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THREAD-CASES FOR LOCK-STITCH SEWING MACHINES

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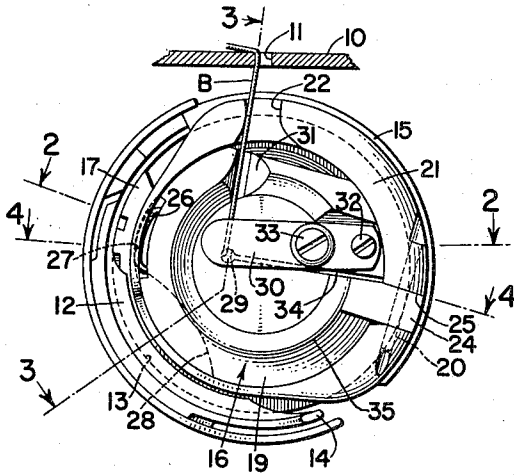


Fig. 1.

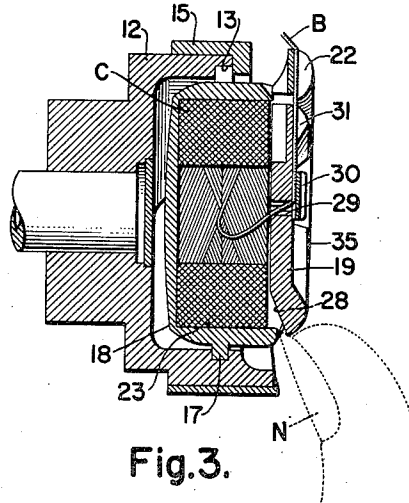


Fig. 3.

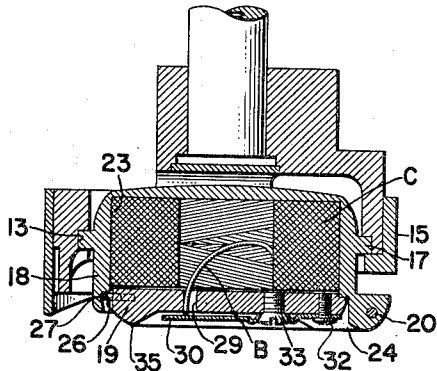


Fig. 2.

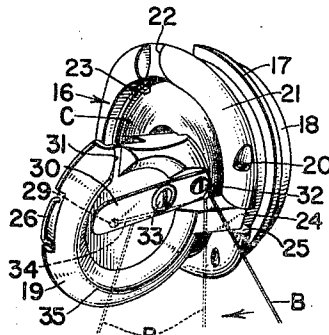


Fig. 6.

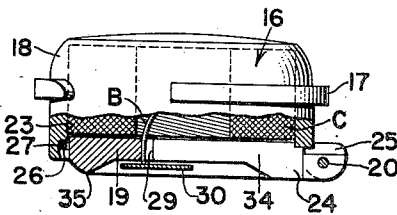


Fig. 4.

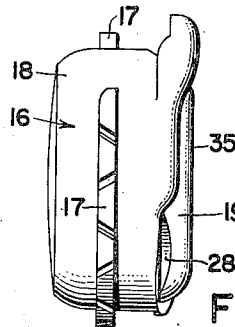


Fig. 5.

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THREAD-CASES FOR LOCK-STITCH SEWING MACHINES

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4 Claims. (Cl. 112—231)

This invention relates to sewing machines of the high speed lock-stitch type, wherein a loop of thread presented by the needle is carried around a thread-case housing the interlocking thread by a circularly moving loop-taker in which the thread-case is stationarily contained.

The invention relates more particularly to the loop-taker thread-mass enclosing means of a lock-stitch sewing machine and has for its primary object the provision of an improved thread-case designed to use a shell-less bobbin, commonly referred to as a cop, in which the thread is preferably delivered from the center of the cop.

Another object of the invention is to provide a thread-case having thread-directing means capable of leading the bobbin-thread from its supply to a thread-tensioning device and thence to the work in a free condition.

A further object of the present invention is to increase the bobbin-thread capacity of a thread-case without increase in the diameter of the thread-case bearing rib or increase in the overall axial thickness of the thread-case.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby, will be readily understood by those skilled in the art.

In the accompanying drawings:

Fig. 1 is a fragmentary front elevational view, partly in section, of a sewing machine equipped with a horizontal axis rotary loop-taker embodying the invention.

Fig. 2 represents a horizontal sectional view taken substantially along the line 2—2, Fig. 1.

Fig. 3 represents a sectional view taken substantially along the line 3—3, Fig. 1, showing the manner in which the operator's finger nail is inserted to pry open the cover of the thread-case.

Fig. 4 is a top plan view of the improved thread-case with a portion in section, which is taken substantially along the line 4—4, Fig. 1, to show the way in which the threading slot formed in the thread-case cover opens into the thread-delivery eye behind the thread-tension spring.

Fig. 5 is a left side elevational view showing the finger-nail cut-out to facilitate opening the thread-case cover.

