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(71) Applicant: **TMT Machinery, Inc.**
Osaka-shi, Osaka 541-0041 (JP)

(72) Inventor: **RIYAMA, Yusuke**
Kyoto, 612-8686 (JP)

(74) Representative: **Betten & Resch**
Patent- und Rechtsanwälte PartGmbB
Maximiliansplatz 14
80333 München (DE)

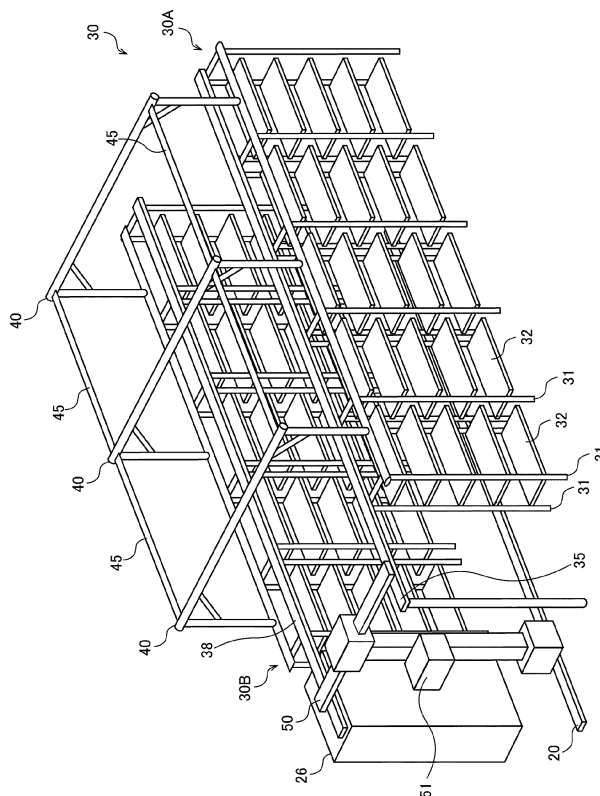
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(54) CREEL STAND

(57) To provide a creel stand that enables a creel robot to supply a yarn feeding package with high reliability. The creel stand 30 in which a yarn feeding package to a peg is supplied by a creel robot 50, includes: a pair of stand bodies 30A, 30B arranged on both sides sandwich-

ing a rail 20 along which the creel robot 50 moves and configured to support the peg; and a beam mechanism 40 configured to couple the pair of stand bodies 30A, 30B at an upper position above the creel robot 50.

FIG. 2



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Description**BACKGROUND OF THE INVENTION****FIELD OF THE INVENTION**

[0001] The present invention relates to a creel stand.

DESCRIPTION OF THE BACKGROUND ART

[0002] Regarding a technology of a creel stand in which a yarn feeding package is supplied by a creel robot, Patent document 1 discloses a technology in which a pair of creel stands capable of holding a plurality of yarn feeding packages are arranged opposite each other across a passage along which a self-propelled yarn feeding package changer travels. In the technology disclosed in Patent Document 1, the yarn feeding package changer rotates 180 degrees by rotating device, an operation of changing the empty take-up tube and the yarn feeding package can be performed also in any of the creel stands arranged opposite each other.

(Prior Art Documents)

(Patent Documents)

[0003] Patent Document 1: Japanese Patent Application Publication No. H09-194139

(Problems to be Solved)

[0004] Incidentally, when a yarn feeding package is supplied to a creel stand by a creel robot, a reaction force when moving the yarn feeding package, which is a heavy load, to the creel stand from the creel robot acts on the creel stand, easily causing the creel stand to sway and tilt significantly. Consequently, there is room for an improvement in that a distance between the creel stand and the creel robot becomes unstable, making it difficult for the creel robot to supply the yarn feeding package. In particular, in recent years, the height of creel stands has tended to be higher than in the past, which has resulted in significant swaying and tilting of the creel stands.

SUMMARY OF THE INVENTION

[0005] The present invention has been made in view of the above-described technical problems, and an object thereof is to provide a creel stand that enables a creel robot to supply a yarn feeding package with high reliability.

(Means for Solving Problems)

[0006] A first aspect of the present invention is a creel stand in which a yarn feeding package to a peg is supplied by a creel robot, the creel stand comprising:

a pair of stand bodies arranged on both sides sandwiching a movement passage along which the creel robot moves and configured to support the peg; and a beam mechanism configured to couple the pair of stand bodies at an upper position above the creel robot, wherein

at least one stand body among the pair of stand bodies includes a stand engagement mechanism engaged with an extension member extending in a direction of the one stand body from the upper position of the creel robot along a direction parallel to the movement passage of the creel robot.

[0007] According to the above-described first aspect of the creel stand, due to the portions being coupled to each other by the beam mechanism at an upper position above the creel robot in the stand body, the pair of stand bodies have high rigidity as a single structure. Consequently, even when a reaction force generated when the creel robot supplies the yarn feeding package to the peg of one stand body is applied to the stand body, sway and tilt of the stand body is reduced by the high rigidity of stand bodies and dispersion of the reaction force to the other stand body via the beam mechanism. Moreover, since tilt of the stand body is reduced, a distance between the one stand body and the other stand body and a distance between the creel robot and the stand body are each constantly maintained. Accordingly, it becomes possible for the creel robot to supply the yarn feeding package to the peg with high reliability.

