patent Application Publication No. H4-213082 (a document indicating a well-known art)

3. Japanese Unexamined Patent Application Publication No. H6-8174

No. 3 The Invention

It is acknowledged that the inventions according to Claims 1-3 of the present application (hereinafter, respectively referred to as "Invention 1" to "Invention 3") are ones specified by the following matters recited in Claims 1-3 of the scope of claims amended by the amendment made on March 2, 2020.

"[Claim 1]

A three-dimensional surface potential distribution measurement system for measuring a surface potential of a stator coil conductor of a rotating electrical machine, whose shape varies three-dimensionally, taking a portion other than a connection portion of the stator coil conductor as a measurement target from radially outside, radially inside, and axially outside the stator coil conductor, the system comprising:

a laser light source to emit laser light;

a Pockels crystal having a first end surface and a second end surface, exhibiting the Pockels effect in which a refractive index changes depending on potential difference between the first end surface and the second end surface, disposed such that the first end surface faces a side that the laser light emitted from the laser light source enters while the second end surface faces the measurement target, and extending in a longitudinal direction along a propagation direction of the laser light;

a mirror disposed on the second end surface and configured to reflect the laser light incident from the first end surface of the Pockels crystal in a direction opposite to the laser light incident direction;

a photodetector having a band following a high-frequency component of an inverter pulse voltage and configured to receive the laser light reflected by the mirror to detect light intensity of the laser light corresponding to the potential difference between the first end surface and the second end surface of the Pockels crystal;

a housing that holds the laser light source, the Pockels crystal, the mirror, and the photodetector while maintaining the relative positional relationship thereamong;

a three-dimensional motion-driver capable of three-dimensionally moving the housing; and

a driving controller that controls the three-dimensional motion-driver, wherein

the housing has a gap sensor configured to be moved integrally with the Pockels crystal and measure a gap between the Pockels crystal and the surface of the measurement target, and a gap signal output from the gap sensor is input to the driving controller, wherein

the driving controller takes a signal from the gap sensor as a feedback signal and controls the three-dimensional motion-driver so as to make a value of the signal be a predetermined gap value, and wherein

the three-dimensional motion-driver includes:

a center shaft externally fixed to a radial center axis position of the stator core so as to be immovable;

a circumferential direction driver mounted to the center shaft and configured to change circumferential and axial positions thereof;

a radial direction driver mounted to the circumferential direction driver and configured to change the radial position thereof; and

a direction-changing rotation driver mounted to the radial direction driver and configured to change the direction of the Pockels crystal.

[Claim 2]

The three-dimensional surface potential distribution measurement system according to Claim 1, wherein

the Pockels crystal is formed in a tapered manner being narrowed from the first end surface toward the second end surface.

[Claim 3]

The three-dimensional surface potential distribution measurement system according to Claim 1 or 2, wherein

the Pockels crystal is a BGO crystal."

No. 4 Inventions described in Cited Documents

1. Regarding Cited Document 1

In Cited Document 1 cited in the reasons for refusal stated in the examiner's decision, there are described the following matters together with drawings.

"[0001] The present invention relates to a surface potential distribution measuring device for measuring a surface potential distribution of an electric field reduction system of a rotating electrical machine."

"[0021] [The first embodiment] FIG. 1 is a perspective view showing the configuration of a surface potential distribution measuring device according to a first embodiment. FIG. 2 is a plane cross sectional view, in a longitudinal direction, of a main body part which includes the Pockels crystal of the surface potential distribution measuring device according to the first embodiment.

[0022] A surface potential distribution measuring device 70 of the embodiment of the present invention is used for an electric field reduction system 3 which is applied to a rotating electrical machine. First, the configuration of a rotating electrical machine that contains the electric field reduction system 3 as a measurement target will be described.

[0023] The rotating electrical machine includes a stator 2 (Refer to FIG. 8) and a rotor (not shown). The rotor is disposed inside the stator 2 and is rotated around a rotational shaft (not shown). The rotor includes the rotational shaft, a rotor core (not shown), and a rotor coil (not shown). The rotor core rotates together with the rotational shaft. The rotor coil is wound around the rotor core.

[0024] The stator 2 includes a stator core 7, a stator coil, and a main insulation layer 4.

[0025] The stator core 7 is disposed in such a way as to be a predetermined distance apart from a radial-direction outer side of the rotor. A plurality of slots are formed along an inner peripheral edge of the stator core 7 with a predetermined gaps therebetween in the circumferential direction.

[0026] Inside the slots, stator coil conductors 1, or formed coils, are housed. Outside the stator core 7, the formed coils are connected via wires. That is, the formed coils are connected together electrically, and a stator coil is produced as a result. The stator coils are produced for U-phase, V-phase, and W-phase. As a result, three-phase winding coils for U-phase, V-phase, and W-phase are produced.

[0027] On the outer periphery of the stator coil conductors 1, the main insulation layer 4 is provided to offer insulating coating on the stator coil conductors 1. More specifically, on the outer periphery of the stator coil conductors 1, a ground insulation tape, which is made mainly of mica epoxy, is wound as the main insulation layer 4.

[0028] Ends 8 of the stator coils where the main insulation layer 4 are provided (which will be referred to as stator coil ends) are not portions that directly contribute to power generation. Therefore, a three-dimensionally bent (or curved) shape is employed for a wire connection part of the formed coils in the stator coil ends 8. That is, a so-called involute shape is employed. This shape keeps the rotating electrical machine compact.

[0029] To the stator coil ends 8, an electric field reduction system 3 is applied in order to prevent occurrence of corona discharge, described later. The electric field reduction system 3 includes a low resistance layer 5 and an electric-field-reduction layer 6.

[0030] Between the main insulation layer 4 of the stator coil end 8 and a part of the stator core 7 facing a slot wall surface, partial discharge, or corona discharge, could occur. In order to prevent the partial discharge, the low resistance layer 5 is provided on the outer periphery of the main insulation layer 4.

[0031] More specifically, on the outer periphery of the main insulation layer 4, a low-resistance semiconductive tape is wound as the low resistance layer 5, from a part where the main insulation layer 4 faces the inner periphery of the stator core 7 to a part where the main insulation layer 4 exposed to outside the stator core 7. The low resistance layer 5 that is provided outside the stator core 7 is about several tens of millimeters in width.

[0032] The low resistance layer 5 is grounded along with the stator core 7. Accordingly, when voltage (AC voltage) is applied to the stator coil conductors 1, the stator coil conductors 1 serve as a drive electrode, and the low resistance layer 5 serves as a ground electrode. In this case, equipotential lines generated between the stator coil conductors 1 and the low resistance layer 5 inside the stator core 7 are nearly parallel.

[0033] The equipotential lines that are generated between the stator coil conductors 1 and the low resistance layer 5 in the stator coil ends 8 are distributed in the thickness direction of the main insulation layer 4. In the stator coil ends 8, depending on a difference in relative permittivity between the main insulation layer 4 and the stator coil conductors 1, and depending on the resistivity of a surface of the stator coil conductors 1, equipotential lines are densely distributed.

[0034] As a result, the potential gradient becomes larger on the surface of the stator coil ends 8, and electric fields are concentrated in a direction that goes along the surface of the stator coil end 8. In particular, at an end of the low resistance layer 5, the potential gradient becomes significantly larger, and partial discharge or creeping discharge, which is corona discharge, is likely to occur.

[0035] In order to prevent the partial or creeping discharge, at the outer peripheries of the end of the low resistance layer 5 and of the main insulation layer 4 of the stator coil ends 8, the electric-field-reduction layer 6 is provided.

[0036] More specifically, on the outer periphery of the main insulation layer 4 of the stator coil end 8, a high-resistance semiconductive tape for reducing the potential gradient is wound as the electric-field-reduction layer 6 in such a way as to cover the end of the low resistance layer 5.

[0037] The surface potential distribution measuring device 70 measures the surface potential of the electric field reduction system 3 that has been applied to the stator coil ends 8. According to the present embodiment, the electric field reduction system 3 of a solo stator coil conductor 1 will be described as a measurement target."

"[0038] The surface potential distribution measuring device 70 includes a measuring device main body 10 (Refer to FIG. 2), a calculation device 20, and a holding and mounting unit 30.

[0039] The measuring device main body 10 includes a semiconductor laser generator (which will be referred to as laser light source) 13, a polarization beam splitter (which will be referred to as PBS) 15, a Pockels crystal 11, a dielectric mirror (which will be referred to as mirror) 14, and a photodetector 16.

[0040] The laser light source 13 emits a laser beam in an incident direction (x-direction) that is perpendicular to a longitudinal direction (y-direction) of the electric field reduction system 3. The laser beam has a wavelength of 532.0 nm, a maximum output of 10 mW, and a diameter of 0.34 mm. In this case, the laser beam is 532.0 nm in wavelength. However, the laser beam may have a different wavelength so long as the laser beam can be propagated through the Pockels crystal 11 and optical components without being significantly attenuated.

