UNITED STATES PATENT OFFICE.

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THREAD CLAMP AND CUTTER FOR SEWING-MACHINES.

1,197,886.


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To all whom it may concern:

Be it known that I, FRANK ZALESKI, a subject of the Emperor of Germany, and residing at Somerville, county of Middlesex, State of Massachusetts, have invented an Improvement in Thread Clamps and Cutters for Sewing-Machines, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to sewing machines and has for its object to provide a novel thread-clamping and cutting device which operates automatically to cut the needle thread and to hold the end thereof leading to the source of supply at the end of a predetermined stitching operation. Said device retains its hold on the needle thread until after the initial stitches have been formed when the machine is set in operation again, thus relieving the operator of the duty of cutting the thread at the end of a stitching operation and of holding the needle thread when the machine is set in operation again.

While my invention is capable of use with sewing machines of different types, I have herein chosen to illustrate it as it might be embodied in a buttonhole sewing machine of the so-called “Reece” type, examples of which are to be found in the following United States Letters Patent: No. 491,250, dated March 28, 1886; No. 653,037, dated August 7, 1900; No. 1,019,667, dated March 5, 1912.

The sewing machines illustrated in the above-mentioned patents include in their construction a clamp frame having work-clamping means and a so-called stitch frame carrying the stitch-forming mechanism usually in the form of an upper and an under thread mechanism which cooperate to concatenate the edge stitches of a buttonhole. This stitch frame and clamp frame are movable relative to each other and when the machine is started in operation the work clamp is operated to clamp the work in position and the buttonhole is then cut, after which the stitch frame and clamp frame have a relative movement to bring the stitch-forming mechanism into proper position to stitch the buttonhole. The stitch-forming mechanism is then automatically set in operation and the stitch frame and clamp frame have a further feeding movement necessary to carry the stitches down one side of the buttonhole, around the eye thereof and back the other side of the buttonhole, after which the stitch-forming mechanism is brought to rest and the clamp frame and stitch frame have a further relative movement to bring the parts to their initial position, the work clamp automatically releasing the work at the end of the stitching operation.

My invention involves a novel device which becomes operative automatically immediately after the work has been unclamped and during the final relative movement of the stitch frame and clamp frame to cut the needle thread and to hold the severed end of the thread until the stitching operation has been commenced again, said device operating automatically to release the needle thread after the formation of the initial stitches.

In order to give an understanding of my invention, I have illustrated in the drawings a selected embodiment thereof which will now be described, after which the novel features will be pointed out in the appended claims.

Figure 1 is a side view of a portion of a buttonhole sewing machine of the “Reece” type having my improvements applied thereto; Fig. 2 is a plan view of the thread-clamping and cutting device showing the portion of the sewing machine to which it is attached and by which it is operated; Fig. 3 is a section on the line 3—3, Fig. 2; Fig. 4 is a plan view of the thread-clamping and cutting device; Fig. 5 is an enlarged end view thereof.

In Fig. 1 1 designates a so-called clamp frame of the sewing machine which is provided with work clamps 2 carried by arms 3 pivoted to the clamp frame at 4, and 5 is a portion of the so-called stitch frame which carries the upper and under thread mechanism. This stitch frame is provided with the usual overhanging arm 6 in which the needle bar 7 reciprocates, as usual, the latter carrying the needle 8 forming part of the upper thread mechanism. This needle bar not only has a reciprocating motion, but
also a rotary motion to effect the stitching around the buttonhole as usual in sewing machines of this type, this rotary motion being secured from a rock-shaft 9 carrying a segmental gear 10 meshing with a pinion 11 through which the needle bar operates. The under thread mechanism is not illustrated herein.

The parts thus far described are such as are usually found in buttonhole sewing machines of the Reece type and form no part of my present invention, and their operation will be made clear from an examination of the above-mentioned patents.

