Patent Right	Date	March 28, 2022	Court	Intellectual Property High Court, Fourth Division
	Case number	2021 (Gyo-Ke) 10063		
- A case in which the court determined that in consideration of the statements in the description, the statement of the claims cannot be considered to be unclear to the extent that it causes unpredictable damage to third parties. - A case in which the court determined that the statement of the detailed explanation of the invention in the description is clear and sufficient enough to enable a person skilled in the art to work the invention stated in the claims without the need to go through an excessive trial and error process, etc. and is thus not in violation of the enablement requirement. - A case in which the court determined that the JPO decision contains no error in its determination concerning common features and differences between the primary prior art found in the JPO decision and the invention in question and determination concerning whether a person skilled in the art could have easily conceived of the invention.				

Case type: Rescission of Trial Decision to Maintain
Result: Dismissed
References: Article 29, paragraph (2), Article 36, paragraph (4), item (i), and Article 36, paragraph (6), item (ii) of the Patent Act

Summary of the Judgment

1. The outline of the case is as follows.
(1) The Defendant filed a patent application for an invention titled "Method of hanging and spreading a body to be hung and spread, such as an indoor net, and the device related thereto" (Patent Application No. 2004-101282; priority claim: July 17, 2003; priority number: Patent Application No. 2003-297966; priority country: Japan; hereinafter referred to as the "Application") on March 3, 2004, and received the registration of establishment of a patent right (Patent No. 3598508; number of claims: 4; hereinafter this patent is referred to as the "Patent") on September 24, 2004.
(2) On December 11, 2019, the Plaintiff filed a request for a trial for patent invalidation seeking the invalidation of the Patent (Invalidation Trial No. 2019-800107).

On April 6, 2021, the JPO rendered a decision stating as follows (hereinafter referred to as the "JPO Decision"): "The patent for the invention claimed in Claim 4 of Patent No. 3598508 shall be invalidated. The request for a trial in relation to the

inventions claimed in Claims 1 to 3 of Patent No. 3598508 is groundless." The certified copy of the JPO Decision was served to the Plaintiff on April 15, 2021.
(3) On May 12, 2021, the Plaintiff filed this lawsuit to seek the rescission of part of the JPO Decision stating that "The request for a trial in relation to the inventions claimed in Claims 1 to 3 of Patent No. 3598508 is groundless."
2. As grounds for the rescission of the JPO Decision, the Plaintiff alleged [i] an error in the determination concerning violation of the clarity requirement (Ground for Rescission 1), [ii] an error in the determination concerning violation of the enablement requirement (Ground for Rescission 2), and [iii] an error in the determination concerning lack of an inventive step (Ground for Rescission 3).
3. In this judgment, the court instructed as follows and dismissed the Plaintiff's claim.
(1) Ground for Rescission 1 (excerpt of the judgment relating to the invention claimed in Claim 1 (Invention 1))

The statement of the claims pertaining to Invention 1 specifies the adjustment means as means for adjusting the "length corresponding to the distance in the height direction" by a body to be hung and spread or/and the "other end" (floor side) of a lifting wire. In consideration of the statements in the description in question (the "Description"), it is possible to understand that the adjustment means is structured in a manner that it lifts up a body to be hung and spread after the lifting wire is lifted by the distance according to the "length corresponding to the distance in the height direction." Therefore, even if the statement of the claims pertaining to Invention 1 does not specify the specific structure of the adjustment means, it cannot be considered to make it difficult for third parties to understand the content of the invention pertaining to the patent and cannot be considered to be unclear to the extent that it causes unpredictable disadvantage to third parties.
(2) Ground for Rescission 2

A person skilled in the art can easily understand the following: in the structure disclosed in a working example in the Description, when winch 10 is activated after the distance between a pair of cylindrical bodies 15 is adjusted to be the "length corresponding to the distance in the height direction" (L; hereinafter sometimes referred to as the "difference") at the lower end (floor side) of a lifting wire, a stopper 14 and cylindrical bodies 15 move a distance equivalent to the "length corresponding to the distance in the height direction" (L) in conjunction with the upper part of a lifting wire 9 along with the movement thereof, and after that, they abut on a wire insertion body 16 and a body to be hung and spread 12 is engaged with the lifting wire 9; and furthermore, the body to be hung and spread 12 is lifted upward in conjunction with the

upward movement of the lifting wire 9; thereby, the body to be hung and spread 12 is lifted in sequence according to the difference from the standard lifting wire (9b in Fig. 1), and can be hung and spread on a circular-arched ceiling.

In some aspects, the statement of the detailed explanation of the invention in the Description cannot be considered to give full explanation about individual working examples and drawings, but it can be considered to be clear and sufficient enough to enable a person skilled in the art to work the invention stated in the claims without the need to go through an excessive trial and error process, etc.

(3) Ground for Rescission 3

Invention 1 and Exhibit Ko 1 Invention differ in the operation mechanism for lifting a net in a circular-arched shape, and the specification of an adjustment means that causes such difference in operation should be positioned as a difference. Therefore, the determination in the JPO Decision contains no error.

The Plaintiff alleges an error in the determination concerning whether a person skilled in the art could have easily conceived of Invention 1 on the premise that "hanging and spreading a body to be hung and spread, such as a net, by moving lifting wires after adjusting the 'distance in height on a circular-arched ceiling' by adjustment means" falls under a common feature. However, this point does not fall under a common feature but a difference. Therefore, the Plaintiff's allegation is groundless in terms of its premise.

A person skilled in the art cannot easily conceive of Invention 1 by applying the matters stated in Exhibit Ko 2 (Unexamined Patent Application Publication No. 1995-265553) or Exhibit Ko 3 (Unexamined Patent Application Publication No. 1993-187134) to Exhibit Ko 1 Invention. Therefore, the determination in the JPO Decision to the same effect contains no error.

Judgment rendered on March 28, 2022
2021(Gyo-Ke)10063, Case of seeking rescission of the JPO decision
Date of conclusion of oral argument: January 26, 2022

Judgment

Plaintiff: T.N. Net Co., Ltd.

(omitted)

Defendant: Higashidasyoukou Inc.

(omitted)

Main text

1. The Plaintiff's claim shall be dismissed.
2. The Plaintiff shall bear the court costs.

Facts and reasons

No. 1 Claim

Of a decision rendered by the JPO on Invalidation Trial No. 2019-800107 on April 6, 2021, the part stating that "the request for a trial in relation to the inventions claimed in Claims 1 to 3 of Patent No. 3598508 is groundless" shall be rescinded.

No. 2 Outline of the case

1. Procedures at the JPO, etc. (There is no dispute between the parties.)

(1) The Defendant filed a patent application for an invention titled "Method of hanging and spreading a body to be hung and spread, such as a net, in an indoor space and the device related thereto" (Patent Application No. 2004-101282; priority claim: July 17, 2003; priority number: Patent Application No. 2003-297966; priority country: Japan; hereinafter referred to as the "Application") on March 3, 2004, and received the registration of establishment of a patent right (Patent No. 3598508; number of claims: 4; hereinafter this patent is referred to as the "Patent") on September 24, 2004.

(2) On December 11, 2019, the Plaintiff filed a request for a trial for patent invalidation seeking the invalidation of the Patent (Invalidation Trial No. 2019-800107).

On April 6, 2021, the JPO rendered a decision stating as follows (hereinafter referred to as the "JPO Decision"): "The patent for the invention claimed in Claim 4 of Patent No. 3598508 shall be invalidated. The request for a trial in relation to the inventions claimed in Claims 1 to 3 of Patent No. 3598508 is groundless." The certified

copy of the JPO Decision was served to the Plaintiff on April 15, 2021.
(3) On May 12, 2021, the Plaintiff filed this lawsuit to seek the rescission of the part of the JPO Decision stating that "The request for a trial in relation to the inventions claimed in Claims 1 to 3 of Patent No. 3598508 is groundless."
2. Statement of the claims

The claims pertaining to Claims 1 to 3 of the Patent are as follows (hereinafter the inventions claimed in Claims 1 to 3 are referred to as "Invention 1," "Invention 2," and "Invention 3," respectively, and Inventions 1 to 3 are collectively referred to as the "Invention").

[Claim 1]

A method of hanging and spreading a net, etc. in an indoor space wherein a winch wire is moved along a circular-arched ceiling in a tense state by means of a winch and lifting wires which are connected to said winch wire at one end are moved, and thereby, a body to be hung and spread that is provided on the other ends of the lifting wires is hung and spread for the purpose of dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments by means of a body to be hung and spread, such as a net, hanging and spreading a body to be hung and spread for stopping balls when playing a ball sport, or hanging and spreading a basket-shaped body to be hung and spread, which is characterized in that the length corresponding to the distance in the height direction of the aforementioned lifting wires between the position in an arbitrary lifting wire to be attached to the winch wire and the position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire is adjusted in advance by an adjustment means that is provided on the body to be hung and spread and/or at the other end of each of the lifting wires, and then a body to be hung and spread, such as a net, is hung and spread by moving the lifting wires

[Claim 2]

A device for hanging and spreading a net, etc. in an indoor space, which comprises a winch wire that is provided along a circular-arched ceiling, a winch that moves said winch wire in a tense state, and lifting wires which are connected to said winch at one end and are provided with a body to be hung and spread, such as a net, at the other end for the purpose of dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments by means of a body to be hung and spread, such as a net, hanging and spreading a body to be hung and spread for stopping balls when playing a ball sport, or hanging and spreading a basket-shaped body to be hung and spread, which is characterized in that an adjustment means for adjusting the length

corresponding to the distance in the height direction of the aforementioned lifting wires between the position in an arbitrary lifting wire to be attached to the winch wire and the position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire is provided on said body to be hung and spread and/or at the other end of each of the lifting wires

[Claim 3]

A device for hanging and spreading a net, etc. in an indoor space stated in Claim 2 wherein said adjustment means comprises a wire insertion body that is provided on the body to be hung and spread and a stopper that is provided on the lower end of each of the lifting wires that is inserted in said wire insertion body

3. Summary of the JPO Decision (limited to parts related to grounds for rescission)

(1) The summary of the JPO Decision is as follows: [i] as Inventions 1 and 2 cannot be considered unclear, the statements of Claims 1 and 2 in the claims in question satisfy the requirement provided in Article 36, paragraph (6), item (ii) of the Patent Act (clarity requirement); [ii] as the statement of the detailed explanation of the invention in the description attached to the written application for the Application (hereinafter this description, including drawings, is referred to as the "Description") regarding Inventions 1 and 2 is clear and sufficient to enable a person skilled in the art of the inventions to work the inventions, the patent pertaining to Inventions 1 and 2 was granted for an application that satisfies the requirement provided in item (i) of the same paragraph (enablement requirement); [iii] as a person skilled in the art would not have easily been able to make the Invention by applying matters stated in publications that were distributed before the priority date of the Invention, namely Unexamined Patent Application Publication No. 1995-265553 (Exhibit Ko 2; hereinafter referred to as "Exhibit Ko 2 Document"), Unexamined Patent Application Publication No. 1993-187134 (Exhibit Ko 3; hereinafter referred to as "Exhibit Ko 3 Document"), Unexamined Patent Application Publication No. 1992-64829 (Exhibit Ko 4; hereinafter referred to as "Exhibit Ko 4 Document"), and Unexamined Patent Application Publication No. 1992-62326 (Exhibit Ko 5; hereinafter referred to as "Exhibit Ko 5 Document") to the invention stated in Unexamined Patent Application Publication No. 2003-117046 that was distributed before the priority date of the Invention (Exhibit Ko 1; hereinafter referred to as "Exhibit Ko 1 Document"; the relevant invention is hereinafter referred to as "Exhibit Ko 1 Invention"), the patent was not granted for an application that was filed in violation of the provisions of Article 29, paragraph (2) of the same Act. The details of these grounds are as stated in (2) and (3) below.

(2) Exhibit Ko 1 Invention and common features and differences between Invention 1

and Exhibit Ko 1 Invention as found in the JPO Decision are as follows.

A. Exhibit Ko 1 Invention

"A method of hanging and spreading a net in an indoor space wherein a net is hung and spread along a ceiling in a circular-arched shape by providing a winch wire along a substantially circular-arched ceiling in a constantly tense state and by moving multiple lifting wires which are connected to said winch wire at one end and are connected to the net at the other end by automatically moving said winch wire by means of an endless winch that is provided within the indoor space for the purpose of dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments or hanging and spreading a net that is used for stopping balls when playing a ball sport,

wherein each of said lifting wires is attached to the winch wire through a connecting tube, only the connecting tube of the lifting wire that is connected to the winch wire at the top is fixed to the winch wire, each of the other lifting wires is attached to a cylindrical connecting tube that is inserted into the winch wire in a movable manner, and each of the connecting tubes is structured to move the other lifting wires upward by abutting on a stopper that is fixed to the winch wire,

and the positions where said stoppers are fixed to the winch wire are determined based on the distance in the height direction between each of the other lifting wires and the top (L_1, L_2) in a state where the net is placed on the floor of the indoor space and the net moves upward in sequence from its top in a circular-arched shape and can be hung and spread"

B. Common features and differences between Exhibit Ko 1 Invention and Invention 1

<Common features>

"A method of hanging and spreading a net, etc. in an indoor space wherein a winch wire is moved along a circular-arched ceiling in a tense state by means of a winch and lifting wires which are connected to said winch wire at one end are moved, and thereby, a body to be hung and spread that is provided on the other ends of the lifting wires is hung and spread for the purpose of dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments by means of a body to be hung and spread, such as a net, hanging and spreading a body to be hung and spread for stopping balls when playing a ball sport, or hanging and spreading a basket-shaped body to be hung and spread"

<Differences>

In Invention 1, the length corresponding to the distance in the height direction "of the aforementioned lifting wires" between the position in an arbitrary lifting wire to be attached to the winch wire and the position in the standard lifting wire at the top or in

the place closest to the top to be attached to the winch wire is adjusted by an adjustment means that is provided on the "body to be hung and spread and/or at the other end of each of the lifting wires." On the other hand, in Exhibit Ko 1 Invention, the positions where stoppers are fixed to the winch wire are determined based on the distance in the height direction between each of the other lifting wires and the top (L_1, L_2) in a state where the net is placed on the floor of the indoor space.

(3) The summary of the JPO Decision concerning the Plaintiff's allegations is as follows.

