Drawer of the Belt Machine

Aytymbetov Seilbek Rzabekovich
Senior teacher Karakalpak State University names Berdakh, (Republic of Karakalpakstan, Nukus)

Jumanyazov Qadam Jumanyazovich
Doctor of Technical Sciences Professor

Matismailov Saypilla Lalashboevich
Associate Professor Tashkent Institute of Textile and Light Industry, (Republic of Uzbekistan, Tashkent)

Abstract: The article presents the results of an experimental study of the drafting device of the RSBD-40 draw frame, in which the corrugated lines of the cylinders are directed in opposite directions with angles of 4 °.

Keywords: unevenness, parallelism, tape, linear density, grooved, cylinders.

One of the main directions of increasing the efficiency of spinning production is the quality of the preparation of the semi-finished product. In this regard, it is relevant to constantly search for more progressive methods for preparing semi-finished products, improve the designs of the machines used, change the composition of the equipment installed in the technological chain.

In the cotton spinning industry, draw frames of various brands are used, which are installed on two transitions. The use of the second transition will increase the strength of the yarn by 8%, reduce the unevenness at breaking load by 15%, and reduce the unevenness at the linear density by $25 \div 40\%$.

The draw frame is designed for straightening and parallelizing fibers, clarifying the product in the drafting device, leveling the product in linear density and composition, as well as for forming an output package-can with a tape.

The closest to the claimed device is the drafting device of the RSBD-40 draw frame, in which the corrugated lines of the cylinders are directed in opposite directions with angles of 4 °.

The drawbacks of the drafting device of the machine are that on the 2-first cylinder the fibers on the belt align and parallelize, and since the directions of the 3-flutes of the second cylinder are opposite to the direction of the flutes of the third cylinder, this leads to yarn curvature.

And the third cylinder, the riffle direction of which corresponds to the riffle direction of the first cylinder, instead of aligning the fibers bent on the second cylinder, leads to the fiber breaking (breaking). This leads to an increase in the unevenness of the belt.
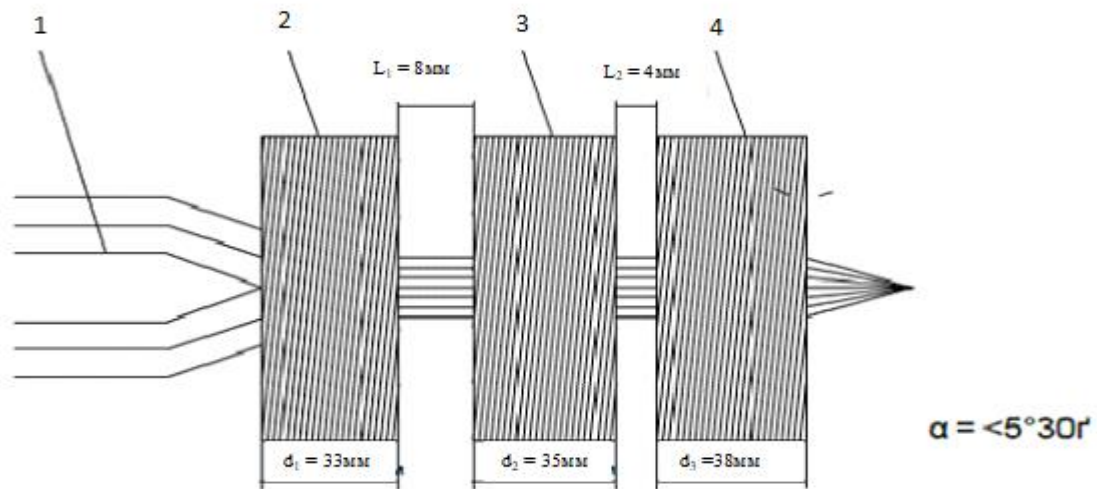
The task is to reduce the unevenness of the belt, by installing cylinders with corrugations directed to one side on the drafting device of the draw frame.

In the draw frame drafting device, containing three successively installed corrugated cylinders with grooves made at an angle, the grooves are made at an angle $\alpha = 5\degree 30'$ relative to the generatrix of the cylinder and are directed in one direction, while the diameter ($d1$, $d2$, $d3$) of the cylinders, installed along the process is equal to $d1 = 33$ mm, $d2 = 35$ mm, $d2 = 38$ mm, the distance between the first and second cylinders is $L1 = 8$ mm, and between the second and third cylinders $L1 = 4$ mm.

In the drawing apparatus of the draw frame, six belts 1 pass sequentially through the first cylinder 2, the second 3, and the third cylinder 4. In this case, the diameter of the cylinders installed during the process is $d_1 = 33$ mm, $d_2 = 35$ mm, $d_2 = 38$ mm, the distance between the first and second cylinders is $L_1 = 8$ mm, and between the second and third cylinders $L_1 = 4$ mm. Recesses are made on cylinders 2, 3, 4 directed in one direction at an angle $\alpha = 5\degree 30'$ relative to the cylinder.

The draw frame drafting device operates in the jollying manner: six parallel belts 1 are combined in the first cylinder 2 with a diameter $d_1 = 33$ mm, where the ends of the cotton fibers are aligned and stretched, then they are directed to the second cylinder 3 with a diameter $d_1 = 35$ mm, here the fibers continue to stretch and to thin, and the third cylinder 4 with a diameter $d_1 = 40$ mm fibers with not straightened ends are thinned and straightened

The result will be a refined will be obtained tape corresponding to a thread with a given linear density. The smoothness of the thread obtained from this tape will increase, the irregularities of the thread will be eliminated and its strength will increase. When spinning, yarn breakage will be reduced and productivity will increase. If the angle of inclination of the corrugated in-depth lines of the cylinders is greater than $\alpha = 5\degree 30'$, then the passage of the threads between the cylinders will slow down and break and breakage of fibers occurs, and if the angle of inclination of the corrugated in-depth lines of the cylinders is less than $\alpha = 5\degree 30'$, it will decrease stretching of the fibers decrease and as a result, the unevenness of the fibers will increase.

Output

As a result of parallelization of cotton fibers and alignment of the ends in the tape due to the installation on the drafting device of cylinders with an angle of inclination of grooved recesses directed relative to the generating cylinder equal to $\alpha = 5\,°\,30'$ and with a diameter, respectively, $d_1 = 33$ mm, $d_2 = 35$ mm, $d_2 = 38$ mm, the unevenness of the thread is reduced from 15.5% to 10% and the waste yield is reduced to 8%. An increase in the yield of the number of threads from 56% to 73% and an increase in productivity up to 26% have also been achieved.

Literature

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