



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) Publication number:

**0 477 978 B1**

(12)

## EUROPEAN PATENT SPECIFICATION

(49) Date of publication of patent specification: **28.12.94** (51) Int. Cl.<sup>5</sup>: **B65H 59/08**

(21) Application number: **91116573.6**

(22) Date of filing: **27.09.91**

(54) **Unwinding tension applying device for package.**

(30) Priority: **28.09.90 JP 262826/90**

(43) Date of publication of application:  
**01.04.92 Bulletin 92/14**

(45) Publication of the grant of the patent:  
**28.12.94 Bulletin 94/52**

(84) Designated Contracting States:  
**BE CH DE FR GB IT LI**

(56) References cited:  
**DE-A- 1 535 151 DE-A- 2 063 550**  
**FR-A- 967 688 FR-A- 2 186 949**  
**FR-A- 2 288 052 GB-A- 640 967**

(73) Proprietor: **TSUDAKOMA KOGYO KABUSHIKI KAISHA**  
**18-18, Nomachi 5-chome**  
**Kanazawa-shi**  
**Ishikawa-Ken (JP)**

(72) Inventor: **Tanaka, Masayoshi**  
**80-2, Oshino 1-chome**  
**Kanazawa-shi,**  
**Ishikawa-ken (JP)**

(74) Representative: **Tiedtke, Harro, Dipl.-Ing. et al**  
**Patentanwaltsbüro**  
**Tiedtke-Bühling-Kinne & Partner**  
**Bavariaring 4**  
**D-80336 München (DE)**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

## Description

### [Background Art]

The present invention relates to an unwinding tension applying device for applying a predetermined unwinding tension to yarn when the yarn is unwound axially from a package (so-called a yarn supply package) formed by winding the yarn in a predetermined shape.

In the textile industry, in many cases yarn is wound round a bobbin into a predetermined shape and is handled as a package.

When such packages are used for beaming process, for example a warp sizing process, it is necessary to arrange a large number of packages on a creel and unwind plural yarns simultaneously from those packages.

In this case, if the yarns are unwound in the absence of tension, there may occur kinky thread (snarl) or entanglement of yarns, so during unwinding of the yarns from the packages it is necessary to apply suitable unwinding tension to the yarns, that is applying suitable resistance to unwinding the yarns.

As an unwinding tension applying device used for such purpose it is known from the JP-patent publication No. Sho 53-1867 to use an endless cloth-like friction member F, as shown in Fig. 9. In the same figure, a package P is mounted substantially horizontally on a creel frame (not shown) through a spindle SP, and sideways of the package P there is disposed a fixed rod RD in parallel with an axis Pc of the package P. Inside the friction member F is inserted the package P so that the friction member is entrained about the package. An intermediate part of the friction member F is passed round the fixed rod RD, and a weight W is inserted into an opposite end side of the friction member which side is hanging down.

A tension according to the weight of the weight W is created in the friction member F, which in turn exerts a pushing force against the outer peripheral surface of the package P, so that a predetermined unwinding tension can be applied to the yarn Y being unwound from the surface of the package. This is because the yarn Y is drawn out in the direction of the axis Pc while being sandwiched in between the package P and the friction member F.

According to such prior art, at every replacement of packages from one to another it is required to bring the friction member F into engagement with the newly-set package. But the removal and mounting of the friction member with respect to the package are troublesome and the working efficiency is poor.

### [Disclosure of the Invention]

Therefore, it is a primary object of the present invention to provide an unwinding tension applying device for a package capable of greatly improving the working efficiency in package replacement, etc. This object is achieved through a device according to claim 1.

### [Brief Description of the Drawings]

Fig. 1 is an explanatory front view showing an embodiment of the present invention;

Figs. 2(A) to 2(C) are side views showing package winding shapes applicable to the present invention;

Fig. 3 is a side view showing a principal portion of the embodiment illustrated in Fig. 1;

Figs. 4, 5 and 6 are explanatory front views showing other embodiments of the present invention;

Fig. 7 is an explanatory perspective view showing a further embodiment of the present invention;

Fig. 8 is an explanatory front view showing a still further embodiment of the present invention; and

Fig. 9 is an explanatory perspective view showing a conventional tension applying device.

