

[54] **THREAD CUTTING DEVICE IN EMBROIDERING MACHINES**

[75] Inventors: **Kurt Bolldorf**, Kaiserslautern; **Edgar Busch**, Trippstadt, both of Germany

[73] Assignee: **Pfaff Industriemaschinen GmbH**, Germany

[22] Filed: **Sept. 4, 1974**

[21] Appl. No.: **502,950**

[30] **Foreign Application Priority Data**

Sept. 5, 1973 Germany..... 2344720

[52] **U.S. Cl.**..... 112/83; 112/252

[51] **Int. Cl.²**..... **D05C 3/04**

[58] **Field of Search** 112/83, 252, 122, 129

[56] **References Cited**

UNITED STATES PATENTS

1,080,914	12/1913	Keller	112/83
1,080,915	12/1913	Keller	112/83
1,086,470	2/1914	Schoenfeld	112/83
1,107,711	8/1914	Schoenfeld	112/83
1,390,785	9/1921	Hill	112/252
1,927,950	9/1933	Pikul	112/252
1,997,148	4/1935	Kleinschmit et al.	112/252

FOREIGN PATENTS OR APPLICATIONS

226,828 10/1910 Germany 112/83

[57]

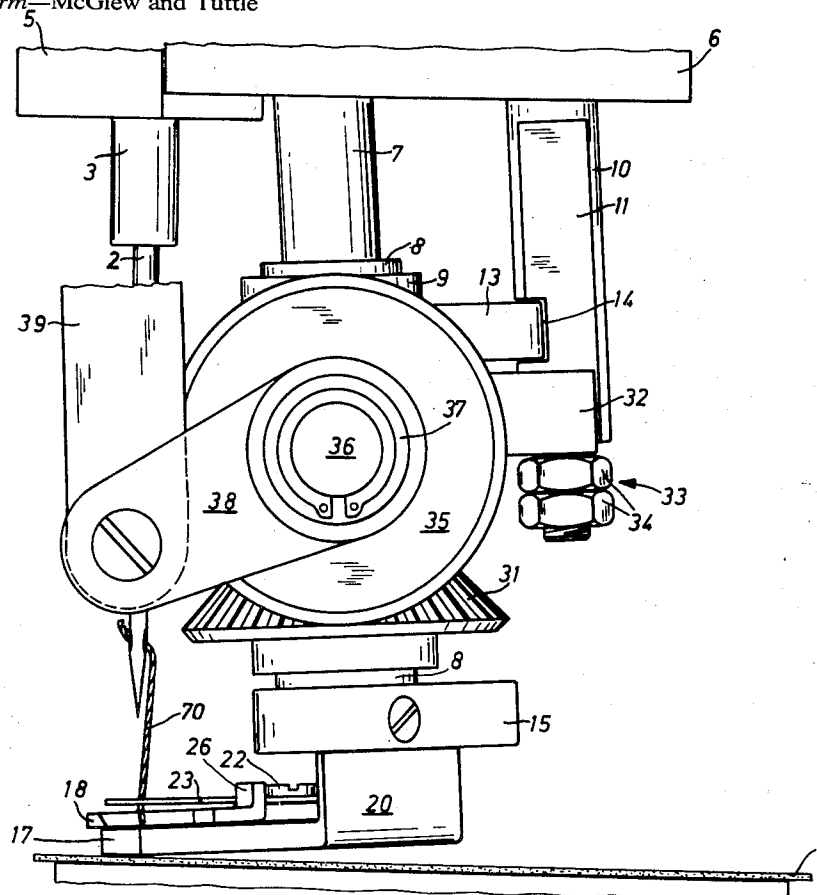
ABSTRACT

A thread cutting device for use with embroidering machines for clamping and cutting needle thread held by an operating needle, comprises a scissors including a lower portion and an upper portion movable relative to said lower portion, each having a cooperative cutting edge. The scissors are closable by relative movement between the upper and lower portions to cut a thread therebetween. The clamping plate which rests on the upper plate portion has an edge portion which is generally parallel to the edge of the lower plate portion but which overlaps the lower plate portion so that the upper portion engages between the clamping plate and the lower portion and the relative closing movement between the upper and lower plate causes a clamping of the thread before it is cut. The scissors are supported on a sleeve member which may be rotated to shift the upper and lower portions relatively and to an operative position at the location of the needle only when the plate portions have been lowered so that they are directly adjacent the workpiece. The upper and lower plate portions of the scissors are also mounted so that they are moved after clamping of the thread to an intermediate position which is slightly removed from the operating position in a lateral direction, and they may be moved further laterally to a rest position at which the upper and lower portions are again opened.

