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SEWING MACHINE BOBBIN

Vafoyeva Zamira Sevindikovna
Bukhara Engineering Technological Institute
Vafayevazamira1@gmail.com

Abstract
In this article, in this article, the technology of sewing production and the application of energy-saving technologies in automatic design, information about the problems.

Keywords: thread winding, bobbin, bobbin case, bobbin winders, vertical hook, thread spools, ring, frame, flywheel, latch mechanism.

Introduction

The invention relates to the sewing industry, in particular to sewing machines, namely the construction of a bobbin for a shuttle thread.

Known bobbin design, consisting of two round discs rigidly connected to each other by a sleeve [1, 2]

The disadvantage of the known design is the impossibility of ensuring a uniform tension of the shuttle thread when it is unwound in the process of sewing materials. When unwinding the thread from the bobbin, depending on the location of the current turn of the thread with a change in the radius of its location, a variable unwinding force is required. At the very beginning of the unwinding of the thread, the turn on the bobbin is located at a large radius of the bobbin and therefore a small tractive force is required to unwind it, and when the thread is used up at the very end, practically the radius of the last turns are in the bobbin at a radius equal to the outer radius of the bobbin sleeve. However, a large pulling force is required to unwind these last turns of thread from the bobbin.

To ensure uniform tension of the shuttle thread when unwinding them, i.e. when sewing materials, the design of the bobbin winder has been improved [3,4]

Known bobbin winders for a sewing machine containing a base, a frame, a drive wheel, a bobbin, a latch mechanism, a thread tension mechanism and a thread cutting mechanism are not reliable in operation and have low productivity.

A bobbin winder for a sewing machine containing a base, a frame, a drive wheel, a bobbin, a latch mechanism, a thread tension mechanism and a cutting mechanism,

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while in order to increase productivity, the thread tension mechanism is made in the form of a square, one of the shelves of which has a thread guide slot and a hole, and the thread cutting mechanism is also made in the form of a slider with a striker coming out and a hole at the end of the bobbin winding [3].

The disadvantage of these bobbin winders for the sewing machine is the complexity of the design and the impossibility of ensuring uniform tension of the shuttle thread when it is unwound during sewing of materials due to the lack of a means of adjusting the thread tension in the bobbin with a gradual decrease in the radius of the turns.

In the known design of the sewing machine 852 cl PMZ [4] (prototype), the bobbin consists of two lateral circular disks rigidly connected to each other by means of a metal sleeve. The disadvantage of this design is also the impossibility of ensuring the uniformity of the tension of the shuttle thread, both during winding and unwinding.

The objective of the invention is to ensure uniform tension of the shuttle thread during winding and unwinding from the bobbin, allowing a significant reduction in thread breakage and an increase in the productivity of the machine.

The task is solved by improving the design of the bobbin, equipped with an elastic energy storage. The essence of the design lies in the fact that the bobbin for the sewing machine contains two lateral circular disks rigidly connected to each other by means of a metal sleeve, to which two semicircular spring plates are symmetrically installed, while the cantilever part of the leaf spring protrudes somewhat from the surface of the bobbin sleeve. The maximum clearance between the cantilever part of the plate and the sleeve does not exceed 25% of the maximum layer thickness of the winding thread on the bobbin. The side circular discs have two holes each for the wire retainers. In this case, before winding the shuttle thread, wire holders are installed, pressing the cantilever parts of the plates to the surface of the sleeve. When the thread has finished winding, the guide wires are pulled out from the holes in the bobbin discs. Due to the accumulated energy, the deformation of the cantilever plates during unwinding of the shuttle thread, the plates press on the wound turns of the thread. Due to this energy, the unwinding force of the thread is significantly reduced, that is, the tension of the thread is reduced, especially at high speed modes of sewing materials. Wire holders ensure that the thread tension is even when winding the bobbin.

The design is illustrated by a drawing, where figure 1- is a general view of the bobbin in section; in fig. 2 - view A in figure 1 (without detail 6); figure 3 - view B in figure 1 (with detail 7).

