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PRODUCTION OF CLOTHKNITTED MATERIALS FOR MEDICINE AND TECHNOLOGY IN A KNITTED MANNER

Summary: Sufficiently wide application in the area of medicine and different technology the textile materials find (sheet, blanket, special regular articles with the elements for heating or cooling the human body, technical sleeves for the evacuation of people with the extraordinary situations, the glove, the medical stockings and so on), in particular, made by knitted method. Production of textile materials on the hosiery equipment it makes it possible to increase not only their qualitative characteristics, to increase the productivity of the production, but also to create promising articles with the specific properties and the increased economic indices. At the Kiev national university of technologies and design together with the number of the research organizations and productions are developed the technologies and special technological equipment for preparing the jersey with the basic-woof threads (of clothknitted materials). The models of the standardized equipment, which allow, are developed, to in particular manufacture the thin tubes (from 1 mm) and braiding for the medical tubes (from 1 to 140 mm).

The description of special equipment for the production is in this article represented of clothknitted articles and the results of investigating its characteristics.

1. Introduction

In the common fleet of knitted machines the circular binding knitting machines occupy key place, which is caused by their high productivity, by wide patterned possibilities and with the significant degree of the automation of the process of the binding. It is on their basis developed a number of the models of technological equipment in the Ukraine on the manufacture of the clothknitted articles, namely the machine of the models TBM, KMTM, MAP and IIBM [1, 2].

Experience of operating such machines showed the great advantages of the knitting method of the manufacture of articles in comparison with the loop. Knitting method makes it possible 3-4 times to increase the productivity of machines.

However, the machines indicated have structural limitations, which do not make it possible to manufacture cords and tubes of different diameters, which in turn negatively influences the expansion of the assortment of the manufactured production.

Taking into account known scarcity in the output of special tubes and cords, it is possible to consider that the equipment of the enterprises of the knitted and textile industry by new more productive equipment for the production by knitted method it is most promising, and scientific research works, the directed toward the improvement constructions and the expansion of the technological possibilities of these machines and the development of the new assortment of articles it is immediate.

2. Description of the machine construction

Is in this article given construction, technical characteristic and version of the improvement of the mechanism of the binding for the purpose of the possibility of obtaining on one machine of tubes, cords, braidings of tubes and the woof-knitting cord with the filler of broad spectrum.

Field of application – lung and textile machine building (the pneumatic and the hydraulic drives), agricultural machine building, the electrical engineering industry, medicine and other branches.

Installation includes the frame, made from the sectional material, shock absorbers for reduction in the vibration loadings to the floor of shop and reduction in the sound effect.

The frame with the mechanism of binding is fastened to the base. The bobbins with the forgings of the threads are established on the revolving disk of the mechanism of binding and integumentary, and also the corresponding thread-guiding accessories. Upper frame with the bank with the revolving disk is fastened above the lower frame. The drive is attached under the frame of the mechanism of binding to the frame, transmitting rotation to the mechanism of binding and to upper bank, and also to the mechanism of the guy, intended for the guy from the zone of the binding of the manufactured article. Packing the threads of the basis is fastened to the frame on the extension brackets from

two sides, through the thread-guiding accessories they enter the mechanism of binding. Electrical equipment for control of installation is installed in the special cabinet. Frame is three-dimensional summary construction from the rolled section. The openings for fastening of the frame of the mechanism of binding and counters of the enclosure are executed from above the frame.



Fig. 1. Knitted circular binding knitting machine (the installation) with change the cylinder for the needles and the pushers

Technical characteristic and type of machine (installation):

- Model – ШВМ(ЛН0)
- Quantity of fontur – 1
- Quantity of the binding heads – 1
- Diamert of needle cylinder, mm. – 8 ... 180
- Class of the installation – 10; 14
- Needle step, mm. – 1,8; 2,1; 2,5
- Quantity of the needles – 5...108
- Position of the needles – 0-15
- Interlacing – the kulirnaya smoothness.
- Processed yarn – 93,5 Tex; 187 Tex.
- Quantity of revolutions of system, min^{-1} – 250 ... 500
- Power of electric motor, kWt – 0,25

Installation is shown in the Fig. 1.

Inside the frame there are guides for fastening of electric motor, with the possibility of the adjustment of the center-to-center distance between the main shaft and the engine, and also the guiding for the installation of mechanism guys. From behind on the lower cross connection there are braces of sectional coil with the filler.

The mechanism of binding includes the needle cylinder of the constant diameter, making it possible to manufacture cords and tubes of one established diameter. The construction of the mechanism of binding makes it possible in the process of work to change the depth of the bending –«kulirovaniya» (to change length the loop-density of the binding).

Upper bank is intended for the threads of soil and basis, and also the supply of filler into the zone of the binding. Mobile cylinder is established into the bearing housing, fixed in the container, established in the housing of the frame. Cylinder is fixed with the nuts. Fixed conduit for the filler is passed through the central openings of cylinder, which in the lower part is fixed in the bearing support of cap, connected with the cylinders. The thread of the soil is passed through the lateral opening with the china eyes, which after passing the deflecting eyes enters the conductor of the thread, laying to the needles of the needle cylinder. The gear with the disk is on top fixed on the cylinder flange, on which is placed the packing with the threads of the soil. From below slip ring is fixed to the flange, which, as in the mechanism of binding, it interacts with the slip ring. Around the cylinder is located fixed container with the ring « guides strands» (the conductor of the thread) for supplying the threads of basis v between the needle spaces.

For expanding the technological possibilities of machine the improvement of the mechanism of the binding is carried out, in which needle cylinder is executed composite and upper part with the change heads of different diameters and classes is included and by grooves for the uvular needles, and lower part with the constant diameter, connected with the upper part, and pushers are placed between the ring of the units of needle locks and the uvular needles in the grooves for the latter.

