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(54) **Twisting device having two rows of spindles**

Zwirnmaschine mit zwei Reihen von Spindeln

Retordeuse avec des broches sur deux rangs

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(56) References cited:
EP-A- 0 299 506 **GB-A- 819 923**
GB-A- 1 277 430 **US-A- 4 136 512**

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a twisting device having enhanced productivity and, more particularly, to a twisting device, which changes the original one-to-one production structure into a two-to-two or a three-to-three production structure in the original space.

BACKGROUND OF THE INVENTION

[0002] Figs. 1 to 3 show a prior art twisting device, wherein a fiber strand 3 on a fiber cake 2 is connected to a bobbin 5 through the rotation of the fiber cake 2 on a creel 1. The fiber strand 3 between the fiber cake 2 and the bobbin 5 will be twisted through the rotation of a spindle motor 6. The fiber strand 3 after twisting passes through a strand-cut sensor 7 and then is wound around the bobbin 5 driven by the spindle motor 6. The balloon control ring 8 and the oil ring 9 are connected and simultaneously driven by the ring rail 10 to move upwards and downwards outside the bobbin 5. The bobbins 5 are separated one from another by separators 4. The above device is called a twisting machine. The twisting machine shown in the figures are mainly applied to fiberglass. Figs. 4 and 5 show the structure of a prior art oil ring 9. Oil is supplied to the oil ring 9 via an oil duct 1a on the ring rail 10. The oil duct is commonly an oil-supplying pipeline. However, if it is used as a dual-ring type oil ring of the present invention, the situation that oil cannot be supplied to the outer oil ring will happen.

[0003] As shown in Fig. 2, when the fiber cakes 2 are installed at the creels 1 of the above twisting machine, the creels 1 will be respectively arranged at the upper part and the lower part of the above machine to let each fiber cake 2 only match a bobbin 5 so as to maximize the use of space. However, this is only an improvement on the height and length of the mechanical structure. Moreover, the bearable weight of the creel 1 far exceeds the weight of the fiber cake 2. That is, the creel is designed to bear more than one fiber cakes. Although the prior art structure has been improved on the basic one-to-one twisting structure, it has the problem that the productivity cannot be further expanded using the same space.

[0004] From EP 0 299 506 B1 a twisting device is known which comprises a creel capable of rotating, one fiber cake formed by at least two fiber strands, wherein the fiber cake is capable of rotating with the creel to let the fiber strands be pendant, and at least two centering eyes respectively passed through by the pendant fiber strands. Further, at least two bobbins are provided below the centering eyes and are capable of rotating to fit the rotation of the creel so that the fiber strands can be respectively twisted and wound thereon.

SUMMARY OF THE INVENTION

[0005] One object of the present invention is to provide a twisting device having enhanced productivity, wherein a bobbin is added to each single set in the width direction of the machine, and a pair of fiber cakes are simultaneously placed on a creel in the original space configuration. The fiber cake is designed to have only a half width of the original fiber cake. Under the premise of the same weight of a fiber cake, the thickness of the fiber cake is increased so that two fiber cakes can be received in the structure of the creel. The original one-to-one production structure is thus changed into a two-to-two production structure. Therefore, the productivity can be doubled, and the cost of machines can be reduced. In other words, a machine of double productivity is obtained, and a half area of the twisting production line can be saved. Briefly, the productivity per unit time per unit ground area is doubled. The above method can also be used to expand the structure of a twisting machine into a three-to-three or a four-to-four structure.

[0006] To achieve the above object, a pair of fiber cakes are simultaneously hung on a transversely hung creel. The pair of fiber cakes respectively loosen two fiber strands downwards during the rotation process of the creel. Each of the two fiber strands passes through a strand-cut sensor and then enters a balloon control ring. Through the guide of an oil ring, each of the fiber strands is twisted and then wound around a bobbin driven by a spindle motor. The pair of balloon control rings and the pair of oil rings are simultaneously driven by a ring rail to move upwards and downwards on the bobbin. Therefore, a pair of fiber strands and a pair of bobbins can use the same creel.

[0007] The various objects and advantages of the present invention will be more readily understood from the following detailed description when read in conjunction with the appended drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS:

[0008]

Fig. 1 is a front view of a prior art twisting device;
 Fig. 2 is a side view of a prior art twisting device;
 Fig. 3 is a top view of a prior art twisting device;
 Fig. 4 is a top view of a prior art oil ring;
 Fig. 5 is a front view of a prior art oil ring;
 Fig. 6 is a front view of the present invention;
 Fig. 7 is a side view of the present invention;
 Fig. 8 is a top view of the present invention;
 Fig. 9 is a top view of an oil ring of the present invention;
 Fig. 10 is a front view of an oil ring of the present invention;
 Fig. 11 is a side view of an unfolded strand-cut sensor of the present invention; and
 Fig. 12 is a side view of a folded strand-cut sensor

of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0009] Figs. 6 to 8 show a twisting device having enhanced productivity of the present invention. A pair of fiber cakes 12 are simultaneously hung on a transversely hung creel 11. The pair of fiber cakes 12 respectively unloosen two fiber strands 13 downwards during the rotation process of the creel 11. Each of the two fiber strands 13 passes through a strand-cut sensor 17 and then enters a balloon control ring 18. Through the guide of an oil ring 19, each of the two fiber strands 13 is twisted and then wound around a bobbin 15. Each of the bobbins 15 is placed on a spindle plate 21 and driven by a spindle motor 16. The pair of balloon control rings 18 and the pair of oil rings 19 are connected to a ring rail 20. All pairs of the bobbins 15 are separated one from another by separators 14. The balloon control rings 18 and the oil rings 19 are simultaneously driven by the ring rail 20 to move upwards and downwards on outside the bobbins 15. Therefore, a pair of fiber cakes 12 and a pair of bobbins 15 can use the same creel 11.