[0008] Moreover, in the high rigid structure in which the stand bodies are coupled to each other by the beam mechanism, the creel robot travels and stops along the stand body in the state where the extension member and the stand engagement mechanism are engaged with each other. Accordingly, even when the number of arranged pegs on the stand body increases and the creel stand and/or the creel robot become taller and become easy to cause tilt and sway, the distance between the stand body and the creel robot can always be maintained constant. Consequently, it becomes possible for the creel robot to supply the yarn feeding package to the peg with high reliability.

[0009] A second aspect of the present invention is the creel stand in the above-described first aspect, wherein preferably the stand engagement mechanism is a rail including a flange longitudinally provided in an up-and-down direction, wherein

the flange is sandwiched with at least two rollers provided rotatably around a rotation axis in the up-and-down direction provided on the extension member.

[0010] According to the above-described second aspect of the creel stand, the flange longitudinally provided in the up-and-down direction is sandwiched with the rollers provided rotatably around the rotation axis in the up-and-down direction provided on the extension member. Accordingly, the distance between the creel robot and the stand body is regulated by the length of

the extension member. Consequently, even when receiving a reaction force that tips the stand body and/or the creel robot, the distance between the creel robot and the stand body can be maintained constant.

[0011] A third aspect of the present invention is the creel stand in the above-described first or second aspect, wherein preferably

the beam mechanism includes a coupling rod-like member coupling the pair of stand bodies to each other, and

the coupling rod-like member includes a dimensional adjustment mechanism capable of adjusting a length dimension in an axial direction.

[0012] According to the above-described third aspect of the creel stand, when the beam mechanism is attached to the stand body, the distance between the pair of stand bodies can be finely adjusted by the dimensional adjustment mechanism.

[0013] A fourth aspect of the present invention is the creel stand in the above-described preceding aspects, wherein preferably a plurality of the beam mechanisms are arranged in a longitudinal direction of the stand body.

[0014] According to the above-described fourth aspect of the creel stand, since the plurality of the beam mechanisms are arranged in the longitudinal direction of the stand body and therefore higher rigidity can be obtained as the structure in which the stand bodies are coupled to each other by the plurality of beam mechanisms, sway and tilt of the stand body can further be reduced. Consequently, it becomes possible for the creel robot to supply the yarn feeding package to the peg with high reliability.

[0015] A fifth aspect of the present invention is the creel stand in the above-described preceding aspects, wherein preferably the beam mechanism includes a diagonal member forming a trussed structure.

[0016] According to the above-described fifth aspect of the creel stand, since the beam mechanism includes the diagonal member forming the trussed structure and therefore higher rigidity can be obtained as the structure in which the stand bodies are coupled to each other by the beam mechanisms, sway and tilt of the stand body can further be reduced. Consequently, it becomes possible for the creel robot to supply the yarn feeding package to the peg with high reliability.

[0017] The creel stand according to the present invention may be formed of merely the configuration described as the creel stand described in the above-described first aspect, or may be formed of freely combining the configuration described in the above-described first aspect with the configuration(s) described in any of the above-described second to fifth aspects, to the extent that consistency can be achieved. When combining the configuration described in the above-described first aspect with the configuration(s) described in any of the above-described second to fifth aspects, all or part of the con-

figuration described in the above-described first aspect can be combined with all or part of configurations of described in the above-described second to fifth aspects, to the extent that consistency can be achieved.

(Advantageous Effects of the Invention)

[0018] According to the present invention, it is possible to provide a creel stand that enables a creel robot to supply a yarn feeding package with high reliability.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a plan view schematically illustrating an overall arrangement configuration example of a false-twist texturing system.

FIG. 2 is an example of a perspective diagram schematically illustrating the false-twist texturing system.

FIG. 3 is a view schematically illustrating a configuration of a peg provided in the stand body.

FIG. 4 is a view of an upper portion of the stand bodies and a creel robot as viewed from a longitudinal direction of the stand bodies.

DESCRIPTIONS OF EMBODIMENTS OF THE INVENTION

[0020] Hereinafter, embodiments for carrying out the present invention will be described with reference to the drawings.

(Overview of False-Twist Texturing System 1)

[0021] FIG. 1 is a plan view schematically illustrating an overall arrangement configuration example of a false-twist texturing system 1. In a false-twist texturing system 1, a yarn feeding package in which a yarn is wound around a cylindrical take-up tube is supplied to a creel stand 30 by a creel robot 50 that moves on a rail 20 extending in a linear shape. Moreover, when supplying the yarn feeding package to the creel stand 30, the creel robot 50 collects an empty take-up tube around which no yarn is wound from the creel stand 30. The "yarn" used herein is exemplified by synthetic fibers, such as polyester. The "yarn feeding package" is a windingtype package for supplying a yarn (synthetic fiber) used in a manufacturing process, such as a false-twist texturing machine. The yarn feeding package is composed of a take-up tube having a cylindrical shape of a center part, and the yarn wound around the take-up tube, and is held by inserting a peg 31B described later (refer to FIG. 3) inside the take-up tube. The rail 20 corresponds to a "movement passage" used in the present invention.