[0041] The laser beam is linearly polarized. The polarization plane of the linearly polarized light is parallel to a direction (z-direction) that is perpendicular to the incident direction (x-direction) and the longitudinal direction (y-direction) of the electric field reduction system 3.

[0042] The PBS 15 allows only the linearly polarized light to pass therethrough. The PBS 15 allows the laser beam emitted from the laser light source 13 to pass therethrough in the incident direction (x-direction).

[0043] The Pockels crystal 11 is disposed in such a way that an axial direction thereof is parallel to the incident direction (x-direction). The Pockels crystal 11 is arranged in a row in the incident direction (x-direction) along with the laser light source 13 and the PBS 15.

[0044] Between a first end surface 11a and a second end surface 11b, the Pockels crystal 11 extends in the axial direction (x-direction) from the first end surface 11a to the second end surface 11b. The Pockels crystal 11 is formed in such a way that the size of the cross section (transverse section) perpendicular to the axial direction changes along the axial direction of the Pockels crystal 11.

[0045] According to the present embodiment, a cross section, perpendicular to the axial direction, of the Pockels crystal 11 is in a square shape; the sides of the square decrease monotonously in length along the x-direction.

[0046] Among the four side surfaces of the Pockels crystal 11 that extends in the axial direction, two adjacent side surfaces are planes parallel to the axial direction, and the remaining two surfaces are inclined against the axial direction.

[0047] The first end surface 11a of the Pockels crystal 11 is grounded, or the first end surface 11a of the Pockels crystal 11 is set to 0 [V] by a power supply device.

[0048] The laser beam from the PBS 15 enters the first end surface 11a of the Pockels crystal 11 and then travels toward the second end surface 11b, which does not cross the first end surface 11a of the Pockels crystal 11.
[0049] A surface of the mirror 14 is provided at the second end surface 11b of the Pockels crystal 11. Voltage is being applied to the second end surface 11b of the Pockels crystal 11, which is the back side of the mirror 14, as the second end surface 11b of the Pockels crystal 11 is being affected by an electromagnetic field around the electric field reduction system 3.
[0050] The back side of the mirror 14 is located a predetermined distance apart from a test point or a to-be-tested part of the electric field reduction system 3. The predetermined distance is set based on the degree of asperity of resin of the surface of the electric field reduction system 3, spatial resolution, and the like.
[0051] The mirror 14 reflects the laser beam, which has entered via the first end surface 11a of the Pockels crystal 11, in a direction opposite to the incident direction (x-direction).
[0052] The Pockels crystal 11 is a piezoelectric isotropic crystal belonging to "Crystallographic point group 3m," causing the Pockels effect. The Pockels effect is a phenomenon of birefringence that occurs when an isotropic crystal of a dielectric is placed in an electric field or when voltage is applied thereto.
[0053] That is, a change in the refractive index occurs depending on the voltage applied. As a result, the light intensity is changed. The Pockels crystal 11 may be BGO (e.g., Bi12GeO20) crystal or the like.
[0054] The Pockels crystal can be made to be sensitive to a component, which is parallel to or perpendicular to the propagation direction of light, of the external electric field depending on a direction formed by the crystal orientation and the propagation direction of the incident light. The former is referred to as vertical modulation, and the latter is referred to as horizontal modulation.
[0055] The Pockels crystal belonging to "Crystallographic point group 3m" is a crystal that can be arranged in a vertical-modulation manner. In the case of the vertical-modulation arrangement, a change in the light intensity is proportional to the integral value of the component of the external electric field parallel to the optical path, or to voltage.
[0056] The light intensity of the laser beam reflected by the mirror 14 corresponds to output voltage VPout, which is a difference in potential between the first end surface 11a and the second end surface 11b of the Pockels crystal 11.
[0057] The PBS 15 allows the laser beam reflected by the mirror 14 to pass therethrough in the longitudinal direction y (according to the present embodiment, the direction is

opposite to the longitudinal direction y).

[0058] The photodetector 16 has a band following high-frequency components of the inverter pulse voltage. The photodetector 16 is disposed in the longitudinal direction y with respect to the PBS 15 (according to the present embodiment, the direction is opposite to the longitudinal direction y). The laser beam enters the photodetector 16 from the PBS 15. The photodetector 16 detects detection light intensity Pout as the light intensity of the laser beam.

[0059] The detection light intensity Pout corresponds to output voltage VPout, which is a difference in potential between the first end surface 11a and second end surface 11b of the Pockels crystal 11. The detection light intensity Pout is expressed by the following formula as a cosine function of the output voltage VPout.

[0060] $Pout = (Pin/2)\{1 - \cos(\pi(VPout./V\pi) - \theta 0)\}$

In the above cosine function, Pin is the incident light intensity of the Pockels crystal 11; $V\pi$ is half-wave voltage; and $\theta 0$ is a phase difference (arbitrary) given by a wave plate. According to the present embodiment, based on the detection light intensity Pout, the output voltage VPout of the Pockels crystal 11 is calculated from the inverse function of the above cosine function.

[0061] The Pockels crystal 11 is a relatively long crystal that is 100 mm in length, for example. Therefore, the disturbance of the electric field distribution of the dielectric surface is small even as the Pockels crystal 11 is moved closer. As a result, the output voltage VPout of the Pockels crystal 11 is proportional to the surface potential of the electric field mitigation system 3 to be measured."

"[0065] The holding and mounting unit 30 includes a protection unit 31; a housing 32; an axial direction movement unit 35; an axial direction drive unit 35a, which drives the axial direction movement unit 35; a longitudinal direction movement unit 36; a longitudinal direction drive unit 36a, which drives the longitudinal direction movement unit 36; and a drive control unit 37, which controls the axial direction drive unit 35a and the longitudinal direction drive unit 36a.

[0066] The protection unit 31 is provided to protect the Pockels crystal 11. The protection unit 31 has a side surface that is inclined at the same degree as one inclined surface of the Pockels crystal 11 and which is formed in the opposite direction along the axial direction. This side surface of the protection unit 31 is fixed in such a way as to be in close contact with the inclined surface of the Pockels crystal 11.

[0067] The position of the protection unit 31 relative to the Pockels crystal 11 is set in such a way that the tip of the protection unit 31 in the side of the electric field reduction

system 3 protrudes further than do the second end surface 11b of the Pockels crystal 11 and the mirror 14. Therefore, the tip of the protection unit 31 reaches the electric field reduction system 3 earlier than the mirror 14 of the second end surface 11b of the Pockels crystal 11 reaches the electric field reduction system 3, thereby preventing the Pockels crystal 11 from making contact with the measurement target or the electric field reduction system 3.
[0068] In the tip part of the protection unit 31 in the side of the electric field reduction system 3, a tip notch 31a is formed. The electric field is disturbed when a dielectric approaches the second end surface 11b of the Pockels crystal 11. Accordingly, the tip notch 31a is formed in order to keep the tip of the protection unit 31 away from the second end surface 11b of the Pockels crystal 11.
[0069] The Pockels crystal 11, the PBS 15, and the protection unit 31 are mounted in the housing 32.
[0070] The housing 32 is mounted on the axial direction movement unit 35. The axial direction movement unit 35 is driven by the axial direction drive unit 35a and therefore moves back and forth in the axial direction (x-direction).
[0071] The axial direction movement unit 35 is mounted on the longitudinal direction movement unit 36. The longitudinal direction movement unit 36 is driven by the longitudinal direction drive unit 36a and therefore moves back and forth in the longitudinal direction (y-direction).
[0072] The axial direction drive unit 35a and the longitudinal direction drive unit 36a perform the driving based on instructions issued from the drive control unit 37. The axial direction drive unit 35a and the longitudinal direction drive unit 36a respectively output information about the travel direction and the travel distance thereof to the drive control unit 37."

"[0087] Then, in order to sequentially measure the surface of the electric field reduction system 3 in both end portions of the stator coil ends 8, the position of the Pockels crystal 11 of the surface potential distribution measuring device 70 is selected, and is controlled by the drive control unit 37 (Step S22: Test point placement process).

[0088] More specifically, the drive control unit 37 calculates the distances that the axial direction movement unit 35 and the longitudinal direction movement unit 36 are required to move, and then outputs instructions regarding the to-be-driven distances to the axial direction drive unit 35a and the longitudinal direction drive unit 36a. As a result, the Pockels crystal 11 is moved to a required position."

