

12 **EUROPEAN PATENT APPLICATION**

21 Application number: **90200603.0**

51 Int. Cl.⁵: **D01H 1/241**

22 Date of filing: **14.03.90**

30 Priority: **24.03.89 IT 1989689**

43 Date of publication of application:
26.09.90 Bulletin 90/39

84 Designated Contracting States:
BE CH DE ES FR GB GR LI

71 Applicant: **SAVIO S.p.A.**
Via Udine 105
I-33170 Pordenone(IT)

72 Inventor: **Sartoni, Sandro**
Via Pendini 1/A
I-40026 Imola, Bologna(IT)
Inventor: **Vernocchi, Vittorio**
Via Cornacchia 3
I-40026 Imola, Bologna(IT)

74 Representative: **De Carli, Erberto et al**
ING. BARZANO' & ZANARDO MILANO S.p.A.
Via Borgonuovo, 10
I-20121 Milano(IT)

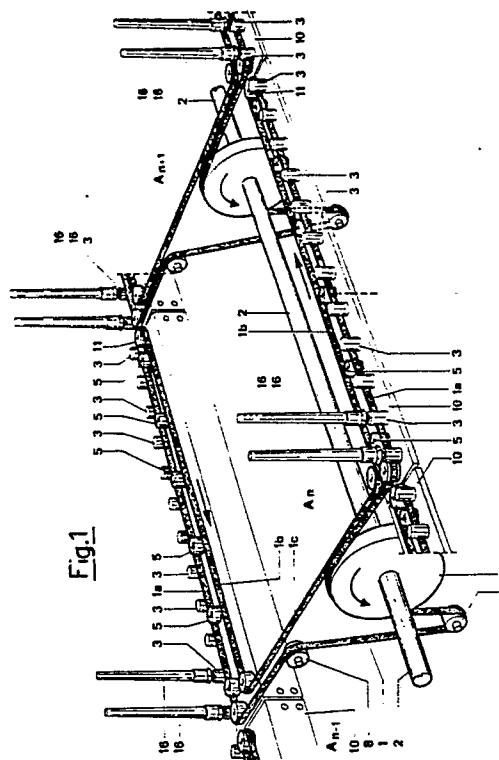
54 **Device for transmitting rotary motion to a limited group of spindles in a ring spinning machine.**

57 A device for transmitting rotary motion to a limited group of spindles of a ring spinning machine by means of an endless belt which partially embraces a drive disc fixed rigidly onto a drive shaft extending longitudinally along the entire machine between the two spinning faces.

Said endless belt extends as an arrangement of longitudinal branches and transverse branches.

Two longitudinal branches, internal relative to the idle rollers, are connected directly by an inner transverse branch, these inner branches being idle return branches; a further two outer branches are connected directly by the outer transverse branch, which partially embraces said drive disc, said branches being operational drive branches. The two outer longitudinal branches drive the spinning spindles, against which they are urged elastically into partially embracing contact by idle roller units each consisting of two idle rollers supported by a common leaf spring support.

The outer transverse branch which embraces the drive disc represents the drive branch for the entire endless belt.



EP 0 389 038 A2

DEVICE FOR TRANSMITTING ROTARY MOTION TO A LIMITED GROUP OF SPINDLES IN A RING SPINNING MACHINE

This invention relates to a drive device of endless belt type for transmitting rotary motion to a limited group of spindles of a ring spinning machine which is divided into sections, one following the other.

More particularly, the invention relates to a device in the form of an endless belt which embraces a drive disc, one of which is fixed rigidly within each section onto a drive shaft. The latter extends longitudinally along the entire machine between the two operating faces of the ring spinning machine, said endless belt travels in partially embracing contact with the spindles along its endless extension.

By the expression "limited group of spindles" we mean a few adjacent spindles which follow each other along the two faces in an aligned frontal arrangement, their number being equal in each longitudinal section into which the spinning machine is divided. Nearly all spinning machines are operated by an endless tangential belt system which rotates the spinning spindles.

As is well known, said endless tangential belt extends substantially rectilinear along the spinning faces and reverses, guided over pulleys, in the two longitudinal end regions of the spinning machine.

In one of the two said end regions the reversing belt passes about a friction drive pulley which is directly coupled, by any known means, to a motor.

