July 11, 1933. A. H. WEIS 1,917,411

AUTOMATIC THREAD CLAMP FOR NEEDLE THREADS

Filed July 21, 1931

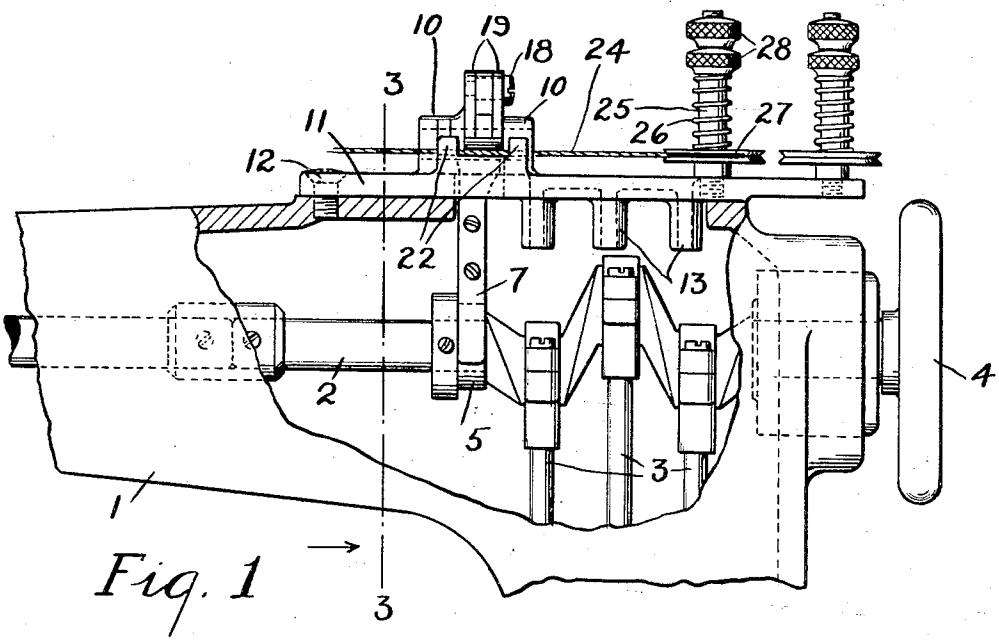


Fig. 1

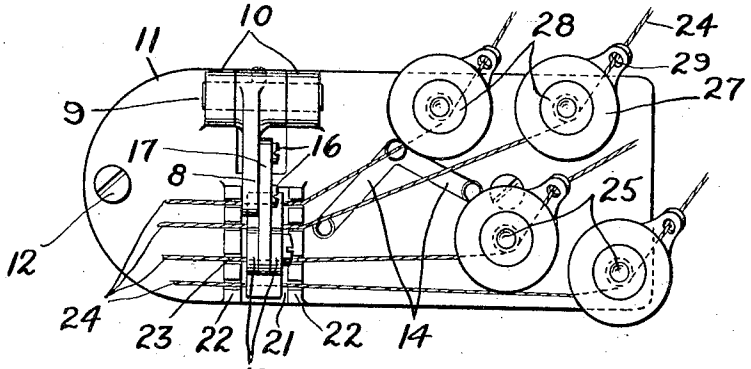


Fig. 2

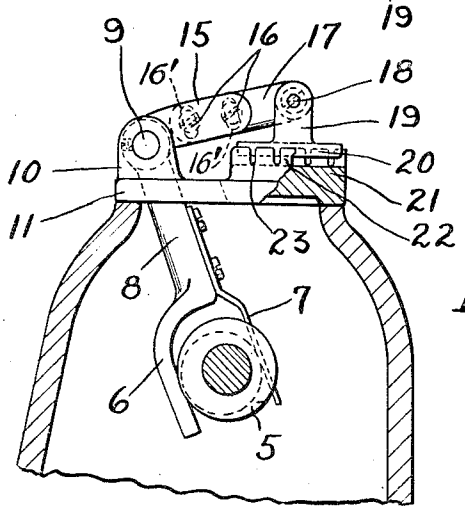


Fig. 3

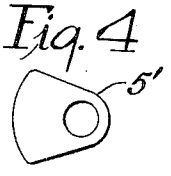


Fig. 4

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UNITED STATES PATENT OFFICE

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AUTOMATIC THREAD CLAMP FOR NEEDLE THREADS

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This invention relates to sewing machines, more particularly to an improved automatic thread clamp for the needle threads, the object of the invention being to provide a simple mechanism that will act on one or more threads as they pass from the tensions to the needles of a sewing machine, whereby each thread will be gripped and clamped uniformly to prevent or retard movement of the thread during such clamping action and to insure the drawing up of the needle loops to the bottom face of the fabric immediately after said loops have been cast off of the loop takers or loopers.

Another object is the provision of a thread clamping means which will permit the proper control of the needle threads, whereby they may pass through the tensions and needles to form stitches in the work with a minimum drag on the thread, thereby to permit threads of delicate character, such as rayon, yarn and similar threads, (which have very little strength or twist) to be used in the needles of a sewing machine for stitching the fabrics.

Many threads are not strong enough to withstand sufficient tension for the stitching of various fabrics and yet draw up a smooth, tight stitch in the work. When sufficient tension is applied to the threads by the ordinary tensions of a sewing machine, the drag is constant, and while the loops of needle threads are around the loopers or loop takers, a tight tension on these threads causes excessive strain and frequent breakage thereof. This will be eliminated by this improved automatic thread clamp which will clamp the threads momentarily, instantly as the thread loops are cast off of the loopers.