[0010] A supporter 22 of the strand-cut sensor 17 is of inflectional shape, as shown in Figs. 7, 11, and 12, which has a supporter plate 220. The supporter plate 220 uses the first axis 221 to join the first supporter plate 222, which then uses the second axis 223 to join the second supporter plate 224. An outside strand-cut sensor 226 is joined on the second supporter plate 224. An inside strand-cut sensor 225 is joined in the supporter plate 220. The outside structures can be folded to form a structure that bobbin can be replaced more conveniently. After used, the second supporter plate 224 is first folded and hidden below the first supporter plate 222, and the first supporter plate 22 is then folded below the supporter plate 220.

[0011] Figs. 9 and 10 show a dual-ring type oil ring 19, which has an oil cup 23 added on the outside oil ring thereof. The oil cup 23 is used to provide oil for the outside oil ring. Moreover, because the ring rail 20 is connected to the inside oil ring, and the whole oil ring is designed to have a smaller weight, the oil ring can be raised or lowered more stably. Therefore, when the oil ring is expanded to form a multi-ring type oil ring, the oil ring will be a ring joined with another one, each ring having a direct oil-supplying device (an oil cup or an individual oil-supplying pipeline).

[0012] Space is fully exploited in the present invention. In the prior art, the creels are arranged up and down, each matching a bobbin arranged at the same row, as shown in Fig. 1. In the present invention, the creels are also arranged up and down, but a pair of fiber cakes are provided on the same creel to match two bobbins arranged fore and aft below, as shown in Figs. 7 and 8. Thereby, the productivity per unit ground area per unit time can be doubled. The weight of a single fiber

cake received in the creel is the same as that of the prior art shown in Fig. 3. Because the fiber cake of the present invention is narrower but thicker while the fiber cake in the prior art is wider but thinner, the weight of a single fiber cake of the present invention is equal to that of the prior art. Therefore, better use can be provided. Additionally, the above embodiment illustrates the present invention using a pair of fiber cakes provided on a creel to match a pair of bobbins. Similarly, more than two fiber cakes can be provided on a creel to match the same number of bobbins in the present invention.

[0013] Although the present invention has been described with reference to the preferred embodiments thereof, it will be understood that the invention is not limited to the details thereof.

Claims

1. A twisting device comprising:

a creel (11) hung in the machine width direction, **characterized in that**, the creel is capable of rotating;

at least two fiber cakes (12) simultaneously arranged abreast and coaxial on said creel (11), said fiber cakes (12) capable of rotating along with said creel (11) to let each fiber strand (13) be pendent;

at least two strand-cut sensors (17) respectively passed through by said pendent fiber strands (13);

at least two balloon control rings (18) and at least two oil rings (19) respectively provided below said strand-cut sensors (17), said oil rings (19) being disposed below said balloon control rings (18), said balloon control rings (18) and said oil rings (19) being connected to and driven by a ring rail (20) to make upward and downward reciprocal motions; and

at least two bobbins (15) provided below said oil rings (19) in a fore and aft arrangement in the machine width direction and capable of rotating to fit the rotation of said creel (11) so that said fiber strands (13) can be respectively twisted and then wound thereon.

2. The twisting device as claimed in claim 1, wherein a supporter (22) of said strand-cut sensor (17) is of inflectional shape.

3. The twisting device as claimed in claim 1, wherein said oil ring (19) is a ring joined with another ring, each having an oil-supplying device.

Patentansprüche

1. Eine Zwirnvorrichtung umfassend:

ein Spulrahmengestell (11), das in Richtung der Breite der Maschine aufgehängt ist, **dadurch gekennzeichnet, dass** das Spulrahmengestell in der Lage ist, sich zu drehen;

wobei die Zwirnvorrichtung ferner umfasst:

wenigstens zwei Faserkuchen (12) die zusammen Seite an Seite und koaxial auf dem Spulrahmengestell (11) angeordnet sind, wobei die Faserkuchen (12) in der Lage sind, sich zusammen mit dem Spulrahmengestell (11) zu drehen, um jeden Faserstrang (13) überhängend sein zu lassen;

wenigstens zwei Strangsnittsensoren (17), die von den überhängenden Fasersträngen (13) durchlaufen werden;

wenigstens zwei Kugelkontrollringe (18) und wenigstens zwei jeweils unterhalb der Strangsnittsensoren (17) bereitgestellte Ölringe (19), wobei die Ölringe (19) unterhalb der Kugelkontrollringe (18) angeordnet sind, wobei die Kugelkontrollringe (18) und die Ölringe (19) verbunden sind mit und angetrieben werden durch eine Ösenquerstange (20) zum Ausführen von sich wiederholenden Aufwärts- und Abwärtsbewegungen; und

wenigstens zwei Haspeln (15), die unterhalb der Ölringe (19) bereitgestellt sind in einer in Richtung der Breite der Maschine als Längsrichtung ausgerichteten Anordnung und dazu in der Lage sind, sich zu drehen, um mit der Drehung des Spulrahmengestells (11) zusammenzupassen, so dass die Faserstränge (13) jeweils gezwirnt und dann darauf aufgewickelt werden können.