### [Detailed Description of the Invention]

Referring first to Fig. 1, there is illustrated an unwinding tension applying device for a package according to a typical embodiment of the present invention. This unwinding tension applying device includes a pair of friction members 11, 11 disposed in a suspended fashion on both sides of a package 1, and operating members 21, 21, 22, 22 which are disposed exteriorly on both sides of the friction members.

The package 1 is formed by winding yarn in a predetermined winding shape around a bobbin 1a. Its winding shape is usually a parallel cheese shape having parallel both ends as shown in Fig. 2(A), or it may have a tapered portion 1b at one end thereof as shown in Fig. 2(B), or it may have tapered portions 1b, 1b at both ends. A spindle 2a is projecting substantially horizontally from a creel frame 2, and the bobbin 1a of the package 1 is fitted on the spindle 2a, whereby the package 1 is mounted substantially horizontally on the creel frame 2.

As shown in Fig. 3, the friction members 11, 11 are each constituted by a band-like member having a predetermined width  $d$  so as to cover at least an end portion on a yarn Y draw-out side of the package 1, with their upper ends being fixed to the

creel frame 2. Weights 11a, 11a are connected to the lower ends of the friction members 11, 11. It is here assumed that the spacing D between the friction members 11, 11 in a naturally suspended state is larger than a maximum diameter of the package 1. The friction members 11, 11 are each constituted by a sheet-like member such as, for example, cloth, plastic sheet, or rubber sheet, and can bend freely.

The operating members 21, 21, 22, 22 are disposed outside the friction members 11, 11 and above and below the package 1, each in parallel with an axis 1c of the package 1. The operating members 21, 21, 22, 22 are each constituted by a rod which is longer than the width d of each friction member 11. Each pair of such operating members located on both sides of the friction members 11, 11 move toward each other and assume operating positions (indicated by dash-double dot lines in Fig. 1) and can also move away from each other and assume retracted positions (indicated by solid lines in Fig. 1).

While the yarn Y is drawn out in the direction of the axis 1c of the package 1 as shown in Fig. 3, the operating members 21, 21, 22, 22 are positioned to the respective operating positions 21', 22', ..., the friction members 11, 11 are bent by the operating members both above and below the package 1 and can thereby be brought into contact with the peripheral surface of the package. At this time, since a tension according to the weight of each weight 11a is applied downwards to each friction member 11, the yarn Y is sandwiched in between the surface of the package 1 and the friction members 11, 11, whereby an appropriate unwinding tension can be applied to the yarn.

On the other hand, upon movement of the operating members 21, 21, 22, 22 to their retracted positions, the friction members 11, 11 leave the package 1 and hang down vertically, so that any force is no longer exerted on the yarn Y being unwound from the package. In package replacement, therefore, the operation can be restarted by moving the operating members 21, 21, 22, 22 to their retracted positions, then loading a new package 1 and thereafter returning the friction members 11, 11 again to their operating positions.

#### Other Embodiments

There may be adopted such a construction as shown in Fig. 4, in which one of lower operations members 22, 22 is largely moved obliquely upwards to an operating position 22', while the other operating member 22 is slightly moved horizontally to an operating position. The length of contact of the friction member 11 associated with the largely moved operating member 22 with respect to the

package 1 can be adjusted over a wide range by adjusting the operating position of the said operating member 22. Therefore, the magnitude of an unwinding tension to be applied to the yarn Y can also be adjusted over a wide range.

Also, there may be adopted such a construction as shown in Fig. 5, in which a friction member 11 is disposed on only one side and as an operating member corresponding thereto there is disposed only a lower operating member 22. The operating member 22 is fixed to a front end of a downwardly curved rocking arm 22a, which arm is constructed to pivot about a shaft 22b. When the rocking arm 22a is moved pivotally in the direction of arrow in the same figure, the operating member 22 moves to an operating position 22', whereby the friction member 11 can be contacted with about a lower half of the peripheral surface of the package 1.

In addition to the friction member 11 used in the embodiment illustrated in Fig. 5 there may be disposed a friction member 11 (see Fig. 6) also on the other side with respect to the package 1. In this case, the friction member 11 on the other side can be contacted with the package 1 from above by means of an operating member 21 which can largely move obliquely downwards. In this case, an auxiliary operating member 23 is disposed for the friction member 11 in question. The auxiliary operating member 23 slightly moves horizontally in synchronism with the operating member 21 to avoid mechanical interference with the friction member 11 associated with the operating member 22. It is desirable to constitute the auxiliary operating member 23 so that it moves back to its retracted position together with the operating member 21, thereby separating the friction member 11 farther from the package 1.

