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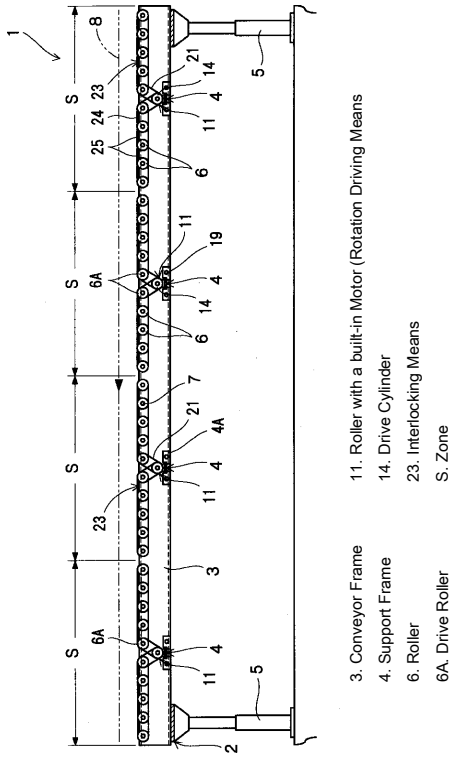
(54) [Name of the invention] Roller Conveyor Installation

(57)[Overview]
[Problem] To provide a roller conveyor installation in which a rotation driving means can be prepared in made-to-stock production and a conveyor frame can be configured inexpensively and with good appearance.
[Solution] A group of freely rotatable rollers 6 is arranged on the conveyor frame 3. The rotation driving means 11 is interlockingly connected to at least one roller, and an interlocking means 23 is provided for interlocking the driven rollers 6A with another group of rollers 6.

The rotation driving means 11 is attached to a support frame 4, and the support frame 4 is connected to the conveyor frame 3. Since the rotation driving means 11 and the support frame 4 can be unitized, the rotation driving means 11 can be prepared in make-to-stock production by preparing the support frame 4according to the conveyor width, and can be assembled quickly with almost no adjustment. The conveyor frame 3 may be formed with a number of holes considering only the connection with the support frame 4, and it can be constructed inexpensively and with good appearance.



[Scope of Claims]

