

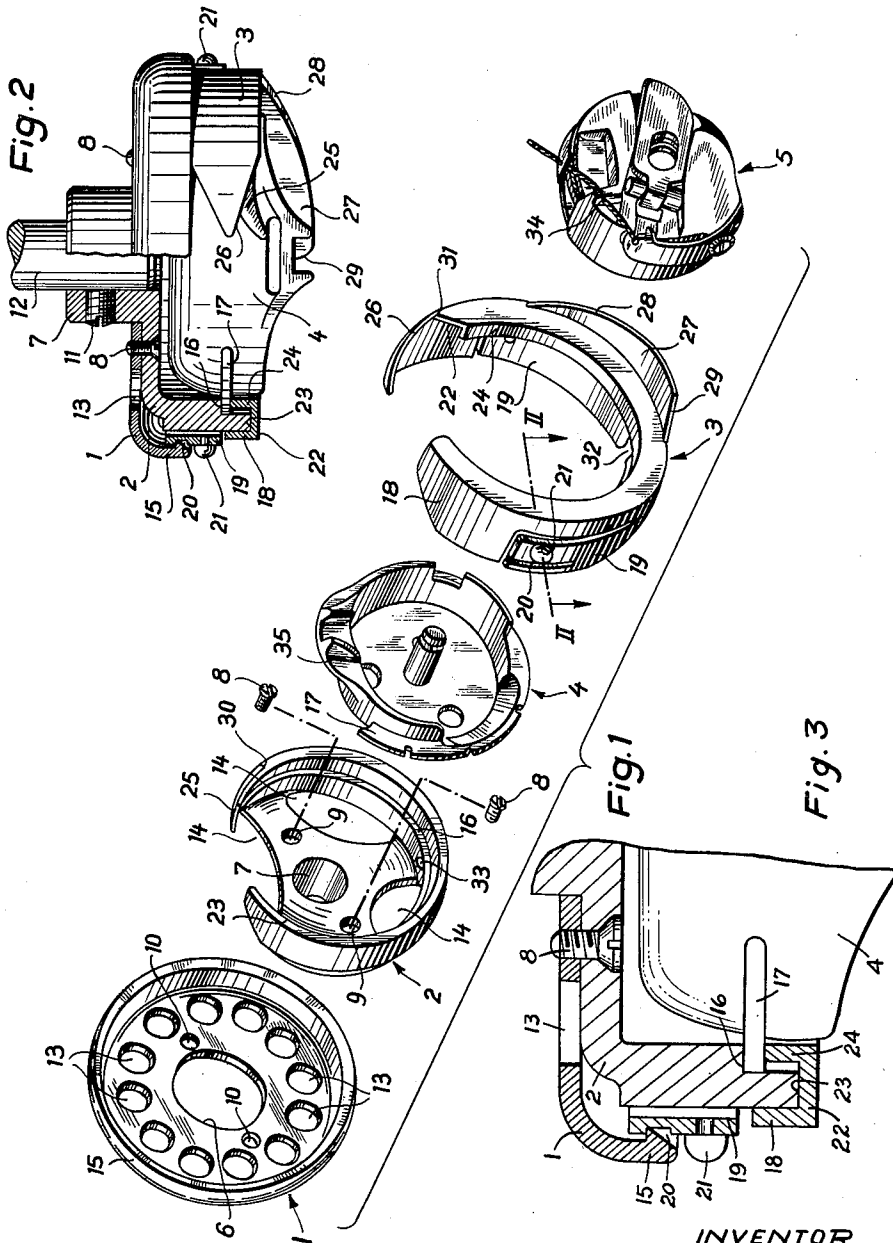
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FREELY ROTATING LOOPER FOR SEWING MACHINES

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FREELY ROTATING LOOPER FOR SEWING MACHINES

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The invention relates to sewing machines and is more particularly concerned with a freely rotating looper in a track formed between a shoulder in the looper cage, and a supporting ring fastened to the looper cage. The supporting ring which forms the sole front part of the track can move resiliently in the direction of the axis of the looper, thereby functioning as a guiding device for the thread at the front side of the rotating looper.