Referring now to Fig. 7, there is illustrated a further embodiment of the present invention, in which friction members 11 opposed to each other can be brought into contact with all of plural packages 1, 1 which are arranged vertically in parallel. In this embodiment, upper ends of the friction members 11, 11 are connected to auxiliary operating members 24, 24 which can move horizontally in synchronism with operating members 21, 21, 22, 22, and lower ends of the friction members 11, 11 are interconnected while carrying a common weight 11a thereon. The friction members 11, 11 are pressed at three points - upper, middle and lower points - with respect to the packages 1, 1 by the auxiliary operating members 24, 24 and the operating members 21, 21, 22, 22, whereby the frictions members can be contacted with the packages simultaneously.

In this embodiment, the number of the packages 1, 1 arranged vertically in parallel can be

increased optionally. Further, packages 1, 1, ... may be arranged in plural parallel rows, and the auxiliary operating members 24, 24 and the operating members 21, 21, 22, 22 for each those rows may be driven between their operating positions and retracted positions simultaneously by means of a common driving mechanism.

There may be adopted such a structure as illustrated in Fig. 8, in which friction members 11, 11 are contacted in common with plural packages 1, 1, ... which are arranged laterally side by side. Operating members 21, 21, 22, 22, ... are disposed on both right and left sides of the packages 1, 1, ... and also in intermediate positions between adjacent packages in a vertically sandwiching relation to the friction members 11, 11. One ends of the friction members 11, 11 are fixed to a creel frame 2, while the other ends thereof are allowed to hang down and then connected together, with a weight 11a carried thereon.

In the embodiments illustrated in Figs. 7 and 8, the connection between the friction members 11, 11 may be rendered disengageable using such a connecting member as a zipper for example. This is convenient for changing the weight 11a to adjust the tension to be applied to the friction members 11, 11.

In all of the above embodiments, it goes without saying that the width  $d$  of each friction member 11 may be almost equal to or somewhat longer than the overall length of the package 1. Or the width  $d$  of the friction member 11 may be made extremely small into a thick string not permitting the engagement of the yarn Y therewith. Further, since the weight 11a is for applying an appropriate tension to the friction member 11, it may be substituted by a suitable spring member.

According to the present invention, as set forth above, friction members capable of being bent and operating members for bending the friction members into contact with a package are combined together, whereby upon movement of the operating members to their operating positions, an unwinding tension can be applied to yarn through the friction members, while upon movement of the operating members to their retracted positions, the friction members can be moved out of contact with the package. In package replacement, therefore, it is not necessary to pass the friction members round the package and disengage them from the package, whereby the working efficiency can be greatly improved. Further, the package replacement and a series of creel operations associated therewith can be automated easily. These excellent effects are attained by the present invention.

The present invention relates to an unwinding tension applying device for applying tension to yarn being unwound from a package formed by

winding of the yarn thereon. According to this unwinding tension applying device, friction members on which is exerted the gravity of weight or the tenseness of spring member are brought into contact with the outer periphery of the package by moving operating members close the package, whereby not only the occurrence of kinky thread (snarl) and the entanglement of yarn can be prevented, but also since the operating members and the friction members can be moved away from the package, it is possible to effect the package replacement easily.

### Claims

1. An unwinding tension applying device for a package (1), having a friction member (11) capable of being bent and disposed sideways of the package (1) in contact with an outer peripheral surface of the package (1), having a weight (11a) or a spring member connected to the said friction member (11) in order to keep the friction member (11) in a tense state, characterized in that an operating member (22) parallel to a package axis (1c) and capable of approaching and leaving the package (1) is disposed outside the friction member (11).
2. An unwinding tension applying device for a package according to claim 1, wherein said friction member (11) is disposed on either the right or the left side of the package (1) or on both right and left sides of the package, and a pair of operating members (21, 22) are disposed above and below the package (1).
3. An unwinding tension applying device for a package according to claim 1, wherein said friction member (11) is disposed either above or below the package (1) or both above and below the package, and a pair of operating members (21, 22) are disposed on the right and left sides of the package (1).
4. An unwinding tension applying device for a package according to claim 1, wherein said operating member (22) is disposed pivotably through a shaft (22b) and a rocking arm (22a).
5. An unwinding tension applying device for a package according to claim 4, wherein another operating member (21) is disposed in a position opposed to the operating member (22) with the package located therebetween.
6. An unwinding tension applying device according to any of claims 1, 2 and 3, wherein plural said friction members (11) are disposed along

plural package rows.

geordnet sind.