[Claim 1] A roller conveyor installation, wherein a group of rollers is arranged freely rotatablely on a conveyor frame, and a rotation driving means is interlockingly connected to at least one roller, and an interlocking means is provided for interlocking a driven roller with another group of rollers, and said rotation driving means is mounted on a support frame and said support frame is connected to said conveyor frame.
[Claim 2] A roller conveyor installation according to claim 1, wherein the roller group is divided into a plurality of zones in the conveying direction, and the rotation driving means is provided for each zone.
[Claim 3] A roller conveyor installation according to claim 1 or 2, wherein the rotational drive means is interlockingly connected to two rollers of the central portion.
[Claim 4] A roller conveyor installation according to claim 1 or 2, wherein the rotation driving means is interlockingly connected to one roller of the end portion.
[Claim 5] A roller conveyor installation according to any one of claims 1 to 4, wherein a control panel for driving and controlling the rotation driving means is provided on the support frame.
[Claim 6] A roller conveyor installation according to any one of claims 1 to 5, wherein the rotation driving means is a motorized roller and the drive cylinder is operatively connected to the roller.
[Claim 7] A roller conveyor installation according to any of claims 1 to 5, wherein the rotation driving means is a motor and the motor shaft is operatively connected to the roller.
[Detailed description of the invention]
[0001]
[Technical field of invention] The present invention relates to a roller conveyor installation which is employed, for example, for conveying various articles.
[0002]
[Conventional technique] As a roller conveyor of a type in which a drive roller is interlocked with another roller group, a free-flow type conveying device as disclosed in, for example, Japanese Utility Model Laid-open No. 2-120409 is provided. In this conventional configuration, a conveying roller group is freely rotatably arranged on a frame via a shaft, and a motor is interlockingly connected to an appropriate shaft via a main driving force transmission belt or the like. Further, the drive transmission belt is provided between adjacent shafts. [0003] According to this conventional configuration, by driving the motor, one shaft is driven and rotated via the main drive force transmission belt, and the other shaft group is rotated via the drive transmission belt, so that conveyance of the conveyed article is performed.
[0004]
[Problem to be solved by the invention] However, according to the above-described conventional configuration, the motor is fixed to the frame. Thus, the motor must be produced each time, for the fixed state may change depending on the shape of the device (such as the transport width) and for other reasons. At the time of fixing, adjustments must be performed sufficiently. Further, while there is a method to accommodate the change in the type and the fixing position of the motor by forming a number of fixing holes on the frame side, this requires a large number of holes to be formed on the frame side, thereby increasing the cost and resulting in poor appearance.
[0005] It is an object of the present invention described in the claim 1 to provide a roller conveyor installation in which a rotation driving means can be prepared in make-to-stock production and a conveyor frame can be constructed at a low cost and with good appearance.
[0006]
[Means for solving the problem] In order to achieve the above object, in the roller conveyor installation of the present invention as described in claim 1, a roller group is rotatably arranged on a conveyor frame, and a rotation driving means is interlocked with at least one roller. An interlocking means for interlocking the driven roller with another group of rollers is provided, and aforementioned rotation driving means is mounted on the support frame, and the support frame is connected to the conveyor frame.
[0007] Thus, according to the invention of claim 1, when an order for the roller conveyor installation is received, a support frame of length corresponding to the conveyor width is prepared and the rotation driving means is mounted on the support frame. This allows the rotation driving means and the support frame to be unitized and transported in this unitized state to the installation site. During installation at the installation site, the rotation driving means and the support frame unitized as a unit is connected to the conveyor frame. At least one roller of a roller group freely rotatably provided between both conveyor frames is interlockingly connected to the rotation driving means, and the other roller group is interlocked via the interlocking means to form a conveying path above the roller group.
[0008] The roller conveyor installation according to claim 2 of the present invention is characterized in that , in the configuration aforementioned in claim 1, the roller group is divided into a plurality of zones in the conveying direction, and the rotation driving means is provided for each of the zones.

[0009] Therefore, according to the invention of claim 2, the rotation of the rotation driving means can be performed for each zone, so that the roller group in each zone can be rotated with the same rotation force. Further, rotation of the rotation driving means can be controlled for each zone.

[0010] The roller conveyor installation according to claim 3 of the present invention is characterized in that, in the configuration aforementioned in claim 1 or 2, the rotation driving means is operatively connected to two rollers of the central portion.

[0011] Therefore, according to the invention of claim 3, two rollers of the central portion are used as the base point, and the rotational force is distributed to the front and back by the interlocking means, so that the roller group can be rotated with the same rotational force.

[0012] The roller conveyor installation according to claim 4 of the present invention is characterized in that , in the configuration aforementioned in claim 1 or 2, the rotation driving means is interlockingly connected to one roller of the end portion.

[0013] Therefore, according to the invention of claim 4, it is possible to easily arrange the interlocking structure of the rotation driving means and the roller and adjust the tension. Further, the roller conveyor installation according to claim 5 of the present invention is characterized in that , in the configuration in any of aforementioned claims 1 through 4, a control panel for driving and controlling the rotation driving means is provided on the support frame.

[0014] Therefore, according to the invention of claim 5, control such as forward / reverse drive, accelerate / decelerate drive, speed adjustment, and the like can be performed with respect to the rotational driving means by the control signal from the control panel. Further, the roller conveyor installation according to claim 6 of the present invention is characterized in that, in the configuration in any of aforementioned claims 1 through 5, the rotation driving means is a roller containing a motor, and the driving cylinder is interlockingly connected to the roller.

[0015] Therefore, according to the invention of claim 6, it is possible to reduce the installation height of the rotation driving means and to compactly place the rotation driving means. Further, the roller conveyor installation according to claim 7 of the present invention is characterized in that, in the configuration in any of aforementioned claims 1 through 5, the rotation driving means is a motor and the motor shaft is interlockingly connected to the roller.

