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DRAWING MECHANISM OF A SPINNING MACHINE

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Annotatsiya. Ushbu maqolada to‘qimachilik sanoatida qo‘llaniladigan yigiruv mashinasining cho‘zish qurilmasi tavsiflanadi. Bu qurilma uchta riflyali silindr va prujinali yuk yordamida silindrlarga bosiladigan elastik qoplamali uchta valikdan tashkil topgan. Oxirgi uchinchi silindrning riflyalari simmetrik tarzda shevron shaklida yasalgan bo‘lib, α_1 va α_2 burchaklari materialning riflyaga ishqalanish koeffitsiyentiga muvofiq tanlanadi.

Kalit so‘zlar: To‘qimachilik, cho‘zish, yigirish, rifliyali silindr, prujinali yuklanish, simmetrik, koeffitsiyent.

Аннотаций. В этой статье используется в текстильной промышленности вытяжной прибор прядильной машины содержит три рифленых цилиндра и три валика с эластичным покрытием, прижатых к цилиндрам пружинной нагрузкой. Рифли последнего третьего цилиндра выполнены симметрично в виде шеврона с углами α_1 и α_2 выбираемыми в соответствии с коэффициентом трения материала о рифли 3 ил.

Ключевые слова: Текстильной, вытяжной, прядильной, рифленых цилиндра, пружинной нагрузкой, симметрично, коэффициентом.

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 α_1 and α_2 selected in accordance with the coefficient of friction of the material on the grooves 3 or .

Key words: Textile, drawing, spinning, corrugated cylinder, spring load, symmetrically, coefficient.

A device for roving output is known, consisting of drawing pairs that include cylinders and pressure rollers installed one above the other, with an additional small cylinder installed, which is pressed against the pressure roller of the output pair of the drawing mechanism and secured by spring elements to the tension roller of the output pair of the drawing mechanism. Thanks to this device, at the output of the drawing mechanism, uncontrolled slippage of fibers from the grip of the output pair during operation is eliminated due to a reduction in the flow arc, and the spread of twist contributes to increasing the strength of the outgoing roving [1].

Disadvantages of this design is the impossibility of regulating the circumference of the arc and the angle of inclination of the weft in the section of the exhaust device-wind drive when processing fibers of different origin and properties, as well as when producing yarn of different assortments. Additionally, the elastic removable sleeves of the pressure rollers do not provide the necessary uniformity in the drafting of yarn fibers.

In existing spinning machines, two parallel fiber strands (slivers) consisting of identical fibers are fed into the drafting system and move in parallel through three groups of drafting pairs,

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comprising fluted cylinders and pressure rollers. The pressure rollers are equipped with elastic rubber sleeves on their outer surface [2].

The drawback of the existing drawing device design is the inability to use them to drain parallel bundles made of various fibers, for example, the first bundle is made of polyester fibers and the second bundle is made of cotton fibers. At the same time, due to the different deformation properties of the fibers, different values of the fibers are observed. This leads to uneven yarn production.

In another known construction of the exhaust device, which contains a feeding pair, exhaust pairs. The output steam has a lower cylinder with an elastic coating and a pressure device in the form of rollers, which are installed on the axes. The axes are fixed to the lower shoulder of the double lever. The upper ends of the levers are connected to each other by a hinge. The two-armed lever is mounted in the middle on a lever installed on the axis, and the axis is mounted on the seat [3].

The drawback of this design is also the fact that it is impossible to ensure even thinning of the ribbon (plate), straightening and parallelisation of the fibers in the corresponding pairs of the device due to the imperfection of the design of the elastic coatings (vtulks). The deformation of elastic coatings actually occurs according to a linear pattern, without taking into account the unevenness of the stretched yarn, especially when stretching two parallel bundles with different characteristics.

The known design of the tensioning device for spinning machines contains tension pairs in which the elastic coatings of the pressure rollers are made with different diameters, there is a means for individual adjustment of the clamping forces of each spring of the loading device (lever) [4].