## Patentansprüche

1. Vorrichtung zum Aufbringen einer Abwickelspannung an einem Wickel (1), die ein Reibungselement (11) aufweist, das verbiegbar ist und zum Anordnen seitlich des Wickels (1) in Berührung mit einer äußeren Umfangsfläche des Wickels (1) geeignet ist, die ein Gewicht (11a) oder ein durch das Reibungselement (11) in einem gespannten Zustand gehaltenes Federelement, welches mit dem Reibungselement (11) verbunden ist, um das Reibungselement (11) zu halten, aufweist, dadurch gekennzeichnet, daß ein Stellelement (22), das parallel zu einer Wickelachse (1c) ist und dazu geeignet ist, dem Wickel (1) angenähert zu werden und den Wickel (1) zu verlassen, an der Außenseite des Reibungselements (11) angeordnet ist. 5 10 15 20
2. Vorrichtung zum Aufbringen einer Abwickelspannung an einem Wickel gemäß Anspruch 1, wobei das Reibungselement (11) entweder auf der rechten oder auf der linken Seite des Wickels (1) oder sowohl auf der rechten als auch auf der linken Seite des Wickels angeordnet ist, und ein Paar Stellelemente (21, 22) oberhalb und unterhalb des Wickels (1) angeordnet sind. 25 30
3. Vorrichtung zum Aufbringen einer Abwickelspannung an einem Wickel gemäß Anspruch 1, wobei das Reibungselement (11) entweder oberhalb oder unterhalb des Wickels (1) oder sowohl oberhalb als auch unterhalb des Wickels angeordnet ist, und ein Paar Stellelemente (21, 22) auf der rechten und der linken Seite des Wickels (1) angeordnet sind. 35 40
4. Vorrichtung zum Aufbringen einer Abwickelspannung an einem Wickel gemäß Anspruch 1, wobei das Stellelement (22) mittels einer Welle (22b) und eines Schwenkarms (22a) drehgelenkig angeordnet ist. 45
5. Vorrichtung zum Aufbringen einer Abwickelspannung an einem Wickel gemäß Anspruch 4, wobei ein anderes Stellelement (21) in einer Position angeordnet ist, die dem Stellelement (22) gegenüberliegt, wobei der Wickel dazwischen angebracht ist. 50
6. Vorrichtung zum Aufbringen einer Abwickelspannung gemäß einem der Ansprüche 1, 2 und 3, wobei mehrere von den Reibungselementen (11) entlang mehrerer Wickelreihen an-

## Revendications

1. Dispositif d'application de tension de déroulement pour une bobine de fil (1), comprenant un organe de friction (11) capable d'être plié et disposé latéralement par rapport à la bobine (1) et en contact avec une surface périphérique externe de la bobine (1), comportant un poids (11a) ou un organe élastique rolié audit organe de friction (11) de façon à maintenir celui-ci à l'état tendu, caractérisé en ce qu'un organe d'actionnement (22) parallèle à l'axe (1c) de la bobine et capable de s'approcher et de s'éloigner de la bobine (1) est disposé à l'extérieur de l'organe de friction (11).
2. Dispositif d'application de tension de déroulement pour une bobine de fil selon la revendication 1, dans lequel ledit organe de friction (11) est disposé soit sur le côté droit soit sur le côté gauche de la bobine (1) soit sur les deux côtés de droite et de gauche de la bobine, et les paires d'organes d'actionnement (21, 22) sont disposés au-dessus et au-dessous de la bobine (1).
3. Dispositif d'application de tension de déroulement pour une bobine de fil selon la revendication 1, dans lequel ledit organe de friction (11) est disposé soit au-dessus soit au-dessous de la bobine (1) ou à la fois au-dessus et au-dessous de la bobine, et une paire d'organes d'actionnement (21, 22) sont disposés sur les côtés de droite et de gauche de la bobine (1).
4. Dispositif d'application de tension de déroulement pour une bobine de fil selon la revendication 1, dans lequel ledit organe d'actionnement (22) est monté de façon pivotante au moyen d'un arbre (22b) et d'un bras basculant (22a).
5. Dispositif d'application de tension de déroulement pour une bobine de fil selon la revendication 4, dans lequel un autre organe d'actionnement (21) est disposé dans une position opposée à l'organe d'actionnement (22), la bobine étant disposée entre eux.
6. Dispositif d'application de tension de déroulement selon l'une quelconque des revendications 1, 2 et 3, dans lequel plusieurs desdits organes de friction (11) sont disposés le long de plusieurs rangées de bobines.