2. Die Zwirnvorrichtung nach Anspruch 1, wobei ein Träger (22) des Strangsnittsensors (17) eine flektierende Form aufweist.

3. Die Zwirnvorrichtung nach Anspruch 1, wobei der Öhring (19) ein mit einem anderen Ring verbundener Ring ist, wobei jeder eine Ölzufuhrvorrichtung aufweist.

au moins deux gâteaux (12) de fibres agencées simultanément côte à côte et coaxialement sur ladite broche (11), lesdits gâteaux de fibres étant aptes à tourner avec ladite broche (11) pour laisser pendre chaque bout, ou mèche, (13) de fibres ;

au moins deux capteurs de casse de bout (17) sont respectivement traversés par lesdits bouts (13) de fibres pendants ;

au moins deux anneaux de contrôle du ballon (18), et au moins deux anneaux de lubrification (19) respectivement installés sous lesdits capteurs de casse de bout (17), lesdits anneaux de lubrification (19) étant disposés sous lesdits anneaux de contrôle de ballon (18), lesdits anneaux de contrôle du ballon (18) et lesdits anneaux de lubrification (19) étant connectés à un rail circulaire (20) et entraînés par celui-ci pour effectuer des mouvements de va-et-vient vers le haut et vers le bas ; et

au moins deux bobines (15) installées sous lesdits anneaux de lubrification (19) disposées dans le sens de la largeur de la machine dans une disposition avant et arrière et aptes à tourner de manière à s'adapter à la rotation de ladite broche (11) de telle manière que lesdits bouts (13) de fibres peuvent être respectivement tordus puis être enroulés sur celle-ci.

2. Dispositif de retordage selon la revendication 1, dans lequel un support (22) du capteur de bout cassé (17) a une forme comportant une inflexion.

3. Dispositif de retordage selon la revendication 1, dans lequel ledit anneau de lubrification (19) est un anneau assemblé avec un autre anneau, chacun des deux étant muni d'un dispositif d'apport de lubrifiant.

Revendications

1. Dispositif de retordage comprenant

une broche (11) suspendue dans le sens de la largeur de la machine, **caractérisé en ce que** la broche est apte à être mise en rotation ;

