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Drafting System Of A Spinning Machine

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Abstract: In this article, a spinning machine drafting device is used in the textile industry. It contains three grooved cylinders and three rollers with an elastic coating, pressed to the cylinders by a spring load. The grooves of the last third cylinder are made symmetrically in the form of a chevron with angles α1 and α2 selected in accordance with the coefficient of friction of the material on the grooves 3 or.

Keywords: Textile, drawing, spinning, fluted drafting roller, spring-loaded pressure, symmetrically, coefficient.

INTRODUCTION:

The known device for delivering the sliver consists of drafting pairs that include cylinders and pressure rollers arranged one above the other, along with an additional small cylinder pressed against the pressure roller of the delivery pair of the drafting unit and fixed by spring elements on the tension roller of the same delivery pair. This configuration prevents uncontrolled fiber slippage from the clamp of the delivery pair during operation by reducing the wrapping angle, while the propagation of twist contributes to an increase in the strength of the delivered sliver [1]. A drawback of this design is the inability to adjust the wrapping angle and the inclination of the sliver in the drafting-unit–guide segment when processing fibers of different origins and properties, as well as when producing yarns of various assortments. In addition, the elastic removable sleeves of the pressure rollers do not provide the required uniformity of fiber drafting. In existing spinning machines, two parallel slivers composed of identical fibers are fed into the drafting unit and advanced in parallel through three groups of drafting pairs consisting of fluted cylinders and pressure rollers. The pressure rollers are equipped with elastic rubber sleeves on their outer surface [2]. A limitation of the existing drafting-unit design is the inability to use it for drafting parallel slivers composed of different fibers, for example, when the first sliver contains polyester fibers and the second contains cotton fibers. Due to the differing deformation properties of these fibers, the slivers undergo different drafting ratios. This results in irregularities in the produced yarn. In another known design of the drafting unit, the system includes a feed pair and drafting pairs. The delivery pair features a lower cylinder with an elastic coating and a pressure device in the form of rollers mounted on shafts. The shafts are fixed on the lower arm of a double-armed lever. The upper ends of the levers are hinge-connected to each other. Additional levers are attached to the middle section of the double-armed lever, mounted on a shaft, with the shaft positioned in a saddle. The disadvantage of this design is also the inability to ensure uniform thinning of the tape (rope), straightening, and alignment of fibers in the corresponding pairs of the device due to imperfections in the design of elastic coatings (buckets). The deformation of elastic coatings actually occurs according to a linear pattern, without considering the unevenness of the stretched yarn, especially when stretching two parallel beads with different characteristics.

In the known design of the drafting device of spinning machines, drafting pairs are included, in which the elastic coatings of the pressure rollers are made with different diameters, there is a means for individual adjustment of the pressure forces of each spring of the loading device (lever) [3]. The disadvantage of this

design is the lack of a clear division into drawing zones. This is manifested in the fact that under the pressure roller of the second drawing pair, the controlled fibers move at the speed of the first, second, and third pairs (they should move only at the speed of the second drawing pair). The movement of fibers at different speeds does not allow for an increase in the number of controlled fibers, and consequently, the draft. This design cannot also be used when stretching two parallel beads with different fiber structures and characteristics.

In another known design, a drafting device of a spinning machine, containing drafting pairs from three riffled cylinders and three pressing rollers with elastic coating, a loading lever with springs, wherein the elastic coatings of the rollers are made of inner and outer rubber bushings, wherein the inner bushing is made in the form of truncated cones connected by smaller bases, and the inner surface of the outer bushing is made in the form of the conical surface of truncated cones connected by larger bases, wherein the stiffness of the inner rubber bushing is greater than the stiffness of the outer bushing, and the springs of the loading lever are made conical, wherein their stiffness is chosen to increase along the movement of the tape and has a ratio of C1< C2< C3 (C1, C2, C3- respectively, the stiffness of the springs for the first, second and third pressing rollers along the movement of the weft) [4]. Also known is the drafting device of the spinning machine, which contains drafting pairs from three riffed cylinders and three pressing rollers with elastic coating, a loading lever with springs, while the elastic coating of the output pressing fiber is made removable and consists of two equal lengths, the first of which has a thickness 25% less than the thickness of the second part of the output pressing roller, a plastic bushing is installed under the first rubber bushing [5].

A disadvantage of this design is the limited possibility of obtaining yarn from various yarns due to the imperfection of the riffle cylinder design. The drafting device design, containing drafting pairs from three rifled cylinders and three pressure rollers with elastic coatings, is closest to the stated one. The load on the rollers is spring-loaded, individual for each roller, and is carried out by a single lever. Seals are installed in front of each exhaust pair. For controlling the movement of fibers in the second stretching zone, there are two belts: upper and lower. The lower belts are tensioned by spring brackets. Depending on the linear density of the produced yarn, the spacing between the belts changes. The change is carried out using interchangeable supports between the planks [6].