Fig. 1

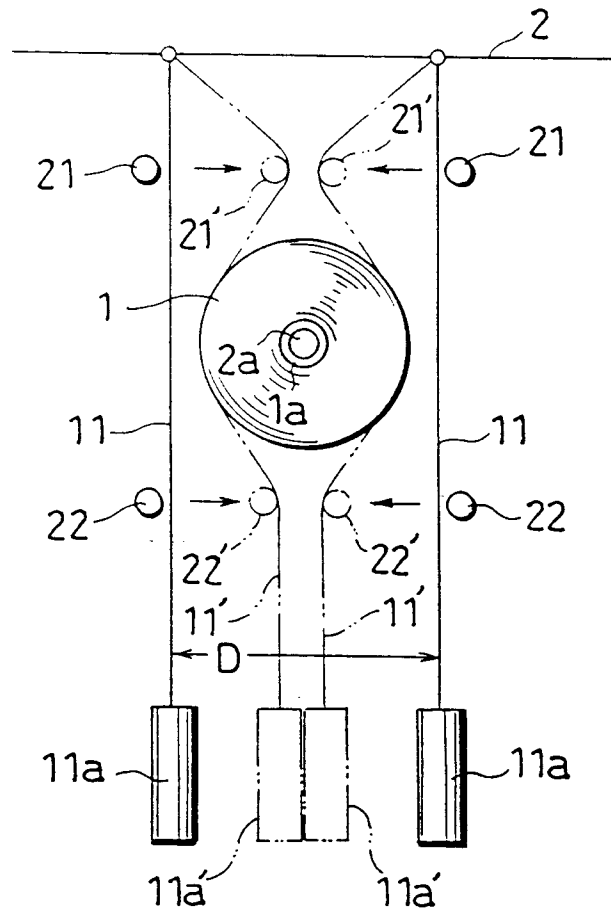


Fig. 2A

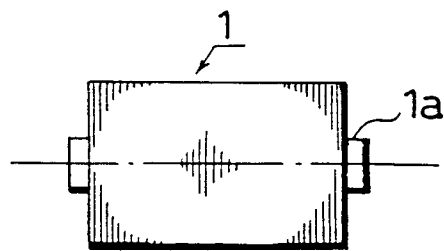


Fig. 2B