[0022] The creel stand 30 includes a pair of stand bodies 30A, 30B arranged at both sides sandwiching the rail 20 and coupled to each other by the beam

mechanism 40. A raw yarn storage unit 26 is provided at a position adjacent to the stand body 30B in a longitudinal direction. The yarn feeding packages to be supplied to the stand bodies 30A, 30B are supplied from a plant-wide conveyance device to the raw yarn storage unit 26 and are temporarily stored in the raw yarn storage unit 26. Then, the yarn feeding packages stored therein are removed from the raw yarn storage unit 26 by the creel robot 50 and are carried to the creel stand 30.

[0023] A machine base 10 is provided at a position, which is adjacent to the stand body 30A and an opposite side to the rail 20. Although not illustrated, a machine base is provided adjacent also to the stand body 30B. The machine base 10 mainly includes, for example, a false-twist texturing machine 12 and a winding machine 14. The yarn unwound from the yarn feeding package is supplied from the creel stand 30 to the false-twist texturing machine 12. In the false-twist texturing machine 12, the yarn unwound from the yarn feeding package is false-twisted. The false-twisted yarn is wound by the winding machine 14.

[0024] The empty take-up tube around which no yarn is wound, obtained by unwinding all the yarn from the yarn feeding package, is collected by the creel robot 50 from the creel stand 30. The collected empty take-up tube is carried by the creel robot 50 to an empty take-up tube collection box 22 provided, for example, adjacent to the stand body 30A in the longitudinal direction and is collected into the empty take-up tube collection box 22.

(Description of Creel Stand 30)

[0025] FIG. 2 is an example of a perspective diagram schematically illustrating the false-twist texturing system 1. FIG. 2 omits illustration of the false-twist texturing machine 12, the winding machine 14, and the empty take-up tube collection box 22, which are illustrated with FIG. 1. Since the stand bodies 30A, 30B have the same configurations, the stand body 30A is mainly described below, and a detailed description of the stand body 30B configuration is omitted.

[0026] The stand body 30A is configured so that a plurality of column supports 31 extending in a vertical direction and arranged in two rows along the rail 20, and a plurality of partition plates 32 are supported by the column supports 31 at predetermined intervals. A peg 31B described below (refer to FIG. 3) that supports the take-up tube is provided in the column support 31 near the rail 20 among the plurality of column supports 31.

[0027] FIG. 3 is a view schematically illustrating a configuration of a peg 31B provided in the stand body 30A.

[0028] The column support 31 is provided with a rotary cylinder 31A capable of rotating around the column support 31 in a longitudinal direction of the column support 31 as an axial direction. The peg 31B and a claw 31C are provided on the rotary cylinder 31A. The peg 31B and the claw 31C rotate integrally as the rotary cylinder 31A

rotates.

[0029] Although a detailed description of the configuration of the creel robot 50 is omitted, the creel robot 50 includes an engagement portion 52 capable of moving in the up-and-down direction, and a peg rotation mechanism 51 that rotates the engagement portion 52. When the creel robot 50 supplies the yarn feeding package to the creel stand 30, and when the creel robot 50 collects the empty take-up tube from the creel stand 30, the creel robot 50 engages the engagement portion 52 with the claw 31C of the creel stand 30, and, in that state, drives the peg rotation mechanism 51 to rotate the engagement portion 52. Consequently, the claw 31C rotates, and the peg 31B also rotates accordingly. By rotating the peg 31B to be directed to the creel robot 50 side, the creel robot 50 can supply the yarn feeding package and collect the empty take-up tube.

[0030] When replacing of the take-up tube, particularly when supplying the yarn feeding packages to the stand bodies 30A, 30B, a reaction force generated when the heavy yarn feeding package is supported by the peg 31B is applied to the stand bodies 30A, 30B. In order to reduce sway or tilt of the stand bodies 30A, 30B due to such a reaction force, the stand bodies 30A, 30B are coupled to each other by the beam mechanism 40 to form a single structure. The beam mechanism 40 couples the stand bodies 30A, 30B to each other at an upper position above the creel robot 50 so as not to interfere the movement of the creel robot 50 moving between the stand bodies 30A, 30B.

[0031] FIG. 4 is a view of an upper portion of the stand bodies 30A, 30B and the creel robot 50 as viewed from a longitudinal direction of the stand bodies 30A, 30B.

[0032] The beam mechanism 40 includes longitudinal coupling members 41A, 41B, a lateral coupling member 42, and diagonal members 43A, 43B. The longitudinal coupling members 41A, 41B and the lateral coupling member 42 correspond to a "coupling rod-like member" used in the present invention.

[0033] The longitudinal coupling member 41A is a long rod-like member, and is fixed to an upper portion of the stand body 30A taking a posture along the vertical direction. The longitudinal coupling member 41A is coupled to, for example, the column support 31 of the stand body 30A. The longitudinal coupling member 41B is fixed to an upper portion of the stand body 30B.

[0034] The lateral coupling member 42 is a long rod-like member, and couples tip portions of the longitudinal coupling members 41A, 41B to each other. The lateral coupling member 42 is coupled to the longitudinal coupling members 41A, 41B at a substantially right angle. The longitudinal coupling members 41A, 41B and the lateral coupling member 42 may be coupled to each other using a jig, or may be coupled to each other by welding or the like.

