ISSN 2181-8622

Manufacturing technology problems

Scientific and Technical Journal Namangan Institute of Engineering and Technology

INDEX COPERNICUS INTERNATIONAL

Google Scholar Crossref doi SLIB.UZ Scientific library of Uzbekistan

Volume 9
Issue 1
2024

UDC 687.053.12

MODERNIZED SEWING MACHINE BOBBIN CAP HOOK THREAD TENSION REGULATOR

MUKHAMEDJANOVA SABRINA DJAMOLITDINOVNA

PhD of Bukhara Engineering Technological Institute, Bukhara, Uzbekistan
Phone: (0897) 424-1070, E-mail: muxamedjanovasabrina@gmail.com

Abstract: The article presents a modernized regulator of shuttle thread tension in sewing machines. The scheme of the new effective constructive scheme and the principle of operation of the shuttle thread tension regulator is developed.

Keywords: sewing machine, shuttle, thread tension, plate, circuit design, regulator, oscillation, mobility, rigidity.

Introduction. In known shuttle sewing machines shuttle device consists of six main structural parts: housing, bobbin holder, staples (guide half-rings), bobbin cap and bobbin. Depending on the type of movement and location of the plane of motion of the body distinguish the following types of shuttles: oscillating, oscillating, uniformly rotating with a horizontal axis of rotation, uniformly rotating with a vertical axis of rotation, etc. The leading structural part of all shuttle devices is the housing, which is fixed on the shuttle shaft of the machine. In the oscillating and oscillating types of shuttle devices return - rotary movement makes bobbin holder. This part of the design of the shuttle device has a pointed spout, which captures the needle loop. The bobbin cap is stationary when turning the body of the shuttle device. In machines with oscillating shuttle it is kept from rotating by a rod in the bobbin cap, which is included in the groove of the overhead bracket. In rotating horizontal shuttle devices bobbin cap and bobbin holder are held from rotation by a set pin. Rotation of the bobbin case when the machine is working is inadmissible, as it can lead to the breakage of the needle. The bobbin holder holds the bobbin case. On machines with a rotating hook, the needle loop goes freely around the bobbin case. The bobbin cap holds the bobbin by adjusting the pressure of the lamellar spring, it can change the tension of the hook thread. [1].

The known regulator of shuttle thread tension bobbin cap sewing machine consists of an arc-shaped plate spring, has two holes, the first for fixing the screw to the side surface of the bobbin cap and the second for the adjusting screw. In this case, the width of the lamellar spring along the entire length is made the same [1].

Results. The disadvantage of the known design of the regulator of tension of the shuttle thread bobbin cap is the impossibility of providing thread tension because of the change in the pressure force of the lamellar spring along its length in the contact zones with the thread passed between the plate and the side surface. In addition, during operation of the machine between the leaf spring and the bobbin case because of the high pressure of the plate on the thread periodically accumulates thread lint, which can lead to jamming and thread breakage.

In another device containing a tension regulator shuttle thread, fixed on the cylindrical body of the bobbin cap, in pressing to the oval slot of the wall of the tension spring is made a groove for placing the thread in it when installing the bobbin in the cap [2].

The disadvantage of this design is an increase in the amount of thread pile at the slot and frequent thread breakage when the thread tension increases.

In the following design in the brake regulator of thread tension the plate element is made with protrusions, and is made of foil, 0,05 mm thick, and the height of protrusions is 0,08÷0,12 mm [3].

The disadvantage of the known design of the shuttle thread tension regulator of the bobbin case is the impossibility of providing thread tension because of the change in the pressure force of the lamellar spring along its length in the contact zones with the thread passed between the plate and the side surface. In addition, during operation of the machine between the leaf spring and the bobbin case because of the high pressure of the plate on the thread periodically accumulates thread lint, which can lead to jamming and thread breakage.

In another device containing a tension regulator shuttle thread, fixed on the cylindrical body of the bobbin cap, in pressing to the oval slot of the wall of the tension spring is made a groove for placing the thread in it when installing the bobbin in the cap [2].

The disadvantage of this design is an increase in the amount of thread pile at the slot and frequent thread breakage when the thread tension increases.

In the following design in the brake regulator of thread tension the plate element is made with protrusions, and is made of foil, 0,05 mm thick, and the height of protrusions is 0,08÷0,12 mm [3].

The disadvantage of the known design is the limited used (only for obtaining zigzag stitches), as well as the complexity and low reliability of the design.

It should be noted that the contact of the plate with the thread occurs along the entire length of the passage of the thread in this area. This leads to an increase in friction, which results in greater thread breakage.