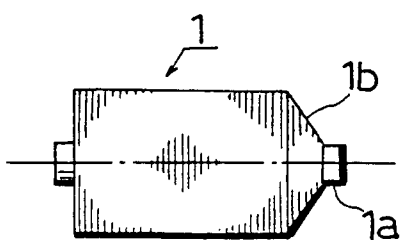


Fig. 2C

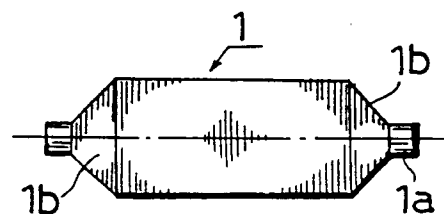


Fig. 3

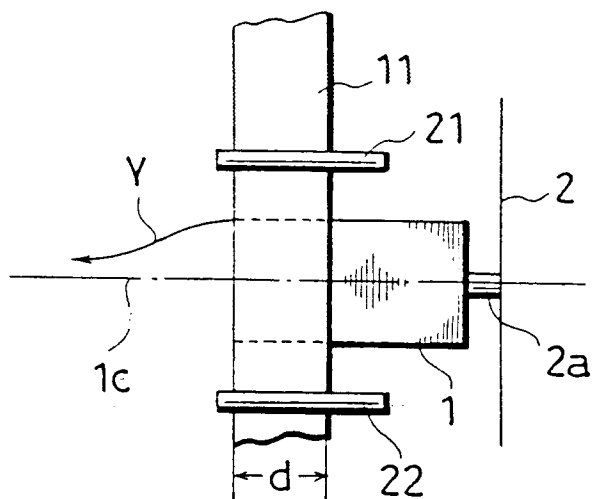


