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CUT-OFF DEVICE FOR THE THREADS OF DOUBLE CHAIN STITCH SEWING MACHINE

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FIG. 1

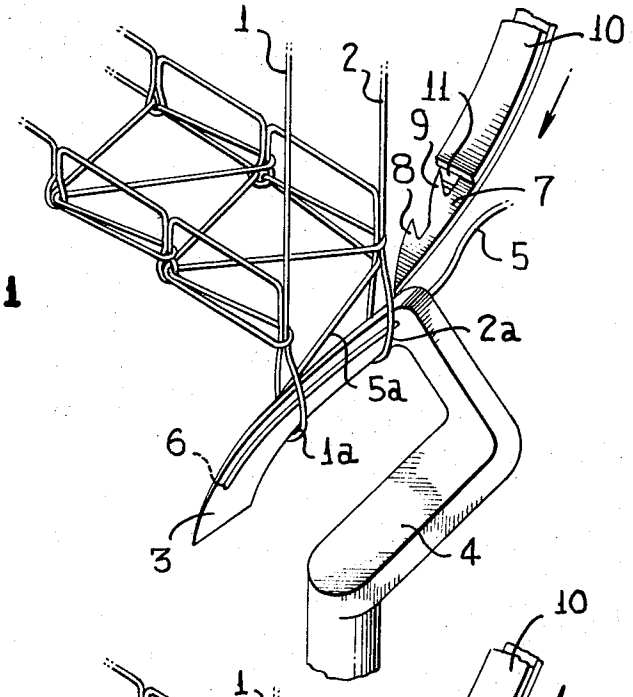
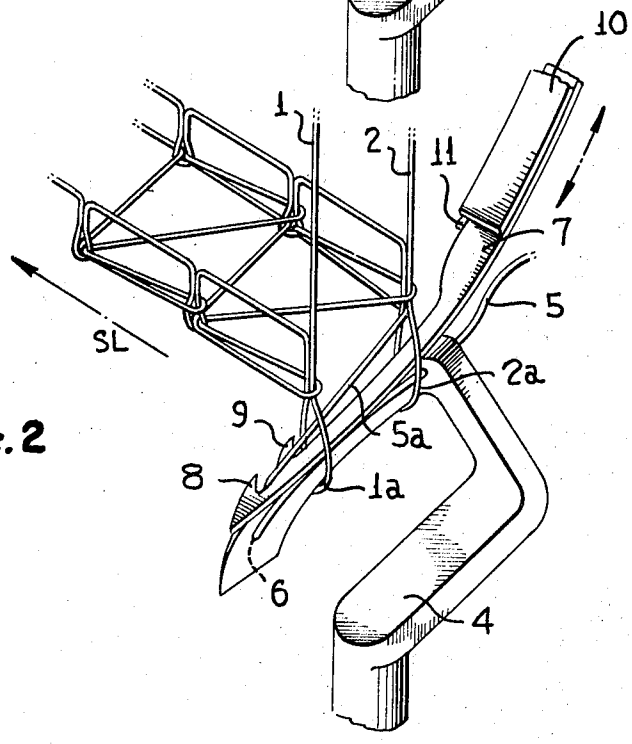



FIG. 2




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# CUT-OFF DEVICE FOR THE THREADS OF DOUBLE CHAIN STITCH SEWING MACHINE

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Int. Cl. D05b 65/02

## ABSTRACT OF THE DISCLOSURE

A thread severing device for cutting threads on a double chain stitch, multiple needle sewing machine wherein the thread carrying needles cooperate with a looper thread carrying looper, the device including a cutter blade presenting a cutting edge and a thread catcher reciprocable in contact with the cutter blade in position for being projected and retracted through the multiple needle thread loops on the projected looper, the thread catcher having two hooks extending from a side thereof, one said hook being effective upon retraction of the thread catcher to engage and conduct portions of the needle thread loops against the thread cutting edge and the other of said hooks being effective upon said retraction to conduct the looper thread against said cutting edge, thereby to separately cut said looper and needle thread portions by engagement thereof between the cutting edge and the hooks.

The invention concerns a cut-off device of the general nature of the devices covered in my copending application for U.S. Letters Patent Ser. No. 548,126, filed May 6, 1966 but improved for adaptation especially for double chain stitch sewing machines where several needles cooperate with a single looper. In the case of such double chain stitch sewing machines wherein several needles and a single looper are employed, the looper thread will cross, depending on the distance of lateral spacing of the needles relative to one another, the needle thread loop located closest to the point of the looper at the height of the path of movement of the thread catcher, whenever the looper is approximately in its foremost end portion. If the thread catcher during its forward movement passes by the loops of the needle thread and the loop thread, then it is difficult to single out the threads within the area of the crossing, in such a manner that upon the return movement or retraction of the thread catcher the loops of the needle threads will be seized by one catcher hook and the looper thread by the other of the catcher hooks.