Primary Examiner—Alfred R. Guest

Attorney, Agent, or Firm—McGlew and Tuttle

12 Claims, 5 Drawing Figures



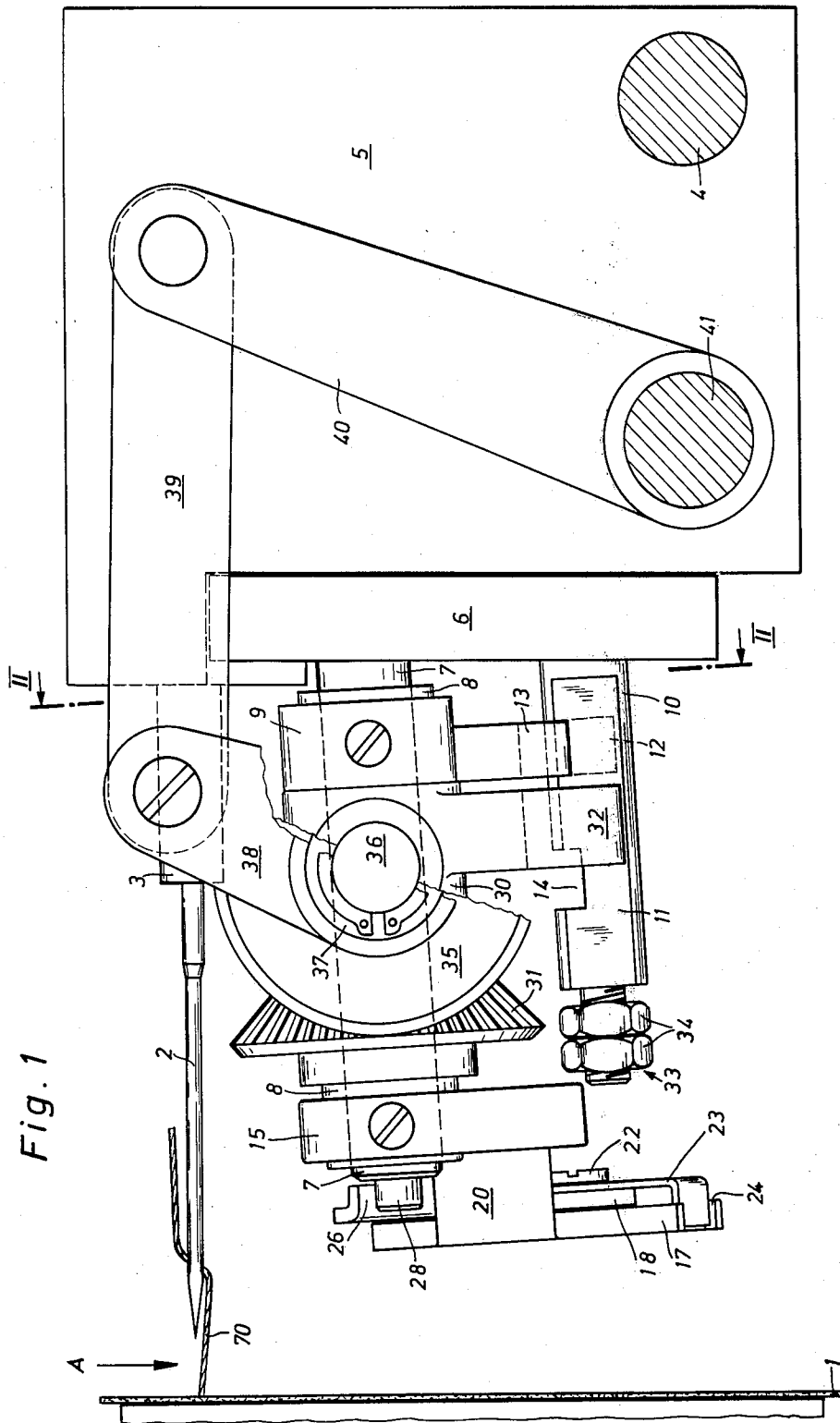


Fig. 2