[0035] The longitudinal coupling members 41A, 41B and the lateral coupling member 42 each have a dimensional adjustment mechanism capable of length adjust-

ment. Examples of the dimensional adjustment mechanism include a mechanism in which a rod member is inserted into a long cylinder and the rod member is advanced or retreated with respect to the cylinder to adjust the length.

[0036] The diagonal members 43A, 43B respectively are diagonally coupled to the longitudinal coupling members 41A, 41B and the lateral coupling member 42 to form a trussed structure. A strength of the beam mechanism 40 in a direction orthogonal to the longitudinal direction of the stand bodies 30A, 30B can be increased by providing the diagonal members 43A, 43B.

[0037] A plurality of the beam mechanisms 40 are provided in the longitudinal direction of the stand bodies 30A, 30B (refer to FIGs. 1 and 2). Moreover, the beam mechanism 40 is coupled to a connection member 45 extending in the longitudinal direction. Consequently, the beam mechanism 40 can prevent from toppling in the longitudinal direction of the stand bodies 30A, 30B and the strength of the beam mechanism 40 can be increased.

[0038] Thus, by coupling the stand bodies 30A, 30B arranged to be separated from each other with the beam mechanism 40, the creel stand 30 can be into the single structure, and the rigidity of the creel stand 30 can be improved.

[0039] The creel stand 30 includes a long C-shape steel 35 provided at an upper portion of the stand body 30A. The C-shape steel 35 corresponds to a "stand engagement mechanism" used in the present invention. The C-shape steel 35 extends along a direction parallel to the rail 20, i.e., along the longitudinal direction of the stand body 30A, (refer to FIGs. 1 and 2).

[0040] At an upper portion of the stand body 30A, a support plate 36 is provided as to bridge over two column supports 31 aligned in a line in the direction orthogonal to the rail 20. A plurality of the support plates 36 are provided in the longitudinal direction of the stand body 30A at predetermined intervals. The C-shape steel 35 is supported at a position near the creel robot 50 in the support plate 36 as viewed from the longitudinal direction of the stand body 30A. The C-shape steel 35 is provided to take a posture in which an open portion faces upward, as viewed from the longitudinal direction thereof. One side surface of the C-shape steel 35, provided in this way, extending in the up-and-down direction corresponds to a "flange" used in the present invention.

[0041] The C-shape steel 35 functions as a guide passage for the creel robot 50. As illustrated in FIG. 4, the creel robot 50 includes an extension member 53A extending from the upper position thereof toward the stand body 30A. The extension member 53A is located at an upper position above the stand body 30A and has a tip portion extending to the position of the C-shape steel 35. A pair of rollers 54 are provided at a lower tip portion of the extension member 53A. The pair of rollers 54 each rotate around the up-and-down direction as a rotation axis. The pair of rollers 54 rotate so as to sandwich one

side surface of the C-shape steel 35 therebetween.

[0042] By sandwiching the one side surface of the C-shape steel 35 between the pair of rollers 54 of the creel robot 50, a distance between the creel robot 50 and the stand body 30A is regulated by a length of the extension member 53A. Consequently, even when receiving a reaction force that tips the stand body 30A or the creel robot 50, the distance between the creel robot 50 and the stand body 30A can be maintained constant.

[0043] Also at an upper portion of the stand body 30B, a support plate 37 is provided so as to bridge over two column supports 31, similarly to the stand body 30A. A plurality of the support plates 37 are provided in the longitudinal direction of the stand body 30B at predetermined intervals. The long C-shape steel 38 is provided on the plurality of the support plates 37 to take a posture in which an open portion faces upward, as viewed from the longitudinal direction thereof. The C-shape steel 38 also functions as a guide passage for the creel robot 50.

[0044] The creel robot 50 includes an extension member 53B extending from the upper position thereof toward the stand body 30B. The extension member 53B is located an upper position above the stand body 30B and has a tip portion extending to the position of the C-shape steel 38. One roller 55 is provided at a lower tip portion of the extension member 53B. The roller 55 rotates around the up-and-down direction as a rotation axis. This roller 55 is provided between both side surfaces of the C-shape steel 38 and rotates while being in contact with the both side surfaces.

(Description of Advantageous Effects)

[0045] As described above, the creel stand 30 of the present embodiment is configured as the single structure formed by coupling the stand bodies 30A, 30B, arranged to be separated from each other, by the beam mechanism 40. Therefore, high rigidity can be obtained compared with a case where the stand bodies 30A, 30B are arranged independently from each other. Moreover, for example, even when a reaction force generated when the heavy yarn feeding package is supplied from the creel robot 50 to the peg 31B of the stand body 30A is applied to the stand body 30A, the reaction force is distributed to the stand body 30B through the beam mechanism 40, thereby reducing swaying and tilting. Furthermore, the stand bodies 30A, 30B arranged to be separated from each other are coupled to each other by the beam mechanism 40, it is possible to prevent each of the stand bodies 30A, 30B from tipping. In addition, by connecting one of the stand bodies 30A, 30B to a wall or ceiling of a factory, swaying, tilting, or tipping can further be suppressed. Such advantageous effects become more pronounced as the height of the stand bodies 30A, 30B increases.