My improved thread clamp and cutter is associated with the work-clamping means and is rendered operative to cut and clamp the thread and to release the thread by the above-mentioned relative movements between the stitch frame and the clamp frame. This thread cutter and clamp comprises a tubular member 12 having at one end a cutting edge 13 and a cooperating element 14 slidably mounted in the tubular member 12 and provided with a thread-receiving passage 15 having a flaring throat 16 leading thereto from one side of the member 14. When the member 14 is projected into the dotted line position Fig. 2, or the full line position Fig. 4, the throat 16 extends beyond the cutting edge 13 and this is the position of the parts at the end of the stitching operation. After the stitching operation has ceased the needle thread \( t \) is caused to pass through the throat 16 into the passage 15 and the member 14 is then given a movement longitudinally of the tubular member 12 into the position shown in Fig. 3, this movement operating to draw the thread \( t \) against the cutting edge 13 and to sever the latter, and also operating to clamp the thread \( t \) between the surface 17 and the inner wall of the tubular member 12, as clearly seen in Fig. 3. The member 14 is cut away slightly at 17 so as to avoid any possibility of cutting the thread at this point, the part being so shaped that it will simply clamp the thread and not sever it. This relative movement of the parts 14 and 12 for cutting and clamping the thread may be provided for in various ways. As herein shown, the tubular member 12 is fixedly secured to an arm 18 which in turn is fastened in some suitable way to the arm 3 carrying the work clamp 2. As herein shown, the arm 18 is secured to the arm 3 by means of screws 19. The member 14 is pivotally connected at its outer end to a lever 20 which is pivoted at 21 to a projection 22 secured to the arm 3, and this lever 20 is provided at its rear end with two cam members 23 and 24, both of which are preferably adjustably fastened to the lever 20 by means of clamping screws 25, each cam member having a slot 26 through which the screws operate. These cam surfaces 23, 24 cooperate with projections 27 and 28 rigid with the stitch frame 5, and in the present embodiment of my invention these projections are shown as carried by a plate or bracket 29 which is secured to the stitch frame by means of screws 30. It will be remembered that the stitch frame and clamp frame have a movement relative to each other in stitching the buttonhole, and it will be seen from Fig. 2 that if the stitch frame moves to the right relative to the clamp frame, such movement will cause the projection 28 to impinge against the cam 24 thereby swinging the lever 20 and moving the clamping member 14 into the dotted line position. On the other hand, movement of the stitch frame to the left relative to the clamp frame will cause the projection 27 to impinge against the cam 23, thus swinging the lever 20 into the full line position Fig. 2, and moving the clamping member 14 into and clamping a thread which occupies the notch 15. The parts are shown in Fig. 2 in the position they assume at the end of the stitching operation. When the machine is started, the work clamps 2 are first brought into operative position to clamp the work and then the clamp frame and stitch frame have a relative movement to carry the needle bar and needle into substantially the dotted line position Fig. 1. This movement brings the projection 28 into substantially the dotted line position Fig. 2 relative to the cam 24. The clamping member 14 is constructed to have sufficient frictional engagement with the tubular member 12 so that it will retain frictionally any position in which it is placed. When the stitch frame and clamp frame have been given a relative movement into the dotted line position, Figs. 1 and 2, the stitching operation is begun, and as it proceeds the stitch frame and clamp frame have a still further relative movement in the same direction to effect the stitching down one side of the buttonhole. This further movement brings the projection 28 against the cam 24 and moves the lever 20 and clamping member 14 into the dotted line position Fig. 2.

It will be understood that when the machine is brought to rest the end of the needle thread \( t \) is held in the clamping device, as shown in Fig. 3, and this clamping member retains its hold on the thread until said clamping member is moved into the dotted line position Fig. 2 by the engagement of the projection 28 with the cam 24. The parts are so timed that this occurs after the initial stitches on the buttonhole have been formed, and as a result, the end of the needle thread will be firmly clamped, as
shown in Fig. 3, during the formation of the first stitch, thus relieving the operator of the duty of holding the end of the thread.