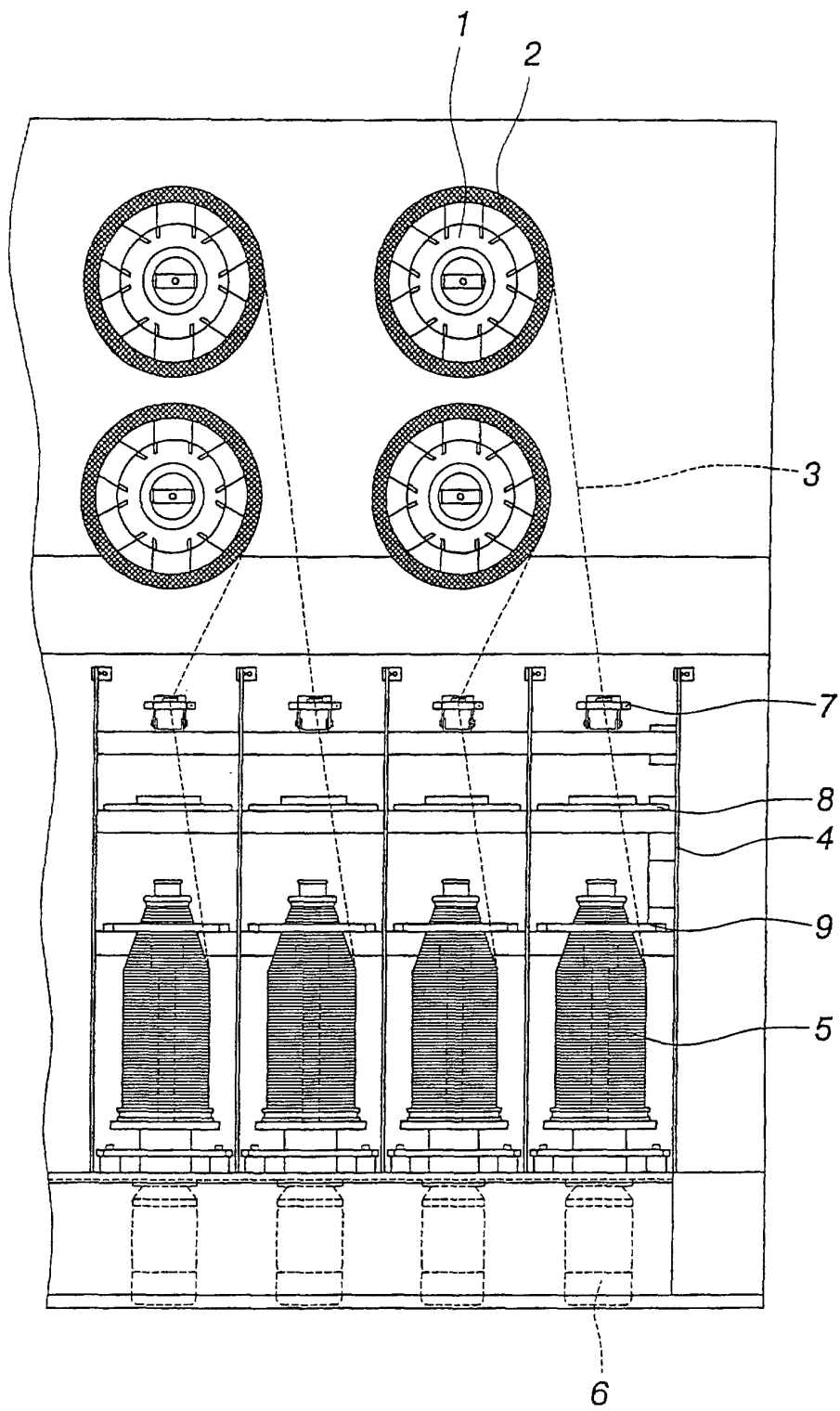


FIG. 1
PRIOR ART

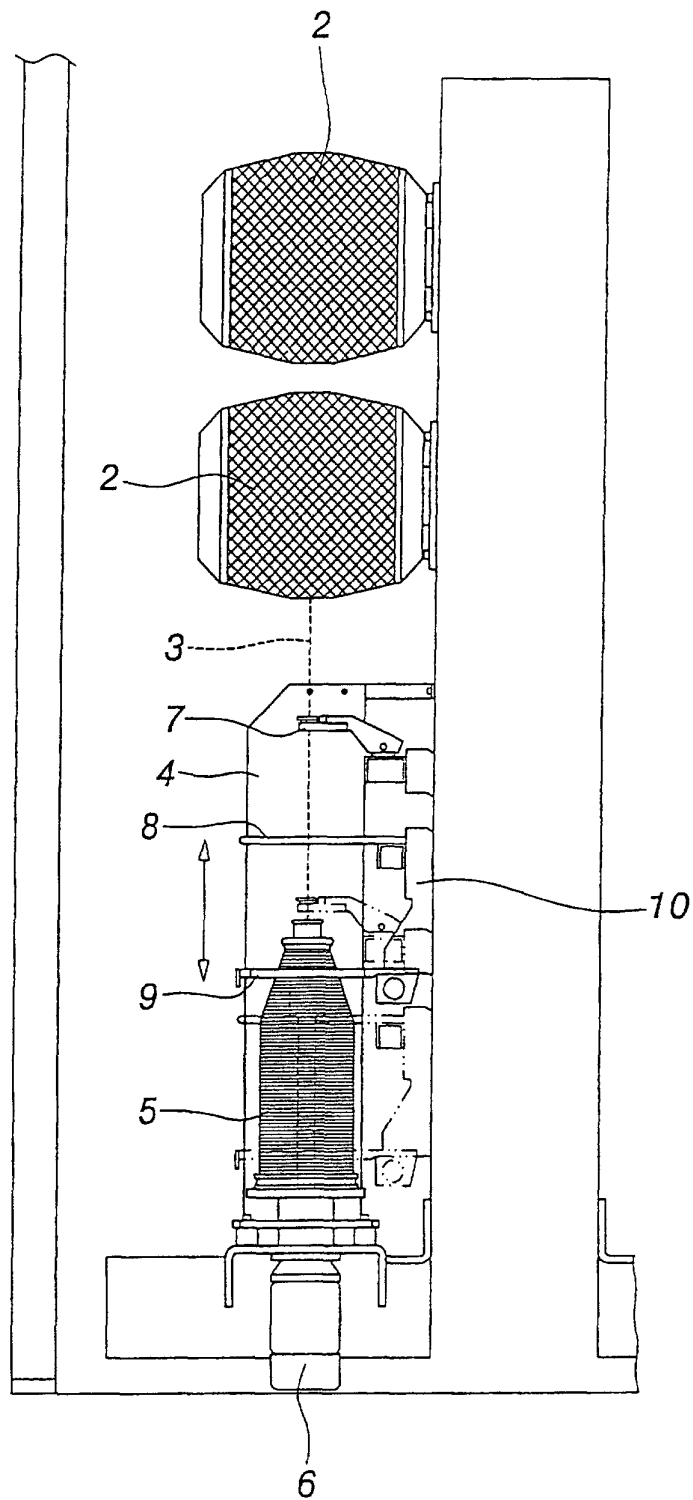


FIG. 2