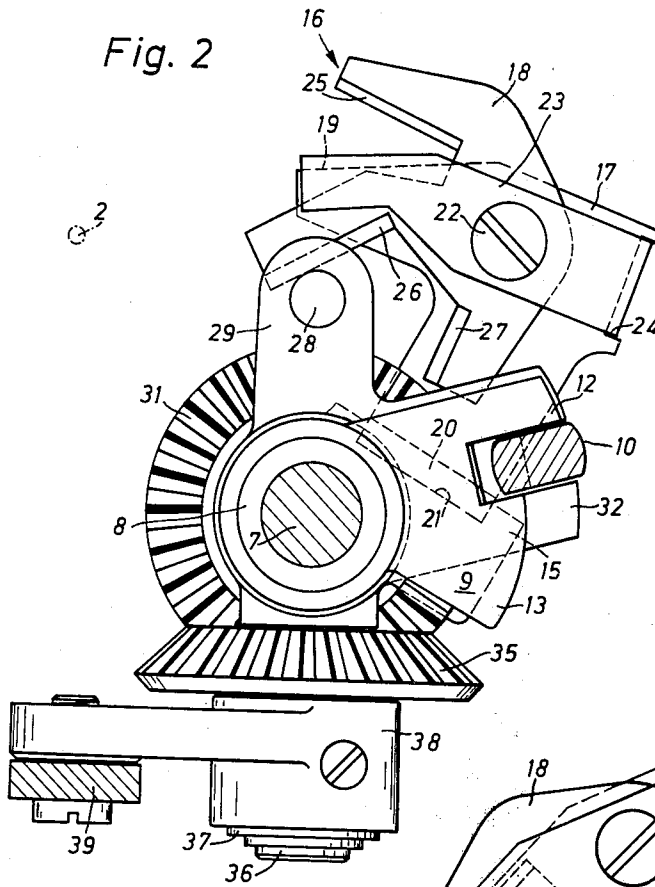


Fig. 3

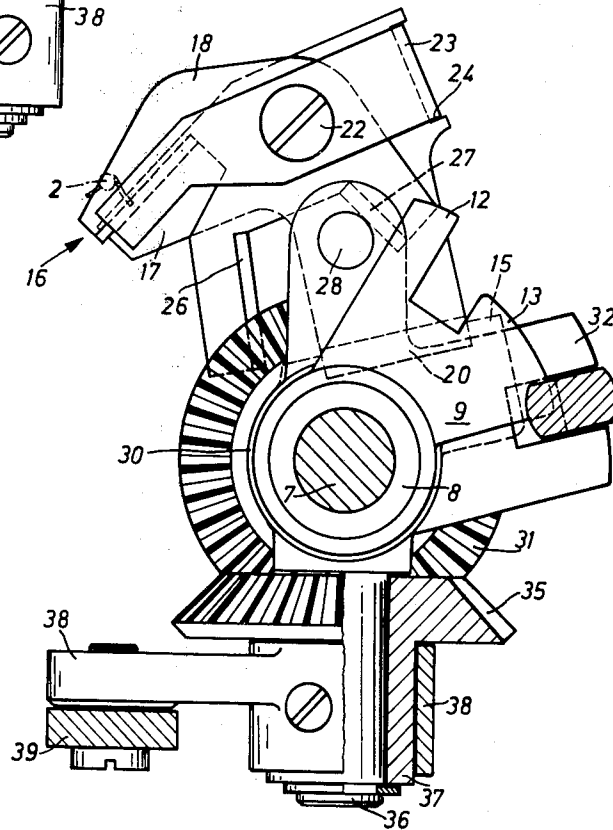


Fig 4

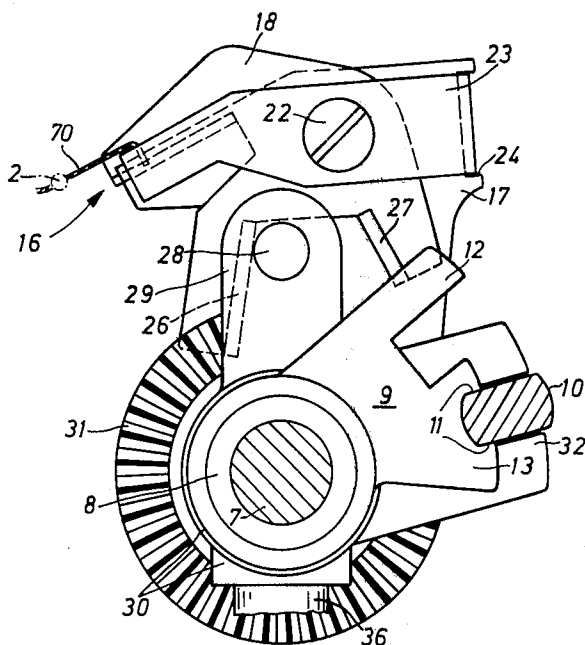
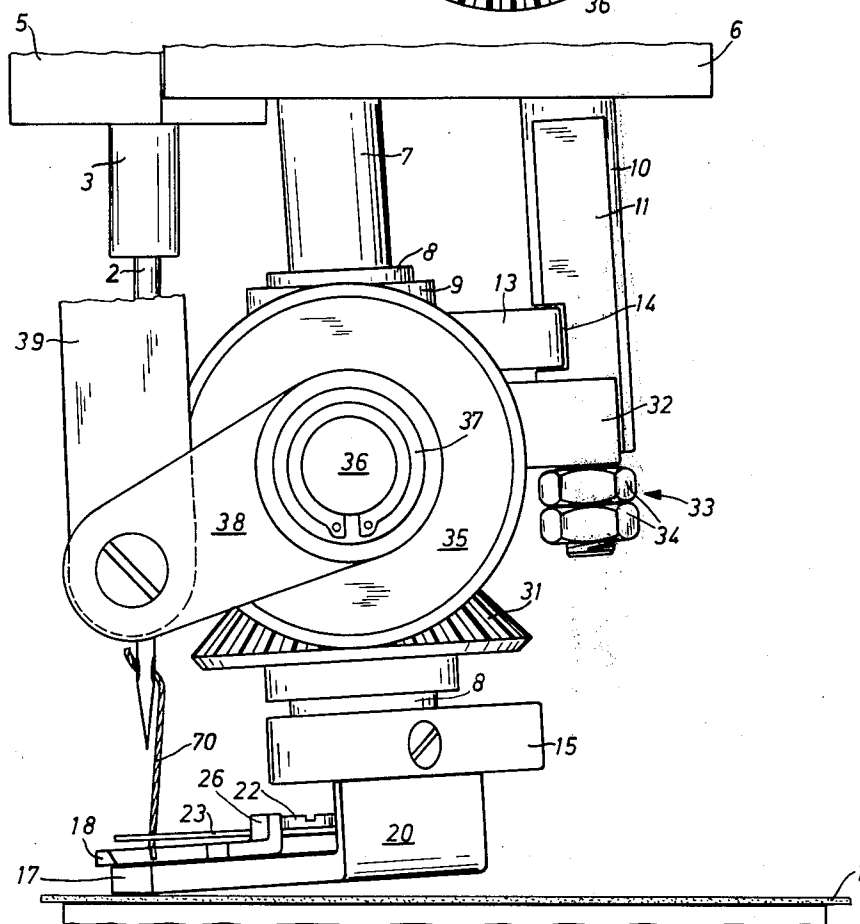


