

## **IMPROVEMENT OF THE LOOPER MECHANISM OF THE SEWING MACHINES**

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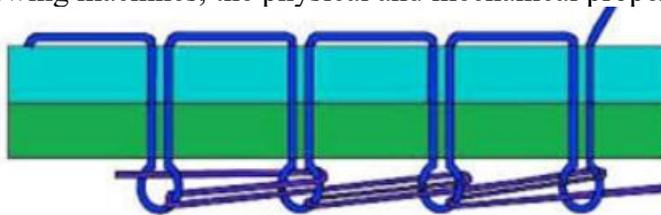
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Today, along with the development of the sewing and knitting production industry, providing the industry with highly qualified, mature specialist personnel that meets the requirements of the time and modern equipment, improving the equipment in the sewing and knitting production enterprises is one of the urgent tasks of the light industry. In particular, modern sewing machines have been created that reduce the stretchability of fabrics when sewing sewing and knitwear, ensure that they produce high-quality stitches in sewing machines, ensure that the technological process is carried out correctly, and that shuttle threads do not break, and their working bodies and mechanisms are being improved.

Sewing machines are divided into two groups, depending on the nature of thread entanglement in the process of creating a sewing machine: shuttle sewing machines; chain stitch sewing machines.

The following working parts of the machine are involved in the formation of a two-threaded chain thread: needle for threading the upper thread, threader for threading the lower thread, expander, rack, rod and a knife mechanism that cuts the edge of the details before threading.

At present, automated and electronically controlled sewing machines of various functions and structures, created based on the latest achievements of science and technology, meeting the requirements of modern technology, are being produced. In the creation and improvement of sewing machines, the physical and mechanical properties and structure of the material to be sewn,



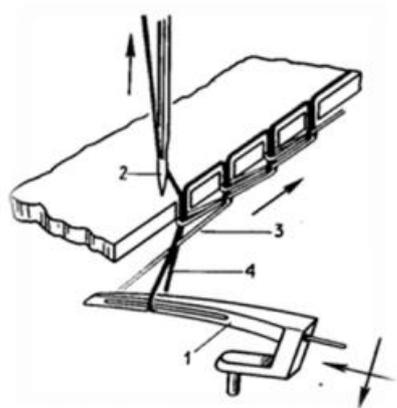
factors affecting the technological process are taken into account.

Chain stitch knitting machines are mainly used for sewing hard and durable fabrics and for temporary joining of garment details.

The left shifter continues to move to the right and meets the oncoming expander, the expander catches the left shifter loop. At this moment, the needle comes out of the material, the rails rise and push the material along the length. The extender rises above the needle plate and aligns the left shifter ring with the line of motion of the needle as it begins to move downwards. The needle enters the ring of the left shifter, pierces the material and begins to descend. At this time, the left shifter moves to the left, and the expander moves to the right.

It is known from the technical specifications of two-needle sewing machines that they are mainly intended for sewing details of items made of light shirts and suiting materials using two parallel shuttles with two threads. The rotation frequency of the main shaft is up to 4000 rev/min., the size of the shaft is from 0 to 6 mm, the distance of parallel shafts is 3.5 : 5.0. Includes interchangeable accessories including needle holder, needle bar, needle plate and rail.

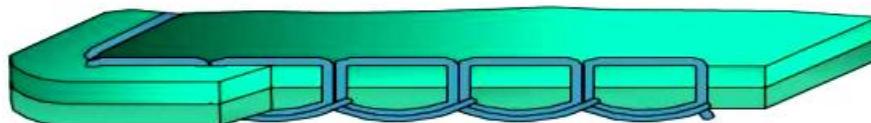
Two parallel embroiderers are used to decorate the details of various items, for example, to decorate the board, collar, belt, plastic and other details; It is widely used in embroidering of straps, ribbons, buckles, coquettes and other works.



**Figure 1. The process of forming a chain reaction.**

1-looper, 2- needle, 3- looper thread, 4- needle thread, 5-fabric.

A single strand chain stitch is twice as elastic as a shuttle stitch and is resistant to stretching the stitch. The productivity of these machines is very high, the construction is simple, because they do not have a bobbin thread, a spinner and a bag cleaning device.



*Figure 2. Single strand chain linker*

The process of formation of a single-stranded chain bag. In the process of the formation of the baghia, the needle 2 (Fig. 1.2), the needle 2, the needle 4, the needle 1 and the thread attached to the needle guide are involved.

The process of formation of bachia can be divided into the following characteristic stages:

- the needle 2 pierces the gauze and falls to the lowest edge position, then when it rises 2-2.5 mm, it forms a loop in the thread, which is caught by the end of the switch 3;
- the shifter 3 extends the loop, the needle 2 comes out of the threads, the toothed rack 4 rises and pushes the threads one way;
- at the end of the threading, the ring deviates and takes a convenient position for the needle 2 to enter it, at the same time, the inclined surface of the switch 3 moves the short (left) part of the ring forward so that it does not get wrapped around the steering wheel of the switch 3;

It is also possible to perform two parallel sewing machines on a single-needle sewing machine, but, firstly, this work cannot be done at the same time, and secondly, it is much more difficult to do it even when using special devices. Double-needle machines increase labor productivity (by 50-80%) and improve the quality of the sewn item.

According to experts, the use of double-needle sewing machines not only improves product quality, but also increases labor productivity by 3.5% compared to previous double-needle machines.

Various machine-building companies are also producing a number of double-needle machines, machines with a gap between 0 and 12 mm, for sewing clothes from all types of fabrics. This machine has a slow lowering of the wheel so as not to damage the gas. Devices for changing and controlling the tension of the upper and lower threads are installed. It is possible to sew not only knitted fabrics, but also leather and thick materials on the machine.



**Figure 2. Existing and improved loopers.**

The structure of the surface layer of the part processed under laser light determines the operational characteristics of the machine units:

- increased hardness,
- an increase in the level of dispersion,
- corrosion resistance,
- friction properties,
- mechanical characteristics,
- changes the sign and magnitude of residual stress.

The results of scientific research show that machine parts working in double friction are less worn by friction. Laser annealing of carbon, alloy and high-speed steels increases their heat resistance.

The heat resistance of low-alloyed carbon steels: U8A, U10A, I3, I5, XVG, 9XS changes little, friction coefficients are reduced in friction pairs. The thermal processes occurring in the surface layer of the parts under the influence of heat determine the amount and distribution parameters of the residual stress in it.

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