Fig. 6 is a perspective view of the thread-case with its cover open showing the thread in full lines overlying the hinge of the cover and in dotted lines the manner in which the thread is pulled sidewise along the threading slot and into the thread-delivery eye.

Referring to the drawings, the present invention has been embodied in a lock-stitch sewing machine having the usual throat-plate 10 which is formed with a needle hole 11. Disposed below the throat-plate 10 is the conventional cup-shaped rotary hook-body 12 having an internal bearing raceway 13 and cut away on one side to provide a loop-seizing beak 14. The outer wall of the

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internal raceway 13 is provided by a detachable gib 15 secured in any suitable manner to the hook-body 12.

Disposed within the cup-shaped hook-body is a thread-case, indicated generally as 16, having formed about its periphery a bearing-rib 17 which is journaled in the raceway 13 of the hook-body 12. The thread-case 16 is formed of a cup-shaped main section 18 and a cover or cap-portion 19 hinged, as at 20, to said main-section 18. Formed on the outer rim-face of the main-section 18 is a needle-thread-loop guard and take-up flange 21 which is provided with the usual rotation-restraining notch 22 adapted to be loosely entered by the tongue on the regular rotation-restraining bar (not shown) common to rotary hook lock-stitch sewing machines. The main-section is formed with a cop-receiving circular cavity 23 which is devoid of the usual center post on which is supported the regular steel bobbin of conventional lock-stitch sewing machines. The circular cavity into which a thread cop C is placed is closed by the cover or cap-portion 19. The thread-case cover 19 is supported on the rim-portion 21 of the main-section 18 by means of a hinge-extension 24 entering a notch 25 in the rim-portion and pivoted on the hinge-pin 20. The cover 19 is locked in its closed position by a latch which is preferably in the form of a resilient keeper wire 26 secured to the cover and adapted to cooperate with a keeper-receiving groove 27 in the rim-portion of the main-section of the thread-case. To facilitate the unlatching of the cover 19 there is provided a finger-nail cut-out 28 in which the operator's finger-nail N can be inserted, as shown in dotted lines in Fig. 3. As will be seen in Fig. 2, when the cover 19 is closed there is provided a cop-receiving cavity 23 which has maximum capacity in relation to the outside dimensions of the thread-case. It will be appreciated that the latch 26 is located within the thickness of the cover 19 and by being so located it does not necessitate a thickening of the cover to the point where the cover would reduce the capacity of the cop-receiving cavity 23.

One of the advantages of using a cop, instead of the usual steel bobbin on which the lower thread is wound, is that the thread is drawn off the cop from the center thereof and as a result the cop does not have to rotate in delivering the thread to the seam being formed. Since the lower thread mass does not rotate, "spilling" of the bobbin thread is eliminated as is also the variable tension imposed on the thread as the bobbin thread is unwound from the usual steel bobbin. As will be observed in Figs. 1 and 2, the bobbin thread B is drawn from the center of the cop C through a thread-delivery eye 29 in the cover 19, thence it travels upwardly between a tension leaf-spring 30 and the cover 19, then through a thread-clearance notch 31 formed in the cover 19, and then through the rotation-restraining notch 22 to the needle hole 11. The tension leaf-spring 30 is secured by a screw 32 to the face of the cover 19 and the pressure exerted by the spring is regulated by manipulation of a tension-regulating screw 33 in the usual manner. In order that the thread-case may be threaded conveniently, a threading slot 34 is cut into the cover 19 and runs from the edge of the rim of the cover into the thread-delivery eye 29. The threading slot 34 is preferably inclined upwardly (Fig. 1) from its outer or thread-receiving end which is below the lower edge of the leaf-spring 30 to its inner end where it opens into the thread-delivery eye 29. It will be seen in Figs. 1 and 6 that the outer end of the threading slot 34 is preferably disposed at the same level as the upper surface of the hinge-extension 24, the advantage being that when threading the thread-case the cop is inserted in the cop-receiving cavity 23 and the beginning end of the bobbin thread is laid over the hinge-extension 24. Sidewise pull on the thread in the direc-

tion of the arrow in Fig. 6 will cause the bobbin thread B to slide off the hinge extension and automatically enter the threading slot 34 and then continued sidewise pull on the thread will cause it to slide along the threading slot and into the thread-delivery eye 29. In its passage along the inclined threading slot 34 the thread contacts the lower edge of the horizontally disposed leaf-spring 30 and thereby flexes the leaf-spring outwardly and enters under the spring 30. This is accomplished by virtue of the fact that the lower edge of the leaf-spring crosses the threading slot 34 so that as the thread slides along the slot it contacts the leaf-spring and flexes it outwardly. When the thread is located in the thread-delivery eye 29 it will be appreciated that the thread is then located beneath the free end of the tension leaf-spring 30, which bears against the cover 19 around the exit end of the thread-eye 29, and by simply swinging the thread upwardly around the end of the spring the thread is positioned to travel upwardly directly to the needle-hole 11 in the throat-plate 10, as clearly shown in Fig. 1. From the foregoing, it will be appreciated that means has been provided whereby the thread-case can be threaded very conveniently merely by inserting the cop, laying the beginning end of the thread over the hinge-extension, pulling the thread sidewise into the thread-delivery eye and then about the end of the leaf-spring, following which the cover of the thread-case is closed.