Fig 5



THREAD CUTTING DEVICE IN EMBROIDERING MACHINES

FIELD AND BACKGROUND OF THE INVENTION

This invention relates in general to the construction of thread cutting devices and, in particular, to a new and useful device for use in embroidering machines for clamping and cutting needle thread.

DESCRIPTION OF THE PRIOR ART

It is well known to seize the thread extending from the delivery reel through the thread feed and the needle eye to the fabric in its portion between the needle eye and the fabric and, upon cutting of the thread, to clamp the end of the thread to prevent the needle eye from being unthreaded. To this end, known devices of this kind are equipped with a thread catching plate which is located within the range of each needle and is provided with a curved slot and which is applied against the fabric at the end of the embroidering operation. Thereupon, the embroidery frame is moved in two coordinate directions whereby the needle thread to be cut is introduced into the slot of the thread catching plate. After lifting the plate, the needle thread is clamped between the upper side of the thread catching plate and the front face of a suction nozzle, and it is cut along its length located between the fabric and the underside of the thread catching plate with the aid of a knife moved by an electromagnet.

In the subsequent embroidering operation, after some stitches, the free end of the needle thread is brought into the cutting position again and is cut with the aid of the knife which becomes effective for the second time. To prevent cut thread ends from being embroidered into the pattern to be manufactured, the loose thread piece is carried away, after the second cutting operation, with a suction air flow through the suction nozzle.

Thread cutting devices of this kind are very expensive in construction, since in addition to the driven cutting knife, they require a thread catching plate which becomes effective under controlled conditions, a suction air flow and also an additional movement of the embroidery frame for the sole purpose of catching the thread. Furthermore, since the needle thread is cut twice, i.e., after affecting the first cut, a certain length is separated from the free end of the thread to avoid having too long a thread at the beginning of the next embroidery pattern. Thread cutting devices of this nature require a great amount of time for their operation, and this considerably affects the performance of the embroidering machine.

SUMMARY OF THE INVENTION

The present invention is directed to a device for cutting the needle thread in embroidering machines which makes it possible to omit the up-to-date necessary shortening of the free needle thread end after the formation of the initial stitches of the embroidery pattern to be manufactured, and after the thread cut, and at the same time, the device ensures short thread ends.

In accordance with the invention, a clamping plate, which is brought into the path of the needle thread, and a cutting tool, movable from a rest position into a working position, are used. The cutting tool is designed as a thread scissors having a lower portion and an upper portion movable relative thereto and includes a clamp-

ing plate resting on the upper portion in frictional contact therewith and overlapping the cutting edge of the lower portion and the thread scissors when in a closed position, and which is movable into an intermediate position provided between its working and rest positions.

From experience, it was discovered that the initial stitches of an embroidery pattern are formed without a substantial displacement of the embroidery frame. This showed the possibility of moving the closed thread scissors away from its working position, in which it interferes with the path of the needle travel, through a relatively small distance. The free end of the needle thread is clamped when the scissors are in the intermediate position immediately adjacent the stitch forming zone during the formation of the initial stitches of the subsequent embroidery pattern.