Execution of needle cylinder by the composite, which includes upper part with the change heads of different diameters and classes and the grooves for the uvular needles, and lower part with the constant diameter, connected with the upper part, and pushers are placed between the ring of the units of needle locks and the uvular needles in the grooves for them, it makes it possible to bind cords and tubes of different diameters and density of cloth knitted material in one knitted machine with the change

knitting head, which ensures the expansion of the technological possibilities of the mechanism of the binding.

In Fig. 2 is represented the common form of the developed by mechanism of the binding of the circular binding knitting machine.

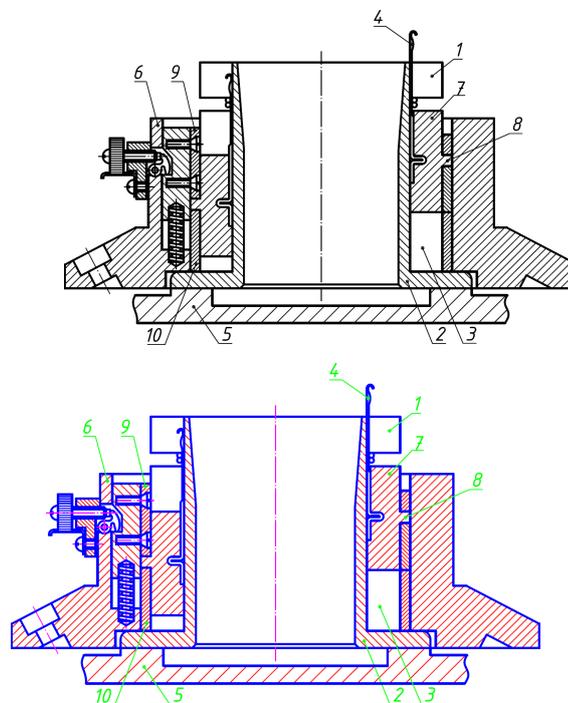


Fig. 2. The common form of the developed by mechanism of the binding of the circular binding knitting machine, which contains the composite cylinder: 1 – the upper part of the composite needle cylinder; 2 – change by the heads of different diameters and classes with grooves 3 for uvular needles 4; 5 – lower part with the constant diameter; 6 – the ring of the units of the needle locks; 7 – the pushers; 8 – the heel of the pushers 7; 9 and 10 – the wedges [3].

The mechanism of binding contains the composite needle cylinder, which includes the upper part 1, with the change heads of 2 different diameters and classes and grooves 3 for uvular needles 4, lower part of 5 with a constant diameter, connected with upper part of 1, the ring of the units of 6 needle locks and pushers 7, placed between the ring of the units of 6 needle locks and uvular needles 4 in grooves 3. Pushers 7 have heels 8, and the rings of the units of 6 needle locks are equipped with wedges 9 and 10. The mechanism of the binding of jersey works as thus.

During, for example, the rotation of the composite needle cylinder, which includes upper part of 1, with change heads 2 with grooves 3 for uvular needles 4 and heels of 8 pushers 7 it interacts with the wedge of 10 rings of the units of needle locks 6, in this case pusher 7 is moved vertically upward, and then vertical motion is transmitted from pusher 7 to needle 4 due to horizontal interaction of the heel of 8 pushers 7. During further rotation of composite needle cylinder the heel of 8 pushers 7 interacts with

wedge 9 the ring of the units of needle locks 6, in this case pusher 7 is moved vertically downward, and then vertical motion is transmitted from pusher 7 to needle 4 due to horizontal interaction of the heel of 8 pushers 7.

Mechanism for the realization of the method of binding are checked with the production of cords and tubes with a diameter of the cylinder of knitting 6-100 mm. For expanding the nomenclature of articles, for example, diameter from 100 ppm of 140 mm prepared additionally four cylinders with diameters of 110, 120, 130 and 140 mm.

Thus, changing in the composite needle cylinder upper part with the change heads with diameter from 100 ppm of 140 mm and pushers were made the sleeves with diameters of 100, 110, 120, 130 and 140 mm substituting only knitting cylinders in the machine. Due to the use of one machine with the constant ring of the units of needle locks and the composite needle cylinder with the change upper parts with the change five heads of different diameters and classes and by grooves with the pushers and the needles it was possible to reduce under production conditions to 25% financial expenditures.

3. Conclusions

Designed installation and a new mechanism for knitting with a composite cylinder and lateral pushers allows:

- to enlarge the nomenclature of the made cords, tubes and braids with the fillers of the articles;
- to realize the method of crochet of jersey due to the displacement of needles under the action of the forces of vertical interaction of wedge - pusher – needle and uniting the horizontal actions of wedge the heel of pusher and pusher the heel of the needle;
- to ensure the reduction of economic expenditures for design, production and operation of the knitted machines.

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PRODUKCJA TKANIN MEDYCZNYCH

Streszczenie: Obecnie bardzo szerokie zastosowanie w medycynie i różnych urządzeniach mają materiały włókiennicze, produkowane w różnych typach maszyn włókienniczych. Przykładami mogą być materiały stosowane jako pieluchy, pościele i inne służące do ogrzewania lub chłodzenia ciała ludzkiego, techniczne rękaw do ewakuacji ludzi w nagłych wypadkach, medyczne pończochy itd. Do poprawy cech fizyczno-mechanicznych materiałów w Kijowskim Narodowym Uniwersytecie Technologii i Wzornictwa w wyniku wielu badań dotyczących organizacji i technologii opracowano szereg technologii i wyposażenia specjalnego procesów do produkcji takich dzianin.