Appeal decision

Appeal No. 2019-13882

Appellant CL Schutzrechtsverwaltungs GmbH

Patent Attorney NAKAJIMA, Jun

The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2017-145091, entitled "Powder Module for Apparatus for Additive Manufacturing of Three-dimensional Object" (the application published on February 1, 2018, Japanese Unexamined Patent Application Publication No. 2018-17735), has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

No. 1 History of the procedures

The application relating to this request for appeal (hereinafter, referred to as "the Application"), is a patent application filed on July 27, 2017 (priority claim under the Paris Convention: July 29, 2016 received by the foreign receiving office, Federal Republic of Germany). Then, an amendment regarding the scope of claims was made on February 8, 2019, and an examiner's decision of refusal was issued on May 23, 2019 (hereinafter, referred to as "the examiner's decision") (date of delivery of a certified copy of the examiner's decision: June 18, 2019). Against this, an appeal against the examiner's decision of refusal was made on October 18, 2019.

No. 2 The invention according to the Application

The invention relating to Claim 1 of the present application (hereinafter referred to as the "Invention") is acknowledged as follows, as specified by the matters recited in Claim 1 according to the scope of claims for patent amended by the written amendment submitted on February 8, 2019.

"A powder module (1) for an apparatus for additive manufacturing of a three-dimensional object, comprising: a powder chamber (2) which defines a powder space capable of being

filled with a powder-shaped constituent material; a carrier (4) which is provided in a powder space (3), defines the powder space (3) on a bottom portion side, and is supported so as to move relative to the powder chamber (2); and a position detection device (6) that is provided for detecting a position of the carrier (4),
characterized in that the position detection device (6) is formed as a cable sensor or has at least one cable sensor".

No. 3 Gist of reasons for refusal of the examiner's decision regarding Claim 1

Since the Invention could have been easily made by a person ordinarily skilled in the art belonging to the Invention before the priority date, based on the invention described in the following Cited Document 1 and the well-known art (see Cited Document 2 to Cited Document 4), the Appellant should not be granted a patent under the provisions of Article 29(2) of the Patent Act.

1. Japanese Unexamined Patent Application Publication No. 2015-155188
2. Japanese Unexamined Patent Application Publication No. H7-26760
3. Microfilm of Japanese Utility Model Application No. H2-25017 (Japanese Unexamined Utility Model Application Publication No. H3-117712)
4. Japanese Unexamined Patent Application Publication No. H9-119831

No. 4 Invention and others described in the Cited Documents

1 The invention described in Cited Document 1

(1) Cited Document 1 describes the following. The underlines are added by the body.

"[0001]

The present invention relates to a three-dimensional shaping apparatus that produces a three-dimensional shaped article by repeatedly forming powder into a layer".

"[0016]

A three-dimensional shaping apparatus 1 according to the present embodiment includes an energy beam irradiation part 2 as a material supply part, a powder supply part 3 as a material supply part, and a shaped article placing part 4. The energy beam irradiation part 2, the powder supply part 3, and the shaped article placing part 4 are supported by a support frame 11. A reference frame 12 as a part of the support frame 11 is formed at the intermediate portion of the support frame 11.
(Omitted)

[0018]

The beam generation part 21 is preferably configured to generate a laser light, an electron beam, or the like. When the energy beam EB is a light beam, the beam scanning part 22 moves an optical element such as a lens to converge the light beam on a metal powder M on a table to be described later and two-dimensionally scans a table 41. In this case, for example, the energy beam irradiation part 2 may have a configuration like that of the laser irradiation unit described in Patent Document 1. When the energy beam EB is an electron beam, the beam scanning part 22 focuses the electron beam under magnetic field control and two-dimensionally scans the table 41. In this case, for example, the energy beam irradiation part 2 may have a configuration like that of the device that emits and guides an electron beam which is disclosed in Patent Document 2.

[0019]

The powder supply part 3 includes a powder storage part 31 that temporarily stores the metal powder M, a leveling part 32 that levels the metal powder M on the table, and an outer frame part 33.

(Omitted)

[0021]

The leveling part 32 is a part that moves a member such as a scraper on the table 41 to level the metal powder M discharged from the powder storage part 31 to thereby form a plane having as uniform a height as possible. The height of the leveled metal powder M can preferably be adjusted.

[0022]

The outer frame part 33 is supported by the support frame 11 and installed on the outer periphery of the table 41 to be described later. To the outer frame part 33, extra metal powder M after being leveled by the leveling part 32 is moved. The metal powder M is preferably circulated by a circulation part which is not shown and returns it to the powder storage part 31.

(Omitted)

[0025]

FIG. 2 is an enlarged view illustrating the shaped article placing part of the three-dimensional shaping apparatus according to the present embodiment. FIG. 3 is a schematic view illustrating an arrangement in a drive transmission part of the three-dimensional shaping apparatus according to the present embodiment. FIG. 4 is a schematic perspective view illustrating the shaped article placing part of the three-dimensional shaping apparatus according to the present embodiment.

[0026]

The shaped article placing part 4 includes a table 41, a slider 42, a ball screw 43, a deceleration part 44, a table drive part 45, a magnetic sensor 46, a magnetic scale 47, a rod 48, and a limit switch 49.

[0027]

The table 41 is supported by the slider 42. The upper surface of the table 41 is a flat surface, onto which the metal powder M illustrated in FIG. 1 is discharged and placed. A shaped article is preferably formed in a shaping area 41a having a smaller size than the external shape of the table 41.