As the stitching proceeds the stitch frame and clamp frame have a relative feeding movement to cause the stitches to be formed down one side of the buttonhole, around the eye thereof and back to the starting point, the stitching operation automatically ceasing when the needle bar is in approximately the dotted line position Fig. 1. The work is then unclamped and the clamp raised, as shown in Fig. 1, and the stitch frame and clamp frame have a still further relative movement to bring the parts in the full line position Fig. 1. During this further relative movement the needle thread is leading from the needle to the work is drawn into the throat 16 of the clamping member 14, it being remembered that said clamping member has been projected into the full line position Fig. 4 and dotted line position Fig. 2 by the engagement of the projection 25 with the cam 24. After the stitch frame and clamp frame have had a sufficient relative movement to bring the needle thread into the notch 15, then the projection 27 comes into engagement with the cam 23, and during the further relative movement of the stitch frame and clamp frame said projection 27 acts on the cam 23 to swing the lever 20 into the full line position Fig. 2, thereby withdrawing the clamping member 14. This withdrawing movement draws the thread against the cutting edge 13 thereby cutting the needle thread and at the same time clamps the thread between the portion 17 and the inside of the tubular member 12, as shown in Fig. 3, so that when the machine comes to rest the needle thread has been cut and the end leading to the needle is firmly gripped by the thread clamp. The operator, therefore, is entirely relieved from the duty of either severing the needle thread or of holding the end to make sure that the first stitch will be properly formed.

I have herein shown the end of the tubular member 12 as slotted, as at 81, and a clamping sleeve 32 is placed about the slotted end, said clamping sleeve being a split sleeve with a clamping screw 33 by which it may be tightened. The purpose of this construction is to provide means for adjusting the clamping mechanism so that the needle thread of whatever size it may be will be properly clamped without danger of cutting it. This construction also provides means for varying the frictional engagement between the clamping member 14 and the tubular member 12 so as to insure the proper friction between these parts to hold the clamping member in either of its two positions. This device also serves to take up any wear and for any necessary adjustment.

It will be seen that the device is simple in construction, positive in its action and is so situated and constructed that it does not interfere with the ordinary use of the machine.

I claim:

1. In a sewing machine, the combination with work-clamping means, of a stitch frame carrying a reciprocating needle, said frame and work-clamping means having a movement relative to each other, a needle-thread-clamping device carried by the work-clamping means and comprising two elements having a telescopic relation, one of said elements having a thread-receiving throat, and means actuated by said relative movement to operate said elements to effect the clamping of the needle thread.

2. In a sewing machine, the combination with a clamp frame carrying work-clamping means, of a stitch frame carrying a reciprocating needle, said frames having a movement relative to each other, a needle-thread-cutting device carried by the work-clamping means and comprising two elements having a telescopic relation, one of said elements having a cutting edge and the other a thread-receiving throat, and means actuated by the relative movement of the frames to give said elements a relative movement to effect the cutting of the needle thread.

3. In a sewing machine, the combination with a clamp frame carrying work-clamping means, of a stitch frame carrying a reciprocating needle, said frames having a movement relative to each other, a needle-thread-clamping device carried by the work-clamping means and comprising a tubular element and a clamping element slidably mounted in the tubular element and provided with a thread-receiving passage, and means actuated by the relative movement of the frames to operate the clamping element to clamp the thread.

4. In a sewing machine, the combination with a clamp frame carrying work-clamping means, of a stitch frame carrying a reciprocating needle, said frames having a movement relative to each other, a needle-thread-cutting device carried by the work-clamping means and comprising a tubular element having a cutting edge, a cooperating element slidably mounted in the tubular element and provided with a thread-receiving passage, and means actuated by the relative movement of said frames to move said elements relative to each other to cause a thread occupying said passage to be moved against the cutting edge.

5. In a sewing machine, the combination with a clamp frame carrying work-clamping means, of a stitch frame carrying a reciprocating needle, said frames having a movement relative to each other, a needle-thread-clamping device comprising a tubular element, a thread-clamping element having an
open thread passage and movable in the tubular element, and means operated by the relative movement of said frames to move the latter element into a position to carry said passage beyond the tubular element so that the needle thread may enter said pas-
sage and then to move said element in the opposite direction to cause the thread to be clamped between said elements.

In a sewing machine, the combination with a clamp frame carrying work-clamping means, of a stitch frame carrying a reciprocating needle, said frames having a movement relative to each other, a combined thread-clamping and cutting device comprising a tubular element carried by the work-clamping means and having a cutting edge, a clamping element received within the tubular element and provided with an open thread passage, means actuated by the relative movement of said frames to present said thread passage in a position to receive the needle thread at the end of the stitching operation and then to give said elements a relative movement to clamp the thread between said elements and to cut the thread.