A. Concerning violation of the clarity requirement

(A) Concerning the "length corresponding to the distance in the height direction"

Based on the phrase "of the aforementioned lifting wires" in Claim 1 of the Patent, it can be said that the "length corresponding to the distance in the height direction" means the "length" of the "lifting wires." In addition, based on the word "of" in the phrase "'of the aforementioned lifting wires," it can also be said that the same length does not refer to the "overall length" of the lifting wires and that the "length corresponding to the distance in the height direction" refers to part of the "lifting wires." Therefore, it cannot be said that the meaning of the phrase "length corresponding to the distance in the height direction" is unclear. The same also applies to the "length corresponding to the distance in the height direction" in Invention 2 and Invention 3 that cites Invention 2.

(B) Concerning the specific structure of the "adjustment means" in Inventions 1 and 2

In invention 1, it is specified that the "adjustment means" is provided on the "body to be hung and spread and/or at the other end of each of the lifting wires," and is also specified that "the length corresponding to the distance in the height direction… is adjusted in advance by an adjustment means." Therefore, in Invention 1, it is specified that the "adjustment means" is a means that has the capability to adjust the length of the lifting wires. Then, even if the specific structure of the "adjustment means" is not specified in the matters required to identify the invention, if adjustment of the length of the lifting wires is specified as a capability exerted by the adjustment means, the structure of Invention 1 can be understood. In light of this, it cannot be said that Invention 1 is unclear to the extent that it causes unexpected disadvantage to third parties.

B. Violation of the enablement requirement

Based on the matter required to identify the invention, "the length corresponding to the distance in the height direction of the aforementioned lifting wires between the position in an arbitrary lifting wire to be attached to the winch wire and the position in the standard lifting wire at the top or in the place closest to the top to be attached to the

winch wire is adjusted in advance by an adjustment means that is provided on the body to be hung and spread and/or at the other end of each of the lifting wires," in Invention 1, and the matter required to identify the invention, "adjustment means for adjusting the length corresponding to the distance in the height direction of the aforementioned lifting wires between the position in an arbitrary lifting wire to be attached to the winch wire and the position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire … on said body to be hung and spread and/or at the other end of each of the lifting wires," in Invention 2, the "adjustment means" is considered to adjust the "length in the height direction" of the "lifting wires."

(A) Where the "adjustment means" is a "locking body that is provided on a net body"

In consideration of the statement in [0058] in the Description "it is also possible to adjust the length of a lifting wire 9 by providing a body to lock the lifting wire 9 (for example, a detachable clip) on a net body 12," it can be understood that the "length corresponding to the distance in the height direction" is adjusted by adjusting the position where a "locking body provided on the net body" is locked to a lifting wire, and it can thus be considered clear for a person skilled in the art that the "length corresponding to the distance in the height direction" is adjusted by adjusting the position where a "locking body provided on the net body" is locked to a lifting wire. Therefore, it can be said that the Description states the case where the "adjustment means" in Invention 1 is a "locking body that is provided on a net body" to the extent that a person skilled in the art can easily work Inventions 1 and 2.

(B) Where the "adjustment means" is a "locking body that is provided on a lifting wire"

In consideration of the statement in [0058] in the Description "it is also possible to adjust the length of a lifting wire 9 by providing a body to lock the lifting wire 9 (for example, a detachable clip) on a net body 12," it can be understood that the "length corresponding to the distance in the height direction" is adjusted by adjusting the position in a lifting wire where a "locking body provided on a lifting wire" is provided, and it can also be understood that the length of a lifting wire from the position to be attached to the winch wire up to a locking body is adjusted by the position of the locking body.

Therefore, [i] in the case where a "locking body that is provided on a lifting wire" is a locking body that locks the lifting wire and a body to be hung and spread, the "locking body that is provided on a lifting wire" is locked with the part closest to the top of the body to be hung and spread, and it can be said that it is clear for a person skilled in the art that the "length corresponding to the distance in the height direction" is adjusted by adjusting the position where the "locking body that is provided on a

lifting wire" is provided; therefore, it can be said that the detailed explanation of the invention in the Description states the case where the "adjustment means" in Invention 1 is a "locking body that is provided on a lifting wire" and it locks the lifting wire and a body to be hung and spread to the extent that a person skilled in the art can easily work Inventions 1 and 2. [ii] In the case where the "locking body that is provided on a lifting wire" is a locking body that locks the lifting wire itself, it can be understood that the length of a lifting wire 9 up to a net body 12 is adjusted by adjusting the position where a lifting wire 12 that is folded back after passing through the net body 12 is fastened by means of the art that is disclosed in Exhibit Otsu submitted by the respondent (Defendant); therefore, it can be said that the detailed explanation of the invention in the Description states the case where the "adjustment means" in Invention 1 is a "locking body that is provided on a lifting wire" and is a locking body that locks the lifting wire itself to the extent that a person skilled in the art can easily work Inventions 1 and 2.

C. Concerning involvement of an inventive step

(A) Concerning Invention 1

Invention 1 and Exhibit Ko 1 Invention clearly differ from each other in that the subject of adjustment is part "of the lifting wires" in Invention 1 while it is the position where a stopper fixed to the winch wire is fixed in Exhibit Ko 1 Invention. It cannot be considered easy to change the subject of adjustment from "part of the lifting wires" to the position where a stopper is fixed. In Exhibit Ko 1 Invention, each of the lifting wires is attached to the winch wire through a cylindrical connecting tube that is inserted in the winch wire in a movable manner and the connecting tubes are structured to move the lifting wires upward by abutting on stoppers that are fixed to the winch wire, so as to make it possible to divide an indoor space with a circular-arched ceiling into multiple compartments by smoothly hanging and spreading a net and to efficiently hang and spread an easy-to-use net with a circular-arched ceiling. Therefore, there is a disincentive to change the design so as to provide the adjustment means on the "body to be hung and spread and/or at the other end of each of the lifting wires."

Although a mechanism for adjusting the position where a curtain body 2 is rolled up which comprises rings 32 that are provided at the lowest end of the curtain body 2 and weights 33 that are provided at the lowest ends of elevating cords 31 is stated in Exhibit Ko 2 Document, the connecting tubes and stoppers in Exhibit Ko 1 Invention are provided on the winch wire, and they adjust the timing of lifting the lifting wires so that a body to be hung and spread can be hung and spread along a circular-arched ceiling. However, the aforementioned matter stated in Exhibit Ko 2 Document differs in the

position where the adjustment means is provided and also differs in the purpose. Therefore, it cannot be said that there is a motivation to apply the same matter to Exhibit Ko 1 Invention.

Moreover, Exhibit Ko 3 Document also does not state any structure pertaining to the difference.

Therefore, it cannot be said that a person skilled in the art would have easily been able to make Invention 1 based on the matters stated in Exhibit Ko 1 to Ko 3 Documents.

(B) Concerning Invention 2

Invention 2 was created by changing the category of invention from a "method of hanging and spreading a net, etc. in an indoor space" of Invention 1 to a "device for hanging and spreading a net, etc. in an indoor space." Therefore, for the same reason as Invention 1, it cannot be said that a person skilled in the art would have easily been able to make Invention 2 based on the matters stated in Exhibit Ko 1 to Ko 3 Documents.

(C) Concerning Invention 3

Invention 3 was created by further limiting the "method of hanging and spreading a net, etc. in an indoor space" of Invention 2. Therefore, for the same reason as Invention 1, it cannot be said that a person skilled in the art would have easily been able to make Invention 3 based on the matters stated in Exhibit Ko 1 to Ko 5 Documents.

(omitted)

No. 4 Judgment of this court

1. Concerning matters stated in the Description, etc.

The Description (Exhibit Ko 12) contains statements as indicated in Attachment 1. According to these statements, it is found that the detailed explanation of the invention in the Description discloses the following matters in relation to the Invention.

(1) The "present invention" relates to a method of hanging and spreading a body to be hung and spread, such as a net, in an indoor space which is used for surely dividing a large indoor space with a substantially circular-arched ceiling, such as a gymnasium, roofed practice area for rainy weather or roofed ballpark (commonly called domed stadium), into compartments according to the intended use (for example, making multiple tennis courts or other courts or dividing the space into a space for combination practice of infielders and outfielders and a space for batting practice, etc. in baseball practice), stopping balls (preventing balls from flying out into the audience or a neighboring court) when playing a ball sport, or hanging and spreading a basket-shaped net body, and the device related thereto ([0001]).

(2) There is a device for dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments or hanging and spreading a net to stop balls when playing a ball sport, which comprises a winch wire that is provided along a substantially circular-arched ceiling, lifting wires which are connected to said winch wire at one end through a connecting body, a winch for moving the winch wire, and a net body that is connected to the other ends of the lifting wires, wherein connecting bodies are structured to move along the winch wire according to the distance from the top. Such device for hanging and spreading a net had the following disadvantage: as connecting fittings move along a winch wire that is provided on a circular-arched ceiling, it is necessary to provide at least two stoppers on each lifting wire to stop the movement of the connecting fittings according to the distance from the top; as the work to adjust the stoppers (especially, fine adjustment that is conducted after the installation of the winch wire) must be conducted on the ceiling side, it is necessary to conduct the work using a crane car, etc. indoors; therefore, a high cost is required and the adjustment work becomes cumbersome. In addition, the device also had the following problems: in the case of changing the state of hanging and spreading of a net body on the ceiling side, for example, to be horizontal to the floor, it is necessary to change the positions to attach the connecting fittings on a case-by-case basis, and relevant work must also be conducted on the ceiling side and is cumbersome; in addition, maintenance work is also cumbersome ([0006], [0008], and [0009]).

(3) The "present invention" solves such problems of the conventional structure, and it is designed to make it possible to easily and safely make fine adjustment of lifting wires and to safely conduct maintenance work ([0010]).

(4) In the device for hanging and spreading a net, etc. in an indoor space, such as a gymnasium, of the "present invention," only the winch wire moves on the ceiling. Therefore, when hanging and spreading or storing a net body, fewer breakdowns and troubles occur in the device compared to conventional devices. In addition, as the adjustment means is provided on a body to be hung and spread, such as a net, and/or on the lower end (floor) side of each of the lifting wires, it is possible to easily conduct maintenance, etc. only by lifting down a body to be hung and spread, such as a net, to the floor side. Moreover, as the adjustment means has a simple structure and is provided on a body to be hung and spread, such as a net, and/or on the lower end (floor) side of each of the lifting wires, it is possible to shorten required time and reduce required steps in the case of installing the device indoors ([0024] to [0026]).

2. Concerning matters stated in Exhibit Ko 1 Document

(1) Exhibit Ko 1 Document contains statements as indicated in Attachment 2. According

to these statements, it is found that the same document discloses as follows.
A. The present invention relates to a method of hanging and spreading a net in an indoor space, which is used for dividing a large indoor space of which the ceiling is formed in a substantially circular-arched shape, such as a gymnasium, into compartments according to the intended use or surely hanging and spreading a net that is provided when playing a ball sport, and the device related thereto ([0001]).
B. In the case of dividing a large indoor space of which the ceiling is in a substantially circular-arched shape (arch-like shape), such as a gymnasium, roofed practice area for rainy weather or roofed ballpark (commonly called domed stadium), into compartments according to the intended use and smoothly using those compartments at the same time or securing safety by stopping balls when playing a ball sport, the indoor space is sometimes divided into compartments by means of a net and is used. However, in the past, when hanging and spreading a partition net to be used, employed procedures were as follows: first placing the net on the floor of the indoor space, attaching a winch wire to the net, attaching said winch wire from one side to the other side of the periphery of the ceiling, and then hanging and spreading the net in a linear manner by moving the winch wire in a tense state by means of an automatic or wind-up winch, and dividing the indoor space by attaching no net to the circular-arched part above the net hung and spread or by providing a net fixed in advance to that part. When detaching a net that was hung and spread, the net was detached by first loosening the tensed winch wire by means of an automatic or wind-up winch and then hanging the winch wire to the floor ([0002] to [0004]).
C. Such conventional method had the following disadvantages: as it took a long time (several hours) and a great deal of labor to hang and spread a net in a large indoor space, such as gymnasiums and roofed (domed) ballparks, which are recently getting larger, a lot of preparation was required to hang and spread a net and work efficiency was low; in addition, regarding a net to be provided on the circular-arched ceiling part, it interfered with the use of the entire indoor space, and if the net was not attached to said part, balls were likely to fly out into another compartment through the part and the indoor space could not be surely divided into compartments ([0005] and [0006]).
D. The present invention is intended to provide a method of hanging and spreading a net in an indoor space, which makes it possible to easily and smoothly hang and spread a net in all types of indoor space, such as a gymnasium or roofed (domed) ballpark, for the purpose of dividing the space into compartments or stopping balls, and in particular, to divide such space into compartments along the circular-arched shape of the ceiling by means of a net, and a device related thereto ([0007]).

(2) Then, putting together [Claim 1], statements in [0014] to [0018] and [0021] to [0023] in the [Detailed explanation of the invention], and [Fig. 1] to [Fig. 4] in Exhibit Ko 1 Document, it is found that the same document states Exhibit Ko 1 Invention as found in the JPO Decision.

3. Concerning Ground for Rescission 1 (error in the determination concerning violation of the clarity requirement)

(1) The statement of the claims of a patent application is required to comply with the requirement that "the invention for which a patent is sought is clear" (Article 36, paragraph (6), item (ii) of the Patent Act). The purport of this requirement is considered to be based on the idea that the patent system is intended to encourage inventions through promoting the utilization of inventions by protecting inventions for patentees through granting patent rights, which are exclusive rights, to persons who disclose inventions and by having third parties understand the content of patented inventions, thereby contributing to the development of industry. In consideration of such purport, compliance with the requirement referred to in the same item should be determined from the perspective of whether or not the statement of the claims is clear to the extent that it does not cause unpredictable damage to third parties in light of the details of the statement of the claims, statements in the Description, and common general technical knowledge at the time of the filing of the application.

Hereinafter, determinations are made on the premise of the above.

A. Concerning Invention 1

Invention 1 is a method of hanging and spreading a net, etc. in an indoor space wherein a winch wire is moved along a circular-arched ceiling in a tense state by means of a winch, and lifting wires which are connected to said winch wire at one end are moved, and thereby, a body to be hung and spread that is provided on the other ends of the lifting wires is hung and spread for the purpose of hanging and spreading a body to be hung and spread, such as a net, in an indoor space with a circular-arched ceiling, such as a gymnasium, which has the following matters required to identify the invention: the length corresponding to the distance in the height direction [iv] of the aforementioned lifting wires [i] between the position in an arbitrary lifting wire to be attached to the winch wire [ii] and the position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire [iii] is adjusted in advance by an adjustment means that is provided on the body to be hung and spread and/or at the other end of each of the lifting wires [v], and then a body to be hung and spread, such as a net, is hung and spread by moving the lifting wires.