[0028]

The slider 42 supports the table 41 at its upper surface. The slider 42 is supported at its lower portion by the ball screw 43. The ball screw 43 is connected to a drive part 45 through the deceleration part 44. The drive part 45 includes a servo motor or other actuator. The driving of the drive part 45 rotates the ball screw 43 to move the slider 42 in the vertical direction, thereby vertically moving the table 41. The ball screw 43 is preferably configured to penetrate the reference frame 12.

(Omitted)

[0032]

A first magnetic sensor 46a, a second magnetic sensor 46b, a third magnetic sensor 46c, and a fourth magnetic sensor 46d are attached to the lower side of the slider 42 so as to correspond to the support positions of the first ball screw 43a, the second ball screw 43b, the third ball screw 43c, and the fourth ball screw 43d.

[0033]

The magnetic sensor 46 is an example of a measurement part. In addition to this example, the measurement part may alternatively be an optical position sensor that detects a distance by attaching a light emitting part to one of the slider 42 and the support frame 11 and attaching a light receiving part to the other one of them, or an ultrasonic wave sensor. Preferably, one of them is attached to the reference frame 12 and the other is attached to the slider 42. Preferably, these sensors are respectively attached so as to correspond to the support positions of the first ball screw 43a, the second ball screw 43b, the third ball screw 43c, and the fourth ball screw 43d. Further alternatively, a motor rotation angle is converted into a stroke amount by a motor encoder and the like that is not shown, which may be used together with the magnetic sensor 46 to detect position in detail.

[0034]

On the support frame 11 on the lateral sides of the slider 42, a first magnetic scale 47a, a second magnetic scale 47b, a third magnetic scale 47c, and a fourth magnetic scale 47d to which magnetic scales are added are arranged oppositely to the first magnetic sensor 46a, the second magnetic sensor 46b, the third magnetic sensor 46c, and the fourth magnetic sensor 46d.

(Omitted)

[0038]

As illustrated in FIG. 5, in the three-dimensional shaping apparatus 1 according to the present embodiment, a controller 50 independently controls the first drive part 45a, the second drive part 45b, the third drive part 45c, and the fourth drive part 45d on the basis of signals input respectively from an input part 51, the first magnetic sensor 46a, the second magnetic sensor 46b, the third magnetic sensor 46c, the fourth magnetic sensor 46d, and a storage part 52.

[0039]

The input part 51 previously inputs information such as a forming shape, a forming pressure, and a forming speed. The storage part 52 stores therein the information input from the input part 51 and a shaping process, and outputs them to the controller 50. The first magnetic sensor 46a, the second magnetic sensor 46b, the third magnetic sensor 46c, and the fourth magnetic sensor 46d respectively measure displacements or speeds and the like thereof from the scales of the opposite first magnetic scale 47a, second magnetic scale 47b, third magnetic scale 47c, and fourth magnetic scale 47d, and output them to the controller 50".

"[0043]

In the three-dimensional shaping apparatus 1 according to the present embodiment, first, each drive part 45 illustrated in FIG. 4 is driven, whereby the table 41 is moved downward as illustrated in FIG. 6. The instructed moving amount of the table 41 is previously input to the input part 51 illustrated in FIG. 5 and then stored in the storage part 52".

"[0046]

Subsequently, the metal powder M is discharged onto the table 41 from the discharge part 31b of the powder storage part 31. Then, the metal powder M is leveled by the leveling part 32 on the table 41 in such a way that the surface thereof is horizontal. Subsequently, the energy beam irradiation part 2 illustrated in FIG. 1 emits the energy beam EB to sinter the metal powder M, thereby forming a part of a shaped article M', as illustrated in FIG. 7".

[0047]

Then, each drive part 45 illustrated in FIG. 4 is driven again, whereby the table 41 is moved downward, as illustrated in FIG. 8. The moving amount of the table 41 is previously input to the input part 51 illustrated in FIG. 5 and then stored in the storage part 52".

"[0050]

Subsequently, the metal powder M is discharged onto the table 41 from the discharge part 31b of the powder storage part 31. Then, the metal powder M is leveled by the leveling part 32 on the table 41 in such a way that the surface thereof is horizontal. Subsequently, the energy beam irradiation part 2 illustrated in FIG. 1 emits the energy beam EB to sinter the metal powder M, thereby forming a part of a shaped article M', as illustrated in FIG. 9".

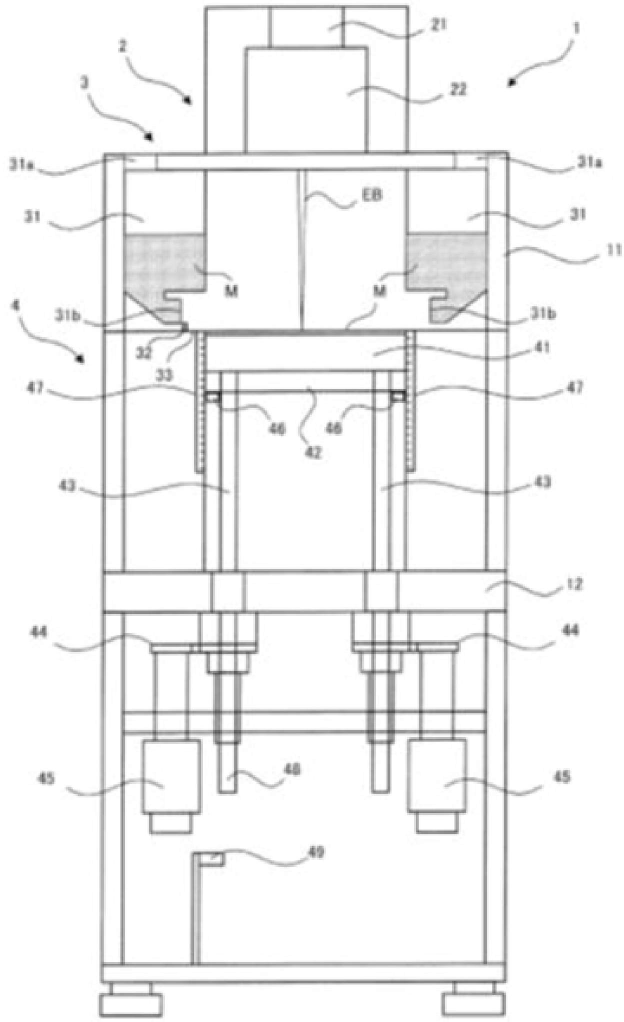
"[0101]