This arrangement tangentially rotates the entire large number of spinning spindles disposed along the two operating faces of the machine.

In known manner, contact rollers are provided to maintain a certain contact pressure between the belt and spindles. This typical tangential belt transmission gives rise to relative slipping between the contacting surfaces of the belt and spindle, the overall considerable slippage resulting in different rotational speeds between one spindle and the next, with consequent different average degrees of twist transmitted to the yarn being formed.

This also gives rise to substantial power losses due to slippage, which because of the ever increasing cost of electric power plus, in Italy, the risk of power cuts due to overloading of the distribution network, substantially increase the production cost not only of the yarn under formation, but also of the finished product, making it poorly competitive.

A method is known for reducing slippage and thus power loss, which involves using for the spinning machine a drive system comprising two endless tangential belts, one for each spinning face. This modification has resulted in only slight reduc-

tion in slippage between the spindles and consequently only slight reduction in electricity consumption. The method also requires a constructional modification which is both difficult to implement and of rather high cost.

The control and maintenance operations associated with these described arrangements are not easy to carry out, because of the considerable length and constructional complication of the entire drive system. In addition, for these operations the entire machine has to be shut down, resulting in interruption in the production of every spindle, with a considerable fall off in the profit of the spinning department.

To obviate these difficulties it has already been proposed to use in the drive system several motors distributed along the machine length (German patent application P 3500322) for transmitting rotary motion to the spindles.

In this known arrangement the motors have to be protected by covers because the amount of fibre waste and dust is always considerable around the bottom of the machines in a textile mill, and in addition the fact of incorporating several motors considerably complicates the spindle drive construction mainly because of the limited space within the machine, so resulting in additional cost. In spite of this, there is still slippage resulting in variations in rotational speed between one spindle and another, and consequent loss of power.

To obviate the aforesaid drawbacks the applicant has constructed and operated a drive device for rotating the spindles in ring spinning machines which has the following advantages:

- it reduces power loss arising in the transmission of motion to the spindles in ring spinning machines without the need for too costly modifications;
- it enables the endless belt to be replaced even with the machine in full operation. In this respect, the drive disc can continue to rotate while its belt is being replaced due to wear or any other accidental cause, the endless belts of the other longitudinal sections of the spinning machine thus remaining in full operation. This results in a considerably improved production efficiency of the spinning department;
- it provides for accurate adjustment of the contact pressure between the spindles and the endless belt by means of groups of rollers positioned on an elastic leaf spring, such an assembly eliminating any slippage between said spindles and the endless belt, with resultant equal rotational speed of all spindles.

These and further advantages are obtained by

the present invention, which is in the form of a drive device of endless belt type for transmitting motion to a limited group of spindles of a ring spinning machine which is divided into sections, each section comprising a drive disc fixed rigidly onto a drive shaft; this latter extends longitudinally along the entire machine between the two spinning faces, said endless belt embracing the drive disc and extending endlessly to slide in partially embracing contact along the spindles, against which, it is pressed elastically by roller units, each comprising two idle rollers supported by a common leaf spring support.

Said endless belt comprises too longitudinal branches internal relative to the idle rollers and one transverse branch, these being idle return branches, plus two longitudinal branches external relative to idle rollers for tangentially driving the spindles and one transverse branch which embraces the drive disc in the manner of a letter C on the side facing the tensioning and deviation pulleys.

Said unit comprising two idle rollers supported by a common elastic leaf spring support can be adjusted in transverse position to exert a gauged contact pressure between the partially embracing endless belt and the spinning spindles.

A preferred embodiment of the invention is described hereinafter by way of non-limiting example with reference to the single accompanying drawing in which:

Figure 1 is a schematic perspective overall view of the device according to the present invention installed in one of the longitudinal intermediate sections of the ring spinning machine;

Figure 2 is a perspective schematic view showing the unit comprising the two idle rollers supported by a common elastic leaf spring support, which presses said idle rollers against the endless belt to urge it into partially embracing contact with the spindles.

In the two figures corresponding parts are given the same reference characters for simplicity.

Those devices and mechanisms of the spinning machine which operationally cooperate with, the device according to the invention are not shown nor is their operation described, both because they are already known, and because they do not concern the operation of the present invention.