Here, according to [0037], [0040], and [Fig. 1] in the Description as well as the

statement of the claims, the "length corresponding to the distance in the height direction" refers to part of the lifting wire, and it can be considered as the length corresponding to the distance in the height direction between the "position in an arbitrary lifting wire to be attached to the winch wire" and the "position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire." That is, in [Fig. 1], the length corresponding to the distance in the height direction ([iv] above) between the position in a lifting wire 9a to be attached to the winch wire ([ii] above) and the position in the standard lifting wire 9a in the place closest to the top to be attached to the winch wire ([iii] above) can be considered as L_1.

According to [0031], [0032], and [Fig. 1] in the Description as well as the statement of the claims, the "adjustment means" can be considered to refer to a means for adjusting the "length corresponding to the distance in the height direction" of the lifting wires by a body to be hung and spread and/or at the other end of each of the lifting wires. In [Fig. 1], it can be understood that there is a means for adjusting L_1, which is the "length corresponding to the distance in the height direction," on the floor side of a lifting wire ([v] above). According to [0040] and [0041] in the Description, it can be understood that the adjustment means is structured to lift up a body to be hung and spread after the lifting wires are lifted by the distance (L_1, L_2) according to the adjusted "length corresponding to the distance in the height direction."

Then, it is specified in the claims pertaining to Invention 1 that the adjustment means is a means for adjusting the "length corresponding to the distance in the height direction" by a body to be hung and spread and/or at the "other end" (floor side) of each of the lifting wires. In consideration of the statements in the Description, it can be understood that the adjustment means is structured to lift up a body to be hung and spread after the lifting wires are lifted by the distance according to the "length corresponding to the distance in the height direction." Therefore, even if the statement of the claims pertaining to Invention 1 does not specify the specific structure of the adjustment means, it cannot be considered to make it difficult for third parties to understand the content of the invention pertaining to the patent and cannot be considered unclear to the extent that it causes unpredictable disadvantage to third parties. Therefore, Invention 1 satisfies the clarity requirement.

B. Concerning Invention 2

Invention 2 is a device for hanging and spreading a net, etc. in an indoor space which comprises a winch wire that is provided along a circular-arched ceiling, a winch that moves said winch wire in a tense state, and lifting wires which are connected to said winch wire at one end and are provided with a body to be hung and spread, such

as a net, at the other end for the purpose of dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments by means of a body to be hung and spread, such as a net, hanging and spreading a body to be hung and spread for stopping balls when playing a ball sport, or hanging and spreading a basket-shaped body to be hung and spread, and which has the following matters required to identify the invention: an adjustment means for adjusting the length corresponding to the distance in the height direction [v] of the aforementioned lifting wires [ii] between the position in an arbitrary lifting wire to be attached to the winch wire [iii] and the position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire [iv] is provided on said body to be hung and spread and/or at the other end of each of the lifting wires [i]. As mentioned in A. above, the "length corresponding to the distance in the height direction" that is to be adjusted by the adjustment means refers to part of the lifting wires in consideration of the statements in the Description, etc., and it can be considered as the length corresponding to the distance in the height direction between the "position in an arbitrary lifting wire to be attached to the winch wire" and the "position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire."

Then, it is specified in the claims pertaining to Invention 2 that the adjustment means is a means for adjusting the "length corresponding to the distance in the height direction" by a body to be hung and spread and/or at the "other end" (floor side) of each of the lifting wires. As mentioned in A. above, in consideration of the statements in the Description, it can be understood that the adjustment means is structured to lift up a body to be hung and spread after the lifting wires are lifted by the distance according to the "length corresponding to the distance in the height direction." Therefore, even if the statement of the claims pertaining to Invention 2 does not specify the specific structure of the adjustment means, it cannot be considered to make it difficult for third parties to understand the content of the invention pertaining to the patent and cannot be considered unclear to the extent that it causes unpredictable disadvantages to third parties. Therefore, Invention 2 satisfies the clarity requirement.

C. Concerning Invention 3

Invention 3 is an invention created by limiting the adjustment means in Invention 2 to one that comprises "a wire insertion body that is provided on the body to be hung and spread and a stopper that is provided on the lower end of each of the lifting wires that is inserted in said wire insertion body." As long as the clarity requirement is satisfied in relation to the adjustment means in Invention 2 as mentioned in B. above, it can also be said that Invention 3 satisfies the clarity requirement.

(2) On the other hand, as mentioned in No. 3, 1.(1)A. above, the Plaintiff alleges that the Invention does not satisfy the clarity requirement as the claims pertaining to the Invention contain neither statement of the specific structure of the adjustment means for adjusting the "length corresponding to the distance in the height direction" nor statement of a method for adjusting the "length corresponding to the distance in the height direction." However, as instructed in (1) above, it is not necessary to state the specific structure, etc. of the adjustment means as alleged by the Plaintiff in the statement of the claims. Therefore, the Plaintiff's allegation pertaining to this point is groundless.

In addition, as mentioned in No. 3, 1.(1)B. above, the Plaintiff alleges as follows: [A] a mechanism for forming a circular-arched shape is not clear; [B] the adjustment methods of the adjustment means in Working Examples 2 and 3 alleged by the Defendant are not clear; [C] a structure for producing the function and effect of "adjusting the folded state of a net when lifting the net while folding it in sequence" is not stated in the claims; [D] a means for solving a problem pertaining to a mechanism wherein a member attached to a lifting wire is locked at a ring-shaped wire insertion body along with the elevation of the lifting wire is not stated in the claims. However, as indicated above, what matters in determining compliance with the clarity requirement is whether or not the statement of the claims is unclear to the extent that it causes unpredictable disadvantage to third parties. Even if a matter pertaining to a detail as alleged by the Plaintiff is not stated, the clarity of the statement of the claims is not denied. In the first place, the Plaintiff's allegations can only be considered unreasonable as they include an allegation questioning the clarity of the working examples alleged by the Defendant and an argument mixing up violation of the clarity requirement and violation of the enablement requirement.

(3) According to the above, the statement of the claims pertaining to the Invention complies with the clarity requirement, and Ground for Rescission 1 alleged by the Plaintiff is groundless.

4. Concerning Ground for Rescission 2 (error in the determination concerning violation of the enablement requirement)

(1) The enablement requirement provided in Article 36, paragraph (4), item (i) of the Patent Act requires that the statement of the detailed explanation of the invention in a description is clear and sufficient enough to enable a person skilled in the art of the invention to work the invention stated in the claims without the need to go through an excessive trial and error process, etc. As mentioned in No. 3, 2.(1)B. above, regarding Working Examples 1 to 4 alleged by the Defendant, the Plaintiff alleges a failure to

satisfy the enablement requirement from the perspective of whether or not these working examples can be worked. Therefore, the Plaintiff's allegation can only be considered unreasonable in the first place.

(2) Leaving aside this point, putting together the statement of the claims and the statement of the detailed explanation of the invention in the Description, the "length corresponding to the distance in the height direction" is the length of part of an arbitrary lifting wire and is the length corresponding to the distance in the height direction between the position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire and the position in an arbitrary lifting wire to be attached to the winch wire, and the "adjustment means" that is provided on a body to be hung and spread or the other end of each of the lifting wires is a means for adjusting the "length corresponding to the distance in the height direction" of the lifting wires, and it refers to a structure that lifts up the body to be hung and spread after the lifting wire is lifted by the length corresponding to the distance in the height direction, as instructed in 3.(1)A. above.

Then, regarding a specific structure of the adjustment means, the detailed explanation of the invention in the Description discloses a structure comprising spherical stoppers 14 that are provided at the lower end of each of the lifting wires 9 in a fixed state, cylindrical bodies 15 that are provided above said stoppers 14 while being inserted into the lifting wires 9, and ring-shaped wire insertion bodies 16 that are provided on a net body 12, as one of the modes for carrying out the Invention ([0032] and [0057]). In consideration of [0031], [0037] to [0042], [Fig. 1], [Fig. 2], and [Fig. 4], a person skilled in the art can easily understand the following: in such structure, when a winch 10 is activated after the distance between a pair of cylindrical bodies 15 is adjusted to be the "length corresponding to the distance in the height direction" (L; hereinafter sometimes referred to as the "portion of the difference") at the lower end (floor side) of a lifting wire, a stopper 14 and cylindrical bodies 15 move a distance equivalent to the "length corresponding to the distance in the height direction" (L) in conjunction with the upper part of a lifting wire 9 along with the movement thereof, and after that, a body to be hung and spread 12 is engaged with the lifting wire 9 in abutting contact with a wire insertion body 16; and furthermore, the body to be hung and spread 12 is lifted upward in conjunction with the upward movement of the lifting wire 9; thereby, the body to be hung and spread 12 is lifted in sequence according to the portion of the difference from the standard lifting wire (9b in Fig. 1), and can be hung and spread on a circular-arched ceiling.

Then, in some aspects, the statement of the detailed explanation of the invention in

the Description cannot be considered to give full explanation about individual working examples and drawings, but it can be considered to be clear and sufficient enough to enable a person skilled in the art to work the invention stated in the claims without the need to go through an excessive trial and error process, etc.

(3) Although the Plaintiff makes various other allegations, all of them are just considered unreasonable or unacceptable. It should also be considered clear from Figs. 1 and 2 in Attachment 4 of this judgment that were graphically described by the Plaintiff as the working examples of the Invention that the Plaintiff originally has not correctly understood that the essential part of the Invention (adjustment means for the "length corresponding to the distance in the height direction") is designed to adjust the length of lifting wires, that is, the length corresponding to the distance in the height direction between the position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire and the position in an arbitrary lifting wire to be attached to the winch wire, at the other end (floor side) of the lifting wires. Therefore, the Plaintiff's allegation should be considered to contain an error in its premise.

Moreover, the Plaintiff also alleges as follows: folding a net and adjusting the folded state of the net (Function and Effect [ii]) is stated as the "second means for solving the problem" of the invention in the Description and is stated as the effect of the invention; therefore, it is a matter required to identify the Invention and is a matter subject to the enablement requirement. However, in the Description, the aforementioned Function and Effect [ii] is not stated in the [Problem to be solved by the invention] section but is stated only as one of the functions produced by the means for solving the problem. Therefore, such matter does not become subject to the enablement requirement.

(4) According to the above, the statement of the detailed explanation of the invention in the Description can be considered clear and sufficient enough to enable a person skilled in the art to work the Invention. Therefore, the statement of the detailed explanation of the invention complies with the enablement requirement, and Ground for Rescission 2 alleged by the Plaintiff is thus groundless.

5. Concerning Ground for Rescission 3 (error in the determination concerning lack of an inventive step)

(1) Error in the finding of common features and differences

A. As mentioned in 2.(2) above, it is found that in Exhibit Ko 1 Invention, a winch wire that is provided along the ceiling is provided with "connecting tubes," each of which is connected to each of the lifting wires, and stoppers, which are fixed to the winch wire according to the distance in the height direction between the top and the position where each of the other lifting wires is attached, and a body to be hung and spread (net) is

lifted in a circular-arched shape along the ceiling by changing the timing when each of the lifting wires is moved upward by the abutment of the connecting tubes on the stoppers that are fixed to the winch wire.

On the other hand, as instructed above, in Invention 1, the length of each of the lifting wires is adjusted to become longer by the portion of the difference equivalent to the "length corresponding to the distance in the height direction" between the position in the lifting wires to be attached to the winch wire and the position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire, and thereby, the lifting wires move upward at the same time when the winch is activated; however, part of a body to be hung and spread (net) that is connected to the lifting wire at the top or in the place closest to the top is lifted first and part of the body to be hung and spread (net) that is connected to a lifting wire closer to the top is lifted in sequence, and thereby, the body to be hung and spread (net) is lifted in a circular-arched shape.

As mentioned above, Invention 1 and Exhibit Ko 1 Invention differ in the operation mechanism for lifting a net in a circular-arched shape, and the specification of an adjustment means that causes such difference in operation should be positioned as a difference. Therefore, the determination in the JPO Decision contains no error.

B. On the other hand, as mentioned in No. 3, 3.(1)A. above, the Plaintiff alleges as follows on the premise that the stopper and connecting tube in Exhibit Ko 1 Invention correspond to means for adjusting the length corresponding to the "difference in height at the circular-arched ceiling" and have the same function as the adjustment means in Invention 1: the structure wherein "a body to be hung and spread, such as a net, is hung and spread by moving lifting wires after adjusting the 'difference in height at the circular-arched ceiling' by adjustment means" should be found as a common feature. However, this allegation is just considered as an allegation made in disregard of the fact that the operation mechanisms of Invention 1 and Exhibit Ko 1 Invention differ from each other, and it is thus not acceptable at all.

(2) Error in the determination concerning whether a person skilled in the art could have easily conceived of Invention 1

A. The Plaintiff's allegation of an error in the determination concerning whether a person skilled in the art could have easily conceived of Invention 1 in the JPO Decision as mentioned in No. 3, 3.(1)B.(A) above is based on the premise that "hanging and spreading a body to be hung and spread, such as a net, by moving lifting wires after adjusting the 'difference in height at the circular-arched ceiling' by adjustment means" falls under a common feature. However, as mentioned in (1) above, this point does not fall under a common feature but a difference. Therefore, the Plaintiff's allegation is

groundless in terms of its premise.

B. In addition, regarding the Plaintiff's allegation as mentioned in No. 3, 3.(1)B.(B) above, elevating codes 31 for lifting a curtain body 2 and a structure for lifting a curtain body 2 wherein multiple rings 32 are longitudinally attached at prescribed intervals, into which the elevating cords 31 are inserted, and weight 33 is attached to the lowest end of each of the elevating cords 31 is disclosed in [0037], [0038], and [Fig. 4] (see Attachment 3-1) in Exhibit Ko 2 Document. However, connecting tubes and stoppers, which constitute the adjustment means of Exhibit Ko 1 Invention, are attached to the winch wire on the ceiling, and there is no motivation to apply a matter stated in Exhibit Ko 2 Document, which only discloses a mere mechanism for lifting a curtain body, to Exhibit Ko 1 Invention. In addition, even by applying such structure to Exhibit Ko 1 Invention, a person skilled in the art does not conceive of the difference, the adjustment means in the Invention, that is, a structure wherein the length of an arbitrary lifting wire, that is, the length corresponding to the distance in the height direction (the portion of the difference) between the position where the standard lifting wire is attached to the winch wire and the position where said arbitrary lifting wire is attached to the winch wire, is adjusted in advance at the other end (floor side) of each of the lifting wires.