The three-dimensional shaping apparatus 1 according to the present embodiment includes the support frame 11, the material supply part 3 supported by the support frame 11, and the shaped article placing part 4 which is supported by the support frame 11 and on which a material supplied from the material supply part 3 is placed. The shaped article placing part 4 includes the table 41 on the upper surface of which a shaped article is placed, the drive part 45 that drives the table 41, the measurement part 46 that measures the position of the table 41, and the controller 50 that controls the drive part 45 on the basis of a measurement value from the measurement part 46. Thus, a three-dimensional shaping apparatus featuring excellent accuracy and productivity can be provided".

"[0104]

The drive part 45 includes the first drive part 45a and the second drive part 45b which can be independently driven. The measurement part 46 includes the first magnetic sensor 46a and the second magnetic sensor 46b that respectively measure the position of the table 41. The controller 50 independently controls the first drive part 45a and the second drive part 45b on the basis of measurement values of the first magnetic sensor 46a and the second magnetic sensor 46b. Thus, a three-dimensional shaping apparatus featuring excellent accuracy and productivity can be provided".

"[FIG. 1]


21
1
2
22
3
31a
31a
EB
31
31
11
M
M
4
31b
M
31b
32
41
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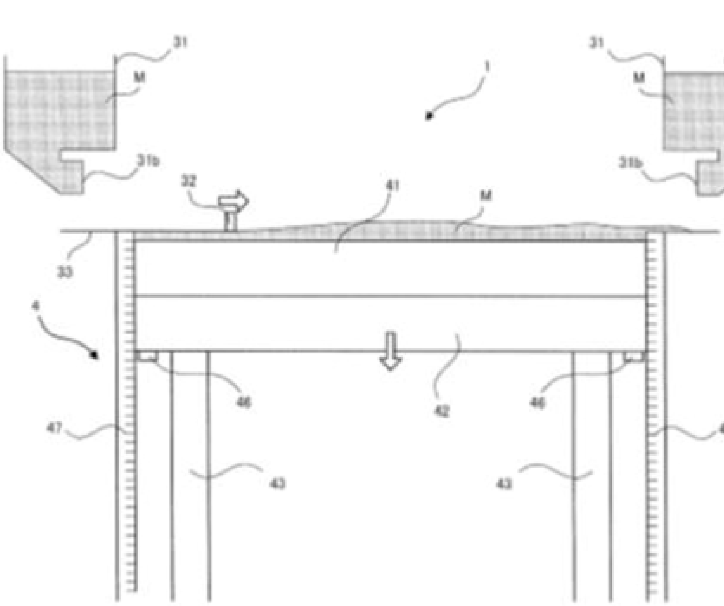
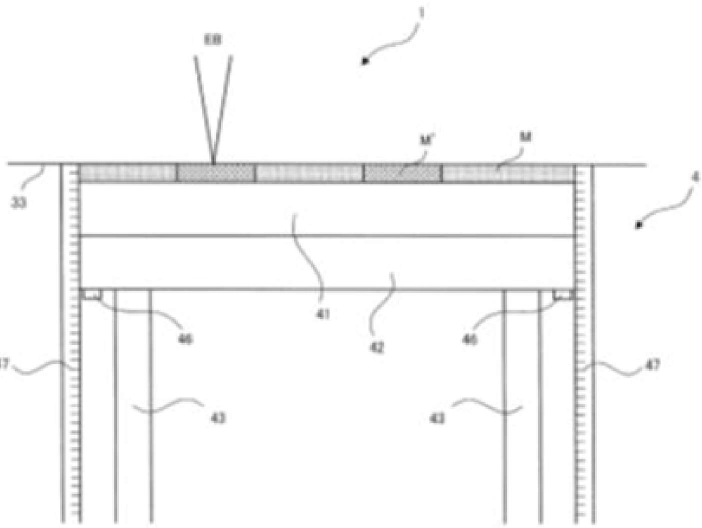
"[FIG. 6]



[FIG. 7]



"

(2) Summarizing the description (1) above of Cited Document 1, Cited Document 1 describes the following invention (hereinafter, referred to as "the Cited Invention").

