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ANALYSIS OF WARPING TECHNOLOGIES FOR A WIDE RANGE OF KNITTING MACHINES

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ABSTRACT

In the article were solved high quality warp yarns production problems on the base of property analyses of the modern high speed weaving looms.

KEYWORDS: *Loom, Manufacture, Disadvantage, Speed, Shaft, Spinning Machine, Length, Size, Process, Tension.*

INTRODUCTION

The improvement of looms took place in several stages, the main purpose of which was to increase the productivity of the loom and automation [1].

At the heart of the transfer of manual control of the loom to the machine was the invention of the mechanisms for forming the loom, throwing the loom weft and attaching it to the edge of the fabric.

The mechanical loom used in industry was first invented in 1784 by the English inventor E.J. Created by Cartwright. The creation of these looms not only dramatically increased the productivity of the loom, but also made it possible to service several looms in the industry at the same time. This significantly increased the worker's labor productivity.

English mechanic R. Robert introduced in 1882 the manufacture of a device that stops the loom when the back thread in the tube is finished or broken. As a result, the machine became the basis for increasing labor productivity, as well as the creation of a mechanism by the American

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inventor Nortron to replace the empty tube in the shuttle with a full tube while the machine was working.

The disadvantage of automatic looms is that the shuttle is 100-150 grams heavier than mechanical looms′shuttle and requires high precision in its preparation. This limits the speed of the machine head shaft. The problem has prompted industry inventors to find another way to throw weft to the shed. The problem was solved in three directions: by creating a weft thrower (dwarf shuttle), rapier, and by throwing weft methods to the shed using an air or water drop. From the 50s of the last century, looms working in these methods began to be widely introduced in the world's textile enterprises.

For more than 50 years, the practice of expanding the working width, increasing productivity and the use of modern information and communication technologies in the management of equipment in the improvement of sewing machines in the practice of weaving is being addressed.

From the references published in the CIS countries [2,3,4,5] the main economic and technical indicators of weft throwing machines in different ways are given in the table.

TABLE BASIC ECONOMIC AND TECHNICAL INDICATORS OF VARIOUS LOOMS

Economic technique indicators			Workshop model	General shaft speed	Workshop width	Weft throw speed	Theoretical productivity	An area occupied by a workshop	Electric motor power	To manufacture 1м^{2}tissue in 1 hour for hand. energy. cost
Measurement unit			-	1/min	M	M/sec	Ark·m/s	M²	kW	kW·M²/s
Year of manufacture	979	Weft throw method	АТ-100-5М (with shuttle)	240	1	11	14400	3,54	0,800	5,48
			СТБ 175 (with shuttle)	260	1,75	24	27300	6,28	2,200	28,6
			П-125-ZB 8 (pneumatic)	350	1,55	30	32550	3,41	1,100	13,7
	1987		АТ-100-5М (with shuttle)	240	1	11	14400	3,54	0,800	5,48
			СТБ-180 (projectile)	300	1,8	24	32400	6,47	2,200	33,9
			П-155 ZB (pneumatic)	350	1,55	30	32550	3,41	1,100	17
	200(		Somet (rapier)	500	1,9	0	57000	10,9	4,000	108

			СТБУ-180 (projectile)	360	1,8	24	38880	7,89	4,000	74
			Toyoda (pneumatic)	1000	1,9	35	114000	7,97	5,500	209

From the analysis of the table, it can be seen that in the former Soviet Union in 1957, no sewing machines were produced. The installation of tens of thousands of AT-100 looms in the country before independence was the basis for comparing their performance with other types of looms (table).

In 1957-1987 [3,4] on AT-100 machines, mainly due to the improvement of some mechanisms, the increase in dimensions led to a 10% increase in the area occupied by the machine, which reduced the amount of product per 1 m2.