Next, regarding the adjustment means stated in Exhibit Ko 3 Document, the Plaintiff seems to focus attention on a structure using a member (turn buckle) provided on the net side. However, according to the statement in [0014] in the same document, a turn buckle 12 is attached at the lower end of a wire lock 11 and is designed to make fine adjustment for aligning protective nets in one line. The same document neither states nor suggests a structure pertaining to the difference. Therefore, a person skilled in the art does not conceive of the structure of the adjustment means in Invention 1 even by applying the matter stated in the same document to Exhibit Ko 1 Invention.

(3) According to the above, the JPO Decision contains no error in the finding of common features and differences, and a person skilled in the art cannot easily conceive of Invention 1 by applying the matters stated in Exhibit Ko 2 Document or Exhibit Ko 3 Document to Exhibit Ko 1 Invention. Therefore, the determination in the JPO Decision to the same effect contains no error. Moreover, a person skilled in the art also cannot easily conceive of Invention 2 that is a "device for hanging and spreading a net, etc. in an indoor space," which is characterized in that the adjustment means relating to the "method of hanging and spreading a net, etc. in an indoor space" of Invention 1 is provided thereon, and Invention 3 wherein the adjustment means in the "device for hanging and spreading a net, etc. in an indoor space" of Invention 2 is limited to a structure comprising a wire insertion body and a stopper that are provided on a body to

be hung and spread by applying the matters stated in Exhibit Ko 2 Document or Exhibit Ko 3 Document to Exhibit Ko 1 Invention. Therefore, the determination in the JPO Decision to the same effect contains no error.

Therefore, Ground for Rescission 3 alleged by the Plaintiff is groundless.

6. According to the above, all grounds for rescission alleged by the Plaintiff are groundless. Therefore, the Plaintiff's claim should be dismissed.

Accordingly, the judgment is rendered as indicated in the main text.

Intellectual Property High Court, Fourth Division
Presiding judge: KANNO Masayuki
Judge: NAKAMURA Kyo
Judge: OKAYAMA Tadahiro

(Attachment 1)
[Detailed explanation of the invention]
[Technical field]
[0001]

The present invention relates to a method of hanging and spreading a body to be hung and spread, such as a net, in an indoor space which is used for surely dividing a large indoor space with a substantially circular-arched ceiling, such as a gymnasium, roofed practice area for rainy weather or roofed ballpark (commonly called domed stadium), into compartments according to the intended use (for example, making multiple tennis courts or other courts or dividing the space into compartments according to the type of baseball practice (the case of dividing the space into a space for combination practice of infielders and outfielders and a space for batting practice, etc.), stopping balls (preventing balls from flying out into the audience or a neighboring court) when playing a ball sport, or hanging and spreading a basket-shaped net body, and the device related thereto.

[Background art]
[0002]

In the case of dividing an indoor space, such as a gymnasium, into two (or more) spaces and using them at the same time for a ball sport (a game, practice, etc.), the indoor space is divided into compartments by means of a net body and used for the purpose of smoothly playing a game, doing practice, etc. (preventing balls used in one court from flying out into another court) or for safety.

In this case, a device for hanging and spreading a net, etc. that has been used conventionally comprised multiple wind-up winches that are provided on the side of the indoor space, pulleys that are provided on the ceiling, multiple lifting wires that are hung from the wind-up winches to the floor through the pulleys, and a net body that is attached to said lifting wires for the purpose of hanging and spreading a net body, and the lifting wires were moved by rotating each of the wind-up winches in the reeling direction, and thereby, the net body was hung and spread.

In addition, in the case of detaching a net body, the lifting wires were moved by rotating the wind-up winches in the pullout direction, and thereby, the lifting wires were hung to the floor. Thereby, the net body was detached.

[0003]

Moreover, when hanging and spreading a net for preventing balls from flying out into the audience, in the same manner as above, the net was also hung and spread by straining a wire from one side to the other side of the periphery of the ceiling by means

of wind-up winches after attaching the net to the wires.

[0004]

The manual method as mentioned above had problems relating to the hanging and spreading of a net. For example, as it took a long time (several hours) and a great deal of labor to hang and spread a net in a large indoor space, such as gymnasiums and roofed (domed) ballparks, which are recently getting larger, a lot of preparation was required to hang and spread a net and work efficiency was low. In particular, when hanging and spreading a net by dividing it into multiple parts, additional preparation required time.

[0005]

In particular, in the case of a roofed (domed) ballpark, as the ceiling is in a circular-ached shape, it is necessary to hang and spread a net there by obliquely providing a wire. However, by this method, the circular-arched part cannot be surely divided. Furthermore, the manual method had a disadvantage that it required more labor in the case of hanging and spreading a net on the circular-ached ceiling as a net needed to be obliquely moved.

[0006]

Therefore, a device comprising a winch wire that is provided along a substantially circular-arched ceiling, lifting wires which are connected to said winch wire at one end through a connecting body, a winch for moving the winch wire, and a net body that is connected to the other end of each of the lifting wires, wherein the connecting bodies are structured to move along the winch wire according to the distance from the top, was devised for the purpose of dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments or hanging and spreading a net to stop balls when playing a ball sport (see Patent Document 1).

[0007]

In this device, when the endless winch is activated, the winch wire moves along the circular-arched ceiling, and the lifting wires that are provided on said winch wire move upward.

Then, as the moving distance of each connecting body is determined according to the distance from the top, the lifting wire at the top first lifts up the net body, and for the other lifting wires, only connecting bodies move in a direction opposite to the moving direction of the winch wire according to the distance from the top. After that, the lifting wires lift up the net body in order closer to the top, and thereby, the net body can be hung and spread along the circular-arched top.

[Patent Document] Unexamined Patent Application Publication No. 2003-117046

[Disclosure of the invention]
[Problem to be solved by the invention]
[0008]

However, a device for hanging and spreading a net as mentioned above had the following disadvantage: as connecting fittings move along a winch wire that is provided on a circular-arched ceiling, it is necessary to provide at least two stoppers on each lifting wire to stop the movement of the connecting fittings according to the distance from the top: and the work to adjust the stoppers (especially, fine adjustment that is conducted after the installation of the winch wire) must be conducted on the ceiling side, and it is thus necessary to conduct the work using a crane car, etc. indoors; therefore, a high cost is required and the adjustment work becomes cumbersome.

[0009]

In addition, the device also had the following problems: in the case of changing the state of hanging and spreading of a net body on the ceiling side, for example, to be horizontal to the floor, it is necessary to change the positions to attach the connecting fittings on a case-by-case basis, and relevant work must also be conducted on the ceiling side and is cumbersome; in addition, maintenance work is also cumbersome.

[0010]

The present invention solves such problems of the conventional structure, and it is designed to make it possible to easily and safely make fine adjustment of lifting wires and to safely conduct maintenance work.

[Means for solving the problem]
[0011]

Then, the present invention is a method of hanging and spreading a net, etc. in an indoor space wherein a winch wire is moved along a circular-arched ceiling in a tense state by means of a winch and lifting wires which are connected to said winch wire at one end are thereby moved, and thereby, a body to be hung and spread that is provided on the other ends of the lifting wires is hung and spread for the purpose of dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments by means of a body to be hung and spread, such as a net, hanging and spreading a body to be hung and spread for stopping balls when playing a ball sport, or hanging and spreading a basket-shaped body to be hung and spread in order to achieve the aforementioned purpose, which is characterized in that the length corresponding to the distance in the height direction of the aforementioned lifting wires between the position in an arbitrary lifting wire to be attached to the winch wire and the position in the standard lifting wire at the top or in the place closest to the top to be attached to the

winch wire is adjusted in advance by an adjustment means that is provided on the body to be hung and spread and/or at the other end of each of the lifting wires, and then a body to be hung and spread, such as a net, is hung and spread by moving the lifting wires.

[0013]

In addition, specifically, in a device for hanging and spreading a net, etc. in an indoor space which comprises a winch wire that is provided along a circular-arched ceiling, a winch that moves said winch wire in a tense state, and lifting wires which are connected to said winch wire at one end and are provided with a body to be hung and spread, such as a net, at the other end for the purpose of dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments by means of a body to be hung and spread, such as a net, hanging and spreading a body to be hung and spread for stopping balls when playing a ball sport, or hanging and spreading a basket-shaped body to be hung and spread, an adjustment means for adjusting the length corresponding to the distance in the height direction between the position in an arbitrary lifting wire to be attached to the winch wire and the position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire is provided on said body to be hung and spread and/or at the other end of each of the lifting wires.

[0014]

Furthermore, the adjustment means comprises a wire insertion body that is provided on the body to be hung and spread and a stopper that is provided on each of the lifting wires that protrusively extends from said wire insertion body.

[0016]

In the aforementioned function of the present invention, when dividing a large indoor space, such as a gymnasium or roofed ballpark, by means of a body to be hung and spread, hanging and spreading a body to be hung and spread for stopping balls or using a basket-shaped body to be hung and spread, a body to be hung and spread, such as a net, that is provided on lifting wires is hung and spread by moving a winch wire that is provided along a circular-arched ceiling through activation of a winch that is provided on one or both sides near the periphery of the ceiling and lifting the lifting wires that are provided on said winch wire.

[0017]

On this occasion, a body to be hung and spread, such as a net, is hung and spread with its upper side being along the circular-arched ceiling and its lower side being horizontal to the floor by moving the lifting wires after adjusting the length corresponding to the distance in the height direction between the position in an arbitrary

lifting wire to be attached to the winch wire and the position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire by an adjustment means that is provided on the body to be hung and spread and/or at the other end of each of the lifting wires.

[0018]

Moreover, when lowering a body to be hung and spread, such as a net, it is possible to lower said body to be hung and spread, such as a net, while keeping the lower side (floor side) of the body to be hung and spread horizontal to the floor by moving the winch wire in a direction opposite to the abovementioned direction through activation of the winch in the opposite direction and moving the lifting wires downward in order starting from the standard lifting wire at the top (in order closer to the top).

[0019]

Regarding the storage of a body to be hung and spread, such as a net, if a body to be hung and spread is not to be used for a long period of time, it is detached from the lifting wires after being lowered to the floor and stored.

[0020]

In addition, by the function by the second means for solving the problem, the lifting wires on the upper side of a body to be hung and spread, such as a net, are made to be in a free state by means of an adjustment means that is provided on the upper side of the body to be hung and spread, such as a net, or on the lifting wires, and in this state, the lifting wires are moved further upward from the position where the body to be hung and spread, such as a net, is hung and spread. Thereby, it is possible to store a body to be hung and spread, such as a net, along the circular-arched ceiling by moving it to the ceiling side in a manner to fold it.

[0021]

On this occasion, in the same manner as above, it is possible to adjust the state of folding (vertical width, number of folds, etc.) of the body to be hung and spread, such as a net, through fine adjustment of the adjustment means that is provided on the body to be hung and spread and/or at the other end of each of the lifting wires.

[0022]

Moreover, by providing a stopper of a lifting wire, which is an adjustment means, at the position equivalent to the length corresponding to the distance in the height direction between the position in an arbitrary lifting wire to be attached to the winch wire and the position in the standard lifting wire at the top or in the place closest to the top to be attached to the winch wire, even if the standard lifting wire at the top or in the place closest to the top moves upward (or downward) due to the movement of the winch

wire and lifts (or lowers) a body to be hung and spread, such as a net, an arbitrary lifting wire moves the distance in the height direction within a wire insertion body that is provided on the body to be hung and spread. After that, a stopper abuts on the wire insertion body, and thereby, the relevant part of the body to be hung and spread, such as a net, is lifted (lowered).

[Effect of the invention]

[0024]

As mentioned above, in the device for hanging and spreading a net, etc. in an indoor space, such as a gymnasium, of the present invention, only the winch wire moves on the ceiling. Therefore, the device produces the effect of having fewer breakdowns and troubles when hanging and spreading or storing a net body compared to conventional devices.

[0025]

In addition, as the adjustment means is provided on a body to be hung and spread, such as a net, and/or on the lower end (floor) side of each of the lifting wires, it is possible to easily conduct maintenance, etc. only by lifting down a body to be hung and spread, such as a net, to the floor side.

[0026]

Moreover, as the adjustment means has a simple structure and is provided on a body to be hung and spread, such as a net, and/or on the lower end (floor) side of each of the lifting wires, it is possible to shorten required time and reduce required steps in the case of installing the device indoors.

[0027]

Furthermore, by making the lifting wires on the upper side of a body to be hung and spread, such as a net, be in a free state, the body to be hung and spread, such as a net, can be stored in the state of being folded on the ceiling side. Therefore, it is possible to make indoor compartments more versatile and expand the range of use.

[Best mode for working the invention]

[0028]

The modes for working the device for hanging and spreading a net in an indoor space, such as a gymnasium, of the present invention are explained below based on Figs. 1 to 8.

[0029]

Fig. 1 is an outline explanatory drawing that explains a method of hanging and spreading a net in an indoor space. Fig. 2 is an outline explanatory drawing that indicates a device for hanging and spreading a net. Fig. 3 is an outline side view that

indicates a connecting fitting that connects a winch wire and a lifting wire. Fig. 4 is an outline side view that indicates an adjustment means that is provided on a lifting wire and a net body. Fig. 5 is an outline front view that indicates an adjustment means that is provided on a lifting wire and a net body. Fig. 6 is an outline perspective view that indicates a basket-shaped net body. Fig. 7 is an outline explanatory drawing that indicates the status of storage of a net body. Fig. 8 is an outline explanatory drawing that explains another method of hanging and spreading a net in an indoor space. Fig. 9 is an outline explanatory drawing that explains another method of hanging and spreading a net in an indoor space.