In a known looper of this type the supporting ring which is resilient in the manner of a split ring is located within a trapezoid shaped ring groove on the inside of the looper cage. This has the disadvantage that in order to move aside in the direction of the axis at the moment of thread entrance, that part of the supporting ring which rests against the journal rib of the bobbin case is deformed. To enable this part to move aside in the direction of the axis, it must be capable of being compressed by very small forces. On the other hand this results in permanent deformation when the device is subjected to unskilled handling, which influences the shape of the track for the journal rib, so that the latter may be journalled with too much clearance, causing noisy operation, and increased wear of the parts. In such form of construction resistance against temporary track expansion is provided not only by the inherent radial resilience of the supporting ring, changed in direction by the inclined surface of the ring slot, but also the frictional forces which arise with the entrance of the thread between thread and supporting ring and between supporting ring and groove and which are likewise guided in the direction of the axis, and both of which can be increased in an uncontrollable manner by accidental causes. Accordingly it is not certain, that upon entrance of the thread, the supporting ring can move aside, so that the looper, and with it all other transmission parts of the machine come to a sudden stop, which is undesirable for different reasons. It is a further disadvantage that the supporting ring, which is wedged in the interior of the looper cage, cannot readily be reached by hand so that its insertion is cumbersome, and its removal is possible only with the aid of tools.

It is an object of the invention to provide a looper construction, which permits accurate but easy going guidance of the bobbin case within the looper cage, and which makes jamming of the sliding parts by passing of the thread between journal rib and track substantially impossible. In accordance with the invention a looper is provided of the aforementioned type in which the bearing rib of the bobbin case is received in a track formed by a shoulder on the looper cage and a supporting ring secured to the looper cage, where only the supporting ring forms the front part of the journal track and is capable of yielding resiliently in the direction axially of the looper acting at the same time as a guide for the thread along the front side of the rotating looper, which supporting ring is connected with the external surface of the looper cage and embraces the looper cage wall and is of U-shaped cross section at its front side, and together with the shoulder, it forms the bearing track engaging the front part of the looper cage, with its leg projecting into the looper cage from which it is radially spaced.

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To facilitate cleaning of the track easily releasable support of the ring is provided which simultaneously with seizing of a loose upper thread by a rotating part of the looper prevents the clogging of the supplied thread on the looper shaft and moves it forwardly. This is accomplished by inserting the supporting ring between the looper cage and a flanged portion of the shell or casing which surrounds and is fastened to the looper cage and spaced therefrom, which ring is slotted to provide resilient stop tongues which, in turn, are provided with gripping knurls and are in engagement with the shell by their inherent resiliency.

For purposes of holding the upper thread loop which must be guided around the front of the bobbin case securely against the base of the looper tip until the casing is seated the ring forms an obtuse angle between a thread guiding blade extending obliquely at radial distance across the looper tip and the end of the engagement area at the base of the looper tip.

The mounting and removal of the supporting ring can be further facilitated in that part of the leg which projects into the looper cage and the contact surface of the supporting ring, are cut out over an angle, which is greater than that part of the bobbin case, which extends beyond the inner radius of the supporting ring.

With loopers rotating twice for each needle stitch the slanting flank of the thread guide blade is interrupted in order to prevent colliding of the needle with the guide sheet. This, however, forms a hook like projection, which can catch and entangle the thread when the machine rotation is inadvertently reversed. In order to avoid this disadvantage, the slanting flank of the thread guide blade, which is connected with the supporting ring, is terminated approximately 183° behind the looper tip, and is of closed design.

Further objects, advantages and details of the invention will become apparent from the following description of an embodiment of the invention illustrated in the attached drawings, in which:

FIG. 1 shows the parts of the looper in an exploded view,

FIG. 2 shows the assembled looper mounted on the shaft partly in section taken along line II—II of FIG. 1 and

FIG. 3 is an enlarged view of a portion of FIG. 2 illustrating details of interengaged components.

The complete looper comprises a housing or casing 1, a looper cage 2, and a supporting ring 3, which rotate together, and a stationary bobbin casing constituted of a lower shell 4 and an upper shell 5.

Casing 1 which surrounds mounting sleeve 7 of the looper cage 2 by means of a center bore 6 is connected to the looper cage 2 by means of set screws 8 which extend through bores 9 in looper cage 2 and are screwed into threaded bores 10 of casing 1.

The looper cage 2 is attached to the looper shaft 12 by means of two screws 11 placed 90° apart from each other, only one of which is visible in the drawing. Perforations 13 in casing 1 together with cutouts 14 in the base of the looper cage 2 provide for ventilation of the interior of the looper cage. The inner annular flange portion 15 of casing 1 embraces with radial clearance the outer circumference of the looper cage 2, and is inclined inwardly and rearwardly and is undercut or backed off on the inside (FIG. 3).