[0016] Therefore, according to the invention of claim 7, an inexpensive motor can be employed as the rotation driving means.

[0017]

[Embodiment of invention] Hereinafter, the first embodiment of the present invention will be described with reference to FIGS. 1 through 6. The frame body 2 of a roller conveyor installation 1 is constituted of a pair of left and right conveyor frames 3 and a support frame 4 connected between lower parts of both conveyor frames 3, and leg members 5 are connected between the lower part of the conveyor frame 3 and 2 points (plural places) in the longitudinal direction.

[0018] Between the conveyor frames 3, rollers 6 are provided so as to be freely rotatable at multiple positions in the longitudinal direction. That is, the roller shaft 7 is positioned in a hole (or a notched portion) formed in the conveyor frame 3, so that the group of rollers 6 can be supported freely rotatably between the conveyor frames 3. Thus, the conveying path 8 is formed above the group of rollers 6.

[0019] A roller with a built-in motor (an example of a rotation driving means) 11 is attached to aforementioned support frame 4. That is, the roller with a built-in motor 11 constitutes of a pair of shaft bodies 12, a driving cylinder body 14 externally fitted between the shaft bodies 12 via a group of bearings 13, and a motor unit 15 provided between a shaft body 12 and a driving cylinder body 14 on one side, and a wiring unit 16 connected to the motor unit 15 and the likes. A pair of grooves 14a is formed in a recessed shape at one end of the driving cylinder 14.

[0020] A vertical plate of each L-shaped bracket 17 is externally fitted on the projecting portion of the pair of shaft body 12. The bracket 17 is mounted on the support frame 4 by allowing a through hole 17a formed in the cross plate portion to communicate with a through hole 4a formed in the support frame 4, and then applying mounting fastener (bolt and nut) 18 from the through hole 17a to the through hole 4a.

In addition, the longitudinal direction of the roller with a built-in motor 11 is arranged as a conveyor width, one end of which is brought closer to one side of the conveyor frame 3, and the other end of which is positioned in the middle of the conveyor width.

[0021] The support frame 4 is connected to the lower portion of each of the conveyor frames 3 as follows. In other words, a pair of bracket portions 4A extending outward in a right angle are bent formed at both ends of the support frame 4 and an elongated hole 4b in the direction of the transport path is formed in the bracket portion 4A.

In a state in which the elongated hole 4b is communicated with the hole 3b formed in the conveyor frame 3, the coupling (bolt and nut) 19 is applied from the elongated hole 4b to the hole 3b, whereby the connection is made.

[0022] As described above, the roller with a built-in motor 11 is attached (set) to the support frame 4, so that the roller with a built-in motor 11 and the support frame 4 are unitized, and the support frame 4 is connected to the conveyor frame 3 in a unitized state.

[0023] The group of rollers 6 is divided into 4 (plurality of) zones S in the direction of the transport path 8, and the motorized roller 11 is provided for each zone S via a unitized support frame 4. Here, the roller with a built-in motor 11 is positioned at a central portion in each zone S, and is linked to two (at least one) rollers 6 of the central portion.

[0024] In other words, a pair of grooves 6a are formed on one end of each of the rollers 6 in a recess shape.

Then, the endless belt 21 is stretched over either of the groove 14a of the drive cylinder 14 and the groove 6a opposed to the groove14a, whereby the two rollers positioned in the central portion are configured as the drive roller 6A which is interlockingly connected to the roller with a built-in motor 11.

[0025] These drive rollers 6A are linked to another group of rollers 6 via the interlocking means 23. In other words, the interlocking belt 24 is stretched between the remaining groove 6a of the driving roller 6A and the groove 6a of the adjacent roller 6 opposed to the remaining groove 6a and the interlocking belt 25 is stretched between adjacent rollers 6 in the same manner, whereby the interlocking means 23 is constituted.

[0026] The support frame 4 is provided with a control panel (drive card) 27 for driving and controlling the roller with a built-in motor 11. In other words, the wiring portion 16 includes a control wiring connected to the control panel 27 in addition to the power supply wiring, and is configured so as to be capable of performing control such as forward and reverse driving, accelerating and decelerating, and speed adjustment with respect to the roller with a built-in motor 11 by a control signal from the control panel 27.