The task of the invention is to provide reliability of operation, uniformity of shuttle thread tension along the entire length of the lamellar arc-shaped spring in contact with the side surface of the bobbin case, elimination of accumulation of thread lint between the lamellar spring and the body of the bobbin case, reducing thread breakage.

The set task is solved by improving the design of the shuttle thread tension regulator of the lamellar spring, providing uniformity of thread tension in the zone of its adjustment, reducing thread breakage by reducing the forces of friction between the plate and thread by reducing the area of contact between them.

Discussions. The essence of the design is that the regulator of the tension of the shuttle thread of the bobbin case of a sewing machine consists of an arc-shaped plate spring with a hole for the adjusting screw and a hole for its attachment to the bobbin case.

In the working part, in the area of the arrival of the shuttle thread surface of the plate is made wavy, sinusoidal shape. In this case, the range (double amplitude) waviness selected equal to the thickness of the hook thread, and the step is selected within the range t = (1,8 ÷ 2,2)□10-3m. In this case, the groove formations of the undulations are made parallel to the lateral edges of the plate. Due to the wavy surface of the working surface of the plate spring, the contact area of the thread and the plate is reduced, the friction force is reduced, thereby reducing thread breakage and lint accumulation.

The design is explained by the drawing, where Fig. 1 a - is a front view of the spring plate tension regulator with local section, Fig. 1 b - section A-A in Fig. 1

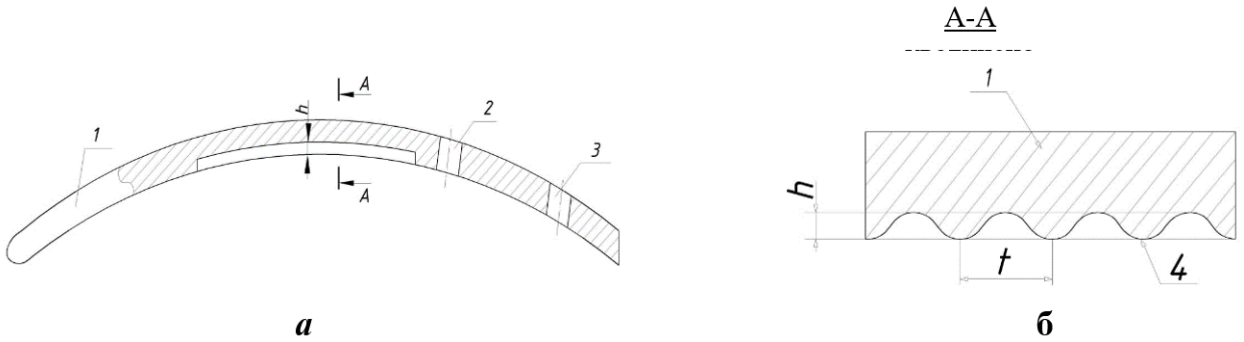

Fig.1. Sewing machine bobbin case hook thread tension adjuster.

Shuttle thread tension regulator bobbin cap sewing machine is an arc-shaped plate spring 1, a hole 2 for the adjusting screw and a hole for its attachment to the bobbin cap.

Arc-shaped lamellar spring 1 in the working part, in the zone of passage of the shuttle thread is made wavy sinusoidal shape 4, the range of undulations chosen equal to the thickness of the shuttle thread, h = hn (where h-span of undulations; hn-thickness of the shuttle thread), and the step of undulations 4 chosen equal to t = (1,8÷2,2)□10-3m.

The design works as follows. The bobbin thread having different linear density passes through the shaft between the side surface of the bobbin case (not shown in Fig.) and arc-shaped plate spring 1. At the same time, due to the change in friction between the thread and the plate 1, thread breakage may occur.

In the working area of the undulations 4 of the lamellar spring 1, the contact area of the thread with the surface of the plate 1 is reduced, and the friction force between them is reduced. In this case, the increase in the pressure of the leaf spring 1 on the thread occurs briefly and cyclically. This eliminates thread breakage and lint accumulation.

Conclusions. On the basis of the analysis of design features of the regulator of shuttle thread tension in the sewing machine an effective design of the regulator is developed.

REFERENCES

1. A.S.Ermakov. Equipment of sewing enterprises: In 2h. Ch 1. Sewing machines non-automatic action: textbook for nachal. vocational education, M., Publishing Center "Academy", 2009.-304 p., p.82.

2. Patent RI N2003745 B.I. N43-44, 1993.

3. Patent SU N1715909 Bulletin N8, 1992.

CONTENTS

PRIMARY PROCESSING OF COTTON, TEXTILE AND LIGHT INDUSTRY