The disadvantage of these drafting devices is the lack of a clear division into drafting zones, as well as the fact that the riffled cylinders do not allow for the necessary uniform drafting of yarn fibers, especially when drafting two pairs of beads with different fibers, for example, polyester and cotton fibers. It should be noted that when stretching and joining two different characteristics of the tapes, the cylinder in existing designs has riffles with the same angle of inclination when they are joined. The drafting device of the spinning machine includes ribbed cylinders 1,2,3, pressure rollers 4,5,6, which form three drafting pairs. The pressure rollers 4,5,6 are mounted on the loading lever 7 on the axes of the pressure rollers 4,5,6, which are movable and connected to the conical springs 8, 9, 10, Figure 1. Seals are installed in front of each drawing pair (not shown in Fig.). Loading lever 7 is connected to the housing by a hinge 14. The pressing rollers 4, 5, 6 have elastic coatings 11, 12, 13. At the same time, the ridges of cylinder 3 of the last third drawing pair 3,6 are sloped, symmetrically made in the form of a shevron with angles α_1 and α_2 selected according to the material's friction coefficient with the ridge. The inclination angles α_1and α_2 of the 16 and 17 riffles of these parts are inclined oppositely in the form of a shevron and are directed towards the middle part of the 16 and 17 riffles. The inclination angles α_1 and α_2 are made of various designs, which are selected depending on the characteristics of the stretched tapes (beads) and have an axial connection:

$$\frac{\alpha_1}{\alpha_2} = \frac{f_1}{f_2}$$

Where α_1, α_2 are the slope angles of the riffles 16 and 17; f_1, f_2 are the friction coefficients of the ribbon with the riffled surfaces of cylinder 3.

The rifled parts of cylinder 3 can be made removable in the form of external bushings 15 and 19, inserted into cylinder 3 through two keys. The drafting device of the spinning machine works as follows. The rifled cylinders 1, 2, 3 receive rotational motion from the electric motor (not shown in Fig.). The loading lever 7 rotates freely due to the hinge 14 and presses the pressure rollers 4, 5, 6 with springs 8, 9, 10 against the rifled cylinders 1, 2, 3. At the same time, the beads 18 supplied in parallel consist of fibers with different characteristics, for example, a bead made of cotton fibers and a bead made of wool fibers. The drafting device of the spinning machine works as follows. The rifled cylinders 1, 2, 3 receive rotational motion from the electric motor (not shown in Fig.). The loading lever 7 rotates freely due to hinge 14 and presses the pressure rollers 4, 5, 6 with springs 8, 9, 10 against the

grooved cylinders 1, 2, 3.

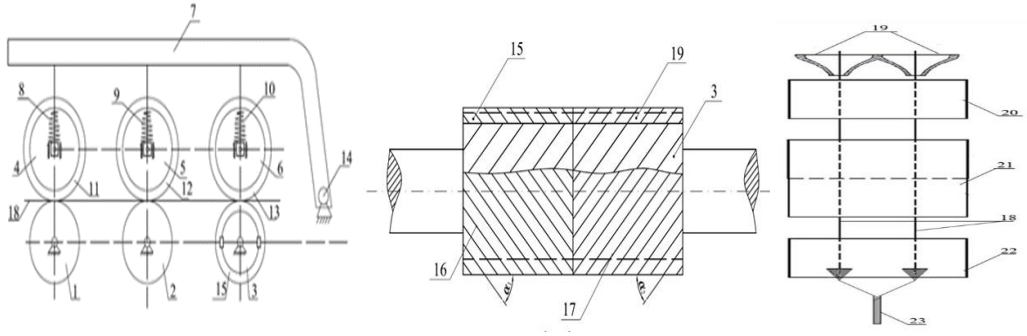

Figure 1. Diagram of the drawing frame

At the same time, the beads 18 supplied in parallel consist of fibers with different characteristics, for example, a bead made of cotton fibers and a bead made of wool fibers. The design allows for the production of yarn with mixed fibers with various high-quality characteristics.

REFERENCES

1. RU 68513 U
2. А.П.Пирматов, Технология прядения, Учебник, 254-265, “Ijod print”, Тошкент, 2020
3. TEXParts Maria-Strasse 8 D-70736 Fellbach.http://www.texparts.de, e-mail : info@texparts.de4
4. UZ FAP 01051
5. Патент UZIAP06851
6. Ю.В.Павлов и другие, Теория процессов, технология и оборудования прядение натуральных и химических волокон, С 138-157, “ Ивановская государственная текстильная академия ”, Иваново 2000