[0027] Hereinafter, the operation in the first embodiment described above will be described. The roller with a built-in motor 11 is produced in the make-to stock production. When an order for the roller conveyor installation1 is received, the support frame 4 of a length corresponding to the conveyor width is prepared. Then, a vertical plate part of the bracket 17 is externally fitted on a projecting part of the pair of shaft bodies 12 of the roller with a built-in motor 11, and a through hole 17a formed on a lateral plate part of the brackets 17 is communicated with a through hole 4a formed on the supporting frame 4. The mounting fastener 18 is applied between the holes 17a and 4a, so that the roller 11 containing the motor is mounted on the support frame 4. Thus, the roller with a built-in motor 11 and the support frame 4 can be unitized and transported to the installation site in a unitized state.

[0028] During assembly at the installation site, the support frame 4 unitized with a motorized roller 11 is connected to the conveyor frame 3. In this case, the connection of the support frame 4 to the lower portion of the conveyor frame 3 is performed in the following manner. In other words, the support frame 4 can be connected between the lower portions of the conveyor frames 3 by allowing the coupling19 to be applied from the elongated hole 4b to the hole 3b in a state in which the elongated holes 4b formed in the pair of bracket portions 4A of the support frame 4 communicated with the hole 3b formed in the conveyor frame 3. Here, the interlocking position can be adjusted within the range of the elongated hole 4b.

[0029] The roller 6 is provided between the conveyor frames 3 so as to be positioned at a plurality of positions in the longitudinal direction and freely rotatable. In other words, in the group of rollers 6, a group of driving rollers 6A and a group of rollers 6a are freely rotatably supported by holes (or notches) formed in the conveyor frame 3 via the roller shaft 7. At this time, the endless belt 21 and the interlocking belt 24, 25 are placed at predetermined positions using the groove portions 6a and 14a. Thus, a roller conveyor installation 1 in which a conveying path 8 is formed above a group of driving rollers 6a and a group of rollers 6 can be assembled.

[0030] As described above, by unitizing the roller with a built-in motor 11 and the support frame 4, and by preparing the support frame 4 corresponding to the conveyor width, the roller with a built-in motor 11 can be manufactured in make-to stock production. Further, since the conveyor frame 3 can be formed with a number of holes in consideration of only the connection with the support frame 4, it can be constructed inexpensively and with good appearance.

[0031] In the roller conveyor installation 1 assembled in this manner, the drive cylinder 14 can be forcibly rotated by driving the motor unit 15 of the roller with a built-in motor 11 based on the control signal from the control

panel 27. Then, with the drive cylinder 14 forcedly rotated, the pair of drive rollers 6A can be interlockingly rotated via the endless belt 21, and the roller 6 can be rotated interlockingly via the interlocking belt 24, 25. Thus, an article (object to be conveyed) can be conveyed on the conveyance path 8.

[0032] In this case, since the roller with a built-in motor 11 is interlocked with the two drive rollers 6A of the central portion, the interlocking means 23 distributes the rotational force in the forward and backward directions with the drive rollers 6A set as a base point, so that the group of rollers 6 can be rotated with the same rotational force and a smooth conveying force can be expected.

Further, by adopting the roller with a built-in motor 11 as the rotation driving means, it is possible to reduce the installation height and to compactly arrange the roller.

[0033] By allowing the rotation of the roller with a built-in motor 11 to be performed for each zone S, the group of rollers 6 in each zone S can be rotated with the same rotational force, and even if the conveying path 8 is long, a smooth conveying force can be expected over the entire length.

20 Further, the rotation of the roller with a built-in motor 11 can be controlled for each zone S, so that an article can be easily conveyed intermittently on the conveying path 8.

[0034] Next, the second embodiment of the present invention will be described with reference to FIG. 7. In other words, the motor (small servomotor) 31 is used as the rotational driving means, and the drive wheel 33 attached to the motor shaft 32 is connected to the drive roller 6A via an endless belt 21. The base portion 34 of the motor 31 is attached to the support frame 4 via the mounting fastener 18.