In some systems of sewing machines, the needle threads are directed from the tensions to a thread eyelet on the top of the needle bar and from thence to the eyes of the needles. The needle bar action provides a form of take-up for the needle threads, this arrangement depending principally on the elasticity of the thread to give and take somewhat as the needle thread loops are on the loopers, and also depending on this elasticity to draw up the loops as they are cast off of the loopers. When threads are used that have a very limited amount of elasticity, difficulty is encountered in drawing up these thread loops and it becomes necessary to provide a take-up or means to act upon the thread immediately as the thread loops are cast off of the loopers. Take-ups are objectionable for various well-known reasons and, therefore, this improved thread nipper, located in close proximity to the tensions, offers advantage in accomplishing this task, since the tensions can be set with very little drag on the threads each one being independent, and can have its respective adjustment, even though all the threads being used are not alike, and a uniform stitch can be made by the independent adjustment of the tensions to suit the character of thread and the material being stitched, so that the finished stitching will be uniform.

Another object of this improvement is to overcome the resistance against the feeding of the work which causes shirring and puckering of delicate fabrics. When an even and constant tension is applied to the thread during the stitching cycle, the feed of the work takes place while the needle loops are around the loopers, and if the thread tensions are tight during this feed movement, the previous stitch is subject to considerable strain and back drag. By loosening the tensions, this is overcome, but an objectionable stitch is frequently produced when the tension on the threads is too loose. Therefore, to overcome this objection and yet operate with a comparatively loose tension on the needle threads, this improved thread nipper is provided to clamp the thread at the desired moment of each cycle of the machine, and at other times permit the thread to pass freely to the stitches.

In the drawing accompanying and forming a part of this specification, Fig. 1 illustrates the rear portion of the upper arm of a well-known Metropolitan top and bottom rotary shaft machine with the tensions and this improved thread clamp applied thereto.

Fig. 2 is a top view of the tensions and thread clamp.

Fig. 3 is a sectional view taken on the line

3—3 of Fig. 1, looking in the direction of the arrow, and is intended to illustrate more clearly the parts of the thread clamp, and Fig. 4 is a view of a triangular shaped cam. Similar characters of reference indicate corresponding parts in the several views.