According to a further development of the invention, a particularly short free end of the needle thread, as well as a minimum distance between the working position and the rest position of the thread scissors, permitting a faster putting into operation of the thread cutting device, may be obtained. To do this, the thread scissors is situated in the intermediate position substantially in the plane of its working position while in its rest position, the thread scissors is situated laterally of the plane of its working position. Due to such an arrangement, the free end of the needle thread is cut to a very short, and thereby negligible, length of some millimeters. In addition, in spite of the short distance between the working and rest position, the thread scissors does not interfere with the formation of the stitch, not even at the most frequent repeating of the pattern.

A constructionally simple solution of the motion of the thread scissors can be obtained so that the thread scissors is moved along a path of motion formed of two components and, to this end, is supported by a sleeve which is pivotally mounted and longitudinally displaceable on a pivot which is fixed to the housing.

If the needle thread is to be cut as close as possible to the manufactured embroidery pattern and, at the same time, damaging of the embroidery pattern is to be securely avoided, it is advantageous to dispose the pivot at an acute angle relative to the path of travel of the needle. Then, the thread scissors moves along a path which is inclined relative to the plane of the fabric and comes into contact with the finished embroidery pattern only in its working position.

To make it possible to derive both the shifting and the pivoting of the thread scissors from a single motion impulse while avoiding controlled blocking arrangements, the sleeve is provided with a locking means preventing rotation. The mechanism cooperates with a guide track which is fixed to the housing and it prevents the rotation of the sleeve along a length corresponding to the distance between the working and the rest position of the thread scissors but releases the sleeve below this length.

An advantageous design of the locking means provides that it comprises a forked member firmly connected to the sleeve and that the guide track has a cut-out in the zone corresponding to the working plane of the thread scissors permitting a leg of the forked member to pass therethrough. According to a further development of the invention, one of the legs is shorter than the other and its width is at least equal to the distance of its pivotal motion and its height corresponds substantially to the height of the cutout of the guide track.

Thereby, during the pivotal movement of the thread scissors, the shorter leg of the forked member is received in the cutout of the guide track, whereupon, the distance of the thread scissors to the fabric remains constant during the working motion and that at the end of the pivotal movement in which the thread scissors is moved from its working into its rest position, the longer leg of the forked member is able to limit this pivotal movement.

To permit the shifting and also pivoting of the thread scissors to be derived from and further actuated by a single motion impulse in a constructionally simple manner, the sleeve is non-rotatably connected to a drive gear whose mating gear which is actuated by a swing lever is supported by a carrier which is mounted coaxially of the sleeve and rigidly connected to the same in the longitudinal direction of the sleeve and is secured against rotary motion about the pivot of the sleeve. The effect is thereby obtained that the motion impulse received, for example, from a swing shaft through a swing lever, causes a shifting motion while the sleeve is secured against rotation and a pivotal motion during the release of the locking mechanism.

Since the thread scissors, including a lower portion and an upper portion movable relative thereto, is to be brought in closed state from the working into the intermediate position and then opened, the carrier is provided, in accordance with a further development of the invention, with a stop pin which projects into the path of motion of the upper portion of the thread scissors and cooperates with two stop surfaces which are provided on the upper portion of the thread scissors. The upper portion of the scissors is mounted on the lower portion and extends in a certain angle thereto. Thereby, the upper portion of the thread scissors is pivoted along with the lower portion about the axis of the sleeve until one of its stop surfaces applies against the stop pin which is stationary relative to the housing. While the upper portion remains in this position, the lower portion continues to pivot about the axis and actuates thereby the closing motion of the thread scissors. During the subsequent back motion of the thread scissors, the upper and lower portions move again along with each other about the axis of the sleeve until the other stop surface of the upper portion comes to apply against the stop pin, whereby, the thread scissors is opened.

Aside from the advantage that both the pivotal motion of the thread scissors and the relative motion of the upper and lower portions necessary for the opening and closing are derived from a single motion impulse, this solution offers an additional possibility of adjusting the instant at which the closing or opening motion has to begin, by changing the distance or the mutual angular position of the stop surfaces.

To permit the guide track for the forked member secured to the sleeve to be used simultaneously as a means locking the carrier of the drive gear against rotation, the carrier is provided with a forked extension cooperating with the guide track and having a height which is greater than the height of the cutout of the guide track.

For an additional securing of the working plane of the thread scissors, and for the exact fixing of the start of the pivotal movement of the sleeve, and adjustable abutment for the extension of the carrier is provided at the lower end of the guide track.

A simple and space-saving constructional arrangement may be obtained by disposing the carrier on the sleeve between the forked member and the drive gear.

Accordingly, it is an object of the invention to provide an improved device for use in embroidering machines for clamping and cutting needle thread, which includes a scissors having a lower portion and an upper portion which are movable relatively, with each having a cutting edge with a clamping plate being carried by the upper portion in a position such that when the upper and lower portions are moved relatively to close them, the upper portion moves between the clamping plate and the lower portion, so that the thread is clamped during the cutting operation, and wherein the scissors are carried on an oscillatable sleeve which is driven to move the upper and lower portions together and relatively during each cutting operation, but only after they are first moved downwardly into a location directly adjacent the thread on the workpiece and which thereafter moves the clamped thread with the scissors to an intermediate position and then to a rest position removed therefrom.