30 The groove 33a is formed in the driving wheel body 33.

[0035] According to the second embodiment, an inexpensive motor 31 can be employed as the rotation driving means, thereby reducing the overall cost. Next, the third embodiment of the present invention will be described with reference to FIG. 8.

[0036] In other words, the roller with a built-in motor 11 (rotation driving means) is interlocked with the one roller of the end portion, and the one roller of this end portion constitute the drive roller 6A.

40 [0037] According to the third embodiment, the arrangement of the endless belt 21 and the tension adjustment can be easily performed. Next, the forth embodiment of the present invention will be described with reference to FIG. 9.

[0038] In other words, the roller with a built-in motor 11 (rotation driving means) is positioned at the level of the group of rollers 6 and also serves as a drive roller. According to the forth embodiment, the drive roller can be omitted by the combined configuration of the roller with a built-in motor 11, thereby reducing the overall cost.

[0039] In the embodiment described above, a linear transport path 8 is shown, however, this can be configured with a curved conveying path 8 by adopting tapered rollers, etc. [0040] In the embodiment described above, a roller conveyor installation 1 which is divided into a plurality of zones S, which allows conveyance intermittently is shown, but a roller conveyor installaion1 and the like which conveys continuously on the conveyance path 8 can be similarly employed. Further, the conveyance path 8 may be a type in which the whole is driven by a single rotation driving means without being divided into a plurality of zones S.

[0041]

[Effect of the Invention] According to claim 1 of the present invention, when an order of the roller conveyor installation is received, a support frame with a length corresponding to the conveyor width is prepared and the rotation driving means is mounted on the support frame, whereby the rotation driving means and the support frame are unitized. During installation at the installation site, the rotation driving means and the support frame unitized as a unit is connected to the conveyor frame. At least one roller of a roller group freely rotatably provided between both conveyor frames is interlockingly connected to the rotation driving means, and the other roller group is interlocked via the interlocking means to form a conveying path above the roller group.

[0042] In this way, the rotation driving means and the support frame can be unitized so that the support frame according to the conveyor width is prepared, whereby the rotation driving means can be produced in make-to-stock production and the assembly can be carried out quickly with little adjustment. In addition, since the number of holes can be formed in consideration of only the connection with the support frame, the conveyor frame can be constructed inexpensively and with good appearance.

[0043] Further, according to claim2 of the present invention, since the rotation of the rotation driving means can be performed for each zone, the roller group in each zone can be rotated with the same rotational force, and even if a long conveying path is used, a smooth conveying force can be expected over the entire length, and the rotation of the rotation driving means can be controlled for each zone.

Thus, intermittent conveyance of an article on the conveyance path can be easily performed.

[0044] In addition, according to claim 3 of the present invention, the 2 rollers of the central portion are set as the base point, and the rotational force is distributed in the forward and backward directions by the interlocking means, whereby the roller group can be rotated with the same rotational force, and a smooth conveying force can be expected.

[0045] In addition, according to claim 4 of the present invention, it is possible to easily perform the arrangement of the interlocking structure of the rotation driving means and the roller and the tension adjustment. Furthermore, according to claim 5 of the present invention, control such as forward and reverse driving, accelerating and decelerating, and speed adjustment and the like can be performed with respect to the rotational driving means by the control signal from the control panel.

[0046] According to claim 6 of the present invention, it is possible to reduce the installation height of the rotation driving means and to compactly arrange the rotation driving means. Further, according to claim 7 of the present invention, an inexpensive motor can be employed as the rotation driving means, thereby reducing the overall cost.

[Brief Description of the Drawings]

[Fig. 1] FIG. 1 shows a partial cutaway side view of a roller conveyor installation according to the first embodiment of the invention.

[Fig. 2] FIG. 3 is a partial cutaway plan view of the roller conveyor installation.

[Fig. 3] FIG. 3 is a longitudinal front view of the roller conveyor installation.