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The bobbin design for the sewing machine includes two lateral circular discs 1 and 2 rigidly connected to each other by means of a metal sleeve 3, to which two semicircular spring plates 4 and 5 are symmetrically connected (welded) at one end. In this case, the cantilever part 9 and 10 of the leaf springs 4 and 5 protrude somewhat from the surface of the bobbin sleeve 3. The maximum clearance between the cantilever part of the leaf springs 4 and 5 and the surface of the sleeve 3 does not exceed 25% of the thickness of the wound layer of the shuttle thread turns. The side round discs 1 and 2 have two holes each for which the wire retainers 6 and 7 enter.

The design works as follows. The shuttle thread is wound around the bobbin. Before winding the thread through the holes 8 of the two side discs 1 and 2 of the bobbin, the holders 6 and 7 are installed. At the same time, the console parts 9 and 10 of the semicircular spring plates 4 and 5 are pressed against the surface of the sleeve 3 by hands. Holders 6 and 7 hold plates 4 and 5 pressed against the surface of the sleeve 3. Then the shuttle thread is wound on the surface of the sleeve 3 and plates 4,5 to a certain layer (thickness) of turns. At the end of the winding of the shuttle thread on the bobbin, the retainers 6 and 7 are removed. In this case, the pressed cantilever parts 9 and 10 of the plates 4 and 5 are released and with a certain pressure will act on the turns of the wound shuttle thread. In the process of unwinding the shuttle thread, that is, when sewing materials, due to the force of pressure of the plates to the body, the thread unwinds more freely. This occurs before the last threads have been unwound from the bobbin.

If necessary, choosing the required stiffness of the spring plates 4 and 5, you can set the required average tension of the unwinding shuttle thread.

The design allows uniform tension of the shuttle thread during the working mode of sewing materials, eliminates thread breakage, and it becomes possible to increase productivity.

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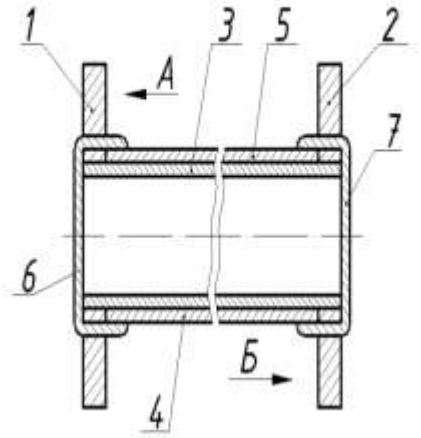

Figure-1

the form A
(without detail 8)

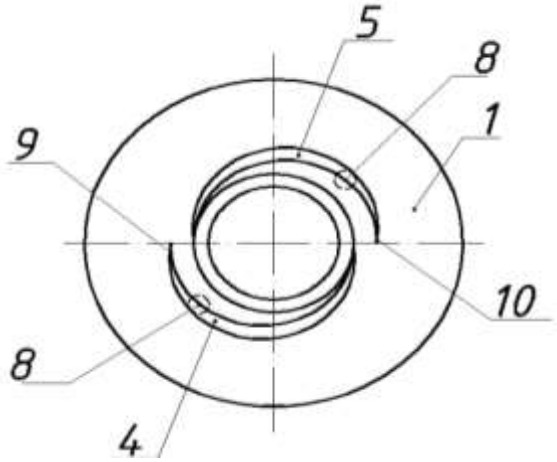

Figure-1

the form B
(with detail 8)

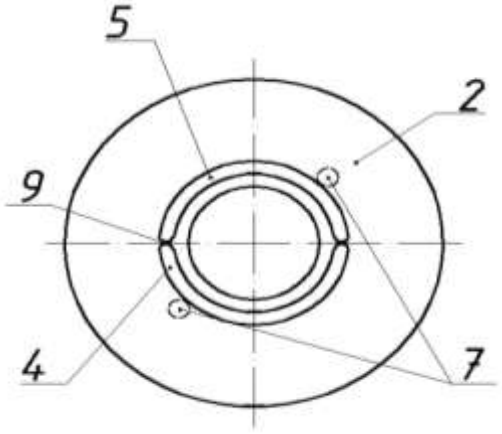

Figure-2

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