In a sewing machine, the combination with a clamp frame carrying work-clamping means, of a stitch frame carrying upper thread mechanism, a thread-clamping device comprising a tubular element and a clamping element slidable in said tubular element and provided with a thread-receiving throat, a lever pivoted to said clamping element, and means rendered operative by the relative movement of said frames to actuate said lever and give the clamping element a movement to carry the throat into position to receive the thread and then into position to clamp the thread between the two elements.

In a sewing machine, the combination with a clamp frame carrying work-clamping means, of a stitch frame carrying upper thread mechanism, a thread-clamping device comprising a tubular element and a clamping element slidable in said tubular element and provided with a thread-receiving throat, a lever pivoted to said clamping element, and means rendered operative by the relative movement of said frames to actuate said lever and give the clamping element a movement to carry the throat into position to receive the thread and then into position to clamp the thread between the two elements, said tubular element having a cutting edge by which the thread is severed as it is clamped.

In a sewing machine, the combination with a stitch frame having stitch-forming mechanism, of work-clamping means situated above the work, said stitch frame and work-clamping means having a relative movement, of a thread-clamping device comprising a tubular element sustained on the work-clamping means, and a clamping element slidably mounted in the tubular element and provided with a thread-receiving passage, and means actuated by the relative movement between said stitch frame and work-clamping means to operate said clamping element.

In a sewing machine, the combination with a clamp frame carrying work-clamping means, of a stitch frame carrying upper thread mechanism, said frames being movable relative to each other, a thread-cutting and clamping device comprising a tubular member provided with a cutting edge, a clamping member having a thread-receiving throat, a lever connected to said clamping member and provided with cams, and projections associated with the stitch frame to engage said cams during the relative movement of the frame and thereby operate the clamping member.

In a sewing machine, the combination with work-clamping means comprising relatively-fixed and movable clamping members, of a stitch frame carrying stitch-forming mechanism, said frame and work-clamping means having a movement relative to each other, a thread-clamping device carried by the movable clamping member and comprising two elements having a telescopic relation, one of said elements having a thread-receiving throat, and means actuated by the relative movement between said stitch frame and work-clamping means to operate said thread-clamping elements thereby to effect clamping of the needle thread.

In a sewing machine, the combination with work-clamping means comprising relatively-fixed and movable clamping members, of a stitch frame carrying stitch-forming mechanism, said frame and work-clamping means having a movement relative to each other, a thread-clamping device carried by the movable clamping member and comprising two elements having a telescopic relation, one of said elements having a thread-receiving throat, and means actuated by the relative movement between said stitch frame and work-clamping means to operate said thread-clamping elements thereby to effect clamping of the needle thread at the end of the stitching operation and to release said needle thread after the initial stitches have been formed on the next succeeding stitching operation.

In a sewing machine, the combination with a stitch frame carrying stitch-forming mechanism, of work-clamping means comprising relatively-fixed and movable clamping members, said work-clamping means and stitch frame having a relative movement, a thread-clamping device comprising a tubular element secured to the movable work-clamping member, a thread-clamping element having an open thread passage and...
movable within the tubular element, and means operated by the relative movement between the stitch frame and work-clamping means to move the thread-clamping element within the tubular element to effect the clamping of the needle thread.

11. In a sewing machine, the combination with a stitch frame carrying stitch-forming mechanism, of work-clamping means comprising relatively-fixed and movable clamping members, said stitch frame and work-clamping means having a movement relative to each other, a thread-cutting device comprising a tubular element secured to the relatively-movable clamping member and having a cutting edge, a cooperating element slidably mounted in the tubular element and provided with a thread-receiving passage, and means actuated by the relative movement between the stitch frame and work-clamping means to move said cutting elements relative to each other to cause a thread occupying said passage to be moved against the cutting edge.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

FRANK ZALESKI.

Witnesses:

F. A. SHEA,

LOUIS C. SMITH.