"[0102] [The second embodiment] FIG. 5 is a plane cross sectional view, in a longitudinal direction, of a main body part which includes the Pockels crystal of the surface potential distribution measuring device according to a second embodiment. The present embodiment is a variant of the first embodiment.
[0103] According to the present embodiment, a gap sensor 41 is provided on the protection unit 31. The gap sensor 41 measures the distance between the gap sensor 41 and the electric field reduction system 3, which is a measurement target. The gap sensor 41 outputs the distance to the drive control unit 37.
[0104] The drive control unit 37 controls the axial direction drive unit 35a so that the gap output from the gap sensor 41 comes to a predetermined target value. The target value is set to a value that would realize a desirable gap size between the Pockels crystal 11 and the electric field reduction system 3.
[0105] According to the present embodiment described above, in cases where the measurement is carried out along the longitudinal direction of the electric field reduction system 3, even if the traveling direction of the longitudinal direction movement unit 36 is not set in such a way as to be parallel to the longitudinal direction of the electric field reduction system 3, the axial direction drive unit 35a controls the distance between the Pockels crystal 11 and the electric field mitigation system 3 in such a way that the gap output from the gap sensor 41 is kept at a constant level.
[0106] That is, the Pockels crystal 11 moves parallel to the electric field reduction system 3 when moving along the electric field reduction system 3."

"[0124] [The fifth embodiment] FIG. 8 is a sectional elevational view of a stator that contains the configuration of a surface potential distribution measuring device according to a fifth embodiment.
[0125] The present embodiment is a variant of the first embodiment. The present embodiment shows not only the case where a single stator coil conductor 1 is tested but also the case where measurement is carried out at a time when stator coil conductors 1 are placed in each slot of the stator 2 and are connected via wires.
[0126] The stator 2 includes a stator core 7 and a stator coil, and is in a cylindrical shape. Along an inner peripheral surface of the stator core 7, a plurality of slots are formed at predetermined intervals in the circumferential direction in such a way as to extend in the axial direction.
[0127] In each slot, a formed coil, which is a stator coil conductor 1, is housed. Outside the stator core 7, the formed coils are connected together via wires. The stator 2 is

mounted on a stator assembly stand 2a.

[0128] A rotor, which is not shown, is not placed in the stator 2. Therefore, the stator 2 is in a hollow state.

[0129] A surface potential distribution measuring device 70 of the present embodiment measures a surface potential distribution of an electric field reduction system 3 when voltage is applied to the stator coil conductors 1 in this state.

[0130] The surface potential distribution measuring device 70 of the present embodiment includes a measuring device main body 10, a calculation device 20, and a holding and mounting unit 30, and further includes support bases 61, a support shaft 62, and a rotation drive unit 63. The calculation device 20 and a drive control unit 37 are not shown in the diagram.

[0131] The support shaft 62 is placed in such a way as to pass through the space inside the stator 2, with both ends of the support shaft 62 being supported by the support bases 61. The support shaft 62 is driven and rotated by the rotation drive unit 63.

[0132] The support shaft 62 supports the holding and mounting unit 30. That is, the support shaft 62 supports a longitudinal direction movement unit 36 to which a longitudinal direction drive unit 36a is attached. The longitudinal direction movement unit 36 supports an axial direction movement unit 35 to which an axial direction drive unit 35a is attached. The axial direction movement unit 35 supports the measuring device main body 10.

[0133] The holding and mounting unit 30 is supported by the support shaft 62 and driven by the axial direction drive unit 64 so that the holding and mounting unit 30 can move along the axial direction of the support shaft 62. In the case of the present embodiment, the holding and mounting unit 30 can move. However, the present invention is not limited to the holding and mounting unit 30 that can move. For example, the holding and mounting unit 30 may be attached to axial direction positions of the support shaft 62 corresponding to both-side stator end portions in such a way as to be able to be detached therefrom.

[0134] According to the present embodiment having the above configuration, the holding and mounting unit 30 is attached to positions on the support shaft 62 that correspond to both-side stator end portions. Accordingly, the holding and mounting unit 30 can be made closer to the entire circumference of the stator inner surface.

[0135] As for the measuring device main body 10 that is attached to the holding and mounting unit 30, the movement of the holding and mounting unit 30 enables the tip of the Pockels crystal 11 to carry out measurement at each position while keeping an appropriate distance from the electric field reduction system 3.

[0136] As described above, according to the present embodiment, it is possible to accurately measure the surface potential of the electric field reduction system 3 in which the inverter pulse voltage is supposed to occur, without damaging the soundness of the tapered Pockels crystal 11, even when being incorporated in the stator."

"[0137] [The other embodiments] Although the preferred embodiments of the present invention have been described above, the embodiments are merely illustrative and do not limit the scope of the present invention.

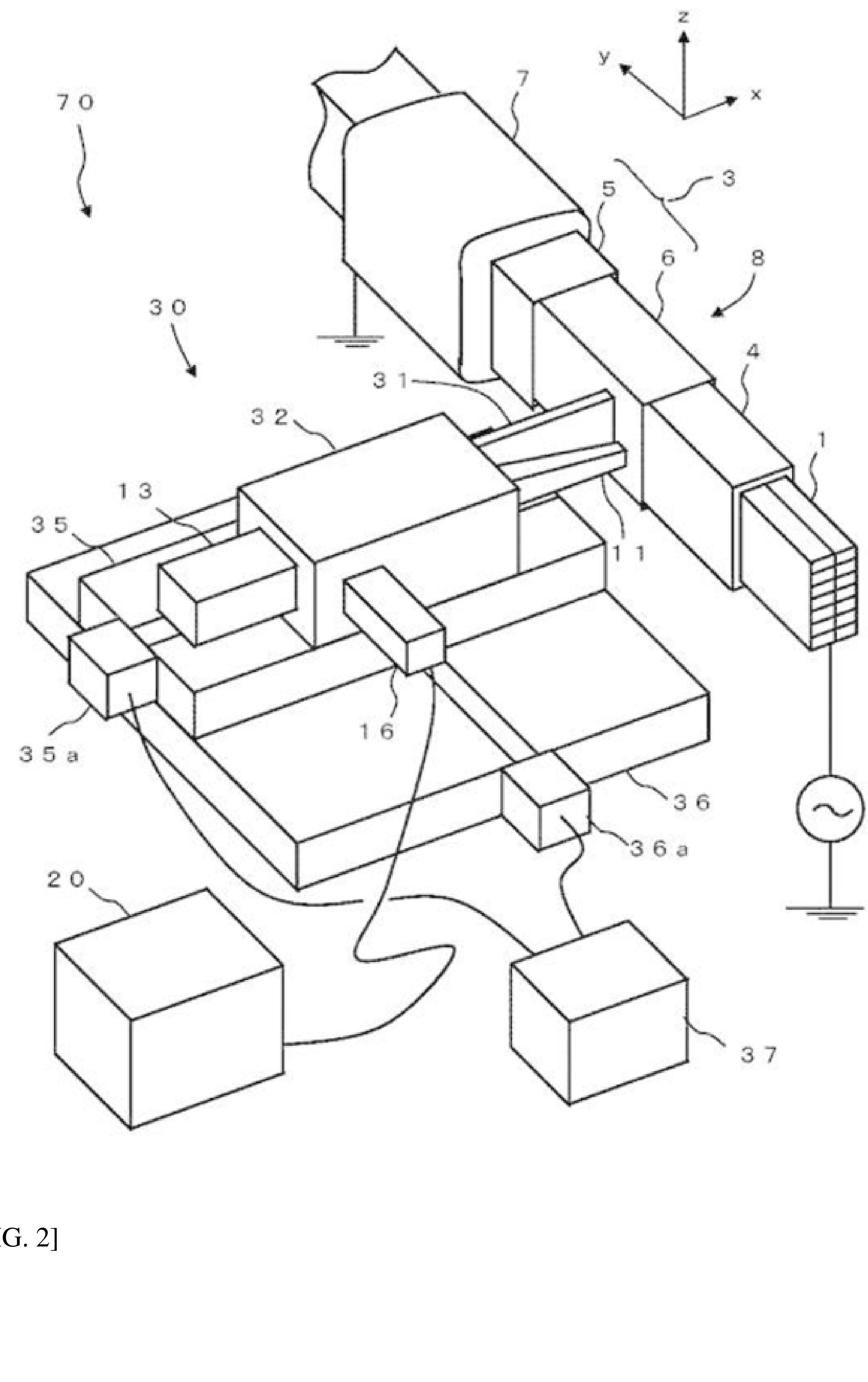
[0138] For example, what has been described is the case where the shape of the Pockels crystal is square in cross section, and the length of the sides decrease monotonously in the axial direction. However, the present invention is not limited to this. For example, the shape of the Pockels crystal may be rectangular or polygonal in cross section. The length of the sides should decrease in the axial direction monotonously.

[0139] Features of each of the embodiments may be used in combination. For example, the gap measurement by the gap sensor 41 of the second embodiment, and the fitting structure involving the movement restriction unit 53 and Pockels crystal gripping unit 51 of the third embodiment may be used in combination. The gap measurement by the gap sensor 41 of the second embodiment, and the movement restriction structure involving the guide hole 56 of the protection unit 55 of the fourth embodiment may be used in combination.