PRIOR ART

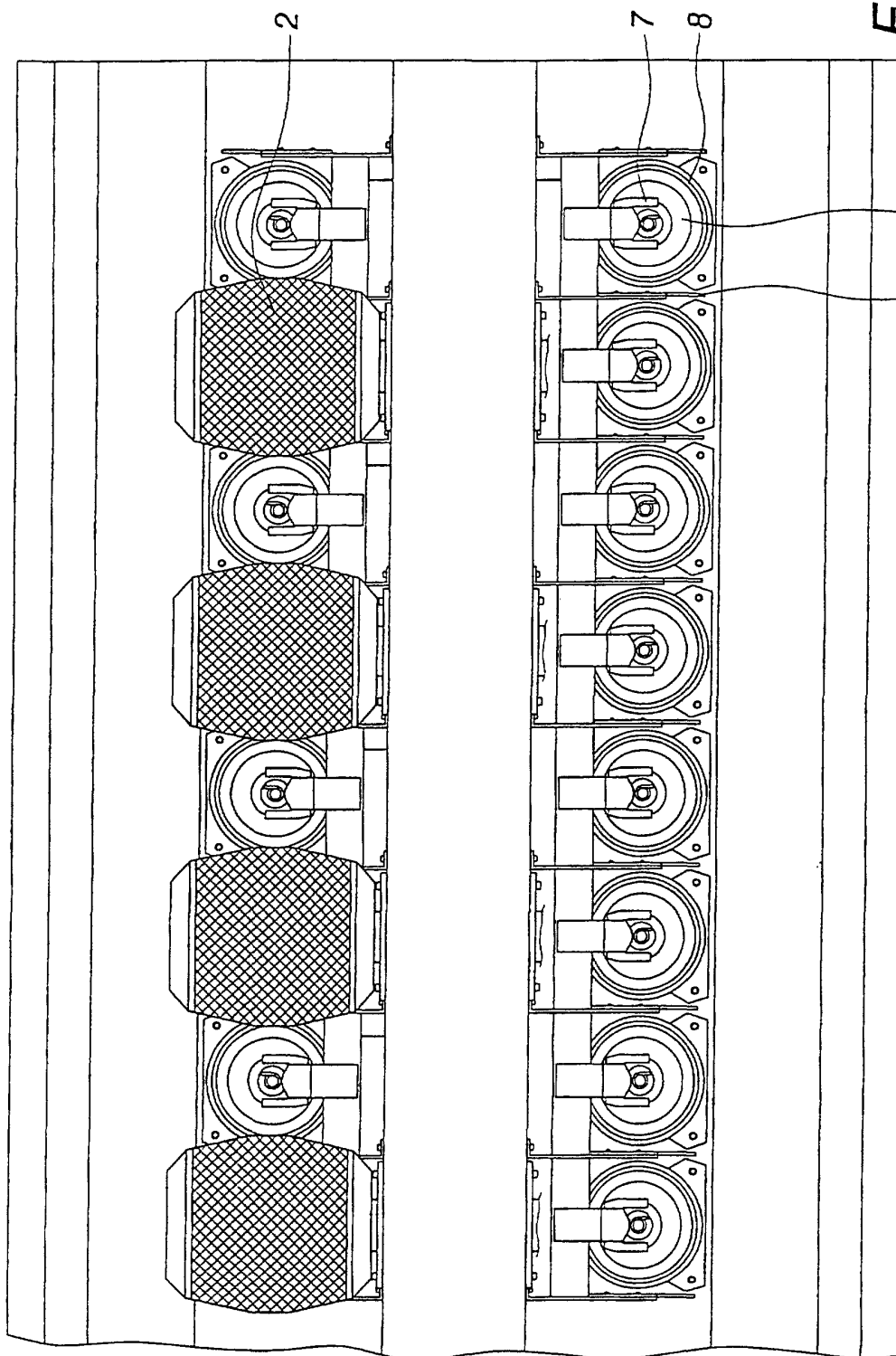


FIG. 3
PRIOR ART

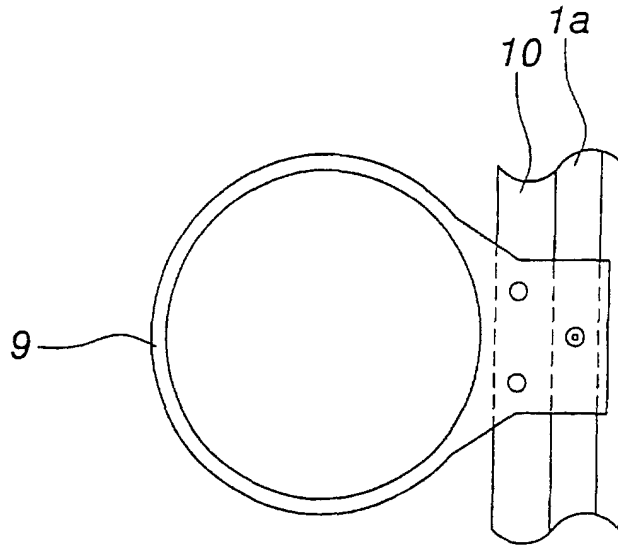