Fig. 4

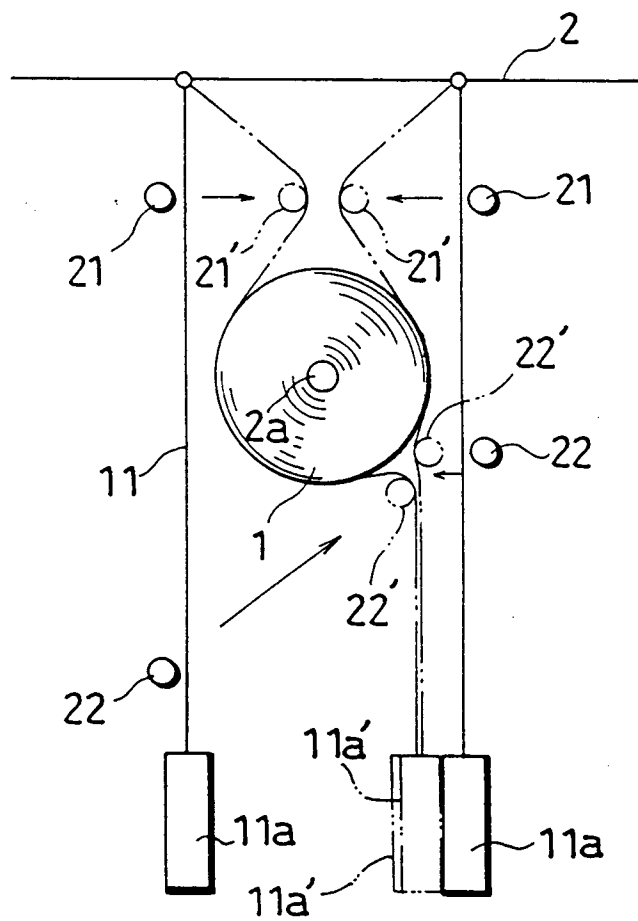


Fig. 5

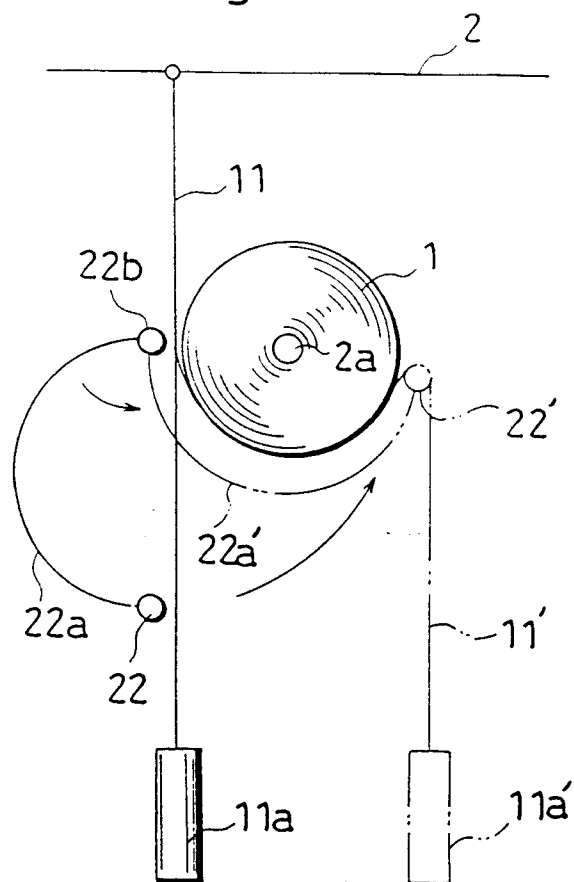


Fig. 6

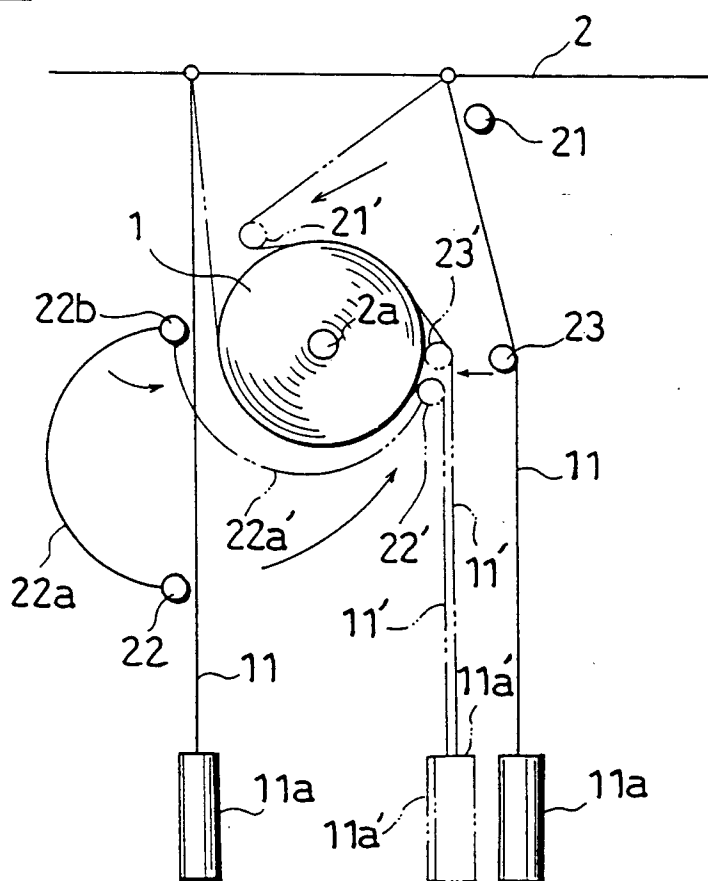