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 increasing the number of controlled fibers, and therefore the drawing. This design also cannot be used when drawing two parallel webs with different structures and fiber characteristics. In another known design, a spinning machine drafting device containing drafting pairs of three grooved cylinders and three pressure rollers with an 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 in the form of a conical surface of truncated cones connected by larger bases, wherein the rigidity of the inner rubber bushing is greater than the rigidity of the outer bushing, and the springs of the loading lever are made conical, wherein their rigidities are selected to increase in the direction of movement of the tape and have a ratio of $C_1 < C_2 < C_3$ (C_1, C_2, C_3 are respectively the rigidities of the springs for the first, second and third pressure rollers in the direction of movement of the web) [5].

Also known is a spinning machine drafting device containing draft pairs of three grooved cylinders and three pressure rollers with an elastic coating, a loading lever with springs, while the elastic coating of the output pressure fiber is made removable and consists of two equal in length, wherein the first of which has a smaller thickness by 25% of the thickness of the second part of the output pressure roller, a plastic sleeve is installed under the first rubber bushing [6].

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The disadvantage of this design is the limited possibilities of obtaining yarn from threads with different characteristics due to the imperfection of the design of the grooved cylinders.

The closest to the claimed design is the drafting device containing draft pairs of three grooved cylinders and three pressure rollers with elastic coatings. The load on the rollers is spring loaded, individual for each roller and is carried out by one lever. Seals are installed in front of each draft pair. To control the movement of the fibers in the second drawing zone, there are two belts: upper and lower. The lower belts are tensioned by spring-loaded brackets. Depending on the linear density of the produced roving, the distribution between the belts changes. The change is carried out using replaceable stops between the bars [7-19].

The disadvantage of these drafting devices is the lack of a clear division into drafting zones, and the corrugated cylinders do not allow the necessary uniformity of the yarn fiber draft, especially when drafting two pairs of webs with different fibers, for example, polyester and cotton fibers.

It should be noted that when drafting and merging two different characteristics of tapes, the cylinder in existing designs has corrugations with the same angles of inclination when they merge.

The drafting device of the spinning machine includes corrugated cylinders 1,2,3, pressure rollers 4,5,6, which form three drafting pairs. Pressure rollers 4,5,6, are installed in the loading lever 7 on the axes of the pressure rollers 4,5,6, which are movable and connected with conical springs 8, 9, 10, Fig. 1. Seals are installed in front of each drafting pair (not shown in the Fig.). The loading lever 7 is connected to the housing by means of a hinge 14. The pressure rollers 4, 5, 6 have elastic coatings 11, 12, 13. In this case, the riffles of the cylinder 3 of the last third drawing pair 3,6 are made inclined, symmetrically in the form of a chevron with angles α_1 and α_2 selected in accordance with the coefficient of friction of the material on the riffles. The angles of inclination α_1 and α_2 of the riffles 16 and 17 of these parts are inclined oppositely in the form of a chevron and are directed toward the middle part of the riffles 16 and 17. The angles of inclination α_1 and α_2 are made different, which are selected depending on the characteristics of the tapes (webs) being drawn out, and have the following ratio:

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

Where, α_1, α_2 – angles of inclination of the corrugations 16 и 17; f_1,f_2- friction coefficients of the tape with the grooved surfaces of the cylinder 3.