FIG. 4
PRIOR ART

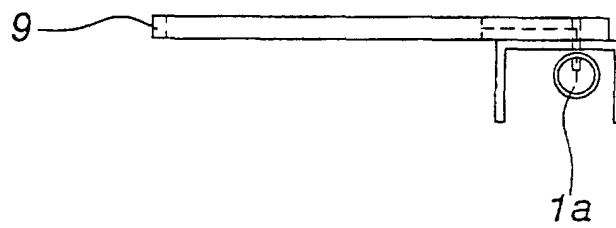


FIG. 5
PRIOR ART

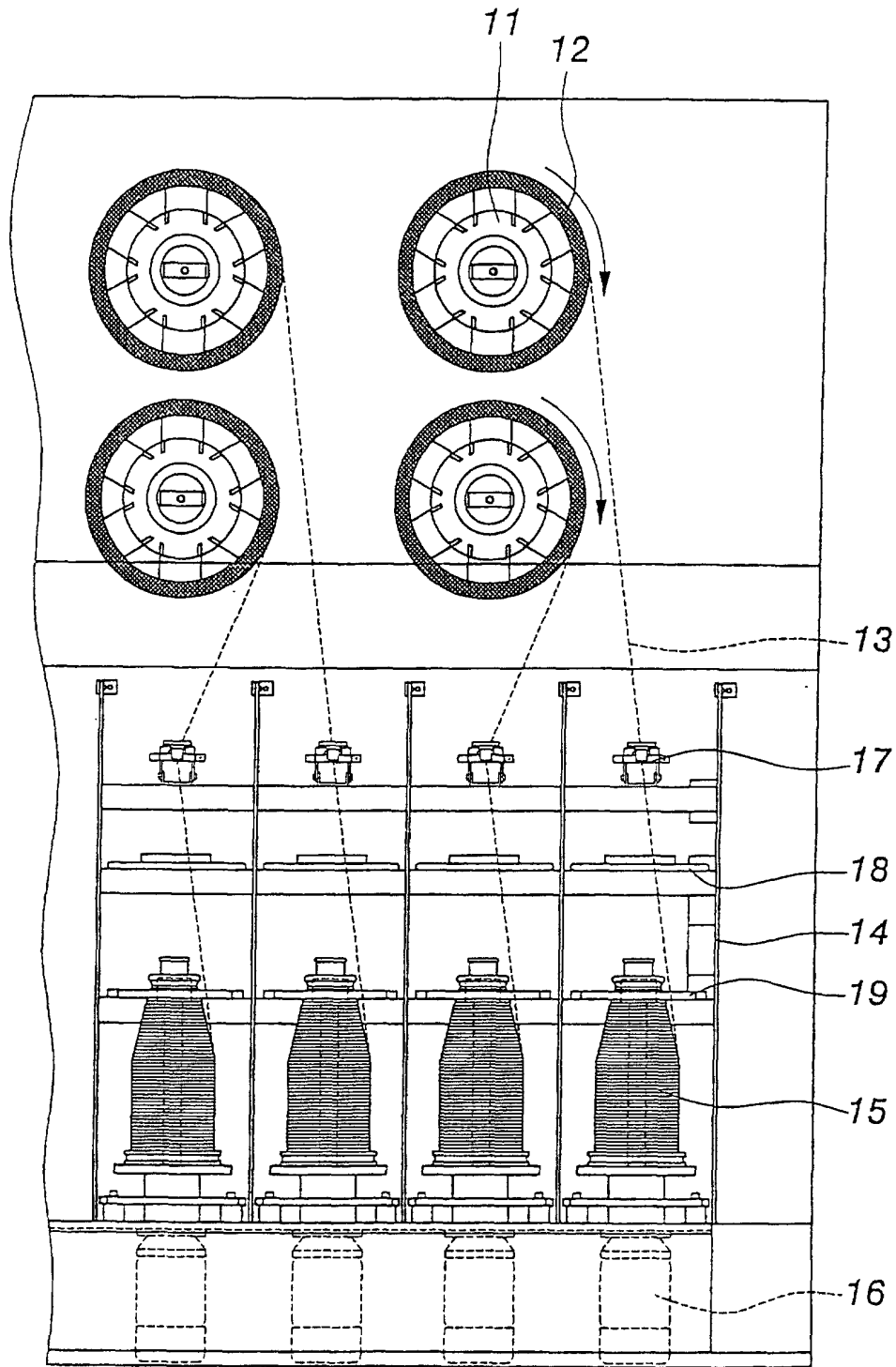