The inner surface of the looper cage 2 is counter bored, thus forming a shoulder 16 against which lower shell 4 comes to rest with its journal rib 17 after insertion. The lower shell 4 is supported in this position by supporting ring 3. Said supporting ring 3 extends with its part 18, which embraces the outer circumference of looper cage 2, below flange portion 15 of casing 1. Part 18 is cut

out in a manner to form flexible tongue means 19, which by virtue of their outwardly directed spring tension engage the undercut or backed off flange portion 15 of casing 1 by means of grooves 20. Gripping knobs 21 on the surface of tongue means 19 facilitate handling of the supporting ring 3 during mounting and removal.

Supporting ring 3 in its engaged position rests with its surface 22 against the front rim 23 of the looper cage 2, so that its leg 24 which projects into looper cage 2 together with shoulder 16 forms a track for the journal rib 17. As a result journal rib 17 is accurately guided in this track but without pressure induced friction. Tongues 19, which by virtue of their form can also deflect within small limits in the direction of the axis of the looper, permit flexible expansion of the track when the thread is drawn in. The inner leg 24 of the supporting ring 3 is located at a radial distance from the inner surface of the looper cage 2 (FIG. 2). As a result, thread drawn into the track finds clearance in the free space between the leg 24, and the inner surface of the looper cage 2. In addition, the supporting ring 3 functions as a thread guide at the front of the rotating looper portion. For this purpose, supporting ring 3 is provided with a thread guiding rim 26 which slants across the looper tip 25 at a radial distance, and is also provided with a thread deflecting blade 27. The receding flank 29 thereof is closed against the ring 3 so that even during inadvertent reversal of the machine the thread can slide over it unretarded. This construction is made possible with the illustrated double rotation looper by locating the end of the receding flank 29 approximately 183° behind the looper tip in the direction opposite to the direction of rotation of the looper where there is still sufficient length of the thread guide blade 27, but the danger of collision of the needle with the guide blade 27 no longer exists. The supporting surface 22 and the inner leg 24 of the supporting ring 3 terminate at the base 30 of looper tip 25, and they form together with thread guide rim 26 an obtuse angle 31 for the purpose of holding that part of the upper thread loop, which has to be passed in front of the bobbin case.

The outer part 18 of the supporting ring 3 is also equipped with a cutout 32, into which projects a pin to prevent twisting of the supporting ring 3. The supporting end 33 of the pin is shown in FIG. 1 in the interior of the looper cage 2.

The lower shell 4 and the upper shell 5 are generally of standard construction. A special feature is merely the guide bore 34 for the lower thread provided in the upper shell 5, and care is taken that the supporting ring 3 can just be removed forwardly after disengagement by compression of the tongues 19. For this purpose projecting portion 35 of lower shell 4 which extends past the inner radius of supporting ring 3 is designed to cover a smaller angle than the cutout of the inner leg 24 and the supporting area 22 of the supporting ring 3.

Having now described my invention with reference to the embodiment illustrated in the drawing, I do not wish to be limited thereto but what I desire to protect by Letters Patent is set forth in the appended claims.

1. A freely rotatable looper for sewing machines comprising a housing having a flange portion, a looper cage mounted in said housing and radially spaced from said flange portion, a bobbin casing received in said looper cage and including a lower shell having a radially extending rib and an upper shell received in said lower shell for interengagement therewith, and a supporting ring, said looper cage having an interrupted cylindrical wall portion presenting a looper tip and having a recess along the inner periphery defining a shoulder and said ring having a portion defining a channel of U-shaped cross section including an inner

leg radially spaced from said inner wall of said cage extending toward said shoulder and forming with said shoulder a track accommodating said rib and an outer leg formed as a part of an outer portion of cylindrical conformation, said outer portion extending around a portion of the outer wall of said cage and having a portion extending transversely of said looper tip adapted to guide the thread and having flexible tongue means loosely engaging said flange portion.