[0030]

A device for hanging and spreading a net in an indoor space 1 is provided on the frame, etc. of a ceiling 2 in an indoor space, such as a gymnasium, and comprises multiple supports 4 … that have lifting pulleys 3 attached on the lower side, pairs of pulleys 5 … that are provided on the upper side of said supports 4, winch wire 7 that is provided between said pulleys 5 and …, a winch 10 that moves said winch wire 7 (in the figures, an endless winch is used; incidentally, the type of the winch 10 is not limited to an endless winch and can be a wind-up winch, etc. and it is freely determined based on the size of an indoor space where the winch is used, the position where the winch is installed, etc.), lifting wires 9 which are connected to said winch wire 7 at one end through a connecting fitting 8 and are wound around lifting pulleys 3, and a net body 12 as a body to be hung and spread that is provided on the other ends of said lifting wires 9.

[0031]

An adjustment means for adjusting the length (L) corresponding to the distance in the height direction between the position in an arbitrary lifting wire 9a to be attached to the winch wire 7 and the position in the standard lifting wire 9b at the top or in the place closest to the top to be attached to the winch wire 7 is provided on said lifting wire 9.

[0032]

Said adjustment means comprises spherical stoppers 14 that are provided at the lower end of each of the lifting wires 9 in a fixed state, cylindrical bodies 15 that are provided above said stoppers 14 while being inserted into the lifting wires 9, and ring-shaped wire insertion bodies 16 that are provided on a net body 12.

[0033]

Regarding the positions where said wire insertion bodies 16 are provided on the net body 12, the wire insertion bodies 16 are provided in line along the longitudinal

direction of the net body 12. The number thereof is not especially limited, but it is necessary to provide them at least on the upper and lower sides of the net body 12.

[0034]

In addition, said stopper 14 may be heavy in order to also serve as a weight. (A structure wherein a weight is separately attached to the lower end side of the net body 12 is also possible.)

[0035]

Said connecting fitting 8 comprises a connecting fitting body 8a, which fixes the forward and backward movement of the winch wire 7 after being inserted therein and is rotatable around said winch wire 7 at that position, and an auxiliary connecting body 8b, which is provided on the side of said connecting fitting body 8a in a rotatable manner, and the auxiliary connecting body 8b is structured in a manner that connecting portions 8c and 8d before and behind it respectively rotate.

[0036]

A method of hanging and spreading a net body 12 in an indoor space with a circular-arched ceiling 2, such as a gymnasium, by means of a device for hanging and spreading a net 1 that is structured as above is explained.

[0037]

When using the aforementioned device 1, first, the other end of each of the lifting wires 9 … is inserted into each of the wire insertion bodies 16 that are provided on the net body 12, and a stopper body 14 … is attached to the end of each of the lifting wires 9 …. After that, the length corresponding to the distance in the height direction between the position in the standard lifting wire 9b at the top or in the place closest to the top to be attached to the winch wire 7 and the position where each of the lifting wires 9a … is attached to the winch wire 7 (L_1, L_2) is adjusted, and said distance is determined by a pair of cylindrical bodies 15.

[0038]

After that, one end of each of the lifting wires 9 … is connected to an auxiliary connecting body 8b … of a connecting fitting 8.

[0039]

If a winch 10 is activated in this state, the winch wire 7 moves between pulleys 5 and … along the circular arch of the ceiling 2 in an endless state (or moves a certain distance back and forth) (direction of the arrow).

[0040]

Then, out of the lifting wires 9 … that are connected to the winch wire 7 through the connecting fittings 8, only the lifting wire 9b at the top first moves upward. On this

occasion, each of the other lifting wires 9a moves a respective distance (L_1, L_2) that was adjusted by the cylindrical bodies 15 within the wire insertion bodies 16 that are provided on the net body 12, respectively.

[0041]

After each of the lifting wires 9a moves a respective adjusted distance (L_1, L_2), the cylindrical bodies 15 stop at the positions of the wire insertion bodies 16 in order starting from the lifting wire 9b that is closest to the top, and the net body 12 is lifted upward.

[0042]

When all the lifting wires 9 lift up the net body 12, the net body 12 can be hung and spread along the circular-arched ceiling 2.

[0043]

In addition, when storing (completely detaching) the net body 12, the winch wire 7 is moved in a direction opposite to the abovementioned direction by activating the winch 10, and the lifting wires 9a … are moved downward in order starting from the lifting wire 9b that is closest to the top. Then, in a state where the net body 12 is lowered to the floor, each of the lifting wires 9 … is pulled out of the wire insertion bodies 16, and the net body 12 is completely detached. Then, only the net body 12 is stored.

[0044]

Moreover, in the case of temporarily storing the net body 12, after the cylindrical bodies 15 are made in a free state in relation to the lifting wires 9, the winch wire 7 is moved in a direction that the lifting wires 9 move upward by activating the winch wire 10. Thereby, the stoppers 14 at the ends of the lifting wires 9 push up the wire insertion bodies 16 while stacking them in sequence. As a result, the net body 12 is further moved up above the position where it is hung and spread and is stored in a folded state along the circular-arched ceiling 2 (see Fig. 7).

[0045]

In this manner, the length corresponding to the distance in the height direction between the position in the standard lifting wire 9b at the top or in the place closest to the top to be attached to the winch wire 7 and the position where each of the lifting wires 9a … is attached to the winch wire 7 in relation to the circular-arched ceiling 2 is adjusted on the side of the net body 12. Therefore, the adjustment (including fine adjustment) is smooth, and maintenance can also be easily conducted.

[0046]

In addition, as the lifting wires 9 are connected to the winch wire 7 through connecting fittings 8 that have multiple rotating portions, they are not tangled with each

other during their movements and thus can move smoothly.

[0050]

Moreover, in the aforementioned working example, the winch wire 7 was moved by one winch 10. However, the number of winches 10 is not limited to one. For example, it is also possible to adopt a structure wherein a winch wire 7 is divided into two at the top and each of the divided winch wires 7 is moved by each of the two winches 10 that are provided on both sides of the ceiling, respectively. In addition, it is also possible to move a winch wire 7 by providing the same number or a fewer number of winches 10 as the number of lifting wires 9 that are provided on the ceiling.

[0051]

For example, it is possible to appropriately hang and spread a net 12 by activating winches 10 without controlling their starting by providing the corresponding number of winches 10 as the number of lifting wires 9 and also providing the adjustment means in the working example on the lower side of each of the lifting wires 9 (see Fig. 8).

[0052]

For example, it is possible to appropriately hang and spread a net 12 by activating winches 10 without controlling their starting by installing, out of multiple lifting wires 9 that are provided along a circular-arched ceiling 2, lifting wires 9 that are at the same height in relation to the ceiling 2 in a manner that they are moved by one winch 10 and providing the adjustment means in the working example on the lower side of each of the lifting wires 9 (see Fig. 9).

[0054]

Moreover, in the aforementioned working example, the winch wire 7 was moved in a substantially circular-arched shape through multiple pulleys 5 that are provided on the ceiling 2. However, in the present invention, the means for moving the winch wire 7 is not limited to this.

[0055]

For example, it is also possible to hang and spread a net body 12 by providing a rail along a circular-arched ceiling 2 and moving pulleys on each of which a lifting wire 9 is provided along said rail. In doing so, it is possible to adjust the state of hanging and spreading of the net body 12 by providing an adjustment means on the lower end side of each of the lifting wires 9.

[0057]

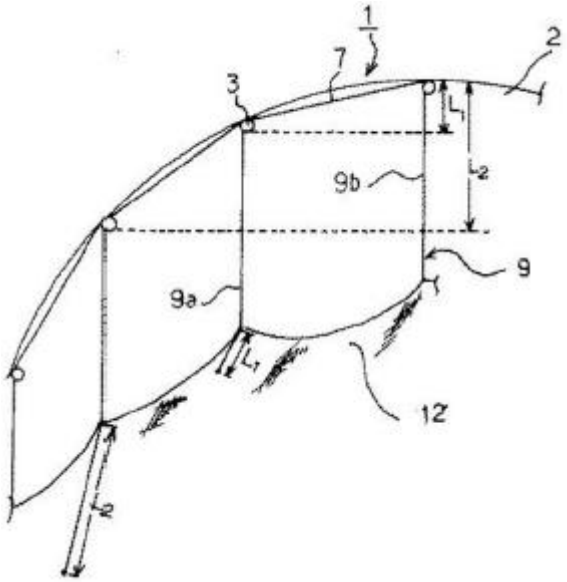
Furthermore, in the aforementioned working example, the adjustment means comprised spherical stoppers 14 that are provided at the lower end of each of the lifting wires 9 in a fixed state, cylindrical bodies 15 that are provided above said stoppers 14

while being inserted into the lifting wires 9, and ring-shaped wire insertion bodies 16 that are provided on the net body 12. However, the adjustment means in the present invention is not limited to this.

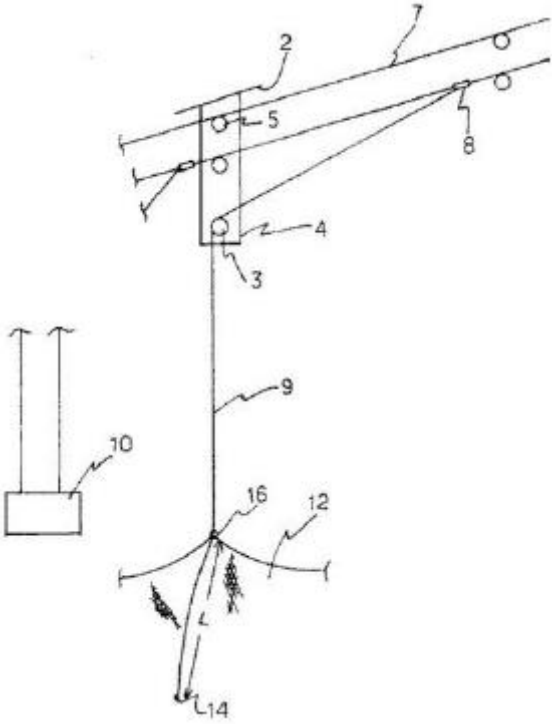
[0058]

For example, it is also possible to adjust the length of a lifting wire 9 by providing a body to lock the lifting wire 9 to a net body (for example, a detachable clip) on the lifting wire 9, and it is also possible to adjust the length of a lifting wire 9 by providing a body to lock the lifting wire 9 (for example, a detachable clip) on a net body 12. In addition, it is also possible to make such adjustment by simply providing wire insertion bodies 16 on a net body 12 and providing spherical stoppers 14 at the lower end of each of the lifting wires 9.

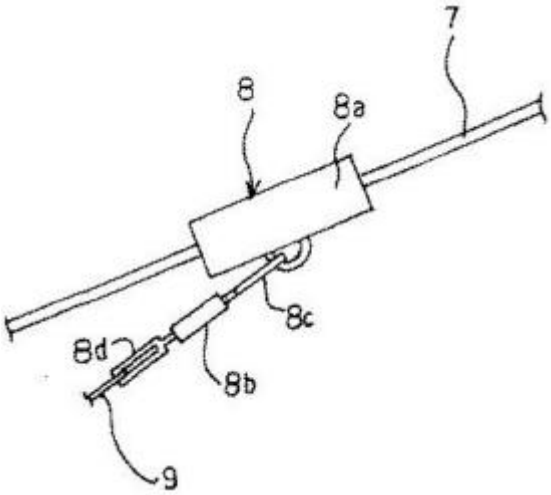
[Fig. 1]



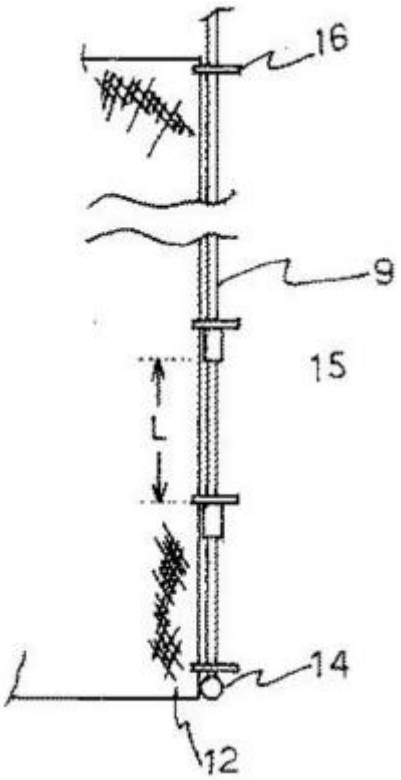
[Fig. 2]



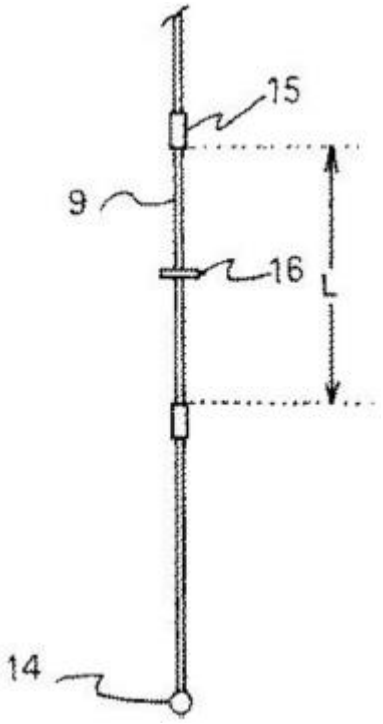
[Fig. 3]



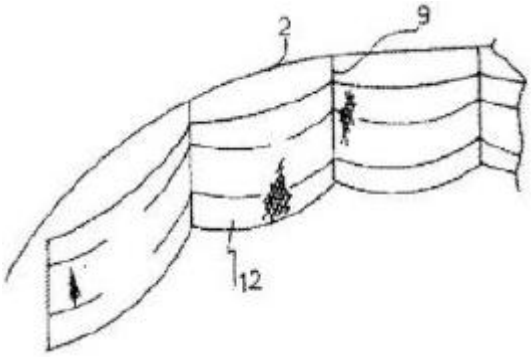
[Fig. 4]



[Fig. 5]

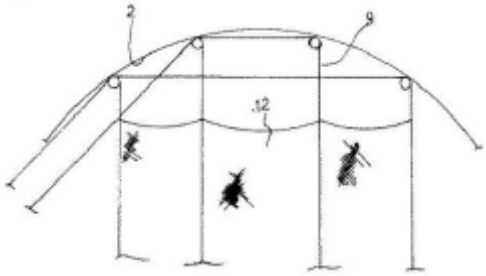


[Fig. 7]



[Fig. 8]

[Fig. 9]



(Attachment 2)

[Claims]

[Claim 1] A method of hanging and spreading a net in an indoor space which is characterized in that a net is hung and spread along a ceiling in a circular-arched shape by providing a winch wire along a substantially circular-arched ceiling in a constantly tense state and by moving multiple lifting wires which are connected to said winch wire at one end and are connected to the net at the other end by automatically moving said winch wire by means of an endless winch that is provided within the indoor space for the purpose of dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments or hanging and spreading a net that is used for stopping balls when playing a ball sport

[Detailed explanation of the invention]

[0001]

[Technical field of the invention] The present invention relates to a method of hanging and spreading a net in an indoor space, which is used for dividing a large indoor space of which the ceiling is formed in a substantially circular-arched shape, such as a gymnasium, into compartments according to the intended use or surely hanging and spreading a net that is provided when playing a ball sport, and the device related thereto.