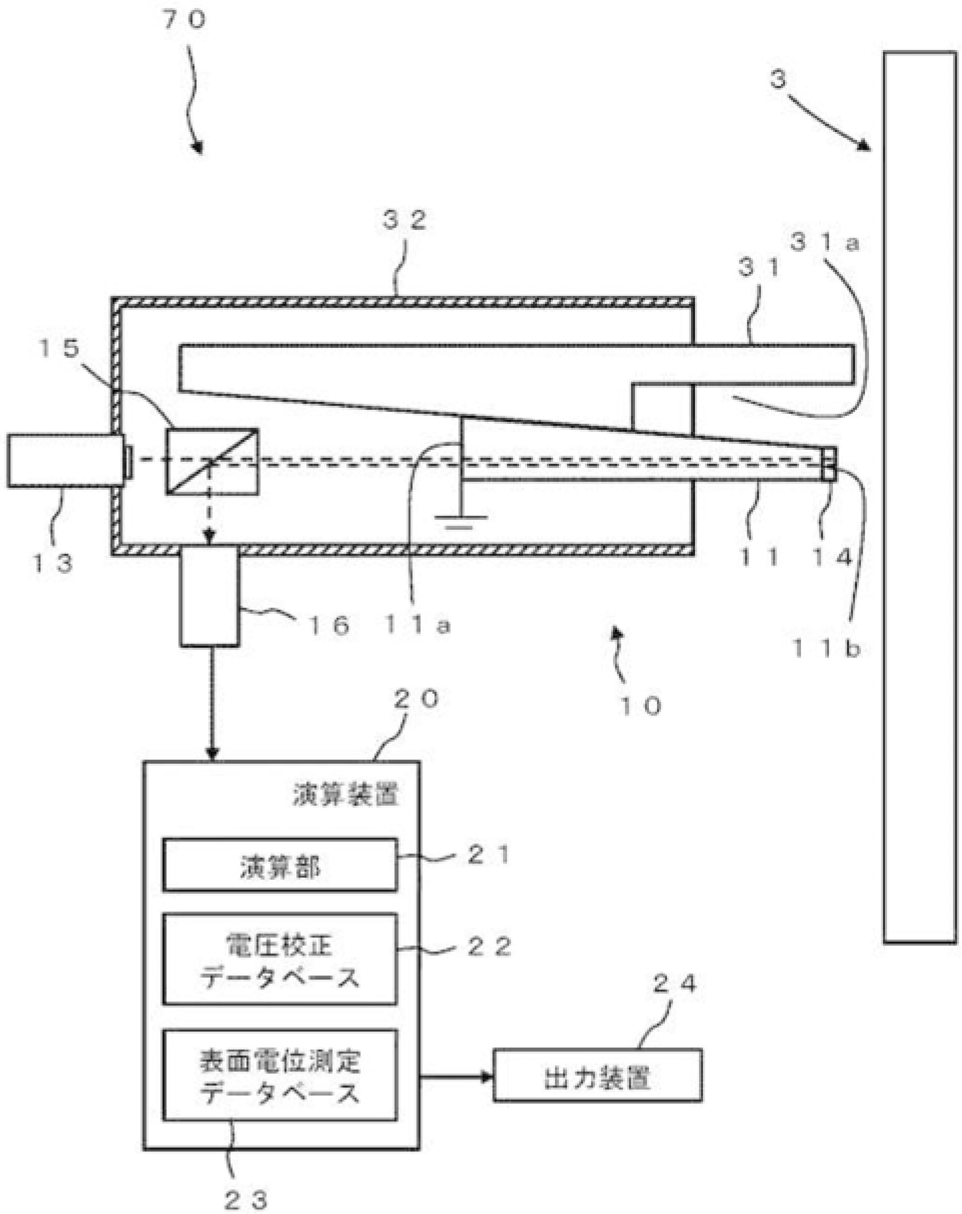
[0140] Furthermore, these features may be used in combination with the application form of the stator 2 in the assembled state of the stator 2 of the fifth embodiment.

[0141] These embodiments can be practiced in other various forms, and various omissions, substitutions, and changes may be made without departing from the scope of the invention."

[FIG. 1]

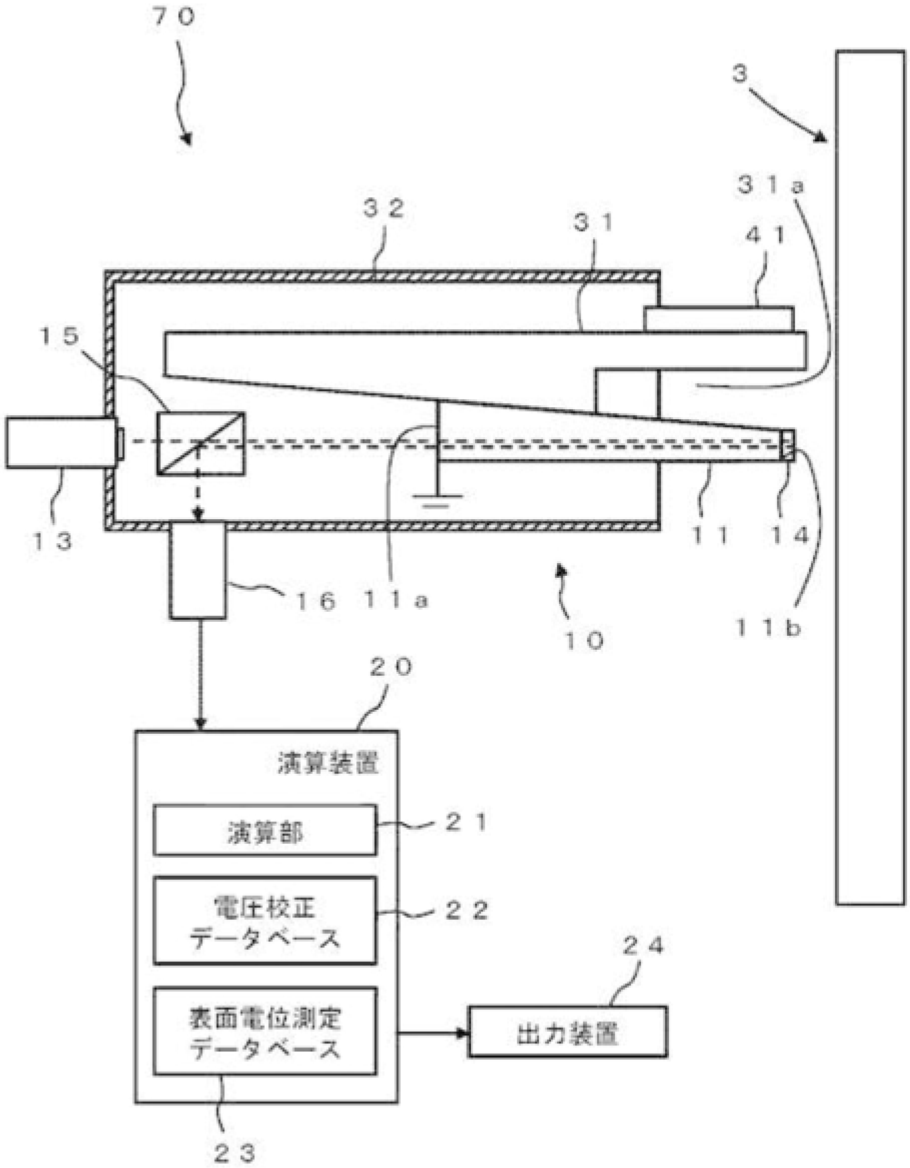


[FIG. 2]



演算装置　Calculation device
演算部　Calculation unit
電圧校正データベース　Voltage calibration database
表面電位測定データベース　Surface potential measurement database
出力装置　Output device

[FIG. 5]