[Fig. 4] FIG. 4 is a longitudinal front view of a portion of a rotation driving means in the roller conveyor installation.

[Fig. 5] FIG. 5 is a plan view of a main portion of the roller conveyor installation.

[Fig. 6] FIG. 6 is an exploded perspective view of a support frame portion in the roller conveyor installation.

[Fig. 7] FIG. 7 is a longitudinal front view of the roller conveyor installation according to the second embodiment of the invention.

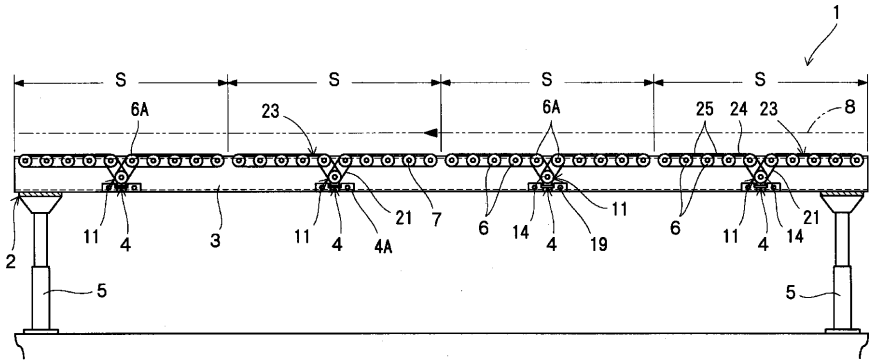
[Fig. 8] FIG. 8 is a side view of the main portion of the roller conveyor installation according to the second embodiment of the present invention.

[Fig. 9] FIG. 9 is a side view of the main portion of the roller conveyor apparatus according to the fourth embodiment of the present invention.

【Explanation of Symbols】

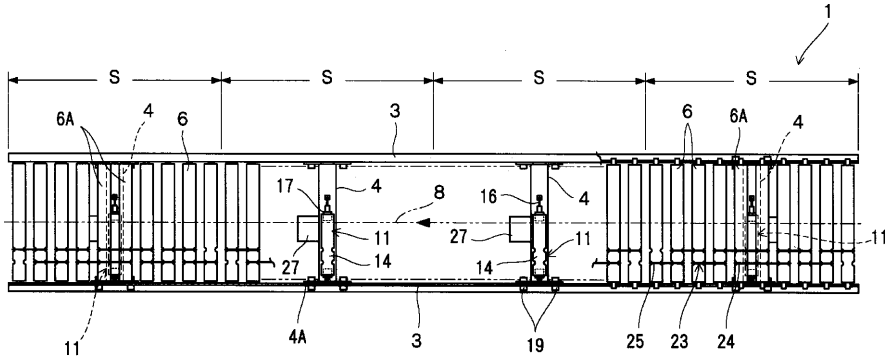
1	Roller Conveyor Installation
2	Frame Body
3	Conveyor Frame
4	Support Frame
4A	Bracket
5	Leg Member
6	Roller
6A	Drive Roller
6a	Groove
7	Roller Shaft
8	Transfer Path
11	Roller with a Built-in Motor (rotation driving means)
12	Shaft Body
14	Driving Cylinder
14a	Groove
15	Motor
17	Bracket
18	Mounting Fastener
19	Coupling
21	Endless Belt
23	Interlocking Means
24	Interlocking Belt
25	Interlocking Belt
27	Control Panel
31	Motor (rotation driving means)
32	Motor Shaft
33	Driving Wheel Body
S	zone