[0046] Moreover, since the distance between the stand bodies 30A, 30B and the creel robot 50 is maintainable at a constant distance by reducing tilt of the stand bodies 30A, 30B, it becomes possible for the creel robot 50 to

supply the yarn feeding package to the stand bodies 30A, 30B with high reliability.

[0047] Furthermore, since the plurality of beam mechanisms 40 are provided in the longitudinal direction of the stand bodies 30A, 30B, it is possible to further reduce swaying and tilting of the stand bodies 30A, 30B. Consequently, it becomes possible for the creel robot 50 to supply the yarn feeding package to the stand bodies 30A, 30B with high reliability.

[0048] Moreover, since it is possible to adjust the lengths of the longitudinal coupling members 41A, 41B and the lateral coupling member 42 of the beam mechanism 40, it can be adjusted in accordance with a distance between the stand bodies 30A, 30B when attaching the beam mechanism 40 to the stand bodies 30A, 30B. Furthermore, since the length of the longitudinal coupling members 41A, 41B can be adjusted, the lateral coupling member 42 can be attached closely to, for example, a beam, ceiling, or the like of the factory, and swaying or tipping of the stand bodies 30A, 30B can be prevented.

(Modified Examples)

[0049] While this embodiment of the present invention has been described above, the present invention is not limited to the above-described embodiment but can be changed in various ways within a scope recited in the claims. For example, in the above-described embodiment, the beam mechanism 40 is configured of the plurality of members, but may be configured of merely one member. Moreover, the column support 31 may be lengthened and an upper portion of the lengthened column support 31 may be used as the longitudinal coupling member 41A. Moreover, the dimensional adjustment mechanism for the beam mechanism 40 may be a mechanism in which a plurality of small rod members are coupled to form one long rod member and the length is adjusted by adjusting the number of small rod members. Furthermore, as long as the movement of the creel robot 50 is not hindered, the stand bodies 30A, 30B may be coupled to each other only by a lateral coupling member 42 without using the longitudinal coupling members 41A, 41B.

[0050] Moreover, in the above-described embodiment, the beam mechanism 40 couples the stand bodies 30A, 30B along a direction orthogonal to the longitudinal direction of the stand bodies 30A, 30B, but the beam mechanism 40 may couple them along a direction of diagonally intersecting with respect to the longitudinal direction, for example.

[0051] Furthermore, the C-shape steel 35 which is a stand engagement mechanism is provided in the upper portion of the stand body 30A and the one side surface of the C-shape steel is sandwiched by the pair of rollers 54 provided at the lower tip portion of the extension member 53A, but it is not limited to such an example. For example, a C-shape steel may be provided near a center of the stand body 30A in the up-and-down direction taking a

posture in which an open portion faces the creel robot 50 side, and a member may be provided extending from the tip of the extension member 53A to the C-shape steel toward a vertically lower side, so that the C-shape steel is sandwiched by the pair of rollers. Even in this case, the distance between the stand body 30A and the creel robot 50 can be maintained constant. Moreover, the stand engagement mechanism may be provided on each of the stand bodies 30A, 30B.

[0052] Moreover, in the above-described embodiment, the pair of rollers 54 provided at the lower tip portion of the extension member 53A is capable of rotating in a state where the one side surface of the C-shape steel 35 is sandwiched therebetween, but in addition thereto, a load of the creel robot 50 may be applied to a web of the C-shape steel 35. By providing, for example, a roller between the roller 54 on the side opposite to the web of the C-shape steel among the pair of rollers 54 and the web, so as to enable to slide between the roller 54 and the web, the load of the creel robot 50 can be applied to the web of the C-shape steel 35. When the load of the creel robot 50 can be applied to the web of the C-shape steel 35, the creel robot 50 will lean against the stand body 30A, and the weight of the creel robot 50 can make the stand body 30A more stable. Moreover, by stabilizing the stand body 30A, it is possible to also stabilize the stand body 30B coupled to the stand body 30A by the beam mechanism 40.

[0053] Moreover, in the above-described embodiment, the extension members 53A, 53B are provided extending toward both of the pair of stand bodies 30A, 30B from the upper position of the creel robot 50, but it is not limited to this example. For example, only the extension member (53A or 53B) may be provided extending from the upper position of the creel robot 50 toward only any one of the pair of stand bodies 30A, 30B. In this case, it is preferable to provide the C-shape steel (35 or 38) at the upper portion of the stand body (30A or 30B) on the side having the extension member, so as to rotate the pair of rollers 54 provided at the lower tip portion of the extension member in the state where the one side surface of the C-shape steel (35 or 38) is sandwiched therebetween.

[0054] Moreover, in the above-described embodiment, the pair of rollers 54 are configured to rotate with one side surface of the C-shape steel 35 sandwiched therebetween, but the member is not limited to such a C-shape steel and may be any member (e.g., an L-shape steel) including a flange that can be sandwiched between the pair of rollers 54.