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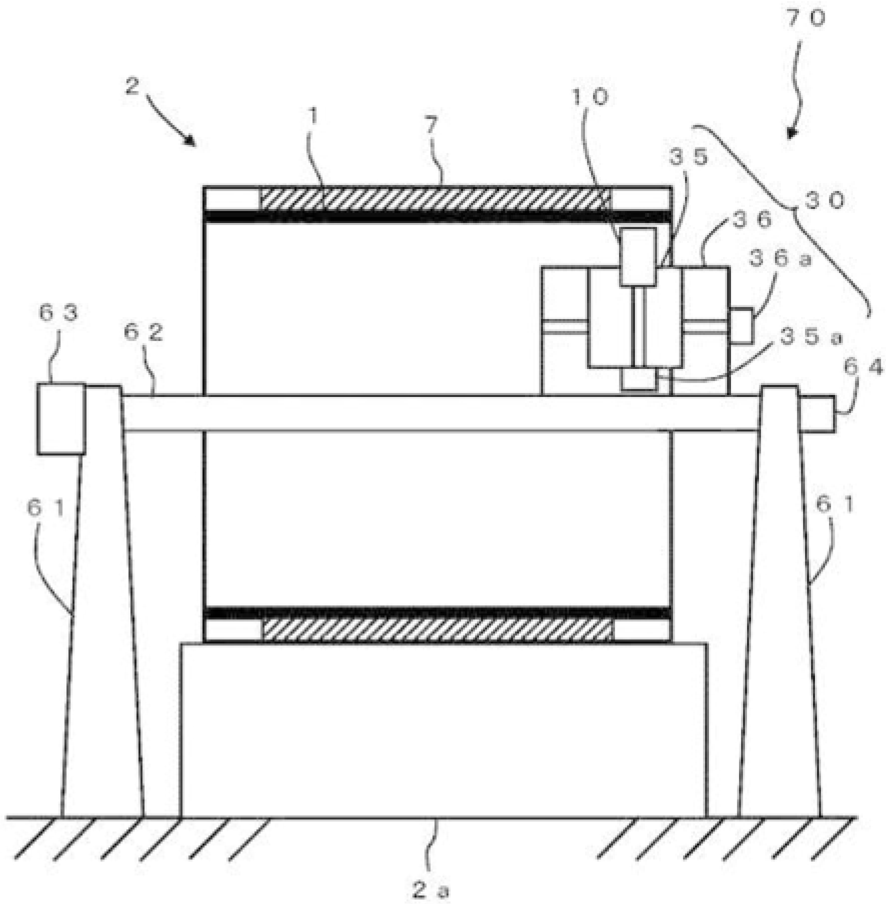
[FIG. 8]



From FIG. 2 and 5, it can be read that the Pockels crystal 11 extends in a longitudinal direction along the propagation direction of laser light.

From FIG. 1, 2 and 5, it can be read that the laser light source 13 and the photodetector 16 are held by the housing 32.

From FIG. 8, it can be read that the support shaft 62 is installed at the center axis position of the cylindrical shape stator 2 including the stator core 7 and a stator coil.

From FIG. 8, it can be read that the rotation drive unit 63 and the axial direction drive unit 64 are attached to the support shaft 62.

In [0065], [0070]-[0072] and FIG. 1, it is described that the holding and mounting unit 30 includes: the housing 32; the axial direction movement unit 35; the axial direction drive unit 35a, which drives the axial direction movement unit 35; the longitudinal direction movement unit 36; the longitudinal direction drive unit 36a, which drives the longitudinal direction movement unit 36; and the drive control unit 37, which controls the axial direction drive unit 35a and the longitudinal direction drive unit 36a, and, in [0130]-[0133] and FIG. 8, that the holding and mounting unit 30 is supported by the support shaft 62, and driven by the axial direction drive unit 64 so that the holding and mounting unit 30 can move along the axial direction of the support shaft 62, and the support shaft 62 is driven and rotated by the rotation drive unit 63.

Accordingly, from these descriptions, the holding and mounting unit 30 allows the housing 32 to move in x and y directions, and the relevant holding and mounting unit 30 is rotatably supported by the support shaft 62, and, therefore, it can be read that there are provided a driver and a driving controller to make the housing 32 movable three-dimensionally.

When the above matters are summarized, as viewed from the above-mentioned described matters and the descriptions of the above-mentioned FIG. 1, 2, 5 and 8, it is recognized that, in Cited Document 1, there is described the following invention (hereinafter, referred to as "Cited Invention").

"A surface potential distribution measuring device for measuring a surface potential distribution of the electric field reduction system 3 which is applied to a rotating electrical machine ([0001], [0022], [0136], [FIG. 8]), the surface potential distribution measuring device comprising:

the laser light source 13 to emit laser light toward the electric field reduction system 3 ([0040]);

the Pockels crystal 11, disposed in such a way extending in the axial direction (x-direction) from the first end surface 11a to the second end surface 11b, generating Pockels effect in which a refractive index changes depending on applied voltage, , located in such a way that the second end surface 11b provided with the mirror 14 to reflect the laser light a predetermined distance apart from a to-be-tested part of the electric field reduction system 3 (the laser light has entered the first end surface 11a and then travels toward the second end surface 11b), and extending in a longitudinal direction along the propagation direction of laser light ([0044], [0048]-[0053], [FIG. 2] and [FIG. 5]);

the mirror 14 provided at the second end surface 11b of the Pockels crystal 11 and configured to reflect the laser light incident from the first end surface 11a in a direction opposite to the incident direction (x-direction) ([0049], [0051]);

the photodetector 16 having a band following high-frequency components of the inverter pulse voltage, receiving the laser light reflected by the mirror 14, and configured to detect optical intensity Pout that corresponds to output voltage VPout, which is a potential difference between the first end surface 11a and the second end surface 11b of the Pockels crystal 11 ([0057]-[0059]);

the housing 32, to which the Pockels crystal 11 provided with the mirror 14 is attached, and which holds the laser light source 13 and the photodetector 16 therein ([0069], [FIG. 1], [FIG. 2], and [FIG. 5]); and

a driver and a driving controller capable of moving the housing three-dimensionally ([0065], [0070]-[0072], [0130]-[0133], [FIG. 1] and [FIG. 8]), wherein,

in the housing 32, the Pockels crystal 11 and the protection unit 31 provided with the gap sensor 41 are attached, and the gap sensor 41 measures a distance between the gap sensor 41 and the electric field reduction system 3, which is a measurement target, to output the distance to the drive control unit 37, and the drive control unit 37 controls the axial direction drive unit 35a so as to make gap output from the gap sensor 41 comes to a predetermined target value ([0066], [0069], [0103], [0104], FIG. 5), wherein

the three-dimensionally movable driver comprises:

the support shaft 62 installed at the center axis position of the cylindrical shape stator 2 including the stator core 7 and a stator coil in such a way as to pass through the space inside the stator 2 ([0126], [0131], [FIG. 8]);

the rotation drive unit 63 and the axial direction drive unit 64 attached to the support shaft 62 ([FIG. 8]); and

the axial direction drive unit 35a provided in the holding and mounting unit 30 driven by the rotation drive unit 63 and the axial direction drive unit 64 ([0132]-[0133], [FIG. 8])."

2. Regarding Cited Document 2

In Cited Document 2 cited in the reasons for refusal stated in the examiner's decision, there are described the following matters together with drawings.

"[0001] [Industrial Application Field] The present invention relates to a test apparatus for an armature coil of a rotating electrical machine having a commutator segment, for example, a direct current motor (hereinafter simply referred to as a test apparatus) and a test brush retainer.

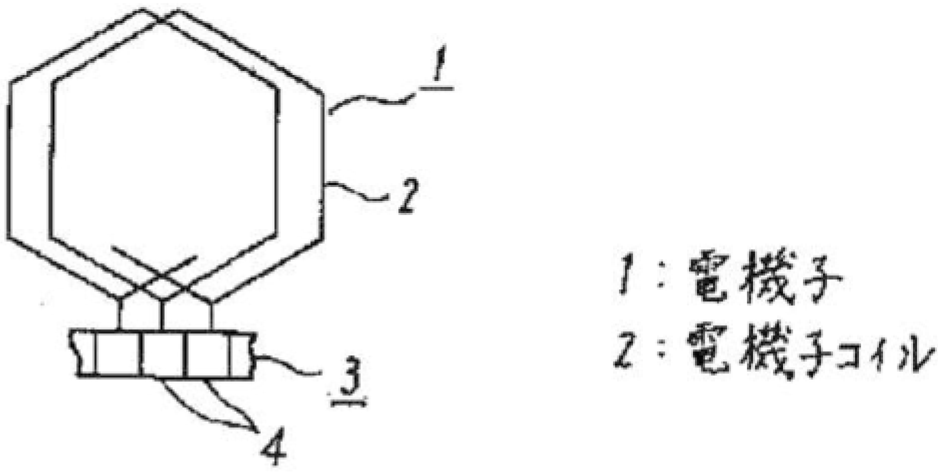
[0002] [Conventional Art] FIG. 8 and FIG. 9 are diagrams showing a test apparatus of a conventional DC machine, as described in, for example, page 8 of 'Technical Data No. 113 of the Nippon Electric Manufacture Industry Association' 'DC Machine Maintenance Standard' (established in June 1977), FIG. 8 shows the configuration of the armature, and FIG. 9 shows the configuration of the test apparatus. In these figures, reference numeral 1 denotes an armature, which includes an armature coil 2 and a commutator 3, and the commutator 3 is composed of a plurality of commutator segments 4.

[0003] Reference numeral 5 denotes a copper bar electrode and reference numeral 6 denotes a direct current constant current power supply, and current from the direct current constant current power supply 6 is supplied to the armature coil 1 through the copper bar 5 and the commutator segments 4. Reference numeral 7 is a measuring electrode and 8 is a voltmeter, and the voltage between the adjacent commutator segments 4 is indicated by the voltmeter 8 via the measuring electrode 5. Although not shown, the armature 1 is rotatably supported by a frame which is a support through bearings.