A further object of the invention is to provide a device for use with embroidery machines for clamping and cutting needle thread, which is simple in design, rugged in construction and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the Drawings:

FIG. 1 is a lateral elevational view of an embroidering machine equipped with the inventive thread cutting device;

FIG. 2 is a sectional view taken along the line II—II of FIG. 1, the thread scissors being in its rest position;

FIG. 3 is a sectional view taken along the line II—II of FIG. 1, the thread scissors being in its working position;

FIG. 4 is a sectional view taken along the line II—II of FIG. 1, the thread scissors being in an intermediate position; and

FIG. 5 is a view similar to that of FIG. 1, the thread scissors being in its working position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings in particular, the invention embodied therein, comprises a device for use in embroidering machines for clamping and cutting needle thread 70, which is passed through a workpiece or fabric 1 to be embroidered. The workpiece or fabric 1 is received in an embroidery frame (not shown) and advances in the direction of the arrow A during the reciprocation of a needle 2 which is carried on a needle bar 3. Needle bar 3 driven by a control shaft 4 which is common for all of the needles 2 of the embroidery machine and which are arranged in a single line (not shown). Needle 2 can be stopped in an extreme position remote from the web fabric. Each embroidery

zone is equipped with a fabric presser (not shown) as well as with a piercer and its respective drive means (also not shown).

The device includes a base plate 6, supporting a pivot 7 and the thread cutting device is secured to the pivot 7 which faces web 1. The plate is carried on a housing 5 which accommodates needle bar 3, and the fabric presser and piercer, which have not been shown. Pivot 7 is disposed at an acute angle, for example, of from 2° to 5° relative to the axis of needle bar 3, and it supports a sleeve 8 which is mounted thereon for longitudinal displacement and for pivotal motion. A forked member 9 is clamped to the upper end of the sleeve 8 and it is guided upon a bolt 10 which has squared sides and which is secured to the base plate 6. The bolt 10 has a longitudinal axis which is parallel to the longitudinal axis of pivot 7.

As seen in FIG. 2, bolt 10 is flattened and forms a guide track 11 for the forked end of member 9 which has legs 12 and 13 which engage on respective sides of track 11 and are movable therealong for a predetermined distance. Beyond this predetermined distance of guide movement, track 11 is provided with a cutout 14 of a size to accommodate leg 13, which is shorter than leg 12. The cutout is dimensioned so that during the pivotal movement of sleeve 8 about pivot 7, the shorter leg 13 of forked member 9 may be moved within the cutout. Since the height of leg 13 corresponds to the height of the cutout, and its width corresponds to the angular distance of its pivotal movement, forked member 9 and thus also sleeve 8 which is rigidly connected thereto, are secured against axial displacement during the entire time of their pivoting.

Sleeve 8 has an extension 15 adjacent its lower end for supporting a thread scissors, generally designated 16. In accordance with the invention, thread scissors 16 includes a lower portion 17 and an upper portion 18. Lower portion 17 of thread scissors 16 comprises a cutting edge 19 and a flange 20 which is secured in a recess 21 of an extension 15 which forms a fitting surface. Upper portion 18 of thread scissors 16 comprises a cutting edge 25 and is pivoted to lower portion 17 on a trunnion screw 22 and it is movable thereon relative to lower portion 17. Clamping plate 23 rests on the free end of the upper portion in frictional engagement therewith, and is secured on trunnion screw 22 so that it overlaps the cutting edge of lower portion 17 in the open state of thread scissors 16. In order to secure clamping plate 23 against relative movement with respect to lower portion 17, the free end of clamping plate 23 remote from cutting edges 25 and 19 extends at a right angle from the remaining portion and engages a recess 24 in the lower portion 17 of thread scissors 16.

As shown particularly in FIGS. 2 and 4, upper portion 18 is provided with two stop surfaces 26 and 27 which are located laterally of its cutting edge 25 and they cooperate with the free end of a stop pin 28 in order to start and stop the relative motion between the upper and lower portions. The other end of stop pin 28 is secured to an arm 29 of a carrier 30. Carrier 30 is disposed coaxially of sleeve 8 between forked member 9 and a drive gear 31 which is non-rotatably connected to sleeve 8 and thereby secured against axial displacement.

Carrier 30 is rotatably mounted on sleeve 8 and includes a forked extension 32 which embraces guide

track 11 and thereby secures the carrier 30 against rotation about pivot 7. The height of the extension 32 is slightly greater than the height of the cutout 14 of guide track 11 in order that carrier 30 may be secured against rotation even during the period where extension 32 passes through the level of cutout 14.