(Reference Numerals)

[0055]

20 Rail
30 Creel stand
30A, 30B Stand body
35, 38 C-shape steel

40 Beam mechanism
 41A, 41B Longitudinal coupling member
 42 Lateral coupling member
 50 Creel robot
 53A, 53B Extension member 5
 54, 55 Roller

Claims

- 10
1. A creel stand (30) in which a yarn feeding package to a peg (31B) is supplied by a creel robot (50), the creel stand (30) comprising:

15 a pair of stand bodies (30A or 30B) arranged on both sides sandwiching a movement passage along which the creel robot (50) moves and configured to support the peg (31B); and
 a beam mechanism (40) configured to couple the pair of stand bodies (30A or 30B) at an upper 20 position above the creel robot (50), wherein at least one stand body (30A and 30B) among the pair of stand bodies (30A or 30B) includes a stand engagement mechanism (C-shape steel 35) engaged with an extension member (53A, 25 53B) extending in a direction of the one stand body (30A or 30B) from the upper position of the creel robot (50) along a direction parallel to the movement passage of the creel robot (50). 30
 2. The creel stand (30) as claimed in claim 1, wherein

35 the stand engagement mechanism (C-shape steel 35) is a rail which includes a flange (one side surface extending in an up-and-down direction of the C-shape steel 35) longitudinally provided in the up-and-down direction, wherein the flange is sandwiched with at least two rollers (54) provided rotatably around a rotation axis in the up-and-down direction provided on the ex- 40 tension member (53A, 53B).
 3. The creel stand (30) as claimed in claim 1 or 2, wherein

45 the beam mechanism (40) includes a coupling rod-like member (longitudinal coupling members 41A, 41B and a lateral coupling member 42) coupling the pair of stand bodies (30A or 30B) to each other, and 50 the coupling rod-like member (the longitudinal coupling members 41A, 41B and the lateral coupling member 42) includes a dimensional adjustment mechanism capable of adjusting a 55 length dimension in an axial direction.