Before explaining in detail the present improvement and mode of operation thereof, I desire to have it understood that the invention is not limited to the details of construction and arrangement of parts which are illustrated in the accompanying drawing since the invention is capable of other embodiments, and that the phraseology which I employ is for the purpose of description and not of limitation.

The upper arm of the sewing machine 1 has a top crank shaft 2, having three connecting rods 3 connecting the top shaft to the bottom shaft which also has a similar three-throw crank shaft. The rear end of the shaft 2 carries a hand wheel 4. Located on the shaft 2 is an eccentric 5 operating against a rigid arm 6 and a spring arm 7 of a lever 8, see Fig. 3. This lever is pivoted at 9 to an upstanding lug 10 carried by a plate 11. This plate 11 is secured to the top surface of the arm 1 of the sewing machine by screws 12, and can readily be removed to give free access to the crank shaft connections. This plate is provided with three depending tubular projections 13 to feed oil to the three cranks of the top shaft and these oil tubes communicate with channels 14 in the top surface of the plate to facilitate oiling.

The lever 8 is provided with an arm 15 having two screws 16 holding and clamping against the arm 15, an adjustable extension piece 17, to which is pivotally connected at 18 the upstanding lug 19 of a thread clamp member 20. This thread clamp member is made in the form shown so as to clamp four threads. The design of these parts is arranged to suit any number of threads required according to the machine's equipment for stitching multiple seams.

The plate 11 is provided with an elevated portion 21 against which the member 20 acts, the side walls 22 of which have slots 23 to guide the threads 24 and keep them separated.

The tensions comprise posts 25, springs 26, the usual discs 27 and the lock nuts 28 for adjusting the tension discs to tension the threads as they pass between the discs.

In Fig. 2, it will be seen that the threads 24 pass through eyelets 29 directly between the tension discs 27 and then to the upstanding walls 22 having the slots 23 for guiding and keeping the threads separate as they pass from there to the needles. The timing of the eccentric 5 with respect to the movement of the loopers and needles is such as to clamp the threads just prior to the thread loops being cast off of the loopers and immediately to release the threads after the stitch has been drawn up to the bottom surface of the goods.

The spring arm 7 of the lever 8 permits the use of cams or triangular eccentrics of irregular form as 5′, Fig. 4, so that a quicker action than that which can be obtained from an ordinary eccentric can be had when needed. The spring arm will yield to compensate for any irregularities in the eccentric or cam and permit it to operate at high speed without noise. The rigid arm 6 insures a positive gripping action and the adjustable extension 17 permits adjustment of the clamping member by means of the elongated slots 16′ to suit different sizes of threads from the thinnest to the thickest.

It is necessary for proper control of needle threads to have an independent tension on each thread because all threads are not alike. At times, different sizes of threads are used on the same machine. Some thread has a tendency to twist and snarl if there is no tension whatever applied to it as it passes to the needles. This usually occurs with the automatic tension as it is opened. Therefore, the arrangement shown in my improvement comprises a constant tension on the thread which is adjustable. In addition thereto, the automatic thread clamp exerts sufficient pressure to compress the threads to different sizes within reasonable limits, so that threads of different sizes can be clamped sufficiently to prevent movement thereof.

It is to be understood that by describing in detail herein any particular form, structure or arrangement, it is not intended to limit the invention beyond the terms of the several claims or the requirements of the prior art.

Having thus explained the nature of my said invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I claim:

1. In a sewing machine having a top arm and a top shaft, the combination of an automatic thread clamping means effective to clamp the threads just prior to the thread loops being cast off the loopers and to release the threads after the stitch has been drawn up to the bottom surface of the goods and comprising a swinging clamping device carried by said top arm and movable in a vertical plane, means co-operating therewith for clamping the threads, and rockable means for operating said clamping device.