Thus for example, the motor which rotates the drive shaft extending longitudinally along the entire machine is not shown. As is well known, this motor is installed in one of the two headstocks of the spinning machine.

In the accompanying figures: 1 is the transverse branch of the endless belt, said transverse branch embracing the drive disc in the manner of a letter C on that side facing the tensioning and

deviation pulleys; 1a are the two operational branches of the endless belt which tangentially entrain the spindles; 1b are the two longitudinal branches, internal relative to the idle rollers, of the endless belt, these branches being idle return branches; 1c is the transverse inner idle return branch of the belt; 2 is the drive shaft which extends longitudinally along the entire machine between the two spinning faces; 3 is the known ring spinning spindle, the base of which is coupled to the spindle bed 10 in a perfectly vertical position so that no eccentricity arises in rotation; 4 is the drive disc fixed rigidly onto the drive shaft 1. One such drive disc 4 is provided in each of the longitudinal sections into which the spinning machine is divided; 5 are the idle rollers which when urged against the endless belt cause this to slide in partially embracing contact with the spindles 3, to rotate them about themselves; 6 and 8 are known tensioning and deviation pulleys for the endless belt. They are supported by the machine frame via arms or any known element. Their purpose is to ensure that the belt 1 passes about the drive disc 4 through a certain angle; 7 is the elastic leaf spring element which supports the idle rollers 5. By flexing elastically, said leaf spring urges the rollers 5, disposed at its ends, against the belt. It is fixed by screws or like elements to a bracket 9 which rests on and is fixed to the spindle bed 10. The leaf spring 7 is formed of elastic material, preferably harmonic steel; 9 is a bracket element for fixing and supporting the leaf spring 7, said element being of adjustable transverse position to adjust the contact pressure between the rollers 5 and the endless drive belt; 11 is the idle deviation pulley between the branches 1a and 1b of the endless belt, it being coupled to the spindle bench 10 as are the spindles 3; 16 is the slightly conical tube which is mounted securely on the spindle. The yarn spun by the spindle of the ring spinning machine winds about said tube 16 in the form of turns. An-1, An and An + 1 are successive longitudinal sections into which the ring spinning machine is divided. Each section comprises a limited number of spindles on each of the spinning faces.

The operation of the device of the present invention is apparent from the figures of the single accompanying drawing.

The transverse branch 1 of the endless belt passes about part of the drive disc 4 which is rotated in the direction of the arrow (see Figure 1) by the drive shaft 2 which extends longitudinally and is coupled at one end to a motor (not shown).

The belt is driven by the disc 4, which it partially embraces, so that its two longitudinal branches 1a slide against the spindles 3, which are rotated at high speed by them.

The device as conceived can also accommo-

date reversal of the direction of rotation of the drive shaft 2 and hence of the drive disc 4 without any constructional modification.

With said reversal the endless belt reverses the direction of its travel to rotate the spindles 3 in the opposite direction so as to pass from Z twist to S twist and vice versa, as is well known in yarn formation.

It is apparent that modifications and additions can be made by experts of the art to the details of the device but without leaving the inventive idea.

Claims

1. A drive device of endless belt type for transmitting motion to a limited group of spindles of a ring spinning machine which is divided into sections, characterised in that each section comprises a drive disc fixed rigidly onto a drive shaft which extends longitudinally along the entire machine between the two faces of the spinning machine, said endless belt embracing the drive disc and extending endlessly to slide along and in partially embracing contact with the spindles, against which it is pressed elastically by roller units, each comprising two idle rollers supported by a common leaf spring support.

2. A device as claimed in claim 1, characterised in that said endless belt comprises, inward of the spindles, two longitudinal branches, internal relative to the idle rollers, and one transverse branch, said branches being idle return branches, said device further comprising two outer longitudinal branches external relative to the idle rollers and one transverse branch which embraces the drive disc in the manner of a letter C on the side facing the tensioning and deviation pulleys, said branches being active in tangentially driving the spindles.

3. A device as claimed in claim 1, characterised in that the unit comprising two idle rollers supported by a common elastic leaf spring support can be adjusted in its transverse position to exert a gauged contact pressure between the partially embracing endless belt and the spinning spindles of one of the sections into which the spinning machine is divided.

15

20

25

30

35

40

45

50

55