[0004] Next, a method of testing an armature coil using the above test apparatus will be described. A voltage drop between the adjacent commutator segments 4 is measured by a voltmeter 8 via the measuring electrode 7 in a state where a predetermined current flows from the direct current constant current power 6 to the armature coil 1 via the copper bar electrode 5 and the commutator segments 4.

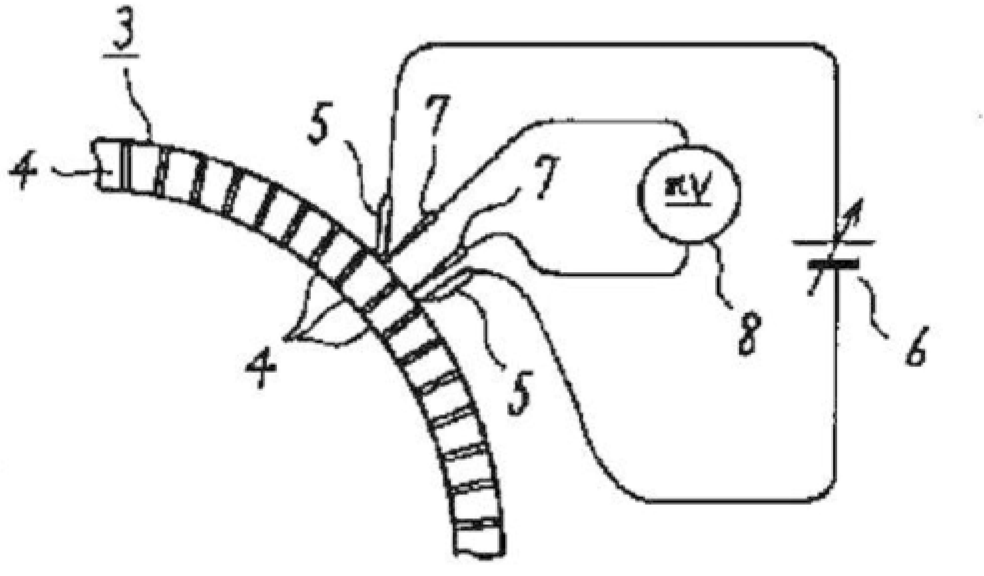
[0005] As is well known, if there is a disconnection in the armature coil 2, the voltage between the commutator segments 4 rises, and if an interlayer short circuit occurs, the voltage between the commutator segments drops. The soundness of the armature coil 2 is tested by this voltage value. In this example, the test is performed for maintenance and inspection of a DC machine, and the above test is performed in a state that all the brushes of the actual machine are raised."

[FIG. 8]



１：電機子　　　1: Armature
２：電機子コイル　　　2: Armature coil

[FIG. 9]



3. Regarding Cited Document 3

In Cited Document 3 cited in the reasons for refusal stated in the examiner's decision, there are described the following matters together with drawings.

"[0001] [Industrial Application Field] The present invention relates to the arm stop control method of performing an emergency stop of the arm of a manipulator.
[0002] [Conventional Method] As a manipulator to be used in repair work of a high-voltage part of overhead distribution lines and the like, a vertical articulated manipulator consisting of a shoulder, a first arm, a second arm, and a hand has been developed. This manipulator needs sufficient insulation performance to prevent accidents such as electric shock, short circuit, and the like, and, therefore, it has a triple tube structure in which some of the constituent members of the first arm are made to be insulating materials, and, together with this, a second arm totally consists of insulating materials.
[0003] The second arm of the triple pipe structure is provided with a hand drive unit to the rear of the second arm, and is configured to transmit the three-axis driving force of the drive unit to the distal hand respectively through the central shaft within the second arm, and a first pipe and a second pipe provided concentrically around the outer circumference of the shaft. Electrical wiring extends from the first arm to the hand driving part of the second arm, but it does not extend further. All the center shaft, the first pipe, the second pipe and the third pipe, which is the outermost layer, are made of an insulating material such as FRP, and, therefore, the second arm and the part ahead thereof are electrically completely insulated.
[0004] Thus, since the second arm and the part ahead thereof are completely electrically insulated, the first arm has a normal configuration, in which a hydraulic motor and electric wires are applied."

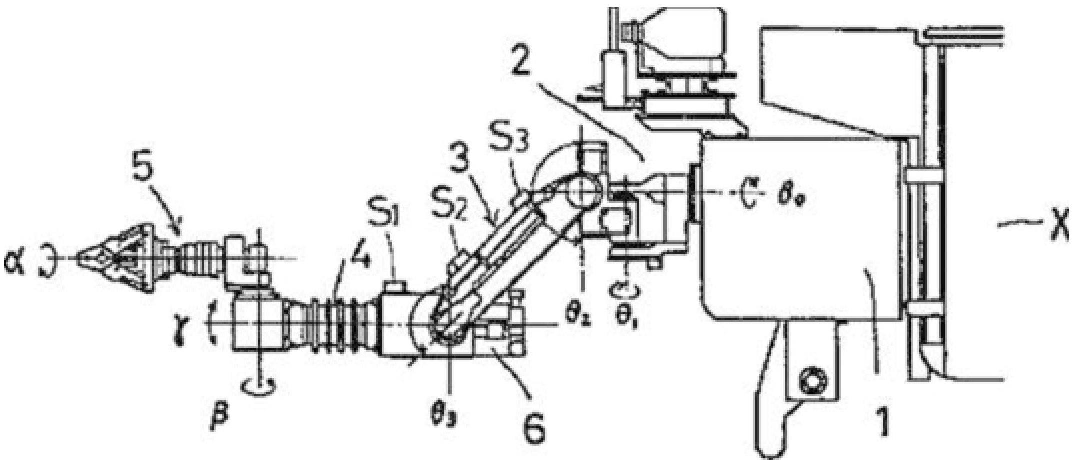
"[0009] FIG. 1 and FIG. 2 show an overall manipulator in which the control method of the present invention is carried out. As shown, the manipulator includes a shoulder 2 attached to a mounting base 1, a first arm 3 attached to the distal end of the shoulder 2, a second arm 4, and a hand 5. X is a fixed base member.
[0010] The shoulder 2 is attached to the mounting base 1 rotatably about a θ_0 axis, and the first arm 3 is attached to the shoulder 2 rotatably about a θ_1 axis and a θ_2 axis.
[0011] As shown in FIG. 3, the θ_0 axis is rotated by a θ_0 axis drive motor 21 using an electric motor, the θ_1 and θ_2 axes are rotated by a driving unit 22 and 23 for driving rack-and-pinion by a cylinder, and the θ_3 axis is rotated by a drive unit 24 for driving an endless chain wound around a sprocket at a shaft end by a cylinder. The cylinders are controlled by electro-hydraulic servo valves provided in the hydraulic system as described later, respectively.
[0012] The first arm 3 is constituted in such a way that two plates 31 and 32 are provided

in parallel, and has an θ_3 shaft at the lower end and the θ_2 axis at the upper end. The drive unit 24 mentioned above is provided between the flat plates 31 and 32 of the first arm 3, and the cylinder of the drive unit 23 is provided vertically on a portion of the shoulder 2 near the first arm. Electric field detection sensors S_1 to S_3 described later are attached to the first arm 3 directly or closely.

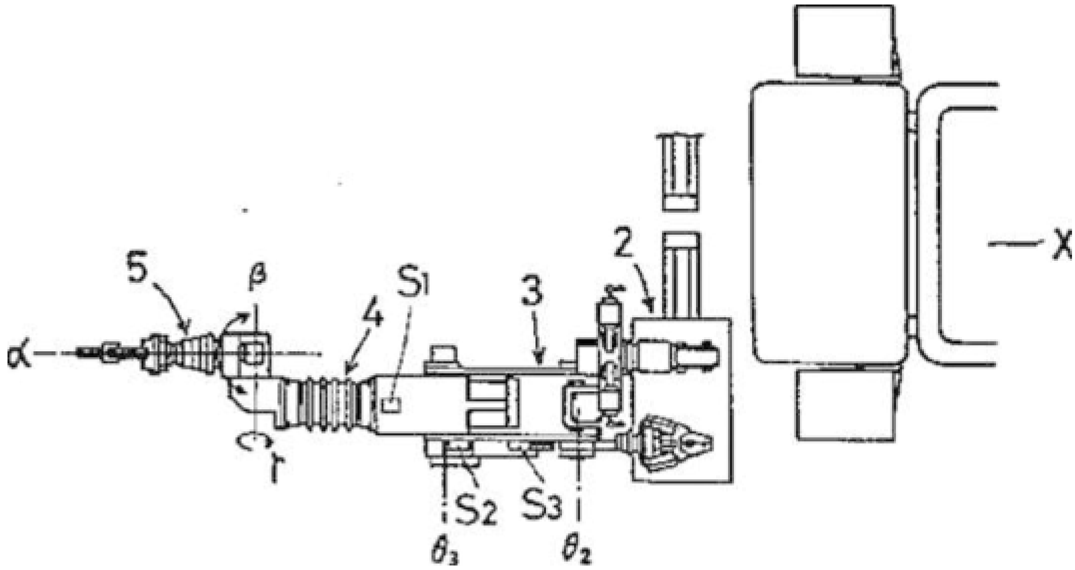
[0013] The second arm 4 consists of those of a first pipe shaft 42, a second pipe shaft 43, and a third pipe shaft 44 that are provided coaxially around the outer periphery of the central shaft 41, and is configured to transmit the driving force of the three axes driving unit 6 mounted to a rear portion of the second arm 4 to the hand 5 through the respective axes of the pipe shafts 41, 42, and 43. In this case, the components of each axis of the second arm 4 are formed by using the insulating material of the FRP, etc. respectively, in order to insulate the distal end portion than the second arm with respect to the first arm.