[0002]

[Prior art] In the case of dividing a large indoor space of which the ceiling is in a substantially circular-arched shape (arch-like shape), such as a gymnasium, roofed practice area for rainy weather or roofed ballpark (commonly called domed stadium), into compartments according to the intended use (for example, the case of making multiple tennis courts or other courts or using the space for baseball practice (such case as dividing the space into a space for combination practice of infielders and outfielders and a space for batting practice, etc.)) and smoothly using those compartments (for playing a game, doing practice, etc.) at the same time (while preventing balls used in one court from flying out into another court) or the case of securing safety by stopping balls (preventing balls from flying out into the audience or a neighboring court, etc.) when playing a ball sport, the indoor space is divided into compartments by means of a net and is used.

[0003] In the past, when hanging and spreading a partition net to be used, employed procedures were as follows: first placing the net on the floor of the indoor space, attaching a winch wire to the net, attaching said winch wire from one side to the other side of the periphery of the ceiling, and then hanging and spreading the net in a linear manner by moving the winch wire in a tense state by means of an automatic or wind-

up winch, and dividing the indoor space by attaching no net to the circular-arched part above the net hung and spread or by providing a net fixed in advance to that part.
[0004] Moreover, when detaching a net that was hung and spread, the net was detached by first loosening the tensed winch wire by means of an automatic or wind-up winch and then hanging the winch wire to the floor.
[0005]
[Problem to be solved by the invention] However, the conventional method as mentioned above had the following disadvantages: as it took a long time (several hours) and a great deal of labor to hang and spread a net in a large indoor space, such as gymnasiums and roofed (domed) ballparks, which are recently getting larger, a lot of preparation was required to hang and spread a net and work efficiency was low.
[0006] In addition, regarding a net to be provided on the circular-arched ceiling part, there was the disadvantage that the net fixed to said part interfered with the use of the entire indoor space, and if the net is not attached to said part, balls were likely to fly out into another compartment through the part and the indoor space could not be surely divided into compartments.
[0007] Therefore, the present invention is intended to provide a method of hanging and spreading a net in an indoor space, which makes it possible to easily and smoothly hang and spread a net in all types of indoor space, such as a gymnasium or roofed (domed) ballpark, for the purpose of dividing the space into compartments or stopping balls, and in particular, to divide such space along the circular-arched shape of the ceiling by means of a net, and a device related thereto.
[0008]
[Means for solving the problem] In terms of Claim 1, the present invention is characterized in that a net is hung and spread along a ceiling in a circular-arched shape by providing a winch wire along a substantially circular-arched ceiling in a constantly tense state and by moving multiple lifting wires which are connected to said winch wire at one end and are connected to the net at the other end by automatically moving said winch wire by means of an endless winch that is provided within the indoor space for the purpose of dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments or hanging and spreading a net that is used for stopping balls when playing a ball sport in order to achieve the aforementioned purpose.
[0009] In addition, as stated in Claim 2, out of the lifting wires, the lifting wire that is connected to the top of the ceiling first moves upward, and the other lifting wires move upward in sequence according to the distance in the height direction between the top and the lifting position of each of the lifting wires on the ceiling.

[0010] Moreover, as stated in Claim 3, the present invention is characterized in that it comprises a guide body that is provided along a substantially circular-arched ceiling, a winch wire that is provided on said guide body, an endless winch that is provided within an indoor space for the purpose of moving said winch wire along the guide body, and multiple lifting wires which are connected to said winch wire at one end and are connected to the net at the other end for the purpose of dividing an indoor space with a circular-arched ceiling, such as a gymnasium, into multiple compartments or hanging and spreading a net that is used for stopping balls when playing a ball sport.

[0011] In addition, as stated in Claim 4, in the present invention, the lifting wires comprise one lifting wire which is connected to the winch wire at one end at the top of a circular arch and other lifting wires which are connected to the winch wire at one end in sequence according to the distance in the height direction from the top. One end of the lifting wire that is connected to the winch wire at the top is fixed to the winch wire, and each of the other lifting wires is fixed to the winch wire through a connecting tube that is inserted into the winch wire in a movable manner. In addition, said connecting tube is structured to move the other lifting wires upward by abutting on a stopper that is fixed to the winch wire according to the distance in the height direction between the top and the lifting position of each of the lifting wires on the ceiling.

[0012] Furthermore, as stated in Claim 5, the other end of each of the lifting wires is inserted into multiple attachment rings that are provided in the height direction of the net and is connected to the lower end of the net.

[0013]

[Function] That is, in the present invention, when dividing a large indoor space, such as a gymnasium or roofed ballpark, into multiple compartments by means of a net or using a net for stopping balls, multiple lifting wires which are connected at one end to a winch wire that is provided on a circular-arched ceiling through a guide body and are connected to the net at the other end are moved upward by automatically moving the winch wire in a constantly tense state by means of an endless winch. Thereby, a net that is connected to the lifting wires can be hung and spread.

[0014] In addition, the lifting wires comprise one lifting wire which is connected at one end to the winch wire at the top of a circular arch and other lifting wires which are connected to the winch wire at one end in sequence. In addition, one end of the lifting wire that is connected to the winch wire at the top is fixed to the winch wire, and each of the other lifting wires is fixed to the winch wire through a connecting tube that is inserted into the winch wire in a movable manner. Each of the connecting tubes is structured to move the other lifting wires by abutting on a stopper that is fixed to the

winch wire according to the distance in the height direction between the top and the positions where the other lifting wires are attached.

[0015] Therefore, in the case of hanging and spreading a net, if the winch wire is moved, the lifting wire which is connected at one end to the winch wire at the top is first lifted at the same time as the movement of the winch wire. Then, the next lifting wire that is closest to the top passes a distance in the height direction between the top and the position where it is attached to the winch wire through the winch wire within the connecting tube and has a stopper fixed to the winch wire abut on the connecting tube. After that, the lifting wire is lifted in response to the movement of the winch wire.

[0016] In this manner, in order closer to the top, each of the subsequent lifting wires passes through the winch wire within a connecting tube and has a stopper that is fixed to the winch wire abut on the connecting tube and is then lifted in sequence in response to the movement of the winch wire in the same manner as above. The net that is connected to the other ends of the lifting wires can be hung and spread along the ceiling in a circular-arched shape.

[0017] In addition, as the other end of each of the lifting wires is inserted into attachment rings that are provided on the net and is connected to the lower end of the net, the net can be stored along the ceiling in a circular-arched shape while being folded at the positions where the attachment rings are provided by further moving the winch wire after hanging and spreading the net.

[0018] In this way, the present invention can divide an indoor space with a circular-arched ceiling into multiple compartments by smoothly hanging and spreading a net and can also efficiently hang and spread a net that is easy to handle and has a circular-arched ceiling.

[0019]

[Mode for working the invention] One of the working examples of a device for hanging and spreading a net in an indoor space, such as a gymnasium, of the present invention is explained in line with drawings.

[0020] Fig. 1 is an outline explanatory drawing that explains a method of hanging and spreading a net in an indoor space. Fig. 2 is an outline explanatory front view that indicates a device for hanging and spreading a net. Fig. 3 is an outline front cross-section view that indicates the elevation of a net by a connecting tube on which a lifting wire is provided and a stopper on which the winch wire is provided. Fig. 4 is an outline front view that indicates the status of a net being elevated by further moving the winch wire indicated in Fig. 3. Fig. 5 is an outline front view that indicates the status of a net being stored.

[0021] A device for hanging and spreading a net 1 comprises an endless winch 3 that is provided on the side of an indoor space 2, a winch wire 5 whose one end is wound around said endless winch 3 and which is provided along a guide body (for example, a pulley or guide rail), which is provided along a circular-arched (arch-like shape) ceiling 2a in the indoor space 2, in a tense state, multiple lifting wires 6 which are connected to said winch wire 5 at one end …, and a net 10 that is provided on the other ends of said lifting wires 6 ….

[0022] Each of said lifting wires 6 is attached to the winch wire 5 through a connecting tube 7, and only for the lifting wire 6a that is connected to the winch wire 5 at the top, the connecting tube 7 is fixed to the winch wire 5 (for example, stoppers 9 are provided before and behind the connecting tube 7). Each of the other lifting wires 6b … is attached to a cylindrical connecting tube 7 that is inserted into the winch wire 5 in a movable manner, and the connecting tube 7 is structured to move the lifting wires 6b upward by abutting on a stopper 9 that is fixed on the winch wire 5.

[0023] The position where said stopper 9 is fixed to the winch wire 5 is determined by the distance in the height direction between each of the lifting wires 6b … and the top (L1, L2, …) in the state of the net 10 being placed on the floor of the indoor space 2. That is, the net 10 moves upward in a circular-arched shape in sequence starting from the top and thereby can be hung and spread.

[0024] Each of said lifting wires 6 has untwisting portions 8 that eliminate the twist of the lifting wire 6 at one end where it is connected to a connecting tube 7 and at the lower end connected to the net 10.

[0025] The other end of each of said lifting wires 6 … is inserted into attachment rings 11 that are longitudinally attached to the net 10 at fixed intervals from the upper end of the net 10 and is connected to the lowest end side of the net 10 through an untwisting portion 8. Incidentally, a sphere 12 is inserted into the lifting wire 6 in the place near the untwisting portion 8, and thereby, it becomes possible to fold the net 10 by abutting the sphere 12 on the attachment rings 11 that are attached to the net 10 when storing the net 10 on the side of ceiling 2a by elevating the lifting wires 6 …. Furthermore, multiple weights 15 … (for example, sandbags) to keep the net 10 horizontal are provided at the lower end of the net 10.

[0026] A method of hanging and spreading a net 10 for dividing an indoor space 2 into compartments by using a device for hanging and spreading a net 1 that is structured as above is explained.

[0027] When using the aforementioned device, a net 10 for dividing a space into compartments is first placed on the floor of an indoor space 2, each of the lifting wires

6 is inserted into attachment rings 11 and is connected to the lowest end side of the net 10 through an untwisting portion 8, and multiple weights 15 are provided at the lower end of the net 10.

[0028] In this state, if an endless winch 3 is activated, a winch wire 5 moves along a circular-arched ceiling, and lifting wires 6 … that are attached to the winch wire 5 move upward. In this upward movement of the lifting wires 6 …, a lifting wire 6a that is located at the center first moves upward, and while keeping a distance in the height direction from the top (L1, L2 …), each of the subsequent lifting wires 6b close to both sides ... passes about the distance (L1) within a connecting tube 7, and then, a stopper 9 that is fixed to the winch wire 5 abuts on said connecting tube 7, and thereby, the lifting wire 6b … moves upward. Furthermore, each of the subsequent lifting wires 6b … moves upward in the same manner. Therefore, the net 10 moves upward from its center according to the shape of the circular-arched ceiling.

[0029] Thereby, the indoor space 2, including the circular-arched ceiling part, can be divided into compartments by means of the net 10.

[0030] In addition, when storing the net 10 that divides the indoor space 2 into compartments, the winch wire 5 is moved by further activating the endless winch 3. Thereby, the lifting wires 6 … are pulled and have spheres 12 abut on attachment rings 11 that are attached to the net 10, and the net 10 is folded at intervals between attachment rings 11 and is stored at the circular-arched ceiling part.

[0031] In this manner, the net 10 can be freely elevated and lowered by providing the winch wire 5 along the ceiling and activating the endless winch 3. Then, by automatically moving the net 10 by means of the endless winch 3, it becomes possible to easily and smoothly divide a large indoor space 2, such as one in many buildings that are now being constructed, into compartments, etc. along the ceiling by means of the net 10.

[0032] In addition, in the aforementioned working example, the other end of each of the lifting wires is inserted into attachment rings that are longitudinally attached to said net at fixed intervals from the upper end of the net and is connected to the lowest end side of the net through an untwisting portion. However, the connection between a lifting wire and a net in the present invention is not limited to this structure. For example, by connecting the other ends of lifting wires on the upper end side of a net, it is also possible to store the net by detaching the other ends of the lifting wires from the upper end side of the net when not using the net.

[0033] Furthermore, in the aforementioned working example, connecting tubes are formed in a cylindrical shape. However, for example, connecting tubes can also be

structured by using a chain.

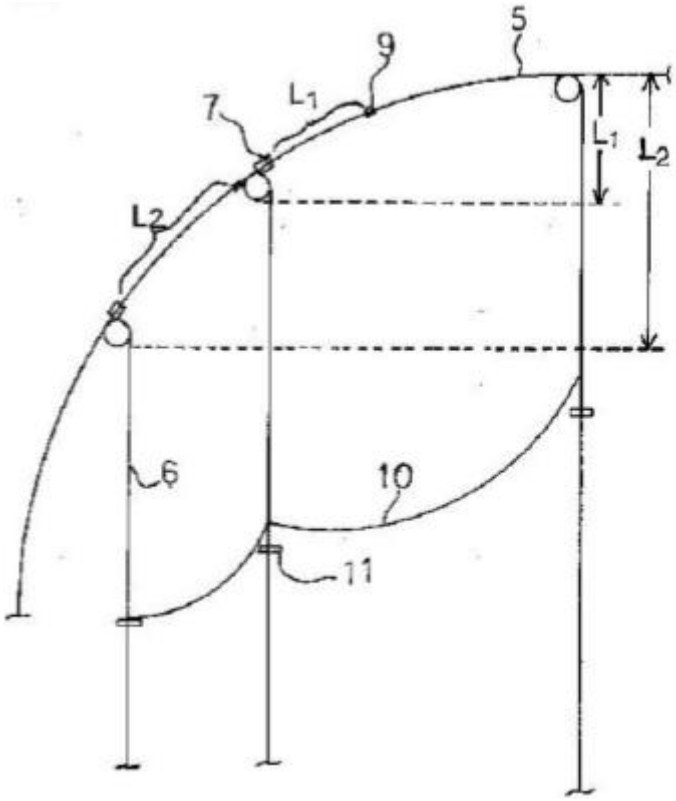
[0034]

[Effect of the invention] As described above, in the method of hanging and spreading a net in an indoor space, such as a gymnasium, and the device related thereto based on the present invention, a winch wire can be automatically moved in a constantly tense state by means of an endless winch. Therefore, the advantage of being able to move and hang and spread a net more easily and smoothly (without requiring labor) in a shorter time than conventional manual methods was achieved.