【Fig.1】



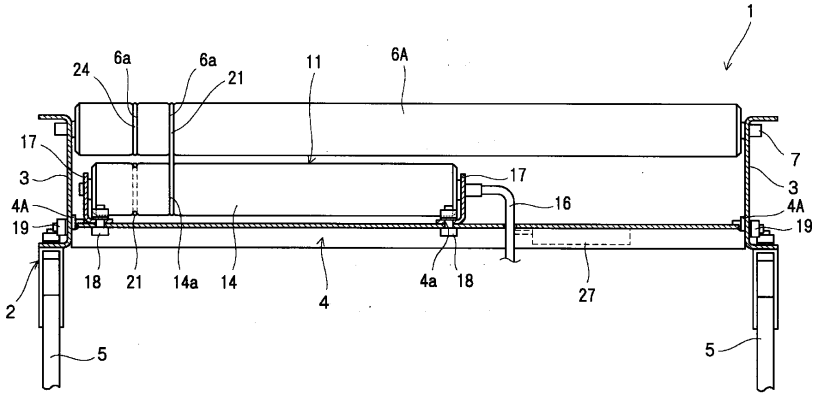
3. Conveyor Frame
4. Support Frame
6. Roller
6A. Drive Roller
11. Roller with a built-in motor
14. Drive Cylinder
23. Interlocking Means
S Zone