The present invention has for its purpose improvement in form and arrangement of the thread severing device of my above mentioned copending application for patent so that the catching hooks of the thread catcher will correctly single out the individual threads and seize them upon retraction of the thread catcher in such a manner, that one catching hook conducts both loops of the needle threads, and the other catching hook the looper thread, separately, to the cutting edge and to the spring clip of the thread severing device to be severed in the manner desired.

Essentially, the desired purpose is accomplished in that the path of movement of the thread catcher in the case where the looper is disposed approximately in its foremost end position, is arranged to extend above and along the looper blade and pass through the loops of the two needle threads hanging on the blade.

A further characteristic consists in that at least the catching hook for the looper thread is arranged on that



side of the thread catcher which faces the looper thread piece running to the last stitch, or stated another way, generally in the direction in which the fabric is being fed during progression of the formation of the stitch line. As a result of the fact that the path of movement of the thread catcher passes through the loops of the needle threads hanging around the looper blade when it is in its foremost projected position, the loops of the needle threads are widened during the forward movement of the catching hooks therethrough and the respective pieces of threads are deflected sideways or spread apart. After the catching hooks have passed through said needle thread loops, said loops quickly return to their original position, so that they can be seized by one of the catching hooks when the latter is on its way back. The looper thread, on the other hand, is forced upwards by the catching hooks and moves sideways only then when it is forced by a catching hook into the near vicinity of the eye of the looper. As a result of this, the looper thread will flex back behind the catching hook only after the latter has moved beyond the loops of the needle threads. Thus, when the catching hooks have arrived at a respective distance beyond the needle thread loops, the looper thread, after the catching hook assigned to it has passed it, will flex back into the recess between the catching hook for the looper thread and that for the needle threads, and will lie across the catcher hook assigned to the loops of the needle threads.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawing.

In the drawings:

FIGURE 1 is a somewhat schematic perspective view illustrating a portion of a two needle thread, looper thread double chain stitch line and the cooperating thread catcher, thread severing and looper devices, with the looper blade in its foremost position in the needle loops and the thread catcher in position for being projected closely over the blade and through the needle thread loops thereon.

FIGURE 2 is a view similar to FIGURE 1 with the thread catcher projected through the needle thread loops and in effective engagement with the looper supported looper thread.

In this preferred form example presentation of the invention, the loops **1***a*, **2***a* of the needle threads **1**, **2** are shown hanging around the blade **3** of the looper **4** standing about in its foremost end position. The piece of thread **5***a* of the looper thread **5** runs in the customary manner from the eye **6** of the looper through the loops **1***a*, **2***a* of the needle thread to the preceding stitch.

According to the present invention the path of movement of the thread catcher **7** has been arranged in such a manner that the catching hooks **8**, **9** will move from the position shown in FIGURE 1 to the position shown in FIGURE 2, right through the loops **1***a*, **2***a*, of the needle threads. On their way forward, from the position shown in FIGURE 1 to the position shown in FIGURE 2, the catcher hooks **8**, **9** will deflect or spread the loops of the needle threads sideways and the legs or portions of each loop facing each other will flex back to their original position after passage of the catching hooks, so that in the part positions shown in FIGURE 2, the pieces of the loop **1***a*, **2***a* of the needle threads will again lie in the path of movement of the catching hooks **8**, **9** and will be seized by the catcher hook **9** during the return movement or retraction of the thread catcher **7**. During its forward movement, the catching hook **8** will have engaged, at its side edge facing in the general direction of the arrow SL on FIGURE 2, under the downwardly inclining looper thread portion **5***a* positioned as shown in FIGURE 1, and permitting said looper thread portion **5***a*

to slide into the recess between catch hooks **8** and **9**. However, shortly before reaching the position shown in FIGURE 2, this piece of thread *5a* of the looper thread is placed under tension by said engagement thereunder of the mentioned side edge portion of the catcher hook **8** and will extend at an increasingly steeper angle downwardly toward said looper blade eye **6** and due to its steeper angular disposition will slide off the catcher hook **8** and flex back into the recess between the catcher hooks **8, 9** as shown in FIGURE 2, and thus place itself across the catcher hook **9** as shown in FIGURE 2. Upon the return movement or retraction of the thread catcher **7**, the catcher hook **9** will be unable to seize the portion *5a* of looper thread, but said looper thread portion will be engaged and conducted by the catcher hook **8**, separately from the loops of the needle threads seized by the catcher hook **9**, to the cutting blade **10** and the spring clip **11** to be severed in the manner previously described. As in the disclosure in my presently copending application Ser. No. 548,126 hereinbefore mentioned the threads will be clamped between the catcher and the spring clip **11** and will be severed against the cutting edge of the cutting blade **10**, in this improved invention, however, three threads being clamped and then cut, namely the two needle thread portions *1a* and *2a* and the looper thread portion *5a*. There may also be a preference to employ a spring clip or clamp spring, cutter blade and a thread catcher of improved form and arrangement as herein disclosed sandwiched therebetween, in the manner generally shown in FIGURES 7 and 8 of said copending application Ser. No. 548,126, in which arrangement only the looper thread will be clamped whilst the needle threads will be released after cutting.