FIG. 6

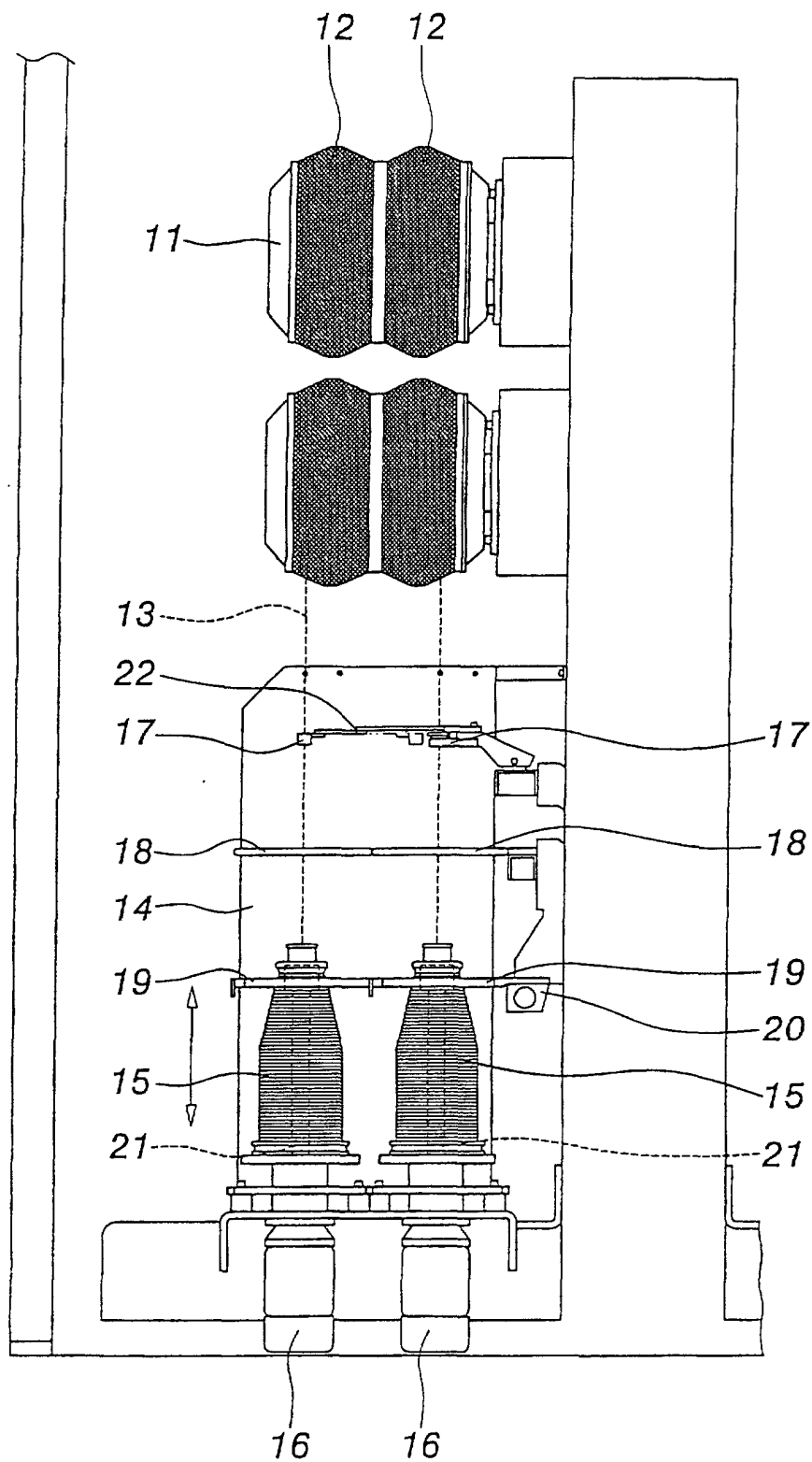
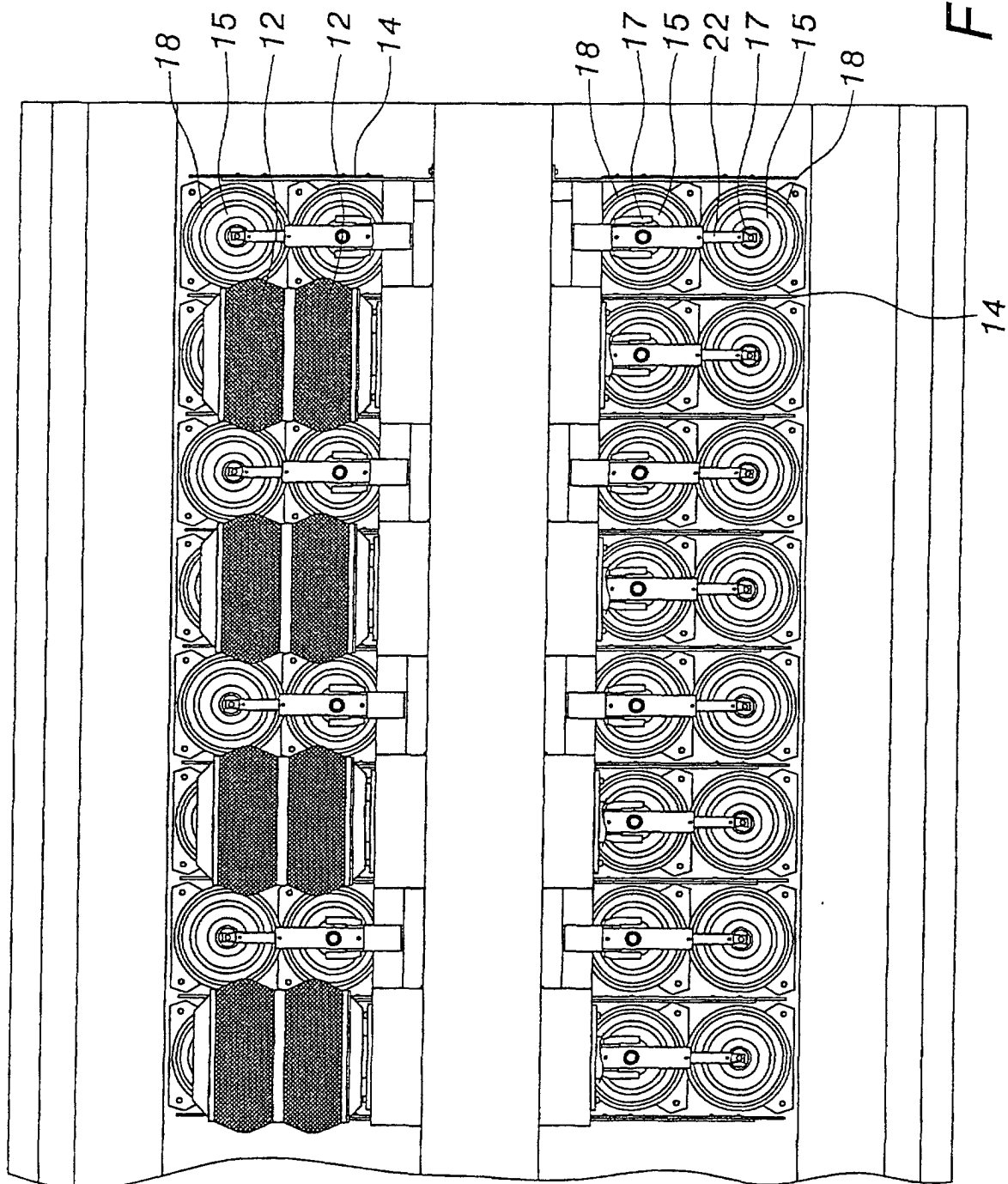