[0014] The hand 5 is rotatable relative to the second arm about β and γ axes, is configured to open and close the fingers by rotating α axis, these three axes transmitting the driving force of the (hydraulic pressure) motors 61, 62, and 63 of the three axes driving unit 6 to the respective axes of 41, 42, and 43 passing through the second arm 4, and is driven via respective gears in the gear mechanism (bevel gear)."

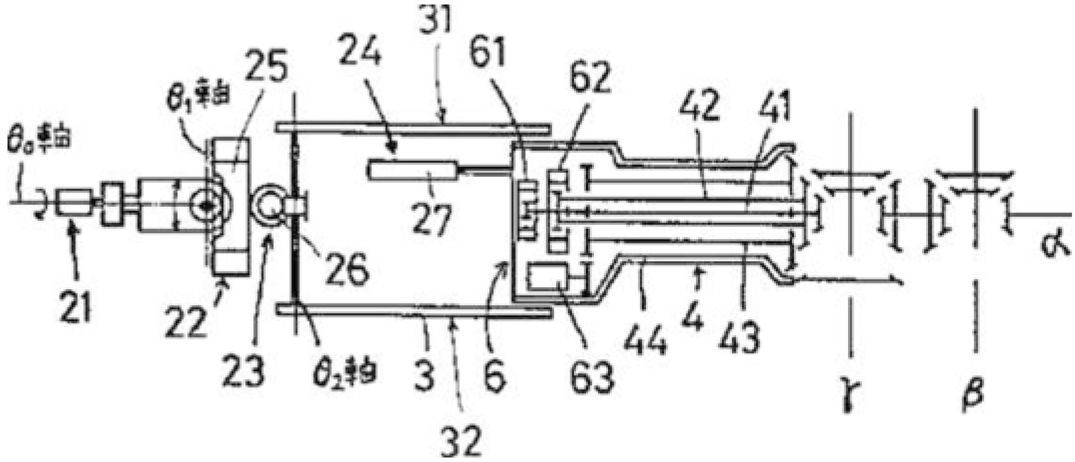
[FIG. 1]



[FIG. 2]



[FIG. 3]



Θ_0 軸 θ_0 axis

Θ_1 軸 θ_1 axis

No. 5 Comparison / Judgment

1 Regarding Invention 1

(1) Comparison between Invention 1 and Cited Invention

Invention 1 and Cited Invention will be compared.

A Since "a surface potential distribution measuring device" of Cited Invention has a drive unit to make the housing provided with a Pockels crystal, which is a measurement element, be capable of moving three-dimensionally, it corresponds to "three-dimensional surface potential distribution measurement system" of Invention 1.

Therefore, "a surface potential distribution measuring device for measuring a surface potential distribution of the electric field reduction system 3 which is applied to a rotating electrical machine" of Cited Invention and "a three-dimensional surface potential distribution measurement system for measuring a surface potential of a stator coil conductor of a rotating electrical machine, whose shape varies three-dimensionally, taking a portion other than a connection portion of the stator coil conductor as a measurement target from radially outside, radially inside, and axially outside the stator coil conductor" of Invention 1 are common in a point of being "a three-dimensional surface potential distribution measurement system for measuring a surface potential".

B "The laser light source 13 to emit laser light toward the electric field reduction system 3" of Cited Invention and "a laser light source to emit laser light" of Invention 1 are common in a point of being "a laser light source to emit laser light".

C Since "the Pockels crystal 11" of Cited Invention is one that is "disposed in such a way extending in the axial direction (x-direction) from the first end surface 11a to the second end surface 11b", it corresponds to one "having a first end surface and a second end surface" of Invention 1.

"Generating the Pockels effect in which a refractive index changes depending on applied voltage" of Cited Invention corresponds to "exhibiting the Pockels effect in which a refractive index changes depending on potential difference between the first end surface and the second end surface" of Invention 1.

"Located in such a way that the second end surface 11b provided with the mirror 14 to reflect the laser light a predetermined distance apart from a to-be-tested part of the electric field mitigation system 3 (the laser light has entered the first end surface 11a and then travels toward the second end surface 11b)" of Cited Invention corresponds to "disposed such that the first end surface faces a side that the laser light emitted from the laser light source enters while the second end surface faces the measurement target " of Invention 1.

Therefore, "the Pockels crystal 11, disposed in such a way extending in the axial direction (x-direction) from the first end surface 11a to the second end surface 11b, generating the Pockels effect in which a refractive index changes depending on applied voltage, located in such a way that the second end surface 11b provided with the mirror

14 to reflect the laser light a predetermined distance apart from a to-be-tested part of the electric field mitigation system 3 (the laser light has entered the first end surface 11a and then travels toward the second end surface 11b), and extending in a longitudinal direction along the propagation direction of laser light" of Cited Invention corresponds to "a Pockels crystal having a first end surface and a second end surface, exhibiting the Pockels effect in which a refractive index changes depending on potential difference between the first end surface and the second end surface, disposed such that the first end surface faces a side that the laser light emitted from the laser light source enters while the second end surface faces the measurement target, and extending in a longitudinal direction along a propagation direction of the laser light" of Invention 1.

D "The mirror 14 provided at the second end surface 11b of the Pockels crystal 11 and configured to reflect the laser light incident from the first end surface 11a in a direction opposite to the incident direction (x-direction)" of Cited Invention corresponds to "a mirror disposed on the second end surface and configured to reflect the laser light incident from the first end surface of the Pockels crystal in a direction opposite to the laser light incident direction" of Invention 1.

E "The photodetector 16 having a band following high-frequency components of the inverter pulse voltage, receiving the laser light reflected by the mirror 14, and configured to detect optical intensity Pout that corresponds to output voltage VPout, which is a potential difference between the first end surface 11a and the second end surface 11b of the Pockels crystal 11" of Cited Invention correspond to "a photodetector having a band following a high-frequency component of an inverter pulse voltage and configured to receive the laser light reflected by the mirror to detect light intensity of the laser light corresponding to the potential difference between the first end surface and the second end surface of the Pockels crystal" of Invention 1.

F It is obvious that, in order for "the Pockels crystal 11 provided with the mirror 14", "the laser light source 13" and "the photodetector 16" that are held by "the housing 32" of Cited Invention to function as the above B-E, the relative positional relationships among these configurations need to be maintained.

Therefore, "the housing 32, to which the Pockels crystal 11 provided with the mirror 14 is attached, and which holds the laser light source 13 and the photodetector 16 therein" of Cited Invention corresponds to "a housing that holds the laser light source, the Pockels crystal, the mirror, and the photodetector while maintaining the relative positional relationship thereamong" of Invention 1.

G "A driver and a driving controller capable of moving the housing three-dimensionally" of Cited Invention correspond to "a three-dimensional motion-driver capable of three-dimensionally moving the housing; and a driving controller that controls the three-dimensional motion-driver" of Invention 1.

H Cited Invention is an invention in which a distance between the gap sensor 41 and the electric field reduction system 3, which is a measurement target, is measured, and that distance is controlled so as to become a predetermined target value, and it is described in [0104] of Cited Document 1 that the predetermined target value is a value to make a gap size between the Pockels crystal 11 and the electric field reduction system 3 be a desirable size; therefore, it is obvious that in order for a distance between the Pockels element 11 and the electric field reduction system 3 to become a desirable size by controlling a distance between the gap sensor 41 and the electric field reduction system 3, the gap sensor 41 and the Pockels element 11 are movable in an integrated manner. In addition, since the gap sensor 41 and the Pockels element 11 are integral with each other, it can be said that the matter to measure a distance between the gap sensor 41 and the electric field reduction system 3 and the matter to measure a distance between the Pockels element 11 and the electric field reduction system 3 are equivalent.