When the thread scissors 16 are in their working plane the underside of forked extension 32 of carrier 30 rests against the upper side of an abutment 33 which is mounted at the lower end of guide track 11 and which is adjustable by means of two nuts 34. The adjustment of the two nuts 34 is provided so that, if the extension 32 rests on upper nut 34, the legs 12 and 14 of the forked member 9 will be positioned at the level of cutout 14 of guide track 11 and forked member 9 will be capable, in this position, of executing a pivotal movement about pivot 7.

Drive gear 31, which is rigidly connected to sleeve 8, cooperates with a mating gear 35 which is mounted for free rotation on a shaft 36 secured to a carrier 30 and which extends in a substantially horizontal direction. Mating gear 35 receives its motion which is to be transmitted to drive gear 31, and thereby to sleeve 8, from a swing lever which is fixed to hub 37 of gear 35, and is driven off shaft 41 common for all of the embroidery zones disposed in one line through a link 39 and a swing arm 40.

The operation of the device is as follows:

During the normal embroidery operation in which the web of fabric 1 to be embroidered is moved by the embroidery frame, in accordance with the embroidery pattern to be manufactured, and the thread guiding needles 2 cooperate with the shuttle to form stitches, thread scissors 16 will remain in a rest position, as indicated in FIGS. 1 and 2. In this position, the clamping plate resting on the upper portion 18 overlaps the cutting edge 19 of the lower portion 17 and stop surface 26 applies against stop pin 28. Both forked member 9 and forked extension 32 of carrier 30 are in a position above cutout 14 of guide track 11 so that both sleeve 8 and carrier 30 are secured against rotation about pivot 7 and thread scissors 16 is in a position laterally spaced from the web of fabric 1.

At the end of the embroidery operation, needle bar 3 is stopped, in a well known manner, and in its position remote from the web of fabric 1, as shown in FIG. 1. Thus, the needle thread extends from the last stitch of the embroidery pattern through the eye of needle 2 and outwardly therefrom, but not shown, and to the thread delivery.

After the stopping has been initiated, a counterclockwise rotary motion is imparted to shaft 41 which is transmitted through swing arm 40 and a link 39 to swing lever 38. Swing lever 38, which is connected to mating gear 35, attempts to impart to the latter, a rotary motion about its axis 36. However, since sleeves 8 and thereby also drive gear 31 connected thereto is secured against pivotal motion about pivot 7 by forked member 9, mating gear 35 is also locked. Consequently, carrier 30, which is secured against rotation about pivot 7 by means of its extension 32, and is fixed on sleeve 8 in an axial direction, is displaced along with sleeve 8 in the direction of the web of fabric until its extension 32 embracing guide track 11 comes to apply against abutment 33.

In this position of extension 32, forked member 9 occupies a position at the level of cutout 14 of guide track

11. Thereby, thread scissors 16 has been displaced on pivot 7 from the plane of its rest position through a distance corresponding to the distance between the rest plane and the working plane and it now occupies a position in its working plane which is predetermined by the adjustment of abutment 33.

In this new position, leg 13 of forked member 9 releases sleeve 8 for a counterclockwise pivotal movement about pivot 7 so that while shaft 41 continues to move, leg 13 is introduced into cutout 14 of guide track 11. Because leg 13 is slightly wider than the corresponding distance of its pivotal movement, it remains within the space of cutout 14 during the entire pivotal movement of sleeve 8, thereby securing the latter from axial displacement, as shown in FIG. 5.

Due to the pivotal movement of sleeve 8, a pivotal motion is imparted to thread scissors 16 which are supported by extension 15. Upper portion 18 and lower portion 17 of scissors 16 are pivoted conjointly about a pivot 7 until stop surface 27 applies against stop pin 28. Scissors 16, which is still open, occupies its working position, in which the needle thread to be cut extends between the cutting edge 25 of upper portion 18, and the lateral edge of clamping plate 23 turned thereto. During the further pivoting of sleeve 8, and while the lower portion continues to move about pivot 7, upper portion 18, because its stop surface applies against stop pin 28, executes a pivotal movement about trunnion screw 22 so that the needle thread is first clamped between the upper side of upper portion 18 and the underside of clamping plate 23 and is then cut, due to the cooperation between cutting edge 25 of the upper portion, and the cutting edge 19 of lower portion 17.

The needle thread end which remains connected to the thread delivery is thereby clamped in scissors 16 between upper portion 18 and clamping plate 23. The thread end remaining with the embroidery is cut close to the embroidery pattern while ensuring that the embroidery is not damaged and this is due to the fact that sleeve 8 and also thread scissors 16 move along paths which are inclined relative to the plane of the web of fabric 1.