2. In a sewing machine having a top arm and a top shaft, the combination of an automatic thread clamping means effective to clamp the threads just prior to the thread loops being cast off the loopers and to release the threads after the stitch has been

drawn up to the bottom surface of the goods and comprising a swinging clamping device carried by said top arm, means co-operating therewith for independently guiding the threads, and means for operating said clamping device comprising an eccentric and a swinging arm in engagement therewith.

3. In a sewing machine having a top arm and a top shaft, the combination of an automatic thread clamping means effective to clamp the threads just prior to the thread loops being cast off the loopers and to release the threads after the stitch has been drawn up to the bottom surface of the goods and comprising a clamping device carried by said top arm, means co-operating therewith for independently guiding the threads, and means for operating said clamping device comprising an eccentric and an arm co-operating therewith, said arm having a rigid member and a spring member.

4. In a sewing machine having a top arm and a top shaft, the combination of an automatic thread clamping means effective to clamp the threads just prior to the thread loops being cast off the loopers and to release the threads after the stitch has been drawn up to the bottom surface of the goods and comprising a clamping device carried by said top arm, means co-operating therewith for independently guiding the threads, and means for operating said clamping device comprising an eccentric and an arm co-operating therewith, said arm having a rigid member and a spring member and said eccentric having an irregular formation.

5. In a sewing machine having a top arm and a top shaft, a thread clamping means effective to clamp the threads independently just prior to the thread loops being cast off the loopers and to release the threads after the stitch has been drawn up to the bottom surface of the goods, and comprising a member having thread guides therein, a swinging co-operating clamping member carried by the top arm, and means for operating said clamping member and comprising a pivoted arm, a swinging arm connected therewith, and an eccentric engaging said last arm.

6. In a sewing machine having a top arm and a top shaft, a thread clamping means effective to clamp the threads independently just prior to the thread loops being cast off the loopers and to release the threads after the stitch has been drawn up to the bottom surface of the goods, and comprising a member having thread guides therein, a co-operating clamping member carried by the top arm and means for operating said clamping member and comprising a pivoted arm, an arm connected therewith, and an eccentric co-operating with said last arm, said last arm having a rigid member co-operating with one side of the eccentric and a spring member co-operating with the other side thereof.

7. In a sewing machine having a top arm and a crank shaft therein, a thread clamping member pivotally secured to said top arm, and means for raising and lowering said thread clamping member and comprising an eccentric carried by said crank shaft and a swinging arm in engagement therewith.

8. In a sewing machine having a top arm and a crank shaft therein, a thread clamping member pivotally secured to said top arm, and means for raising and lowering said thread clamping member and comprising an eccentric carried by said crank shaft and an arm co-operating therewith, said arm having a rigid member and a spring member effective to yield and compensate for any irregularities in the eccentric.

9. In a sewing machine having a top arm and a crank shaft therein, a thread clamping member pivotally secured to said top arm, and means for raising and lowering said thread clamping member and comprising an eccentric carried by said crank shaft and an arm co-operating therewith, said arm having a rigid member and a spring member effective to yield and compensate for any irregularities in the eccentric, and said eccentric having an irregular form.

10. In a sewing machine having a top arm and a crank shaft therein, a thread clamping member pivotally secured to said top arm, and means for raising and lowering said thread clamping member and comprising an eccentric carried by said crank shaft, and a swinging arm in engagement therewith, and means for adjusting said thread clamping member to different sizes of threads.

11. In a sewing machine having a top arm and a top shaft and provided with thread tensions, an automatic thread clamping means located between said tensions and the forward end of the arm and comprising a member having thread grooves, a co-operating clamping member carried by the top arm, a pivoted adjustable arm for the clamping member, a lever connected with said arm and having a rigid member and a spring member, and a cam carried by said top shaft co-operating with said rigid and spring members for operating said clamping member and timed to clamp the threads just prior to the thread loops being cast off the loopers and to release the threads after the stitch has been drawn up to the bottom surface of the goods.

Signed at Nyack, New York, this 17th day of July, 1931.

ALBERT H. WEIS.