FIG. 1

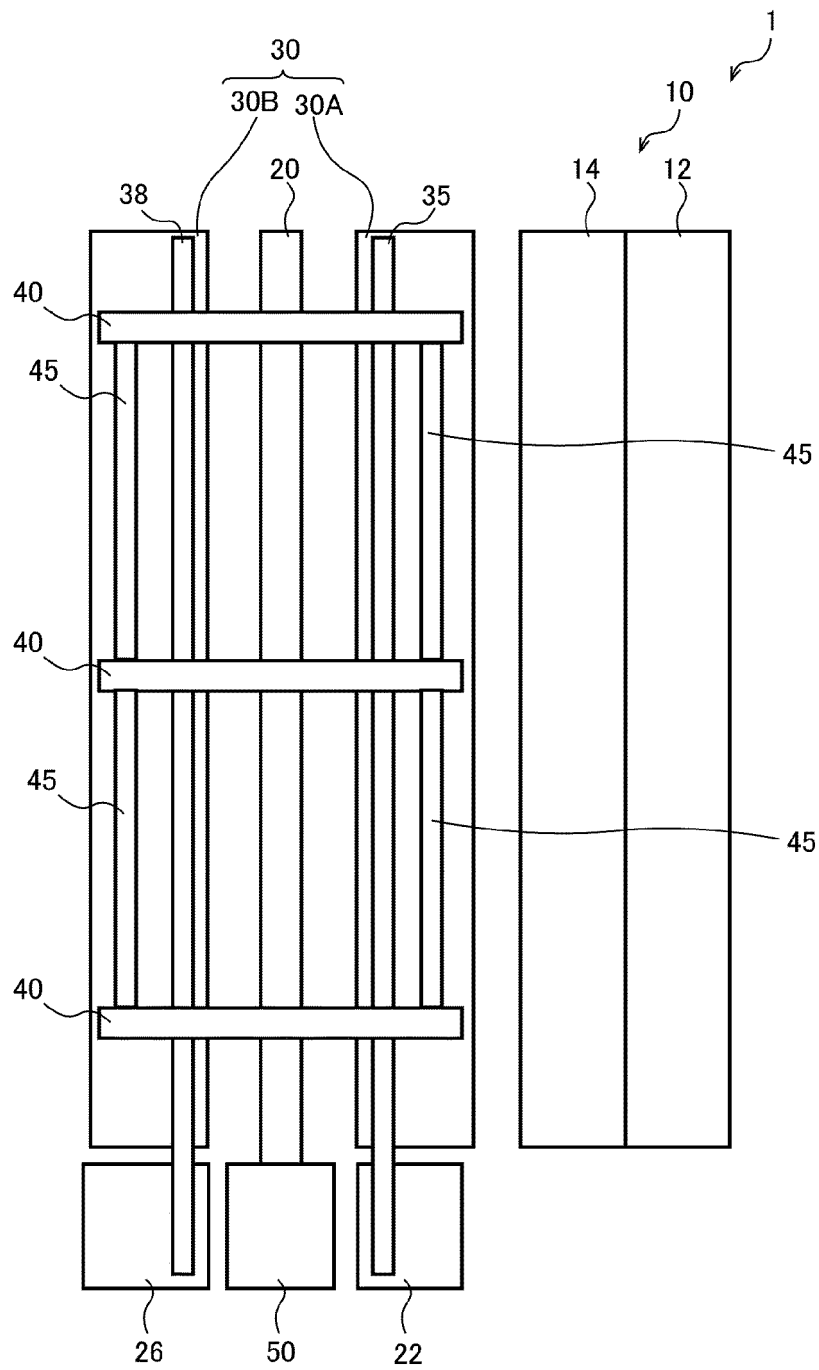


FIG. 2

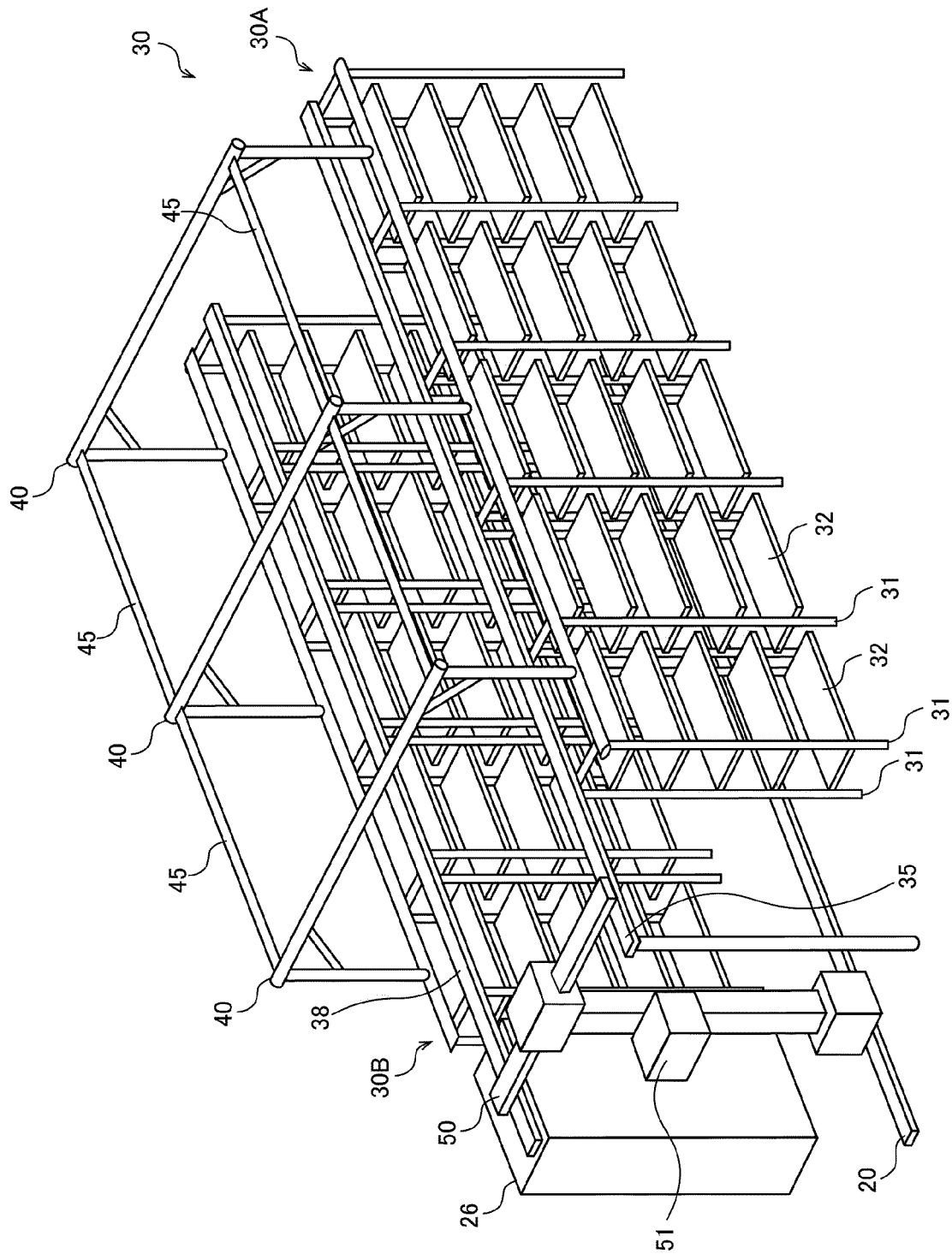


FIG. 3

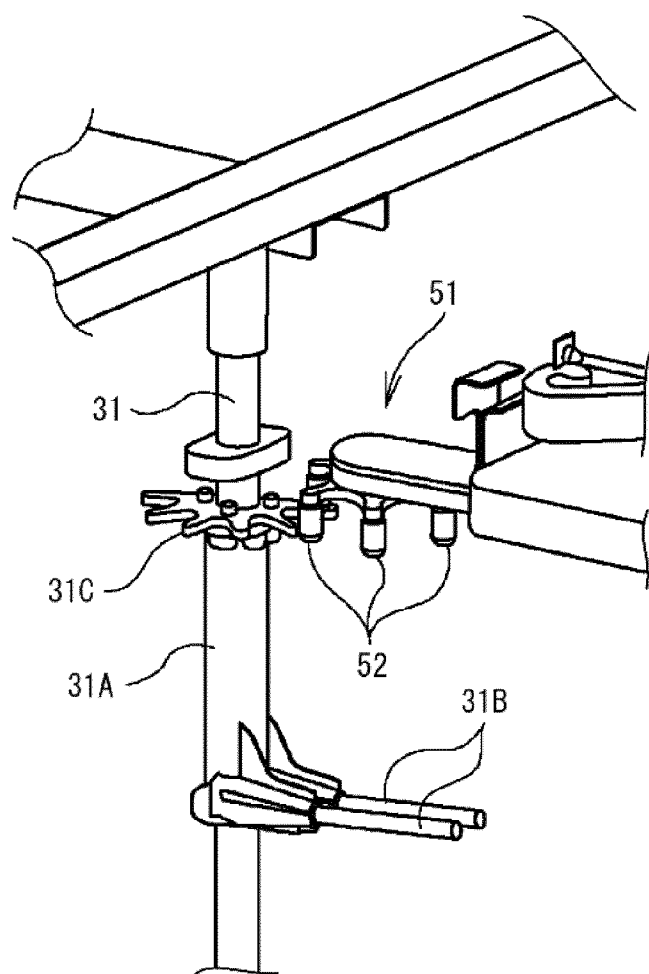
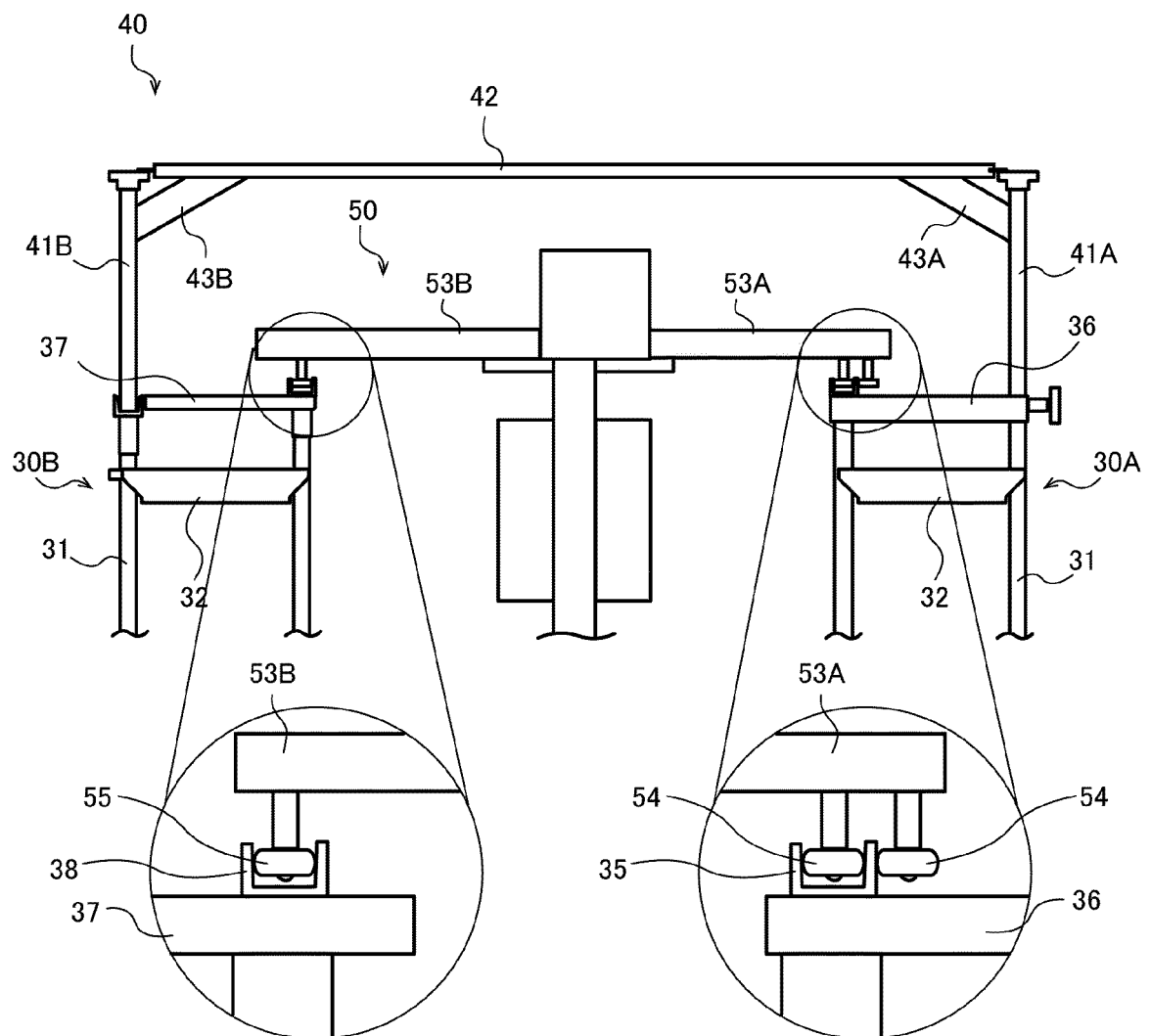


FIG. 4





EUROPEAN SEARCH REPORT

Application Number

EP 24 20 4214

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			B65H D02H
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		17 February 2025	Guisan, Thierry
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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