After the thread is cut, an opposite rotary motion is imparted to shaft 41. Since leg 13 of forked member 9 is still positioned within cutout 14 of guide track 11, sleeve 8 executes a pivotal motion about pivot 7 which is opposed to its first pivotal movement and, in consequence, is in the clockwise direction. Thereby, stop surface 27 of upper portion 18 moves away from stop pin 28 so that, as shown in FIG. 3, upper portion 18 and lower portion 17 of thread scissors 16 move clockwise. Thread scissors 16 remains in the closed state and the needle thread is clamped therein.

As soon as thread scissors 16 comes into a position outside the path of motion of needle 2, shaft 41 is stopped. Thread scissors 16, which is still closed, occupies an intermediate position, as shown in FIG. 4, in which it continues to be located in the closed state in a zone immediately adjacent the zone of the stitch formation, but in a position in which it does not hinder the formation of the stitches.

In the position of the thread scissors 16, shown in FIG. 4, in which leg 13 is still within cutout 14 and stop surface 26 is applied against stop pin 28, the drive of the embroidery frame and of the needle bar is started. After the first stitches are formed in the next embroidery pattern which most frequently is effected without

a substantial displacement of the embroidery frame, the rotary motion of shaft 41 is started again without the necessity of interrupting the stitching operation. Sleeve 8 then pivots clockwise about pivot 7 while stop pin 28 stops the further rotation of the upper portion about the axis. Therefore, while lower portion 17 continues to pivot about pivot 7, upper portion 18 executes a pivotal movement about trunnion screw 22 whereby thread scissors 16 is opened. The pivotal movement of sleeve 8 continues as long as leg 12 of forked member 9 applies against guide track 11 and while leg 13 is already outside of the cutout 14 of guide track 11. Thereupon, sleeve 8, which is secured against rotation, but released for an axial displacement, is shifted along pivot 7 and brought into its rest position which is remote from the web of fabric 1. In this position, it does not hinder the stitch formation, not even at a most frequent repeating of the stitch formation.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A device for use with embroidery machines for clamping and cutting needle thread held by an operating needle, comprising a scissors including a lower portion and an upper portion movable relatively thereto, each of said upper and lower portions having a cooperative cutting edge, a clamping plate resting on said upper plate and having an edge spaced from said lower portion cutting edge and overlapping said lower portion, the cutting edge of said upper portion being movable during closing between said clamping plate and said lower portion to clamp the thread therebetween, and means for moving said upper portion, said lower portion and said clamping plate relatively and together to close them around the thread at a location of the needle and to clamp the needle and cut it, and to move all of said upper portion, said lower portion and said clamping plate to an intermediate position with the clamped thread, and thereafter to move said upper portion, lower portion and said clamping plate relatively to open the scissors and to position them in a rest position spaced from said intermediate position and release the thread end.

2. A device according to claim 1, wherein said scissors is situated substantially in the same plane in its intermediate position and its working position, and is situated in its rest position at a plane spaced laterally from the plane of its working position.

3. A device according to claim 1, including a sleeve carrying said upper and lower plate portions of said scissors and said clamping plate, the housing having a pivot supporting said sleeve for rotational and axial movement.

4. A device according to claim 3, wherein said pivot extends in an acute angle in respect to the path of motion of said needle.

5. A device according to claim 3, including a bolt defining a guide track for said sleeve, said sleeve having arm means thereon engageable with said track during its movement which lock said sleeve against rotatable movement during a portion of its movement therealong but which permit rotational movement when said sleeve moves beyond a predetermined position on said guide track, the distance of movement along said guide

track corresponding to the distance between the working plane and the rest plane of said scissors.

6. A device according to claim 5, including a member connected to said sleeve having a forked end with leg portions on each side of said guide bolt, said guide bolt having a cutout portion corresponding to the location of the working plane of said scissors accommodating a leg of said forked member.

7. A device according to claim 6, wherein one of said legs of said forked member is shorter than the other, said shorter leg being pivotal with said sleeve and the width of said shorter leg being at least equal to the distance of its pivotal motion, and the height of said shorter leg being substantially equal to the height of said cutout portion of said guide track.

8. A device according to claim 5, including a drive gear connected to said sleeve, a mating gear driving said drive gear, a swing lever connected to said mating gear to rotate said mating gear, a carrier mounted coaxially on said sleeve and supporting said swing lever and connected to said pivot so as to be non-rotatable in re-

spect thereto.

9. A device according to claim 8, wherein said carrier includes a stop pin projecting into the path of motion of said upper portion of said scissors, said upper portion having an arm with two stop surfaces which are co-operable with said stop pin, said upper and lower portions of said scissors being pivoted together and relatively upon engagement of one of said stop surfaces with said stop pin.

10. A device according to claim 9, wherein said carrier includes a forked extension cooperating with said guide bolt and having a greater height than said cutout portion.

11. A device according to claim 8, wherein said guide track has a lower end with an adjustable abutment thereon, and an extension of said carrier engaged on said abutment.

12. A device according to claim 9, wherein said carrier is disposed between said forked member and said drive gear.

* * * * *

25

30

35

40

45

50

55

60

65