"A three-dimensional shaping apparatus 1 that produces a three-dimensional shaped article by repeatedly forming powder into a layer ([0001] and [0016]), comprising:

an energy beam irradiation part 2 as a material supply part; a powder supply part 3 as a material supply part; and a shaped article placing part 4, the energy beam irradiation part 2, the powder supply part 3, and the shaped article placing part 4 being supported by a support frame 11, wherein a reference frame 12 as a part of the support frame 11 is formed at the intermediate portion of the support frame 11 ([0016]),

wherein the powder supply part 3 includes a powder storage part 31 that temporarily stores metal powder M, a leveling part 32 that levels the metal powder M on the table, and an outer frame part 33 ([0019]),

wherein the leveling part 32 is a part that moves a member such as a scraper on the table 41 to level the metal powder M discharged from the powder storage part 31 to thereby form a plane having as uniform a height as possible ([0021]),

wherein the outer frame part 33 is supported by the support frame 11 and installed on the outer periphery of the table 41, and to the outer frame part 33, extra metal powder M after being leveled by the leveling part 32 is moved ([0022]),

wherein the shaped article placing part 4 includes a table 41, a slider 42, a ball screw 43, a deceleration part 44, a table drive part 45, a magnetic sensor 46 that measures a position of the table 41, a magnetic scale 47, a rod 48, and a limit switch 49 ([0026] and [0101]),

wherein the table 41 is supported by the slider 42, and the upper surface of the table 41 is a flat surface, onto which the metal powder M is discharged and placed ([0027]),

wherein the driving of the drive part 45 rotates the ball screw 43 to move the slider 42 in the vertical direction, thereby vertically moving the table 41 ([0028]),

wherein the magnetic sensor 46 mentioned above is attached as a first magnetic sensor 46a, a second magnetic sensor 46b, a third magnetic sensor 46c, and a fourth magnetic sensor 46d to the lower side of the slider 42 ([0032]),

wherein the first magnetic sensor 46a, the second magnetic sensor 46b, the third magnetic sensor 46c, and the fourth magnetic sensor 46d respectively measure displacements or speeds and the like thereof from the scales of the oppositely arranged first magnetic scale 47a, second magnetic scale 47b, third magnetic scale 47c, and fourth magnetic scale 47d on the support frame 11 on the lateral sides of the slider 42, and output them to the controller 50 ([0034] and [0039]), and

wherein concerning the operation of the three-dimensional shaping apparatus 1 ([0041]), first, each drive part 45 is driven, whereby the table 41 is moved downward ([0043]),

subsequently, the metal powder M is discharged onto the table 41 from the discharge part 31b of the powder storage part 31, then, the metal powder M is leveled by the leveling part 32 on the table 41 in such a way that the surface thereof is horizontal, subsequently, the energy beam irradiation part 2 emits the energy beam EB to sinter the metal powder M, thereby forming a part of a shaped article M' ([0046]),

then, each drive part 45 is driven again, whereby the table 41 is moved downward ([0047]),

subsequently, the metal powder M is discharged onto the table 41 from the discharge part 31b of the powder storage part 31, then, the metal powder M is leveled by the leveling part 32 on the table 41 in such a way that the surface thereof is horizontal, and subsequently, the energy beam irradiation part 2 emits the energy beam EB to sinter the metal powder M, thereby forming a part of a shaped article M' ([0050])".

2 Matters described in Cited Document 2

(1) Cited Document 2 describes the following matters. The underlines are added by the body.

"[0002]

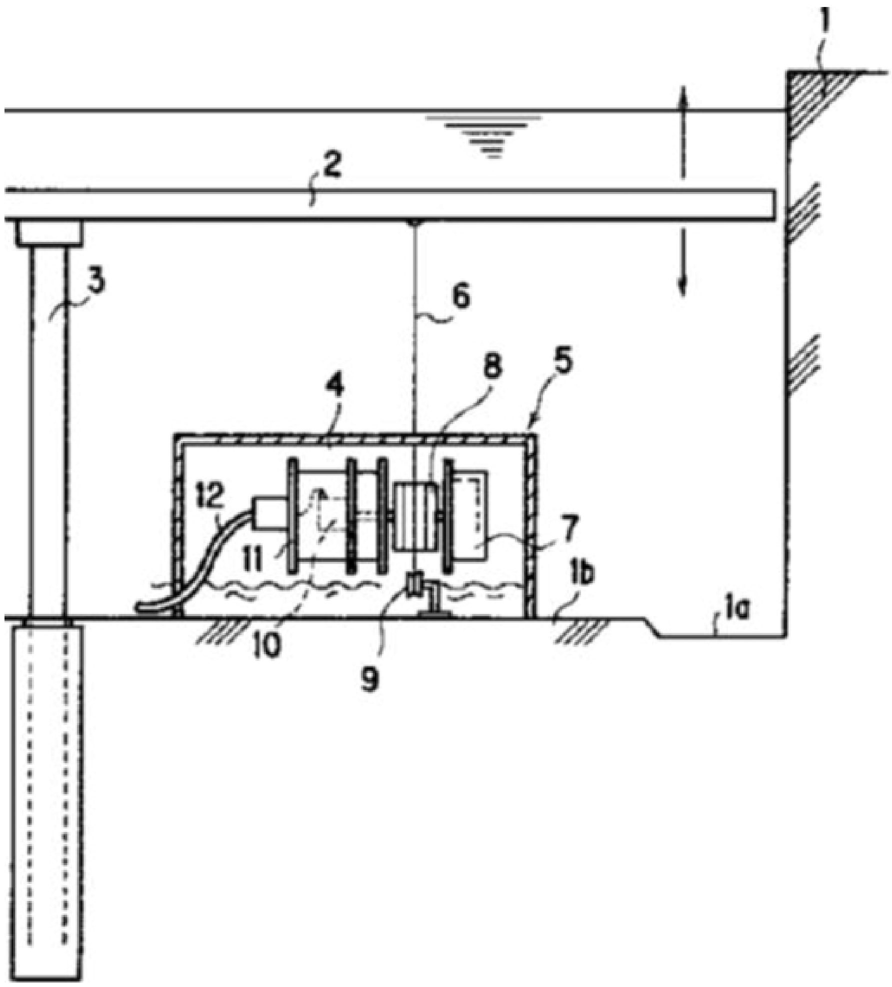
[Description of the Prior Art] For example, in a swimming pool, as shown in FIG. 5, it is known that the water depth of the pool 1 can be adjusted by raising and lowering an elevating floor 2 with a fluid pressure cylinder 3.