It will be apparent from the foregoing, and the schematic illustrations in FIGURES 1 and 2, that the usual vertically reciprocable needles, not shown in interest of avoiding confusion of the illustrated two needle thread, single looper thread example stitch pattern, pass the needle thread loops *1a* and *2a* through the material being worked into the position shown in FIGURE 1 wherein said loops receive the looper blade **3** and the looper thread **5** carried and guided thereby as shown in FIGURE 1, said looper blade, in this illustration being at its foremost projected position. It is at this time that the thread catcher **7** and its hooks **8** and **9**, projecting from the catcher **7** generally in the direction in which the fabric is being fed during progression of the formation of the stitch line as indicated by the arrow SL, passes through the needle thread loops *1a* and *2a* into the position illustrated in FIGURE 2, for purposes previously described. While it is preferred that the path of travel of the thread catcher be arcuate and about a fixed center, and brought about through means such as are shown in my copending application for U.S. Letters Patent Ser. No. 548,126, filed May 6, 1966, or comparable means, it is to be understood that the thread catcher path may be other than arcuate and brought about through other means within the spirit and scope of the invention as defined in the appended claims.

I claim:

**1.** A thread severing device for cutting threads on a double chain stitch, multiple needle sewing machine of a type wherein the stitch forming means includes multiple thread carrying needles and a thread carrying looper having a blade and operable in a position in which the blade is projected across the stitch line and through the loops of the needle threads formed by projection of the needles through a work pieces followed by retraction thereof, said thread severing device comprising in combination with the looper, a cutter blade terminating in a thread cutting end portion, and a thread catcher reciprocable in contact with said cutter blade and in a path closely overlying the looper blade when in its projected position and having two thread catcher hooks extending from a side thereof in position for passing through the needle thread loops upon projection of the thread catcher, one of said hooks being disposed to be effective upon retraction of the thread catcher to engage and conduct portions of the needle thread loops against said thread cutting end portion, and the other of said hooks being disposed to be effective upon said retraction to conduct the looper thread against said thread cutting end portion, thereby to separately cut said looper and needle thread portions by engagement thereof between said cutting end portion and said hooks.

**2.** A thread severing device as defined in claim **1** wherein there is included a spring clip holding the thread catcher against the cutter blade.

**3.** A thread severing device as defined in claim **1** wherein the cutter blade and the thread catcher are arcuate in shape and the thread catcher is movable in an arcuate path.

**4.** A thread severing device as defined in claim **2** wherein the cutter blade the thread catcher and the spring clip are arcuate and the thread catcher is movable in an arcuate path.

**5.** A thread severing device arrangement as defined in claim **1** wherein the looper blade has an eye through which the looper thread carried thereby extends through the needle thread loops on the looper blade and to the last formed stitch in a stitch line being formed, at least one of the thread catcher hooks extending away from the thread catcher in a direction toward said portion of the looper thread extending toward said last formed stitch.

**6.** A thread severing device arrangement as defined in claim **1** wherein the looper blade has an eye through which the looper thread carried thereby extends through the needle thread loops on the looper blade and to the last formed stitch in a stitch line being formed, the thread catcher hooks extending away from the thread catcher in a direction toward said portion of the looper thread extending toward said last formed stitch.

**7.** A thread severing device arrangement as defined in claim **1** wherein the looper blade has an eye through which the looper thread carried thereby extends through the needle thread loops on the looper blade and to the last formed stitch in a stitch line being formed, the thread catcher hooks being disposed in spaced relation adjacent the projected end of the thread catcher with the endmost one of said hooks disposed in position for engaging and lifting the portion of the looper thread extending from the looper blade eye to the last formed stitch as the thread catcher is reaching its fully projected position so that said extending and lifted looper thread portion can fall into position behind said endmost hook thereby to assure separate conduct of the looper thread portion by said endmost hook during the thread cutting action.

**8.** A thread severing device arrangement as defined in claim **1** wherein both thread catcher hooks extend away from the thread catcher generally in the direction in which a work piece being stitched is being fed during progression of the formation of the stitch line.

**9.** A thread severing device arrangement as defined in claim **1** wherein the looper blade has an eye through which the looper thread carried thereby extends through the needle thread loops on the looper blade and to the last formed stitch in a stitch line being formed, at least one of the thread catcher hooks extending away from the thread catcher in a direction toward said portion of the looper thread extending toward said last formed stitch, the cutter blade and the thread catcher being arcuate in shape and the thread catcher being movable in an arcuate path.

**10.** A thread severing device arrangement as defined in claim **1** wherein the looper blade has an eye through

which the looper thread carried thereby extends through the needle thread loops on the looper blade and to the last formed stitch in a stitch line being formed, at least one of the thread catcher hooks extending away from the thread catcher in a direction toward said portion of the looper thread extending toward said last formed stitch, there also being included a spring clip holding the thread catcher against the cutter blade, the cutter blade, the thread catcher and the spring clip being of like arcuate shape and the thread catcher being movable in an arcuate path.



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U.S. Cl. X.R.

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