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Research Article

CONSTRUCTIVE ANALYSIS OF MODERN CIRCULAR NEEDLE KNITTING MACHINES

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ABSTRACT

The production of knitted goods in the light industry has entered a phase of rapid development after the 20s of the last century. Today, the global production of knitwear accounts for more than 35% of total textile products. This figure is expected to be above 50 per cent by 2025. This, in turn, requires the introduction of modern technologies in enterprises, based on the demands and needs of consumers for the quality of knitted products.

KEYWORDS

Knitting machines, knitted products, knitting machines.

INTRODUCTION

Almost all products made of fabrics are made of knitted fabrics.

At present, knitting enterprises are equipped with modern knitting machines, which are controlled by a program with high productivity and technological capabilities. Modern knitting machines include the following technical and economic indicators:

- High productivity of knitting machines;
- Possession of high-tech icons (knitting earrings and knitted fabrics and coupons for outerwear and underwear, production of knitted products used in machinery and other sectors of the economy, simultaneous use of different types of yarn in machines);

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- High efficiency of raw materials and low labour costs in the production of knitted garments compared to the production of garments from fabrics;
- Ease of working conditions and high quantity of product per unit area [1-7].

Circular double-needle knitting machines with modern, wide technological capabilities and high class occupy a significant place in the enterprises of knitwear production operating in the country. Double-needle knitting machines occupy a significant place among knitting machines due to their versatility, and high productivity and is equipped with electronic control and monitoring devices. In the knitting industry, the modern circle specializes in double-needle knitting machines with tires and double-tires (interlock), as well as knitted and crocheted knitwear. In addition, the prevention of accidents in the production of knitting weaving machine safety requirements [8-11].

We analyzed the circle by studying the SMARTC1 knitting machine KONMEIT model with two needles and observed that the loop formation is performed by distribution or in series (Fig. 1).

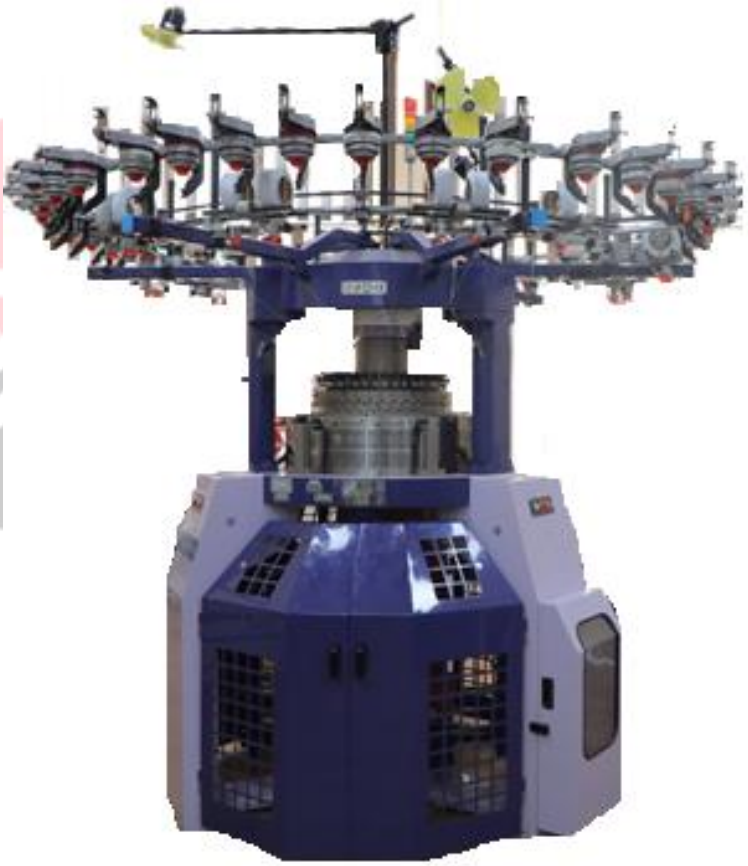

Figure 1. General view of SMARTC1 knitting machine of KONMEIT type with two needles in a circle.