Therefore, "in the housing 32, the Pockels crystal 11 and the protection unit 31 provided with the gap sensor 41 are attached, and the gap sensor 41 measures a distance between the gap sensor 41 and the electric field reduction system 3, which is a measurement target, to output the distance to the drive control unit 37, and the drive control unit 37 controls the axial direction drive unit 35a so as to make gap output from the gap sensor 41 comes to a predetermined target value" of Cited Invention corresponds to "the housing has a gap sensor configured to be moved integrally with the Pockels crystal and measure a gap between the Pockels crystal and the surface of the measurement target, and a gap signal output from the gap sensor is input to the driving controller, wherein the driving controller takes a signal from the gap sensor as a feedback signal and controls the three-dimensional motion-driver so as to make a value of the signal be a predetermined gap value" of Invention 1.

I "The center axis position of the cylindrical shape stator 2 including the stator core 7 and a stator coil", "the support shaft 62 installed" "in such a way as to pass through the space inside the stator 2", and "the rotation drive unit 63 and the axial direction drive unit

64 attached to the support shaft 62" of Cited Invention respectively correspond to "a radial center axis position of the stator core", "a center shaft externally fixed" "so as to be immovable", and "a circumferential direction driver mounted to the center shaft and configured to change circumferential and axial positions thereof" of Invention 1.

As viewed from [FIG. 8] of Cited Document 1, "the axial direction drive unit 35a provided in the holding and mounting unit 30 driven by the rotation drive unit 63 and the axial direction drive unit 64" of Cited Invention is one that changes the position of the cylindrical shape stator 2 in a diameter direction, and, therefore, it corresponds to "a radial direction driver mounted to the circumferential direction driver and configured to change the radial position thereof" of Invention 1.

Accordingly, "the three-dimensionally movable driver comprises: the support shaft 62 installed at the center axis position of the cylindrical shape stator 2 including the stator core 7 and a stator coil in such a way as to pass through the space inside the stator 2; the rotation drive unit 63 and the axial direction drive unit 64 attached to the support shaft 62; and the axial direction drive unit 35a provided in the holding and mounting unit 30 driven by the rotation drive unit 63 and the axial direction drive unit 64" of Cited Invention and "the three-dimensional motion-driver includes: a center shaft externally fixed to a radial center axis position of the stator core so as to be immovable; a circumferential direction driver mounted to the center shaft and configured to change circumferential and axial positions thereof; a radial direction driver mounted to the circumferential direction driver and configured to change the radial position thereof; and a direction-changing rotation driver mounted to the radial direction driver and configured to change the direction of the Pockels crystal" of Invention 1 are common in a point that "the three-dimensional motion-driver includes: a center shaft externally fixed to a radial center axis position of the stator core so as to be immovable; a circumferential direction driver mounted to the center shaft and configured to change circumferential and axial positions thereof; and a radial direction driver mounted to the circumferential direction driver and configured to change the radial position thereof".

(2) Corresponding Feature and Different Feature

When the above-mentioned examinations of (1) are integrated, Invention 1 and Cited Invention are identical in the following corresponding feature, and differ in the following different feature.

<Corresponding Feature>

A three-dimensional surface potential distribution measurement system for measuring a surface potential, the system comprising:

a laser light source to emit laser light;

a Pockels crystal having a first end surface and a second end surface, exhibiting the Pockels effect in which a refractive index changes depending on potential difference between the first end surface and the second end surface, disposed such that the first end surface faces a side that the laser light emitted from the laser light source enters while the second end surface faces the measurement target, and extending in a longitudinal direction along a propagation direction of the laser light;

a mirror disposed on the second end surface and configured to reflect the laser light incident from the first end surface of the Pockels crystal in a direction opposite to the laser light incident direction;

a photodetector having a band following a high-frequency component of an inverter pulse voltage and configured to receive the laser light reflected by the mirror to detect light intensity of the laser light corresponding to the potential difference between the first end surface and the second end surface of the Pockels crystal;

a housing that holds the laser light source, the Pockels crystal, the mirror, and the photodetector while maintaining the relative positional relationship thereamong;

a three-dimensional motion-driver capable of three-dimensionally moving the housing; and

a driving controller that controls the three-dimensional motion-driver, wherein

the housing has a gap sensor configured to be moved integrally with the Pockels crystal and measure a gap between the Pockels crystal and the surface of the measurement target, and a gap signal output from the gap sensor is input to the driving controller, wherein

the driving controller takes a signal from the gap sensor as a feedback signal and controls the three-dimensional motion-driver so as to make a value of the signal be a predetermined gap value, and wherein

the three-dimensional motion-driver includes:

a center shaft externally fixed to a radial center axis position of the stator core so as to be immovable;

a circumferential direction driver mounted to the center shaft and configured to change circumferential and axial positions thereof; and

a radial direction driver mounted to the circumferential direction driver and configured to change the radial position thereof.

<Different Feature>

Regarding three-dimensional surface potential distribution measurement system, in Invention 1, it is one "for measuring a surface potential of a stator coil conductor of a rotating electrical machine, whose shape varies three-dimensionally, taking a portion other than a connection portion of the stator coil conductor as a measurement target from radially outside, radially inside, and axially outside the stator coil conductor" in which the three-dimensional motion-driver has "a direction-changing rotation driver mounted to the radial direction driver and configured to change the direction of the Pockels crystal", whereas, in Cited Invention, it is one for measuring a surface potential distribution of an electric field reduction system which is applied to a rotating electrical machine, but not one that takes a stator coil conductor as a measurement target, and the three-dimensional motion-driver does not have "a direction-changing rotation driver mounted to the radial direction driver and configured to change the direction of the Pockels crystal".

(3) Judgment by the body on Different Feature

As is described in [0129]-[0136] of Cited Document 1, Cited Invention is one in which, in order to measure a surface potential distribution of the electric field reduction system 3 when voltage is applied to the stator coil conductors 1 even in a state that the electric field reduction system 3, which is a measurement target, is embedded in the cylindrical shape stator 2, the holding and mounting unit 30 having the measuring device main body 10 attached thereto is brought close to the entire perimeter of the inner surface of the stator 2 by a three-dimensionally movable driver.

Therefore, a motivation to use the device for measuring the surface potential distribution of the electric field reduction system 3 of Cited Invention for "measuring a surface potential of a stator coil conductor of a rotating electrical machine, whose shape varies three-dimensionally, taking a portion other than a connection portion of the stator coil conductor as a measurement target from radially outside, radially inside, and axially outside the stator coil conductor", which is a constitution concerning the aforementioned different feature, cannot be found, and, so long as there is no motivation to measure from radially outside, radially inside, and axially outside the stator coil conductor, it has to be said that there is no motivation to have "a direction-changing rotation driver mounted to the radial direction driver and configured to change the direction of the Pockels crystal", which is a constitution concerning the aforementioned different feature.

Here, although there is described, in [0001]-[0005], and FIG. 8 and 9 of Cited

Document 2, an apparatus in which a predetermined current is made to flow from the direct current constant current power 6 to the armature coil 1 via the copper bar electrode 5 and the commutator segments 4, and a voltage drop between the adjacent commutator segments 4 is measured by a voltmeter 8 via the measuring electrode 7, thereby testing an armature coil, it is not one that measures the electric field reduction system 3 using an electric field sensor of a noncontact type of a Pockels element as is the case with Cited Invention; therefore, it cannot be said that it would have been achieved with ease by a person skilled in the art to apply the technical matter described in Cited Document 2, in which the measurement target comes into contact with the armature coil 1 and current is made to flow, to Cited Invention, which is a noncontact type surface potential distribution measuring device.

Furthermore, there is described, in [0001]-[0004], [0009]-[0014], and FIGS. 1-3 of Cited Document 3, a manipulator in which the first arm 3 having electric field detection sensors S_1-S_3 attached thereto is used for repair work of a high-voltage part such as overhead distribution lines is attached to the shoulder unit 2 rotatably about the θ_1 axis and the θ_2 axis; however, as described above, in Cited Invention, the measurement target is the electric field reduction system 3, and, in the first place, there is no motivation to measure from radially outside, radially inside, and axially outside the stator coil conductor, and, therefore, it would not be easily conceived of by a person skilled in the art to apply the above-mentioned constitution described in Cited Document 3 to Cited Invention.

Therefore, it cannot be said that Invention 1 could have been invented with ease by a person skilled in the art based on Cited Invention and the technical matters described in Cited Documents 2 and 3.

2 Regarding Inventions 2 and 3

Inventions 2 and 3 also have the identical constitution Invention 1, and, therefore, by the same reason as for Invention 1, it cannot be said that these could have been invented with ease by a person skilled in the art based on Cited Invention and the technical matters described in Cited Documents 2 and 3.

No. 6 Closing

As above, Inventions 1-3 are not ones that could have been invented with ease by a person skilled in the art based on Cited Invention and the technical matters described in Cited Documents 2 and 3.   Therefore, the present application cannot be rejected by the reason of the examiner's decision.

In addition, beyond that, no reasons for refusal were found.

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

January 21, 2021

Chief administrative judge:	OKADA, Yoshimi
Administrative judge:	HAMAMOTO, Sadahiro
Administrative judge:	HAMANO, Takashi