[0003] In this type of pool, in order to detect a stroke of the fluid pressure cylinder 3, a stroke detection device 4 that uses a wire at the lower end level of the fluid pressure cylinder 3 on an abutment 1b of a pool bottom wall 1a is located and provided inside a watertight box 5.

[0004] Here, a wire 6 that transmits the stroke of the fluid pressure cylinder 3 to the detection device 4 is wound or unwound by a drum 8 that is constantly urged in a winding direction by a recoil spring 7, and is locked to the elevating floor 2 via a pulley 9 that guides a portion led out from the lower end of the watertight box 5 to the outside upward.

[0005] The rotation speed of the drum 8 at the time of winding or unwinding is calculated by a rotary encoder 10 provided in a main casing 11, and the stroke is calculated. Further, a connection cable 12 for sending a detection pulse signal to a control chamber that is not shown watertightly penetrates the outer end plate of the main casing 11".

"[FIG. 5]



"

(2) Summarizing the description of (1) above of Cited Document 2, Cited Document 2 describes the following matter.

"In order to detect a position of an elevating floor 2, one side of a wire 6 is locked to the elevating floor 2, the other side is configured to be wound or unwound by a drum 8 that is urged in a winding direction, and the rotation speed of the drum 8 corresponding to a winding amount or an unwinding amount of the wire 6 is calculated by a rotary encoder 10 to calculate a stroke of a fluid pressure cylinder 3".

3 Matters described in Cited Document 3

(1) Cited Document 3 describes the following. The underlines are added by the body.

(Page 17, line 11 to page 18, line 13)

"The displacement converter body 21 is installed at a reference location on the immovable member 24, the tube fixing member 26 is fixed on the closest immovable member 24 of the measurement object 20 so that a tip end of the guide tube 25 matches in a moving direction of the measurement object 20, and the tip end of a wire 23 is coupled to the measurement object 20.

A position of a measured location in an initial installation state is made to be an initial position, and a resistance value (or an output value thereof) of the variable resistor 8 at that time is made to be an initial value.

If the measured location relatively displaces (moves) with respect to the reference location, according to the displacement amount thereof, the wire 10 shows translatory or curving movement along the bending of the guide tube 25, is unwound out against the energy storing force (or winding behavior) of the spiral spring 14; namely, a constant output spring, or is wound by the energy storing force, and according to that, the wire winding drum 6, the spring-wound drum 7, and the variable resistor 8 having the common rotary shaft 9 integrally rotate. Consequently, since output corresponding to the displacement amount from the initial position of the measured place is outputted from the variable resistor 8, the output is guided to a displacement indicator prepared separately through the electric cable 19, and the displacement amount is indicated or recorded by the displacement indicator".

(Page 22, lines 11 to 14)

"For example, in the embodiment mentioned above, although the variable resistor is used as a rotation angle detector, a rotary encoder and the like outputting a pulse according to a rotation angle may be also used".

(2) Summarizing the description of (1) above of Cited Document 3, Cited Document 3 describes the following matter.

"In order to detect the relative displacement with respect to a reference location of a measurement object 20, a tip end of a wire 10 is coupled to the measurement object 20, the other end of the wire 10 has a configuration that can be wound up around a wire winding drum 6, and a rotation angle of the wire winding drum 6 corresponding to the unwinding or winding amount of the wire 10 is detected by a rotary encoder to detect displacement amount from an initial position of a measured location".

4 Matters described in Cited Document 4

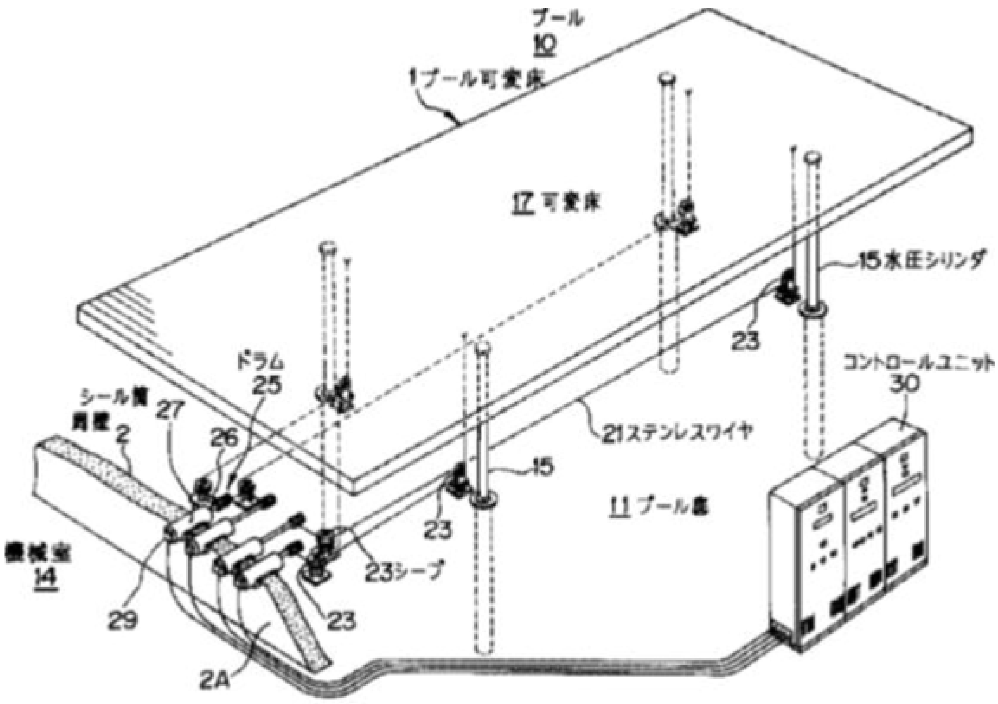
(1) Cited Document 4 described the following matters.　The underlines are added by the body.