When we constructively analyze the circular double-needle KONMEIT SMART C1 knitting machine, we can see that it consists of the following main parts [12-14]:

- Spinning part provides the ring-forming members with thread. The threading mechanism consists of a spool located at the top of the machine needles and four special racks mounted around the machine to mount the coils. The threading section is equipped with an eye guide that allows easy

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unravelling of the threads in the bobbin, devices for directing the threads to the needles, adjusting the thread tension and controlling the continuous supply of thread. According to the function of the threading part, the loop-forming process in the weaving process is to provide the members with the thread at the same time;

- Knitting part The needles with the tongue are attached to the circular needle in a horizontal and vertical position. The cylinder needles and washer needles are placed perpendicular to each other, and the needle together with the needles performs a circular motion using an electric motor around the main shaft. The loop-forming members around the needle (an electromagnetic pulse mechanism that controls the threading, distribution, finishing, throwing, and movement of the needles) are attached to the machine table in a stationary position relative to the needles. As a result of the circular motion of the needle to the members of the loop formation, the thread to the needles is provided using special devices;
- Pulling part located at the bottom of the machine, is equipped with three traction and wrapping shafts as well as an extension box that provides rotational movement of the shafts. The gearbox consists of a gear that adjusts the rotational motion, a gear wheel, a gear rail and bevel gears. Pull the knitted fabric continuously according to the function of the pull-up wrapping part and wrap it on a special roller at the same tension.

The spinning system on the circular double-needle KONMEIT knitting machine consists of a mechanism and devices attached to a spool located at the top of the machine needle, as well as four special racks mounted around the machine to install the coils (Figure 2).

Figure 2. Threading system. 1-spool, 2-automatic threading mechanism, 3-device for supplying lycra yarn, 4-cross, 5-belt, 6-pulley, 7-belt tensioning device.

In the sequential process of loop formation, the rings are formed by a series of needles between the two needles. The active needle that forms the loop by taking the rings of needles directly from the thread feeder is the passive needle that forms the ring from the thread of the active needle rings of the needles (Fig. 3).

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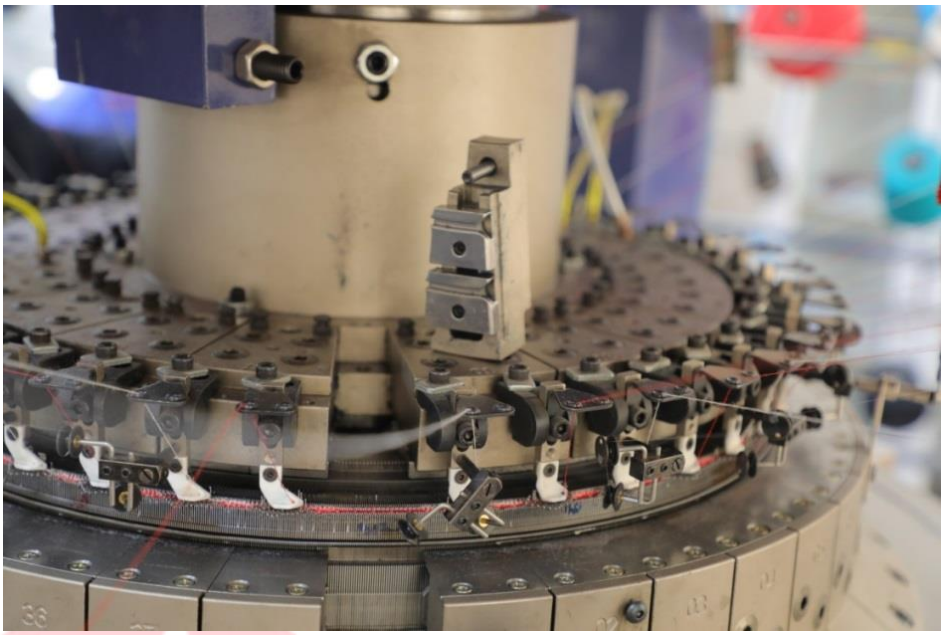

Figure 3. The location of the ring-forming mechanism and details of the weaving part.

The traction winding is located at the bottom of the machine and is equipped with three traction and winding shafts as well as a gearbox that provides rotational movement of the shafts (Figure 4). The pull-up piece continuously pulls the woven knitted fabric and wraps it on a special roller at the same tension.

Figure 5. Pulling and wrapping system

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CONCLUSION

In short, the appearance of a circle on a two-needle knitting machine. It allows for expanding the range of products with high physical, mechanical and hygienic properties, low consumption of raw materials, and increases the volume of finished products, regularly updating the range, equipped with modern knitting machines.

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