Fig. 7

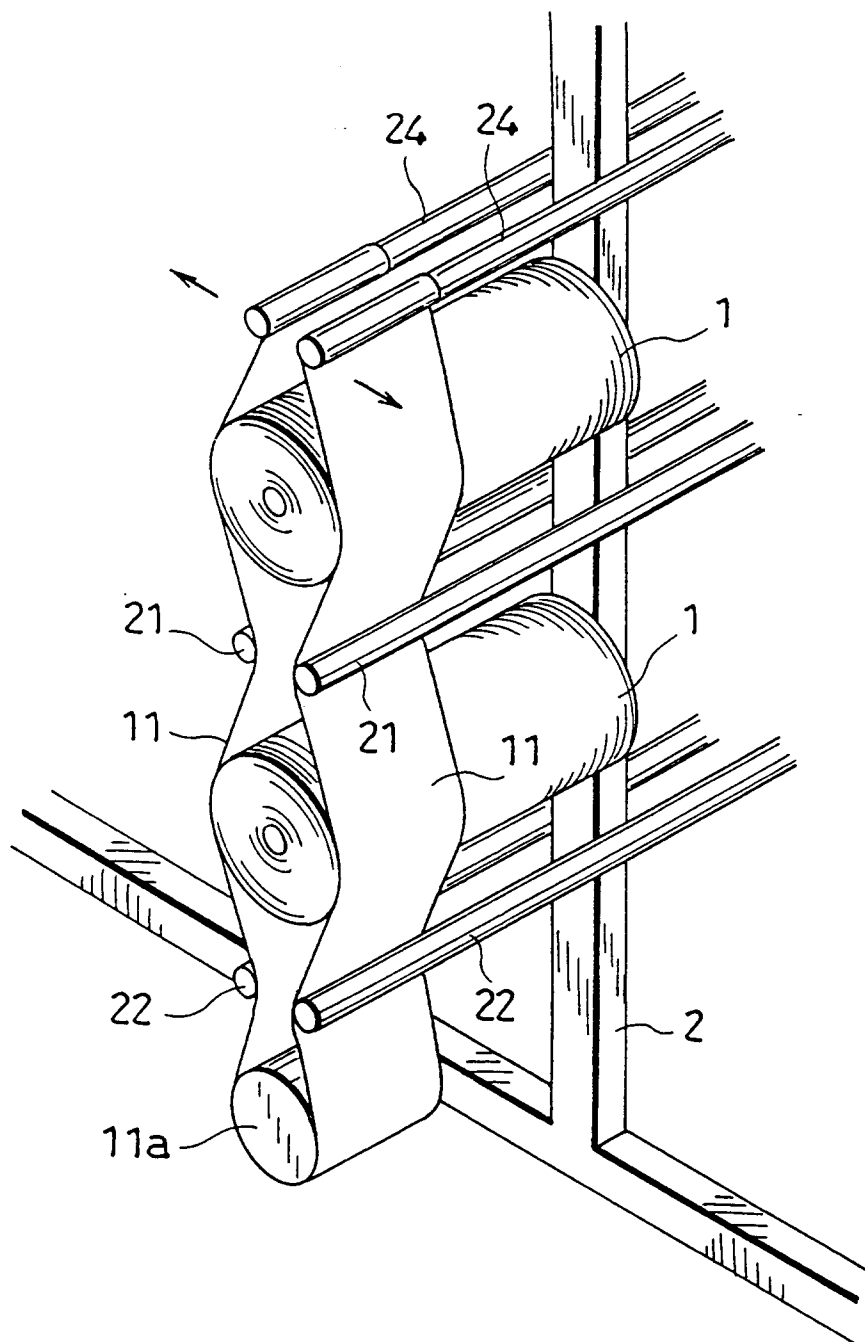


Fig. 8

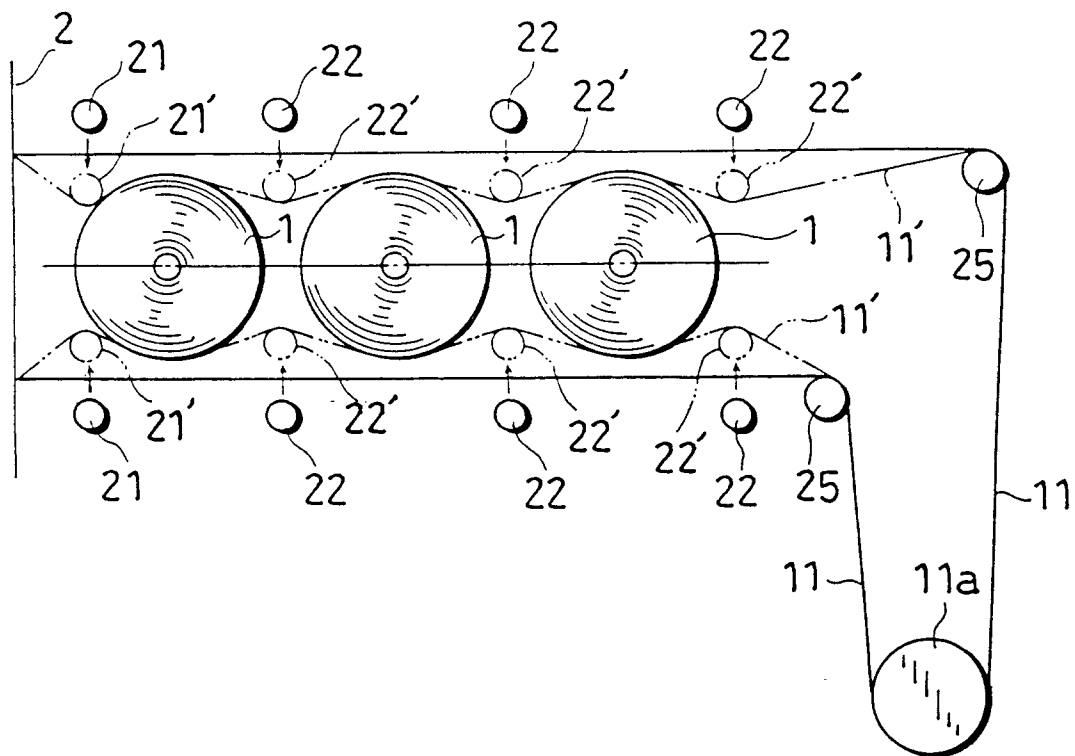


Fig. 9