"[0012] As shown in the figure, in the pool 10 filled with water, a plurality of hydraulic cylinders 15 are arranged on the bottom 11 of the pool variable floor 1 as elevating means, and the variable floor 17 is supported so as to move up and down on these hydraulic cylinders 15 to adjust the water depth.　The variable floor 17 has an opening/closing portion in the corner where an operator can enter the lower space for inspection and maintenance of the hydraulic cylinder 15 and the like, and a plurality of elevating guide rollers (not shown) that roll on the peripheral wall 2 are provided in the peripheral portion.
[0013] Usually, the pool 10 is always filled with water to a certain level; for example, to the overflow opening position.　Therefore, when the water surface is set as the reference level, the level of the variable floor 17; that is, the water depth, can be measured from there.　The level detection device 20 for the pool variable floor of the present embodiment measures the amount of elevation in the vicinity of each hydraulic cylinder 15 for a comparatively large variable floor 17, and obtains the water depth at a plurality of locations.
[0014] That is, one end of the stainless wire 21, which is a non-stretchable flexible wire, is attached to the variable floor 17 in the vicinity of each hydraulic cylinder 15.　Sheaves 23 are vertically mounted on the pool bottom 11 immediately below the mounting portions, and the other ends of the stainless wire 21 are guided by these sheaves 23 so as to reciprocate respectively from the vertical direction to the horizontal direction.
[0015] Further, sheaves 23 are horizontally mounted in the vicinity of the pool peripheral wall 2, and these sheaves 23 change the direction of the other end of the stainless wire 21 in the horizontal plane and guide it in a reciprocating manner.　Further, in the vicinity of the poll side bottom portion 2A, drums 25 capable of winding and feeding out the other end portion of the stainless wire 21 are respectively arranged.
[0016] These drums 25 penetrate the bottom of the pool side wall bottom portion 2A via a seal cylinder 27 which is sealing means, and are fixed to one end side of the drum shaft 26 leading to the machine room 14 at the other end.　A spiral spring 28 is attached to the other end side of the drum 25 as an urging means for always urging the drum 25 in the winding direction, and a rotary encoder 29 that transmits a rotation number signal of the drum 25 corresponding to the vertical moving distance of the variable floor 17 to a control unit 30 is provided.
[0017] The spiral spring 28 has the maximum drum winding force when the variable floor 17 is raised to the highest level, and is attached to the drum shaft 26 at one end and to the

housing H at the other end so that the winding force still remains even when the variable floor 17 is lowered to the lowest level. Therefore, tension is applied to the stainless wire 21 not only when the variable floor 17 is raised but also when it is lowered, and the stainless wire 21 does not loosen.

[0018] The rotary encoder 29 transmits a pulse signal to the control unit 30 by a rotation angle corresponding to the moving distance of the stainless wire 21, and the control unit 30 immediately calculates a current level of the variable floor 17 from the reference level and digitally displays it".

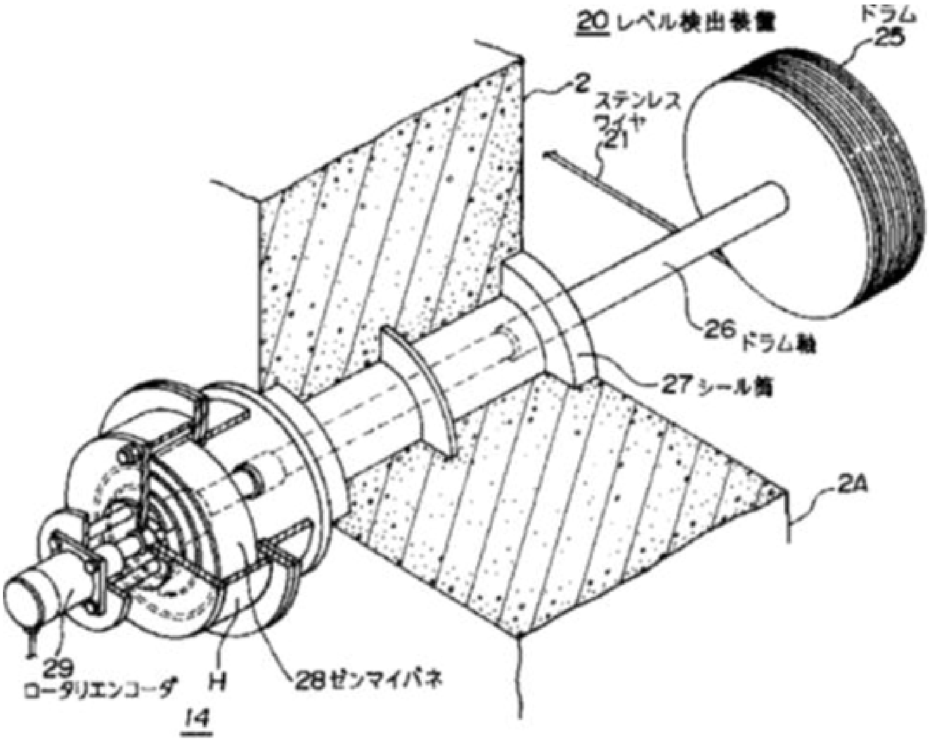
"[FIG. 1]