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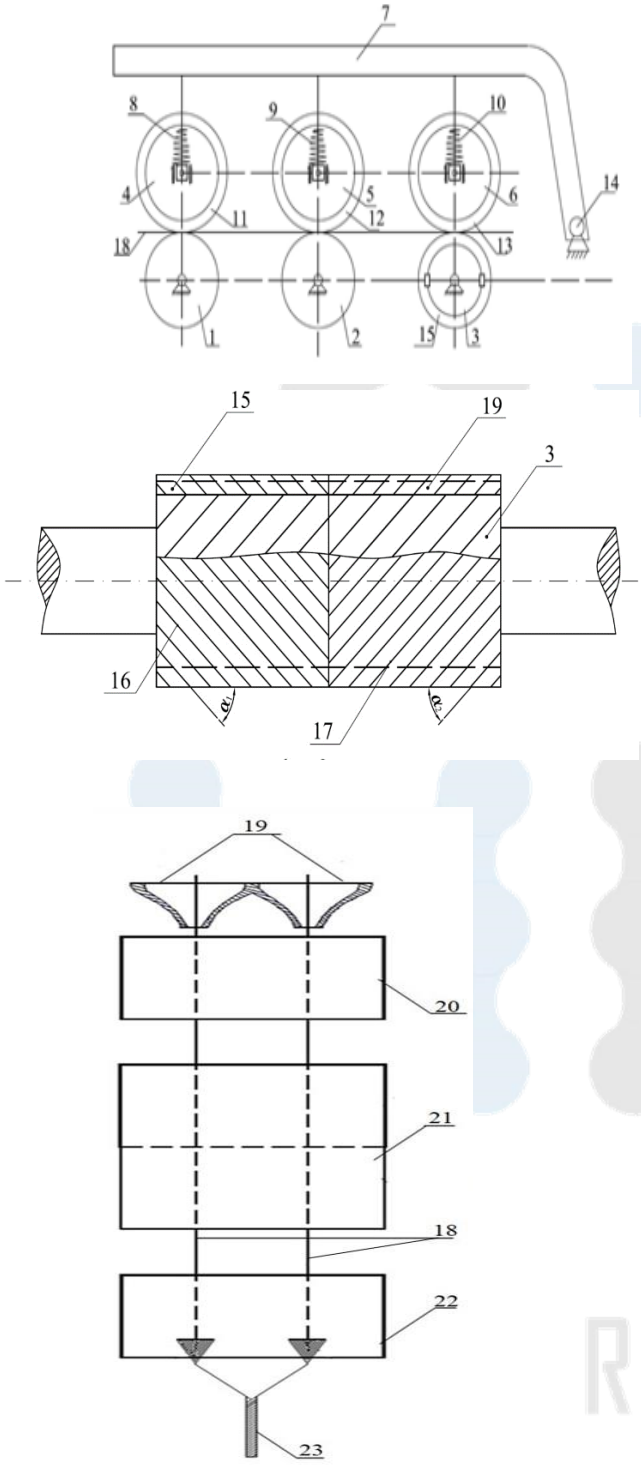

Figure 1. Exhaust device diagram

The grooved parts of the cylinder 3 can be made removable in the form of external bushings 15 and 19 mounted on the cylinder 3 by means of two keys. The spinning machine drafting device operates as follows. The grooved cylinders 1, 2, 3 receive rotational motion from an electric motor (not shown in the Fig.). The loading lever 7, freely rotating due to the hinge 14, presses the pressure rollers 4, 5, 6 by means of springs 8, 9, 10 to the grooved cylinders 1, 2, 3. In this case, the parallel-

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fed webs 18 consisting of fibers of different characteristics, for example, a web of cotton fibers and a web of wool fibers.

According to the diagram (Fig. 3) the feeding of webs (tapes) 18, they pass through the eyes 19 into the drafting zone and through the drafting pairs 20, 21, 22, that is, through the corrugated cylinders 1, 2, 3 of the pressure rollers 4, 5, 6. Due to the increasing speed mode of the drafting pairs as the webs 18 advance, straightening and parallelization of the fibers occurs. In the third drafting pair 3,6, due to the inclined corrugations 16 and 17, the webs 18 are intertwined and become one. At the same time, due to the different inclination angles α_1 and α_2 of the angles of the corrugations 16 and 17, the fibers with different characteristics, that is, friction coefficients, are obtained a thread 23 of uniform density with mixed fibers (cotton and wool) of high quality.

The design allows for the production of a thread with mixed fibres with different characteristics of high quality.

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