In the 60s of the last century, the former Soviet Union introduced textile-free STB machines into the textile practice [3]. The data showed that the head shaft rotation speed of STB machines was 13.3% higher than that of AT machines. Considering that the working width of the machine will be 175 cm, it was observed that the theoretical productivity increased by 1.9 times. The productivity of pneumatic looms introduced into production during this period is twice as high as that of looms. The increase in the theoretical productivity of the machines led to an increase in the amount of product per 1 m^2. The increase in the power of electric motors installed on machine tools has led to an increase in the amount of electricity consumed for the production of 1m^2 of fabric on STB machines by 2.5 times, and on pneumatic machines by 1.3 times. The years 1987-2006 can be described by the widespread introduction of non-sewn looms instead of looms. In particular, during the years of independence, we can see the example of Italy's Somet, Italy's Toyoda and Russia's improved STBU-180, STB-250, STB-360, which are installed in the republic's textile enterprises. These machines are primarily distinguished by the high speed of rotation of the main shaft. It can be seen from the table that the head of the STBU-180 increased the rotation speed of the loom by 1.2 times, on the loom "Somet" by 1.66 times and on the loom by 3.3 times compared to the loom STB-180. While noting the high productivity of the new looms, along with their cost-effectiveness, it is necessary to reduce the breakage of the threads on the loom first in order to use them effectively.

It should be noted that during the period under review, the "technological chain" of preparation of cotton yarn for weaving (rewinding, selection, loading and transfer or tying) has hardly changed. However, the fact that large windings were obtained on pneumomechanical spinning machines did not solve the problem of rewinding.

During the years of independence, cone-shaped coils ready for weaving have been delivered to the textile enterprises of the republic, with an integrated system of rewinding machines with ring spinning machines. Special research is being conducted on the problems associated with repackaging machines.

During the period under analysis (50-80 years), instead of drum machines, first SV-140, then SP-140 and SP-180 (without drums) machines were introduced into production. According to references published in 1957, 1979, and 1987, the design speed in the selection remained virtually unchanged. In 2006, the design speed of the SP-140 increased to 1000 m / min.

In general, is there a need to increase the selection rate? After all, the capacity of modern weaving enterprises is 100-150 looms, and a single picking machine that supplies them can work 5-6 hours a day. In addition, the difference in the length indicated by the counter with the speed of rotation of the warp spool and the length of the threads on the spool was a factor in the selection. This in turn leads to an increase in the amount of waste in the aggravation. The size of the width of a modern loom can increase the number of yarns in the body, as well as the number of spools in the band, while increasing the number of yarns in the body. An analysis of the research papers devoted to this process revealed that they are mainly devoted to the development of the tension of the yarns being wound from different bobbins and to ensuring that the tension of all the selected yarns is the same.

The number of yarn brokes in the selection is much smaller than in rewinding, but in modern equipment of this type, the torn yarn ends can be tied without knots, the yarn broke can be tied by hand in knots, untied on a loom or loom, the knot can not be broken.

In the selection, increasing the speed of the warp yarns, along with increasing the theoretical productivity of the machine, also causes a number of shortcomings. When a single thread is broken, the spool may spin 1-2 or more times during the stop period. As a result, it may take a long time to find and connect the end of the broken rope, or the spinning worker may start the machine without connecting the end of the rope coming from the bobbin at all. In some cases, tying the end of the thread to an adjacent thread will cause the loom machine or loom to stop.

In the years of analysis, the use of multi-drum machines, including 11-drum machines, was observed instead of mounted machines during the loading process. Due to the increase in drums, according to the data for 1987-2006, the drying capacity of the machines was increased from 330 kg / h to 490 kg / h. This event is also mainly aimed at increasing the speed of movement of the threads and the theoretical productivity of the machine. Although the modern information and communication technologies of spinning machines installed in joint ventures are aimed at improving the quality of products, along with the automation of process control, the problem of improving the quality of yarns, taking into account the specifics of modern looms.

CONCLUSION

The acceleration of the process of tissue formation in modern non-woven looms and the width of the woven fabric in them is 1.7 m to 3.5 m and more compared to looms requires improvement of raw material quality as a result of improving the process of making warp and weft yarns.

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