TOOLS TO DETERMINE THE TENSION OF SELECTED YARNS ON KNITTING MACHINES BY EXPERIMENT

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The article examines the tools and equipment for measuring the tension of yarn on looms. Tension gauges manufactured by various firms have also been researched. The study and experimental determination of the tension of yarns in looms on looms allow not only to find the amount of tension but also to find its vibrational nature, as well as changes in various parameters during the weaving process.

Experimental study of tension allows to determine changes in yarn tension in the width and depth of the machine, to find the causes of various diseases in the fabric, to find a way to improve the quality of the fabric and increase the productivity of the machine. This will play an important role in the processing of yarns from chemical fibres. Yarn tension measuring tools can be divided into classes and groups according to certain characteristics. In weaving looms, in the practice of measuring the tension of yarns in the body, the electric, mechanical and optical movements of first-class tools are common.

HH-2 (Figure 1) branded tool for measuring the tension of individual yarns.

The yarn tension in the instrument is determined in grams and is indicated by an arrow on a scale in the measuring range from 1 to 400g. As can be seen from Figure 1, the tool has two handrails and sliding support: a guide and a receiver, a rotating thread.

Fig. 1. HH-2 instrument for measuring the tension of individual threads.
The receiving thread is attached to a moving shaft that carries the gear sector. On the axle of the gear wheel, 3 arrows are mounted, aimed at tension along the degree scale. The moving bullet and arrow are under the influence of the spring. To measure the tension, the instrument must be adjusted in such a way that the thread horn is assembled and the first 2 moving receiving rollers are rotated, then 1 fixed guide roller. When measuring the tension, it should be observed that the horn of the thread adjusted to the tool is parallel to each other and in it, perpendicular to the bracket, on which the guidewire conductor is mounted. The Swiss company Uster produces a tool for measuring the tension of individual yarns. The instrument is produced in 2 categories, one of which is designed to measure the average amount of tension, the other to measure the amount of high tension. Figure 2 shows the schematic diagrams of the instrument classification.

The device, which measures the average amount of tension, has 3 controlled yarns bent, 1 receiving yarn conductor and 2 directional yarns. The receiving wire conductor is mounted on 4 shafts under the influence of 5 spiral springs. It is connected by 7 shafts, 6 screw nails, 9 piston bearings of a pneumatic damper and a 7-point arrow loaded with 8 spiral springs.

The stiffness of springs 6 and 8 is very low; The function of the 8 springs is to correct the zero position of the arrow. The arrow is damped with a small damper. The tension of the rope is drawn on a scale of 10 with an arrow.

![Fig. 2. Schematics of the classification of the instrument of the firm Uster.](image)

Fig. 2. Schematics of the classification of the instrument of the firm Uster. a is the instrument diagram for measuring the average amount of tension; b is an instrument diagram that measures the amount of tension that is high.

If the lower frequency of vibration of the yarn tension exceeds (3) hertz and generates vibration with a frequency below 0.5 hertz, the instrument gives stationary readings of the average volume of tension.

Vibration is partially generated at frequencies ranging from 0.5 to 3 hertz. The device for measuring the high tension of the threads differs from those described above in that instead of a spring, a one-sided auxiliary device was used between 4 axes and 7 arrows, so that the arrow indicates the tension volume of the threads close to the top. If the 6 supports of the auxiliary device (see Fig. 2b) are placed in reverse order and the direction of short-term movement from 8 springs to 7 arrows is changed, the principle of movement of the tool can be applied to obtain an indicator close to a small amount of thread tension.

The British firm Newmark produces a mechanical device used to compare the tension of yarns. The instrument on the project is simple enough and is based on the principle of two-shoulder scales. The tool consists of an arrow and a scale with zero in the middle. The axis of rotation of the arrow is mounted on the axis of rotation of
the receiver with 2 receiving wire harnesses. In the body (upper part) of the tool are mounted two guide wires. The tension-comparable yarns are adjusted to their respective systems. When the tension of the yarns to be compared is equal, the arrow stands at the zero division of the scale. The direction and magnitude of the arrow’s zero interference characterize the relative tension relative to each other. The tool can be used to detect the same tension in the lower and upper branches of the hamster. The practice of using tools based on the principles of mechanical motion shows that this group of devices combines a sufficiently small sensitivity, a significant slowness of the moving part, and can not provide a change in thread tension, recording vibrations in a short time interval. Mechanical principle instruments can be used to measure the tension of yarns over a large period, in a way that is closer to reality. Mechanical-optical motion devices, devices used to measure the tension of yarns, are widely used in testing work on measuring the tension of yarns in the body on looms.

![Image](image_url)

**Fig. 3. Instruments for measuring the tension of the main individual yarns on looms**

Mechanical-optical devices satisfactorily capture the vibration of the tension of the threads in the body during the weaving process and allow you to visually observe the change in the volume of the thread, as well as to record the vibration of the tension on film and photographic paper.

We have developed tools for measuring the tension of individual threads of mechanical movement based on instruments of the firm Uster. Its distinguishing feature is the amount of platform on which two instruments are mounted to measure the upper and lower voltages of the thread tension. Also, the power gauge wire conductors are designed in the form of a single-shoulder bullet. The advantage of the new tool is the accuracy in measuring the tension of individual yarns to obtain several recommendations, as well as the convenience and simplicity of service.

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