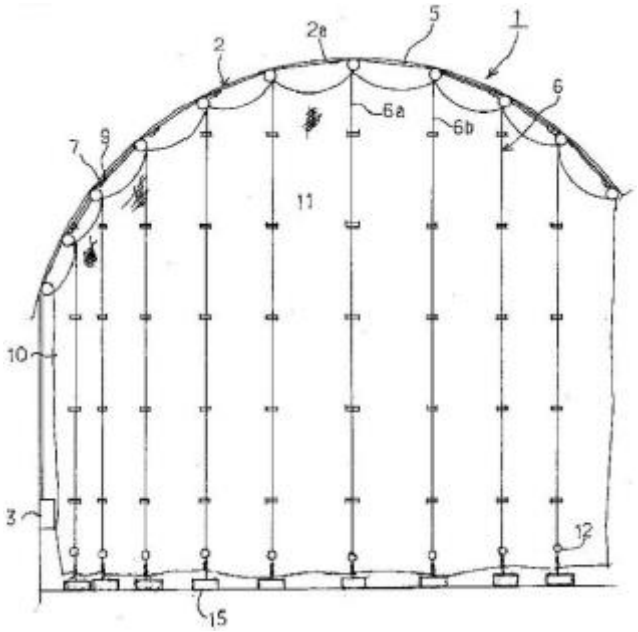
[0035] In addition, it is possible to divide various kinds of indoor spaces (in particular, large indoor spaces) into compartments, and especially, to divide them into compartments up to the ceiling of the arm (circular-arched) part, depending on the positions where lifting wires and winch wire are attached and the method of attaching them. Therefore, the method and device have the advantage of being able to be used more effectively for stopping balls.

[0036] Furthermore, as the structure of the device is simple, the device has the advantage of being able to keep down manufacturing costs and being economical.

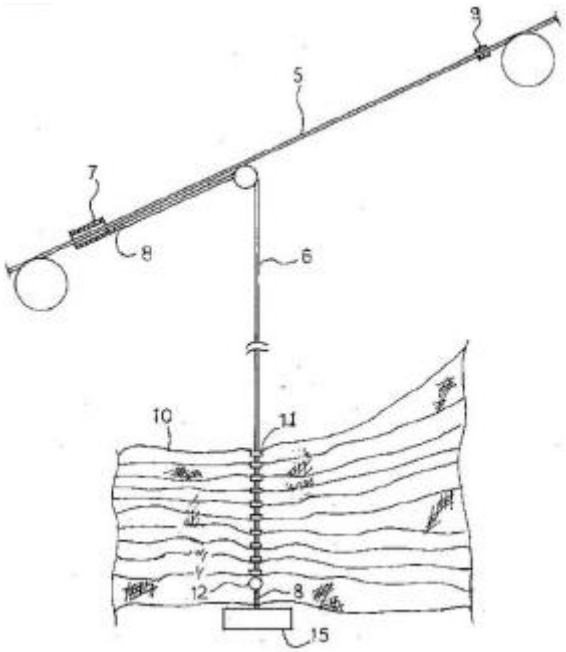
[Fig. 1]



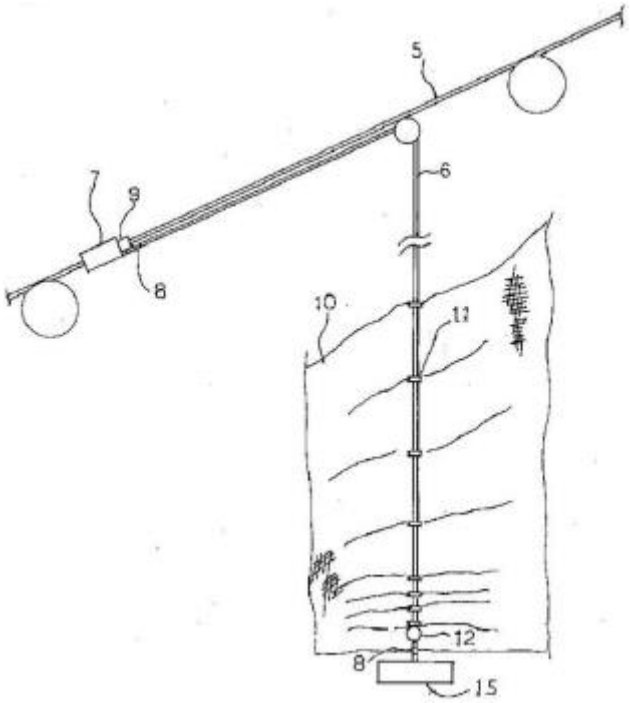
[Fig. 2]



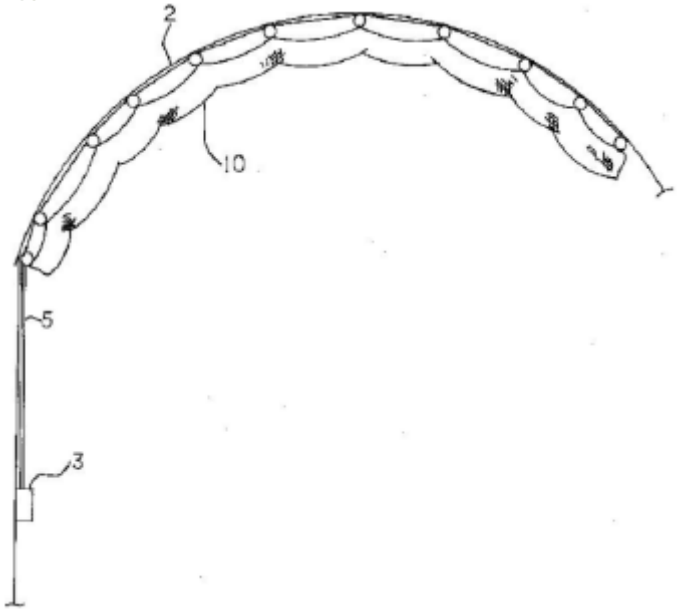
[Fig. 3]



[Fig. 4]



[Fig. 5]



(Attachment 3)

1. Exhibit Ko 2

[0029] … Fig. 1 is an outline view that indicates a curtain body elevating device pertaining to one of the working examples of the present invention. The curtain body elevating device in the present working example comprises a curtain body 2, such as a curtain or stage curtain, whose upper end edge is fixed to a rail 1 that is attached to the top of a window, stage or banquet hall, etc., elevating units 3 that elevate and lower the curtain body 2 through elevating cords 31, and an elevation controller 5 that controls these elevating units 3.

[0033] An elevating cord 31 is pulled out of a drum 35 toward the side of a push-up fitting 43. That is, as indicated in Fig. 3, an elevating cord 31 that is pulled out of a drum 35 passes between a hanging body 42 and a push-up fitting 43, reaches the central part of the lower end of the hanging body 42, and is hanging down through an insertion hole 42b that was drilled at the central part of the lower end. Then, a weight 33 whose diameter is larger than that of the insertion hole 42b is attached at the lower end of this elevating cord 31.

[0034] As an elevating unit 3 has a structure as mentioned above, when a motor 34 is activated and positively rotates, the elevating cord 31 is wound up by the drum 35 and gets elevated. When the weight 33 gets elevated and hits the lower end surface of the hanging body 42, the hanging body 42 is lifted along a slotted hole 42a. Then, when the lower end of the slotted hole 42a hits a support shaft 41, the lifting of the hanging body 42 is stopped. Then, as indicated by a dashed-two dotted line in Fig. 3, the hanging body 42 is subjected to force in the direction toward the elevating cord 31 due to the pullout force of the weight 33, and it is rotated in the direction of arrow A in Fig. 3 while centering around the support shaft 41. As a result of this, as indicated by the dashed-two dotted line, lever 4a of a limit switch 4 is pushed up by the push-up fitting 43, and the limit switch 4 is turned off and the rotation of the motor 34 is stopped.

[0035] In order to surely turn off the limit switch 4 in such manner, it is necessary to pull the elevating cord 31 out of the drum 35 toward the side of the push-up fitting 43, as described above. That is, this is for the following reason: as indicated by a dashed-dotted line in Fig. 3, when an elevating cord 31 is pulled out of the opposite side of a push-up fitting 43, the pullout force of a drum 35 to a weight 33 works in the direction of the elevating cord 31 as indicated by the dashed-dotted line; therefore, a hanging body 42 rotates in the direction of arrow B in Fig. 3 while centering on a support shaft 41, and cannot turn off a limit switch 4.

[0036] In addition, if a drum 35 is reversely rotated by reversely driving a motor 34, an

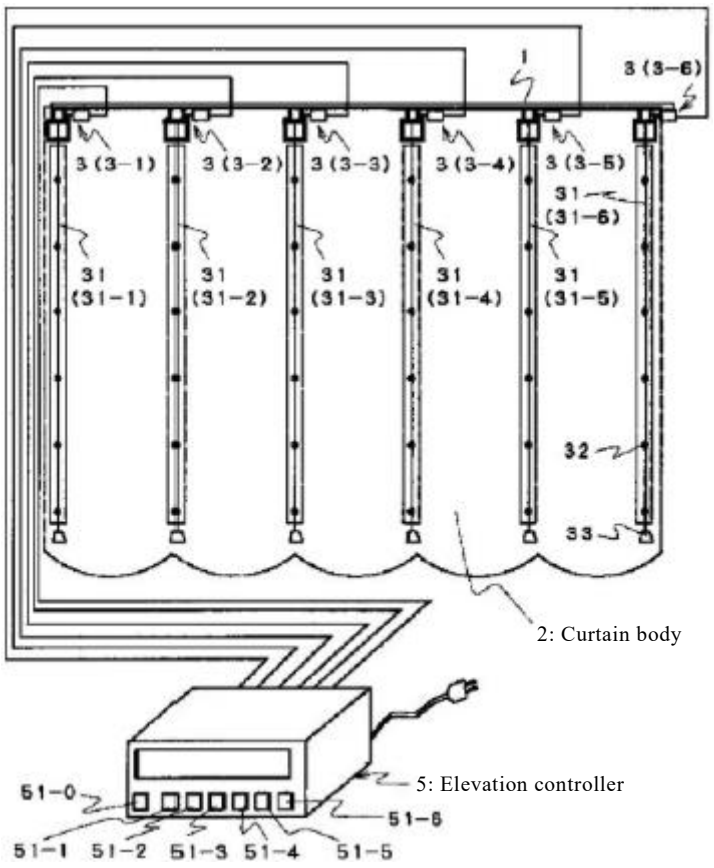
elevating cord 31 is pulled out of the drum 35 and gets lower due to the weight of a weight 33.

[0037] Six elevating cords 31 that are elevated and lowered by elevating units 3 in this manner are inserted into rings 32 that are attached to a curtain body 2 as indicated in Fig. 1. Specifically, as indicated in Fig. 4, multiple rings 32 are longitudinally attached at prescribed intervals on the back side of the curtain body 2 at the positions where elevating cords 31 are hung, and the elevating cords 31 are inserted into these rings 32. Then, a weight 33 is attached to the lowest end of an elevating cord 31.

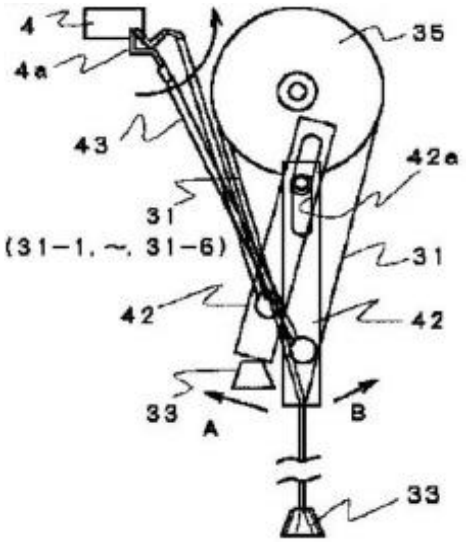
[0038] The internal diameter of a ring 32 is set smaller than the external diameter of a weight 33. Therefore, if an elevating cord 31 is pulled up, a weight 33 gets caught on a ring 32 at the bottom. Thereby, an elevating cord 31 is pulled up, and if a weight 33 is elevated, a curtain body 2 is gradually rolled up from the lower end side.

[0088] As explained above, according to the curtain body elevating device in the present working example, it is possible to freely and easily set and change the positions of elevating cords 31-1 to 31-6 only by operating setting keys 51-1 to 51-6 of an input device 51. Therefore, it is possible to set and change a curtain body 2 to be in a variety of styles.