FIG. 7



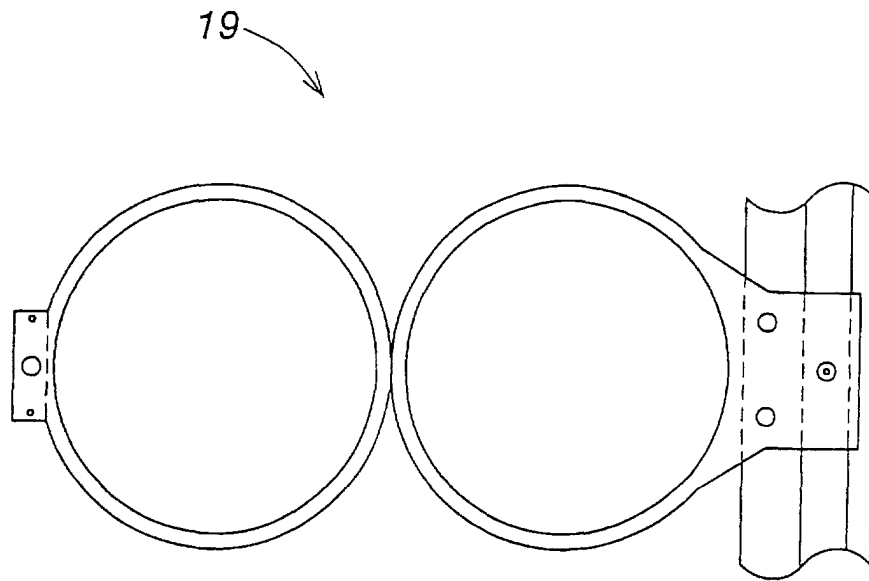


FIG. 9

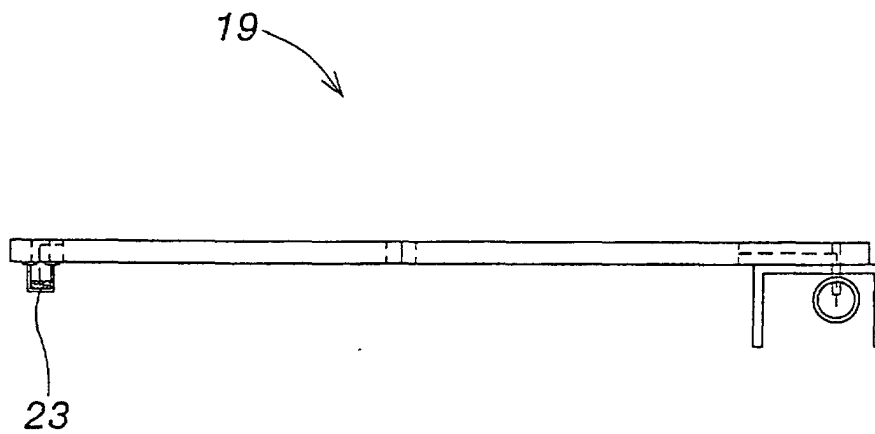


FIG. 10

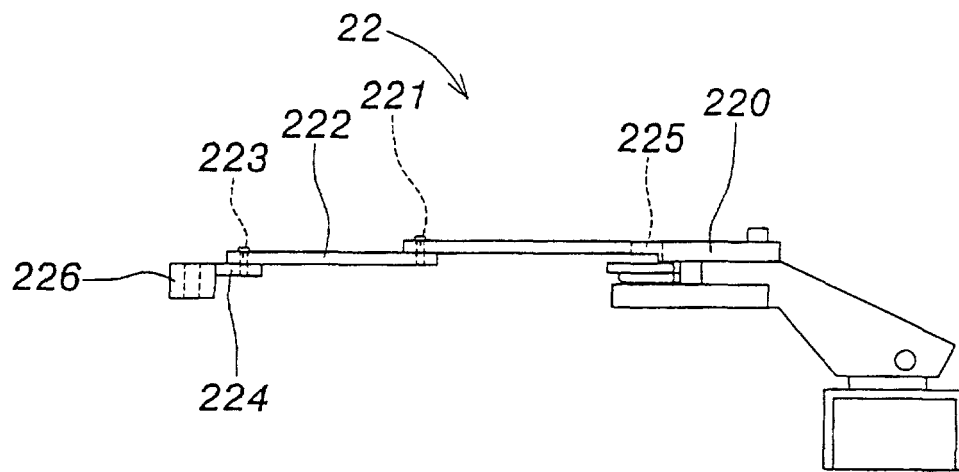


FIG. 11

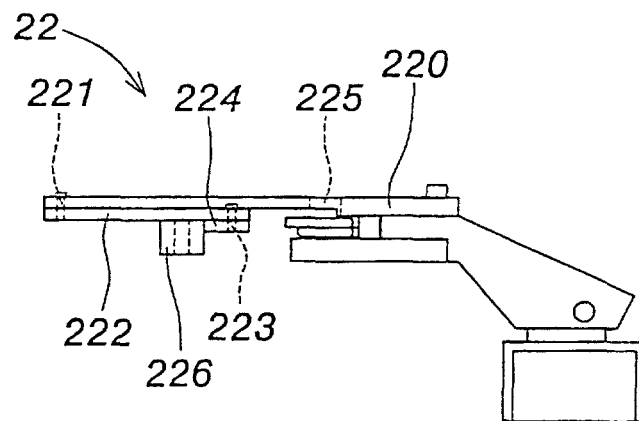


FIG. 12