【Fig. 2】

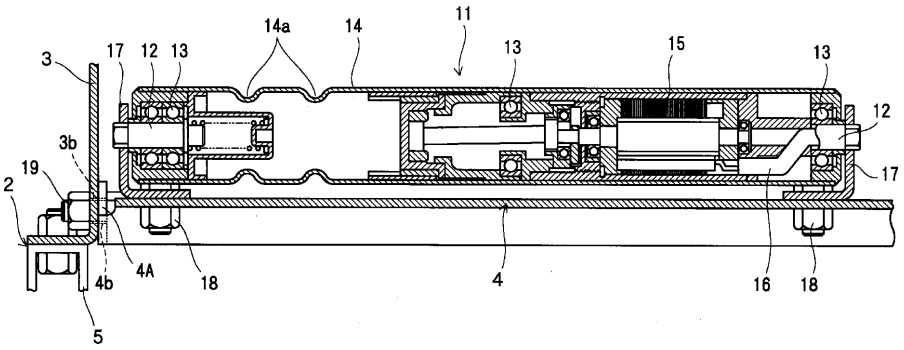


3. Conveyor Frame
4. Support Frame
11. Roller with a built-in motor (Rotation Driving Means)
27. Control Panel
S Zone

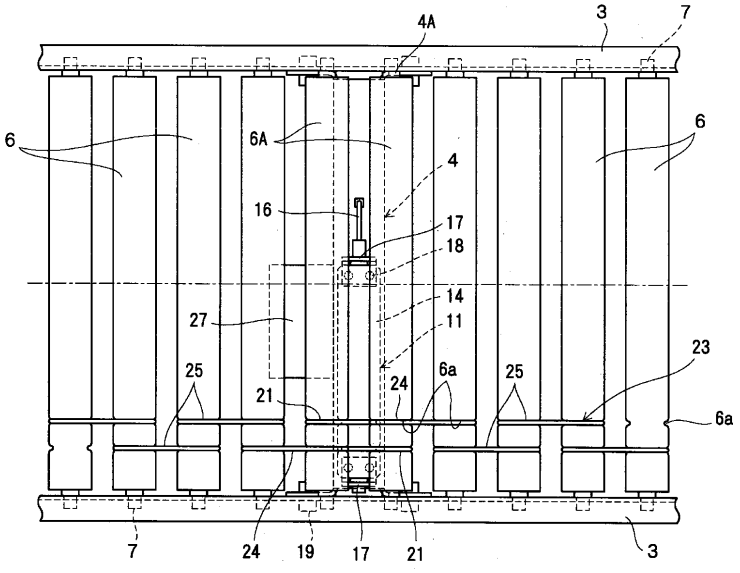
【Fig. 3】



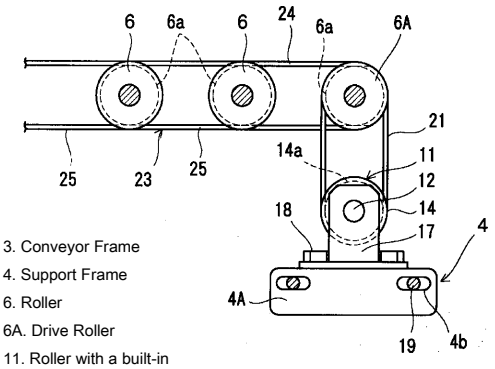
【Fig. 4】



【Fig. 5】

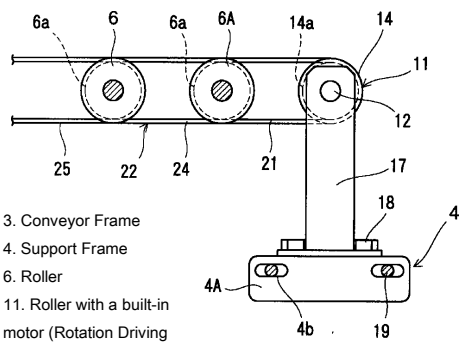


【Fig. 8】



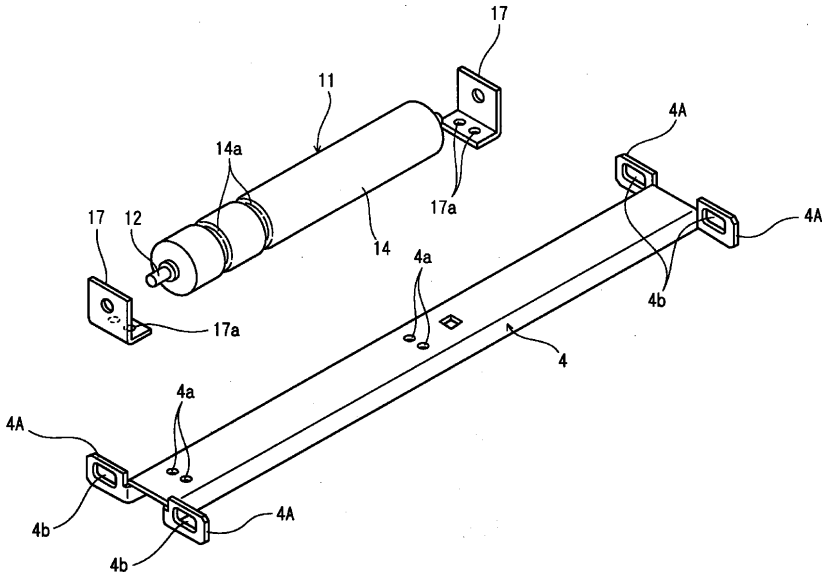
3. Conveyor Frame
4. Support Frame
6. Roller
6A. Drive Roller
11. Roller with a built-in motor (Rotation Driving Means)
14. Drive Cylinder
23. Interlocking Means

【Fig. 9】

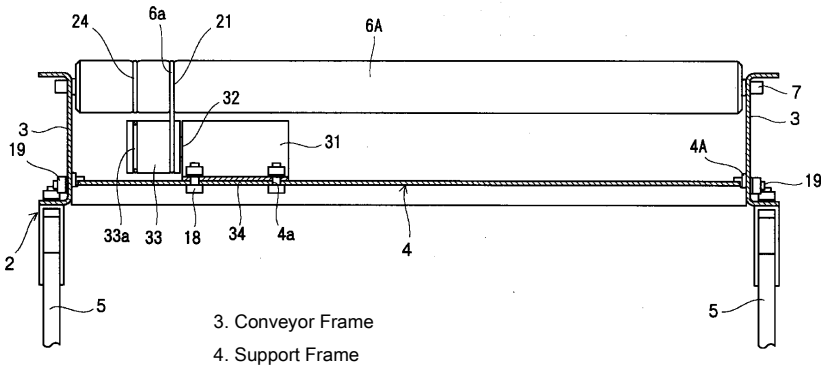


3. Conveyor Frame
4. Support Frame
6. Roller
11. Roller with a built-in motor (Rotation Driving Means)
14. Drive Cylinder
23. Interlocking Means

【Fig. 6】



【Fig. 7】



3. Conveyor Frame
4. Support Frame
6A. Drive Roller
23. Interlocking Means
31. Motor (Rotation Driving Means)
32. Motor Shaft