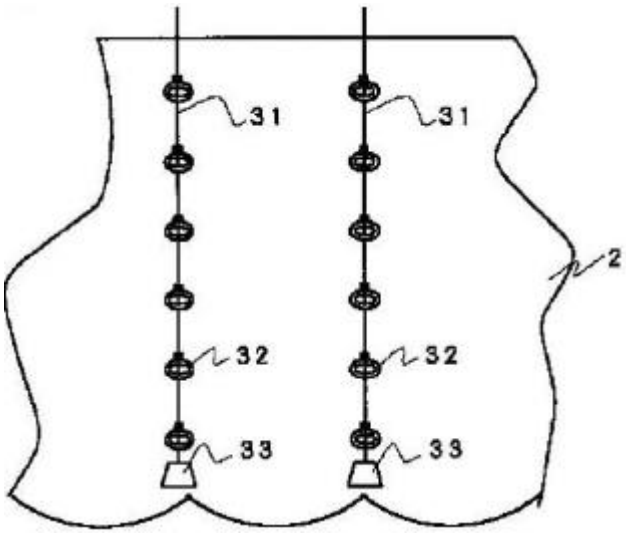
[Fig. 1]



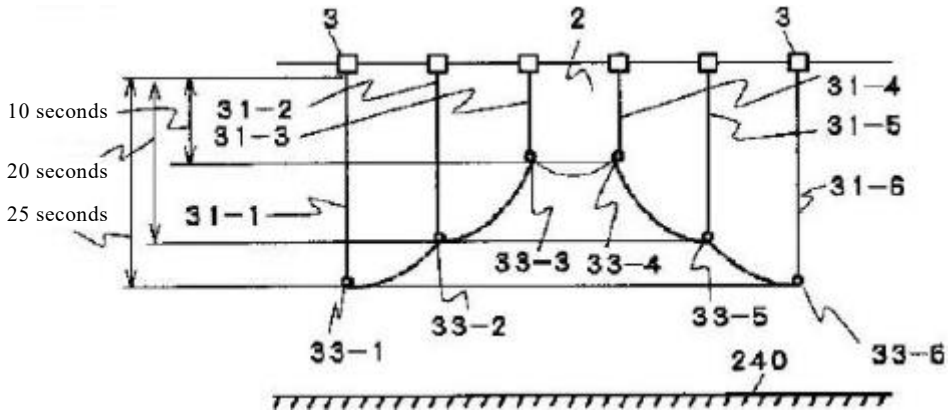
[Fig. 3]



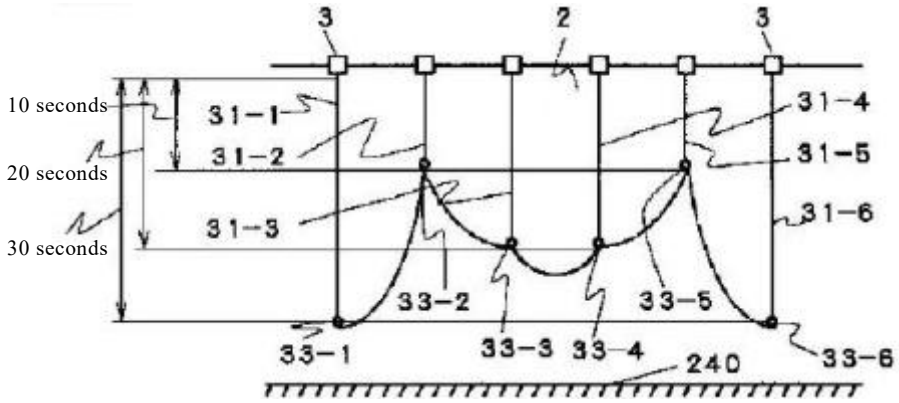
[Fig. 4]



[Fig. 9]



[Fig. 10]



2. Exhibit Ko 3

[0010]

[Function] A curing net elevating wire maintains a tense state by its other end being attached to a weight. The curing net elevating wire is attached to the upper frame of a curing net with its length being appropriately adjusted in accordance with the height of a building. The curing net elevating wire is driven upward and downward by driving multiple hoists by means of a common driving device, and thereby, the curing net is elevated and lowered.

[0011]

[Working example] … In the working example explained below, the present invention is applied to the elevation of a curing net that is used in a method wherein a curing net is provided between a curing gondola and an arm supporting the gondola in a tense state and a work gondola is elevated and lowered within a space between the curing net and the external wall surface of a building, such as a method indicated in Examined Patent

Application Publication No. 1982-40313. Incidentally, for the convenience of explanation, the state of winding of each kind of wire at each sheave that is provided on an arm is omitted in Fig. 2.

[0012] In Fig. 1 and Fig. 2, from an arm 2 that is fixed to a parapet 6 of a building 1, an outside wire 4 for hanging down a stage and an inside wire 5 for hanging down a stage are hung through hanging rings 3a and 3b and hanging rings 3a and 3c, respectively. Multiple arms 2 are attached along the parapet 6, and wires 4 and 5 are hung from each of the arm 2, respectively. A curing net 8 that is attached to an upper frame 7 is provided between these wires 4 in a tense state. Rings 9 are attached at appropriate positions on both edges of each curing net 8, and by inserting a wire 4 into each of these rings 9, each curing net 8 can be elevated and lowered by using the wire 4 as a guide. Incidentally, a hanging ring 35 is used for a wire for hanging down a work gondola.

[0013] One end of a curing net elevating wire 10 is attached to an upper frame 7 of a curing net 8 through a wire lock 11 and a turn buckle 12. As indicated in Fig. 3 in a magnified manner, a wire lock 11 has a structure wherein a wedge-shaped block 11b is fitted into a box-shaped block 11a in a manner that a pin 11d that protrudes into the box-shaped block 11a that forms a trapezoidal concave region 11c is inserted into a slotted hole 11e of the wedge-shaped block 11b. A wire 10 is pressed between the wedge-shaped block 11b and the box-shaped block 11a and is locked there by first putting the wedge-shaped block 11b in a pulled-up position, putting the curing net elevating wire 10 in a desired position and placing it within concave region 11c, and then hammering the wedge-shaped block 11b from above.

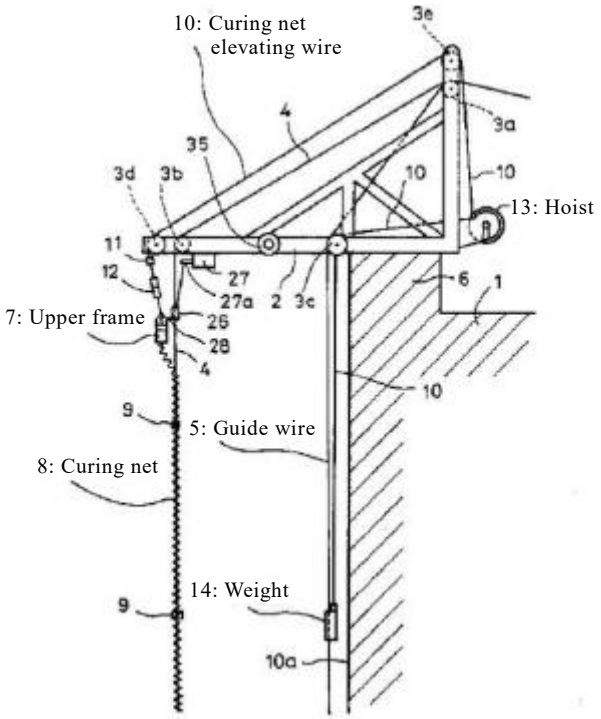
[0014] A turn buckle 12 for making fine adjustment of the position to attach a curing net is attached to the lower end of a wire lock 11.When attaching a curing net elevating wire 10 to the upper frame 7 of each of the curing nets, the length between the upper frame 7 and the position where a wire lock 11 is attached is adjusted so as to align the curing nets in one line by making fine adjustment through operation of the turn buckle after locking the wire lock 11 to around the position where the wire 10 is attached.

[0015] A curing net elevating wire 10 is wound around a hoist 13 that is provided at the back side of an arm 2 through sheaves 3d and 3e of the arm 2. For example, an endless winder wherein both of the sideboards that have contact with the side of a wire are composed of a leaf spring, like the one described in Patent Application No. 209965, is preferred as a hoist 13.

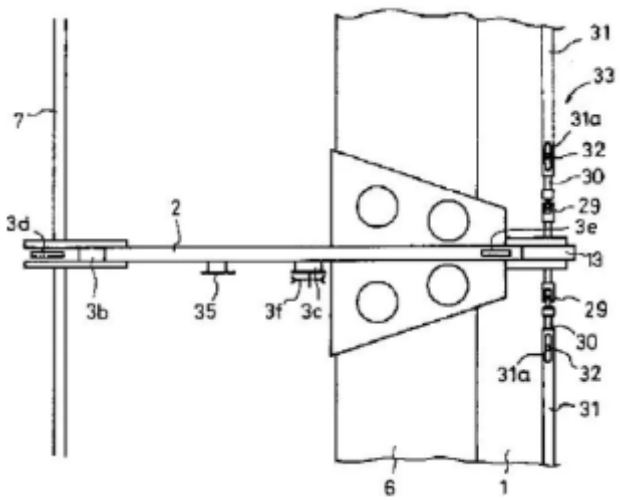
[0016] The other end of a curing net elevating wire 10 is hung along an external wall surface 10a of a building 1 through a sheave 3f of an arm 2 (see Fig. 2), and its tip

section is attached to a weight 14.

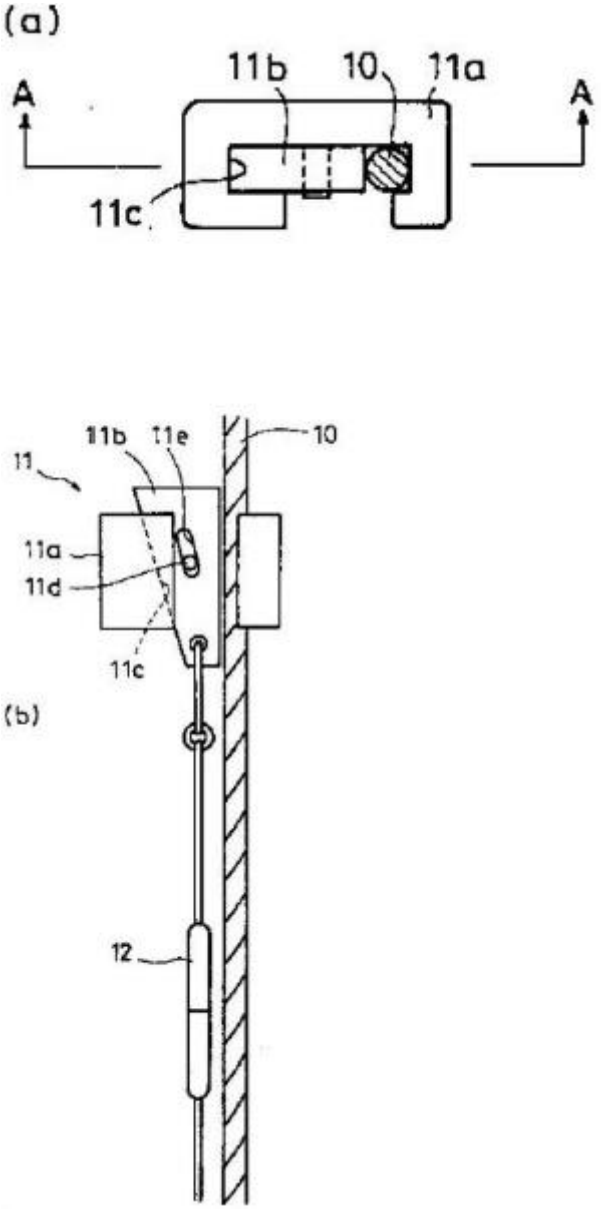
[Fig. 1]



[Fig. 2]

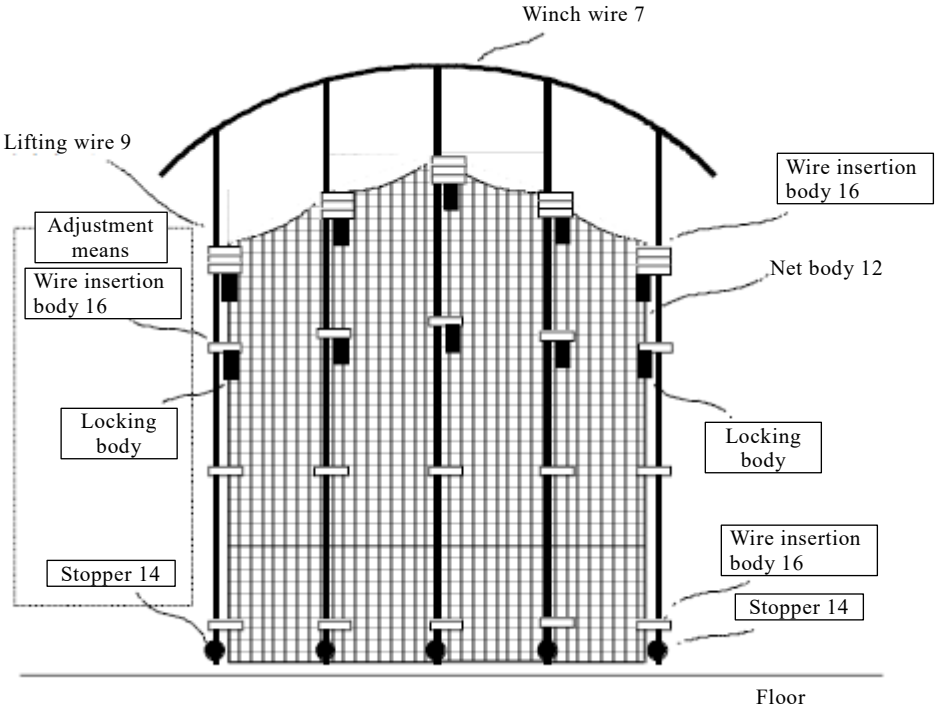


[Fig. 3]



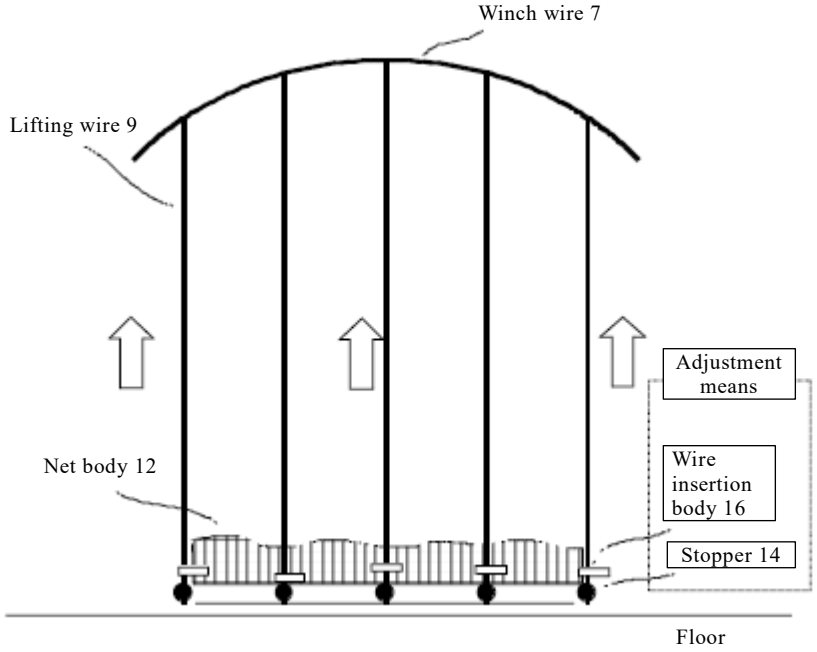
(Attachment 4)

1. Working example [iii]



2. Working example [iv]

(1) Before lifting



(2) After lifting