2. A freely rotatable looper for sewing machines comprising a housing having a flange portion, a looper cage mounted in said housing and radially spaced from said flange portion, a bobbin casing received in said looper cage and including a lower shell having a radially extending rib and an upper shell received in said lower shell for interengagement therewith, and a supporting ring, said looper cage having an interrupted cylindrical wall portion presenting a looper tip and having a recess along the inner periphery defining a shoulder and said ring having a portion defining a channel of U-shaped cross section including an inner leg radially spaced from said inner wall of said cage extending toward said shoulder and forming with said shoulder a track accommodating said rib and an outer leg formed as a part of an outer portion of cylindrical conformation, said outer portion extending around a portion of the outer wall of said cage and having a portion extending transversely of said looper tip adapted to guide the thread, said flange portion extending inwardly of said housing and said ring having resilient tongue means along said outer portion provided with gripping knobs and presenting grooves adapted to engage said flange portion.

3. A freely rotatable looper for sewing machines comprising a housing having a flange portion, a looper cage mounted in said housing and radially spaced from said flange portion, a bobbin casing received in said looper cage and including a lower shell having a radially extending rib and an upper shell received in said lower shell for inter engagement therewith, and a supporting ring, said looper cage having an interrupted cylindrical wall portion presenting a looper tip and having a recess along the inner periphery defining a shoulder and said ring having a portion defining a channel of U-shaped cross section including an inner leg radially spaced from said inner wall of said cage extending toward said shoulder and forming with said shoulder a track accommodating said rib and an outer leg formed as a part of an outer portion of cylindrical conformation, said outer portion extending around a portion of the outer wall of said cage and having a portion extending transversely of said looper tip adapted to guide the thread, said flange portion extending inwardly of said housing and said ring having resilient tongue means along said outer portion provided with gripping knobs and presenting grooves adapted to engage said flange portion, said portion on said ring adapted to guide the thread including a guiding edge extending obliquely between and radially outwardly of said looper tip and the base of said tip and defining an obtuse angle proximate said base adapted to hold the thread guided around the front of said upper shell.

4. A freely rotatable looper for sewing machines comprising a housing having a flange portion, a looper cage mounted in said housing and radially spaced from said flange portion, a bobbin casing received in said looper cage and including a lower shell having a radially extending rib and an upper shell received in said lower shell for interengagement therewith, and a supporting ring, said looper cage having an interrupted cylindrical wall portion presenting a looper tip and having a recess along the inner periphery defining a shoulder and said ring having a portion defining a channel of U-shaped cross section including an inner leg radially spaced from said inner wall of said cage extending toward said shoulder

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and forming with said shoulder a track accommodating said rib and an outer leg formed as a part of an outer portion of cylindrical conformation, said outer portion extending around a portion of the outer wall of said cage and having a portion extending transversely of said looper tip adapted to guide the thread, said flange portion extending inwardly of said housing and said ring having resilient tongue means along said outer portion provided with gripping knobs and presenting grooves adapted to engage said flange portion, said portion on said ring adapted to guide the thread including a guiding edge extending obliquely between and radially outwardly of said looper tip and the base of said tip and defining an obtuse angle proximate said base adapted to hold the thread guided around the front of said upper shell, said lower shell having a radially outwardly projecting portion, and said U-shaped conformation of said ring proximate said base including said inner leg of said ring extending into said looper cage being cut out along an angular section which is greater than said projecting lower shell portion.

5. A freely rotatable looper for sewing machines comprising a housing having a flange portion, a looper cage mounted in said housing and radially spaced from said flange portion, a bobbin casing received in said looper cage and including a lower shell having a radially extending rib and an upper shell received in said lower shell for interengagement therewith, and a supporting ring, said looper cage having an interrupted cylindrical wall portion presenting a looper tip and having a recess along the inner periphery defining a shoulder and said ring having a portion defining a channel of U-shaped cross section including an inner leg radially spaced from

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said inner wall of said cage extending toward said shoulder and forming with said shoulder a track accommodating said rib and an outer leg formed as a part of an outer portion of cylindrical conformation, said outer portion extending around a portion of the outer wall of said cage and having a portion extending transversely of said looper tip adapted to guide the thread, said flange portion extending inwardly of said housing and said ring having resilient tongue means along said outer portion provided with gripping knobs and presenting grooves adapted to engage said flange portion, said portion on said ring adapted to guide the thread including a guiding edge extending obliquely between and radially outwardly of said looper tip and the base of said tip and defining an obtuse angle proximate said base adapted to hold the thread guided around the front of said upper shell, said thread guiding portion including said oblique guiding edge and a blade extending from said outer portion of said ring over approximately 183° from said looper tip in the direction opposite to the direction of rotation and having an inwardly receding flank closed upon said ring.

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