In order that the needle-thread-loop, as it is cast about the thread-case, will not snag on the tension spring 30 it will be seen that the face of the cover 19 is recessed to provide a raised rib 35 which functions to hold the limb of the needle-thread-loop away from the leaf-spring 30. It will be understood that the rim of the main-section 18 of the thread-case is thickened and suitably rounded off to function as a needle-thread-loop guard and take-up flange identified as 21 and this combination guard and flange serves to prevent contact of the needle-thread-loop with the rotary hook element during cast-off and also exercises some take-up action on the thread to augment that of the usual take-up located in the head of the sewing machine. The presence of the guard and flange 21 permits the present thread-case to be substituted in all sewing machines equipped with the type of hook and bobbin case disclosed, for example, in the Kessler Patent No. 2,085,699, dated June 29, 1937.

By virtue of the construction above described I have been able to produce a thread-case having a gain of approximately 66% in bobbin-thread capacity over the capacity of the conventional bobbin of the above noted Kessler Patent No. 2,085,699.

Having thus described the nature of the invention, what I claim herein is:

1. A thread-case for sewing machine loop-takers, comprising, a cup-shaped main-section formed with a cop-receiving cavity opened at one end, a cover hingedly mounted on said cup-shaped main-section and closing said cop-receiving cavity, said cover hinge including a hinge-projection extending from said cover and pivoted to said cup-shaped main-section, complementary latch means mounted on said cover and main-section and provided for holding said cover in closed position on said main-section, said cover formed with a thread-delivery eye through which thread can be delivered from the center of a cop in said cop-receiving cavity, a threading slot provided in said cover with its outer end at the periphery of the cover adjacent to and above said hinge-projection and its inner end opening into said thread-delivery eye, and thread tensioning means located on said cover for contacting said thread as it emerges from said thread-delivery eye.

2. A thread-case for sewing machine loop-takers, comprising, a cup-shaped main-section formed with a cop-receiving cavity opened at one end, a cover hingedly mounted on said cup-shaped main-section for closing said cop-receiving cavity, said cover hinge including a

hinge projection having a flat upper surface, said hinge projection extending from said cover and pivoted to said cup-shaped main-section, complementary latch means mounted on said cover and main-section provided for holding said cover in closed position on said main-section, said cover formed with a thread-delivery eye through which thread can be delivered from the cop in said cop-receiving cavity, a threading slot provided in said cover with its outer end opening into the periphery of the cover at an elevation below the level of the thread-delivery eye but at the level of the upper surface of said hinge projection and its inner end opening into said thread-delivery eye, and a thread tensioning leaf spring mounted on said cover above the level of the outer end of said thread-delivery slot and bearing on said cover around the exit end of said thread-delivery eye.

3. A thread-case for sewing machine loop-takers, comprising, a cup-shaped main-section formed with a cop-receiving cavity opened at one end, and a flat cover for closing said cop-receiving cavity, said main-section having a thickened and rounded needle-thread-loop guard and take-up flange mounted on the rim face thereof and having a rotation restraining notch cut into said flange, and said cover having hinge means pivotally supporting the cover on said main-section and said cover having a raised rib formed on its front face and defining a flat recessed surface, a thread-delivery eye formed in said cover and having its outer end opening into said flat recessed surface, a threading slot formed in said cover with its inner end opening into said thread-delivery eye and its outer end opening into the peripheral edge of said cover above the level of said hinge means, a thread tensioning leaf-spring mounted on said cover and having its free end bearing on said flat recessed surface adjacent the exit end of said thread-delivery eye, and latch means for holding said cover in cavity-closing position on said main-section, said latch means including a keeper member mounted on said cover and a complementary keeper groove formed in said main-section.

4. A circularly movable loop-taker for sewing machines comprising, a circularly movable loop seizing element having a loop-seizing beak and an internal circumferential raceway, a thread-case element disposed within said loop-seizing element and constrained against circular movement with said loop-seizing element, said thread-case comprising a cup-shaped main-section provided with an external bearing rib disposed in contact with said circumferential raceway and with a cop-receiving cavity opened at one end, a plate-like cover hingedly mounted on said cup-shaped main-section and closing said cop-receiving cavity, said cover hinge including a hinge projection extending from said cover and pivoted to said cup-shaped main-section, and having a substantially flat upper surface, complementary latch means mounted on said cover and main-section and provided for holding said cover in closed position on said main-section, said cover formed with a thread-delivery eye through which thread can be delivered from the cop in said cop-receiving cavity, a threading slot provided in said cover with its outer end opening into the peripheral edge of the cover at a point where its bottom edge is coplanar with the upper surface of said hinge projection and its inner end opening into said thread-delivery eye, and thread tensioning means located on said cover for contacting said thread as it emerges from said thread-delivery eye.

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