プール　Pool
プール可変床　Pool variable floor
可変床　Variable floor
水圧シリンダ　Hydraulic cylinder
コントロールユニット　Control unit
ドラム　Drum
シール筒　Seal cylinder
周壁　Peripheral wall
ステンレスワイヤ　Stainless wire
プール底　Pool bottom
機械室　Machine room

シーブ　Sheave

[FIG. 2]



レベル検出装置　Level detection device
ドラム　Drum
ステンレスワイヤ　Stainless wire
ドラム軸　Drum shaft
シール筒　Seal cylinder
ロータリエンコーダ　Rotary encoder
ゼンマイバネ　Spiral spring

"

(2) Summarizing the description (1) above of Cited Document 4, Cited Document 4 describes the following matter.
"In order to calculate a current level of a variable floor 17 supported so as to move up and down, from a reference level (water surface), one end of the stainless wire 21 is attached to the variable floor 17, the other end is configured to be wound and unwound by a drum 25, and a rotation angle of the drum 25 corresponding to a vertical moving distance of the variable floor 17 is detected by a rotary encoder 29".

No. 5 Comparison

1 The Invention and the Cited Invention are compared.

A The Cited Invention is "a three-dimensional shaping apparatus 1 that produces a three-dimensional shaped article by repeatedly forming powder into a layer"; "repeatedly forming into a layer" is nothing more than "layered" forming, so that "a three-dimensional shaping article" "manufactured" "by repeatedly forming powder into a layer" of the Cited Invention corresponds to "additive" "manufactured" "three-dimensional object" of the Invention.

Therefore, "a three-dimensional shaping apparatus 1" of the Cited Invention corresponds to "an apparatus for additive manufacturing of a three-dimensional object" of the Invention.

B "Metal powder M" of the Cited Invention corresponds to "a powder-shaped constituent material" of the Invention.

In the Cited Invention, in "a three-dimensional shaping apparatus 1," "the operation" is performed, in which "first," "the table 41 is moved downward," "the metal powder M is discharged onto the table 41" "to sinter," and then "again" "the table 41 is moved downward," and "the metal powder M is discharged" "to sinter". That is, before the discharge of "the metal powder M," "the table 41" is "moved downward," thereby forming "a space capable of discharging the metal powder M," and the space corresponds to "a powder space capable of being filled with a powder-shaped constituent material" of the Invention.

Further, in the Cited Invention, since "the leveling part 32 is a part that moves a member such as a scraper on the table 41 to level the metal powder M discharged from the powder storage part 31 to thereby form a plane having as uniform a height as possible," it is obvious that the Cited Invention has a member becoming a wall defining a side part of the space corresponding to the powder space in the Invention; that is, a member performing a function corresponding to "defining a powder space capable of being filled with a powder-shaped constituent material".

Concerning the powder chamber, considering the description of Paragraph [0008] of the specification of the Application, it is described that "The powder module comprises a powder chamber. The powder chamber defines a powder space that can be filled with constituent material. The powder space is defined at least on the side by walls (powder chamber walls) of the powder chamber generally formed like a hollow rectangular parallelepiped or like a hollow cylinder. At the bottom, the powder space is defined by a carrier". Considering this description, it can be said that "a powder chamber" is "a member having a member becoming a wall defining at least the side of the powder space".

Accordingly, it can be said that the Cited Invention has a member corresponding to "a powder chamber (2) which defines a powder space capable of being filled with a powder-shaped constituent material" of the Invention.

C In the Cited Invention, it is recognized that "the table 41" is moved downward to form "a space capable of discharging the metal powder M," and "the table 41" is provided in the inside of "the space". Further, "the upper surface of the table 41 is a flat surface, onto which the metal powder M is discharged and placed," and "the upper surface" forms a bottom portion of "the space". Then, "the table 41" "is supported by the slider 42," "the driving of the drive part 45" "moves the slider 42 in the vertical direction, thereby vertically moving the table 41" relatively to "a member becoming a wall defining the side" of "the space". Accordingly, "a table 41" of the Cited Invention corresponds to "a carrier (4) which is provided in a powder space (3), defines the powder space (3) on a bottom portion side, and is supported so as to move relative to the powder chamber (2)" of the Invention.

D "A magnetic sensor 46" and "a magnetic scale 47" of the Cited Invention are "apparatuses" provided to "measure a position of the table 41," and correspond to "a position detection device (6) that is provided for detecting a position of the carrier (4)" of the Invention.

2 Summarizing the comparison results of A to D of 1 above, corresponding features and different features between the Invention and the Cited Invention are as follows.

[Corresponding Feature]
"An apparatus for additive manufacturing of a three-dimensional object comprising: a powder chamber which defines a powder space capable of being filled with a powder-shaped constituent material; a carrier which is provided in a powder space, defines the powder space on a bottom portion side, and is supported so as to move relative to the powder chamber; and a position detection device that is provided for detecting a position of the carrier".
[Different Feature 1]

The Invention is "a powder module (1) for an apparatus for additive manufacturing of a three-dimensional object" comprising "a powder chamber (2)," "a carrier (4)," and "a position detection device (6)," and does not especially require an energy irradiation source for additive manufacturing as an essential component, whereas, in the Cited Invention, "an energy beam irradiation part 2 as a material supply part, a powder supply part 3 as a material supply part and a shaped article placing part 4" are components of "a three-dimensional shaping apparatus 1," and it cannot be said that a specified part among these components is configured as a common member (module) having a set of functions.

[Different Feature 2]

In the Invention, "the position detection device" "is formed as a cable sensor or has at least one cable sensor," whereas, in the Cited Invention, it is formed by "a magnetic sensor 46" and "a magnetic scale 47".

No. 6 Judgment

Hereinafter, the different features will be examined.

1 Regarding Different Feature 1

In general, modularization of a collection of parts having a certain function is general conventional means widely used regardless of technical field.

Here, regarding "an energy beam irradiation part 2" that is one of the components of "a three-dimensional shaping apparatus 1" of the Cited Invention, in [0018] of Cited Document 1, "the energy beam irradiation part 2" may have a configuration like "the laser irradiation unit" or "the device that emits and guides an electron beam".

Then, although "an energy beam irradiation part 2" of the Cited Invention is positioned as "a material supply part" together with "a powder supply part 3," as described above, considering that the specific constitution of "an energy beam irradiation part 2" may be configured as various devices such as optical means and electronic means, it is an obvious design change for a person skilled in the art to select and adopt modularization, which is a common technique, and separately configure "an energy beam irradiation part 2" and "a powder supply part 3" which are positioned as "a material supply part", as independent components, and it cannot be recognized as special.

Therefore, in the Cited Invention, it could have been easily conceived by a person skilled in the art to recognize "a powder supply part 3" and "a shaped article placing part 4" as a common member having a set of functions except for "an energy beam irradiation part 2" that may be configured as various devices, thereby modularizing them and configuring them as "a powder module" as in the Invention.

2 Regarding Different Feature 2

As described in Cited Document 2 to Cited Document 4, it is a matter of well-known art to attach a wire to one end of the object, configure the other end of the wire to be wound by a winding drum, detect a rotation angle of the winding drum corresponding to the unwinding amount of the wire, and use a sensor for detecting the displacement amount of the object from the unwinding amount (corresponding to "a cable sensor" of the Invention), in order to detect a position of an object displacing on a straight line.

Further, in [0033] of Cited Document 1, it is described that the magnetic sensor 46 is an example of a measurement part, and in addition to this example, an optical position sensor, an ultrasonic wave sensor, a motor encoder, and the like may be used. As described above, considering that the measurement part of the Cited Invention is not particularly limited to the magnetic sensor 46, in Cited Document 1, it could have been easily conceived by a person skilled in the art to configure it as "a cable sensor" as in the Invention, instead of the magnetic sensor 46 as a measurement part by adopting the well-known art mentioned above.

3 Regarding the functions and effects

Even if comprehensively considering the different features mentioned above, the functions and effects exerted by the Invention merely fall within a scope that can be predicted from the functions and effects exerted by the Cited Invention and the well-known art, and cannot be recognized as particularly distinguishing effects.

4 Summary of Judgment

Therefore, the Invention could have been easily invented by a person skilled in the art, on the basis of the Cited Invention and the well-known art.

No. 7 Appellant's allegation

The Appellant alleged in the written request for appeal that "It is necessary to use a sensor whose detection performance is not prevented by powder, in a powder module used in a situation handling a powder-shaped constituent material. Since detection performance of a magnetic sensor is not prevented by the existence of powder, a magnetic sensor is used in the invention described in Cited Document 1. Therefore, like the invention described in Cited Document 1, in the situation handling a powder-shaped constituent material, a person skilled in the art cannot have the motivation to replace the magnetic sensor intentionally used so as not to be prevent the detection performance by powder, with another sensor".

Considering this point, in [0033] of Cited Document 1, it is described "The magnetic sensor 46 is an example of a measurement part. In addition to this example, the measurement part may alternatively be an optical position sensor that detects a distance by attaching a light emitting part to one of the slider 42 and the support frame 11, and attaching a light receiving part to the other one of them, or an ultrasonic wave sensor. Preferably, one of them is attached to the reference frame 12 and the other is attached to the slider 42. Preferably, these sensors are respectively attached so as to correspond to the support positions of the first ball screw 43a, the second ball screw 43b, the third ball screw 43c, and the fourth ball screw 43d. Further alternatively, a motor rotation angle is converted into a stroke amount by a motor encoder and the like that is not shown, which may be used together with the magnetic sensor 46 to detect position in detail". As a measurement part, not limited to the magnetic sensor, an optical position sensor, an ultrasonic wave sensor, a motor encoder, and the like may be used, and the change of the measurement part is expected. Therefore, the Applicant's allegation that there is no motivation to change the measurement part from the magnetic sensor cannot be accepted.

No. 8 Closing

As described above, since the Appellant should not be granted a patent for the Invention under the provisions of Article 29(2) of the Patent Act, the Application should be rejected without examining the inventions relating to other claims.

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

August 20, 2020

Chief administrative judge: OKADA, Yoshimi
Administrative judge: NAKAZAWA, Shingo
Administrative judge: HAMANO, Takashi