

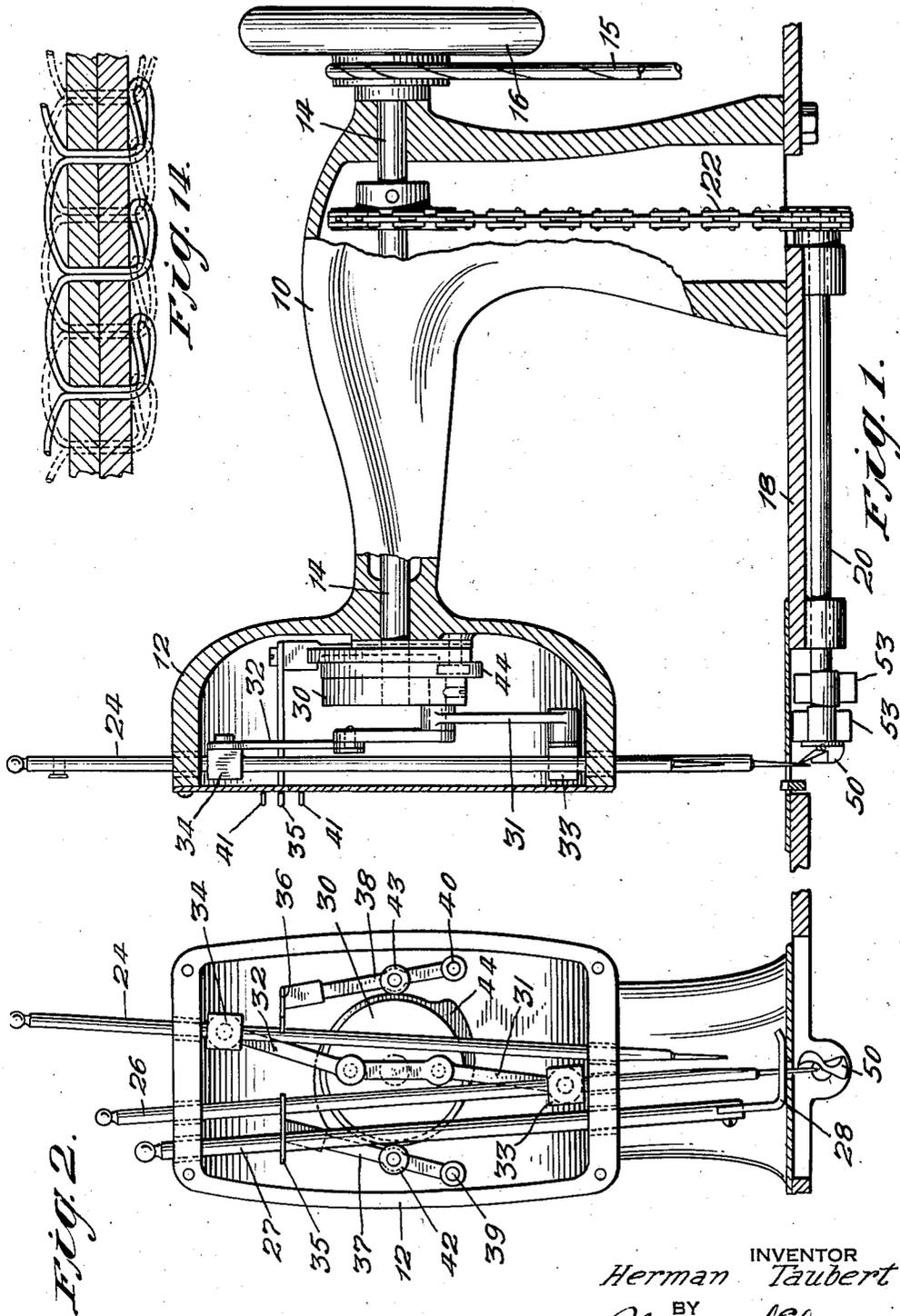
Oct. 20, 1936.

H. TAUBERT

2,058,271

SEWING MACHINE

Original Filed July 23, 1932 3 Sheets-Sheet 1



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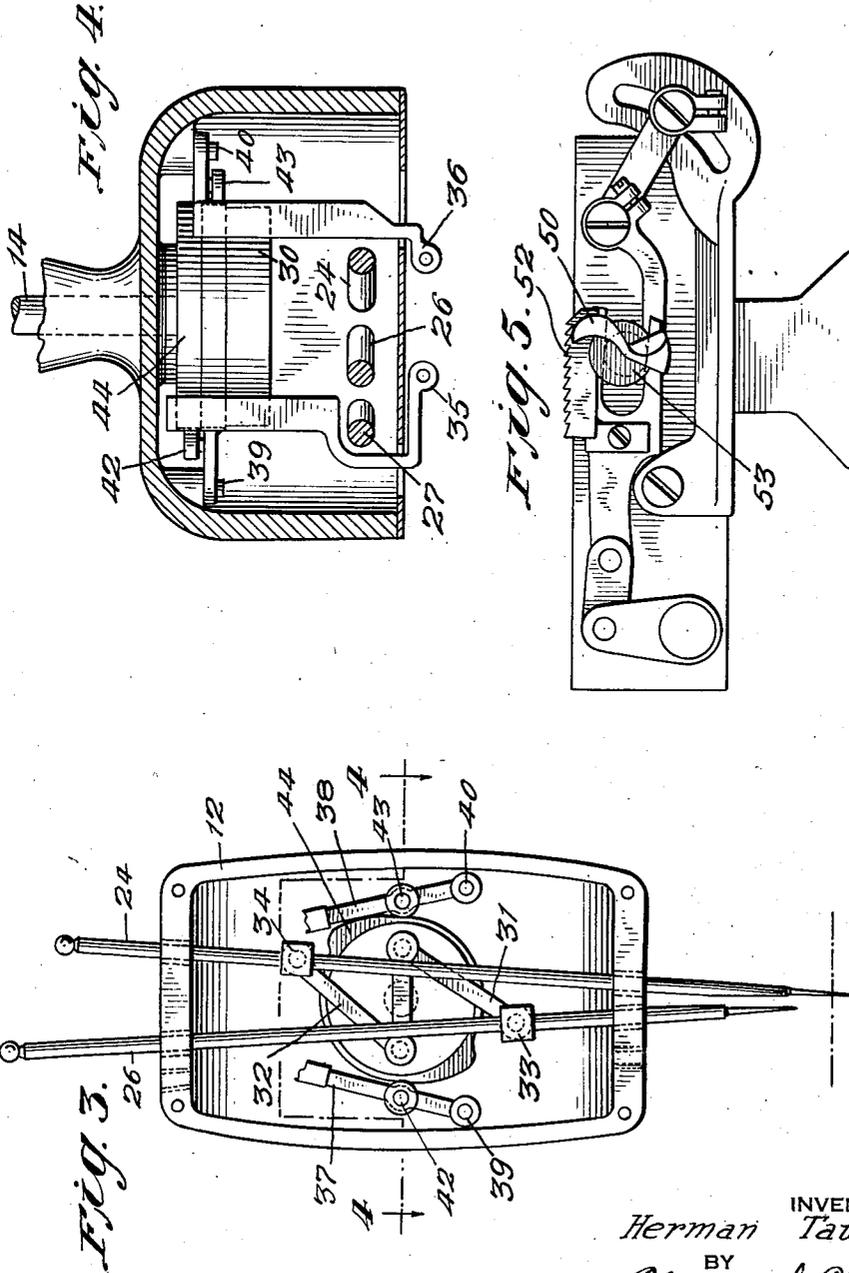
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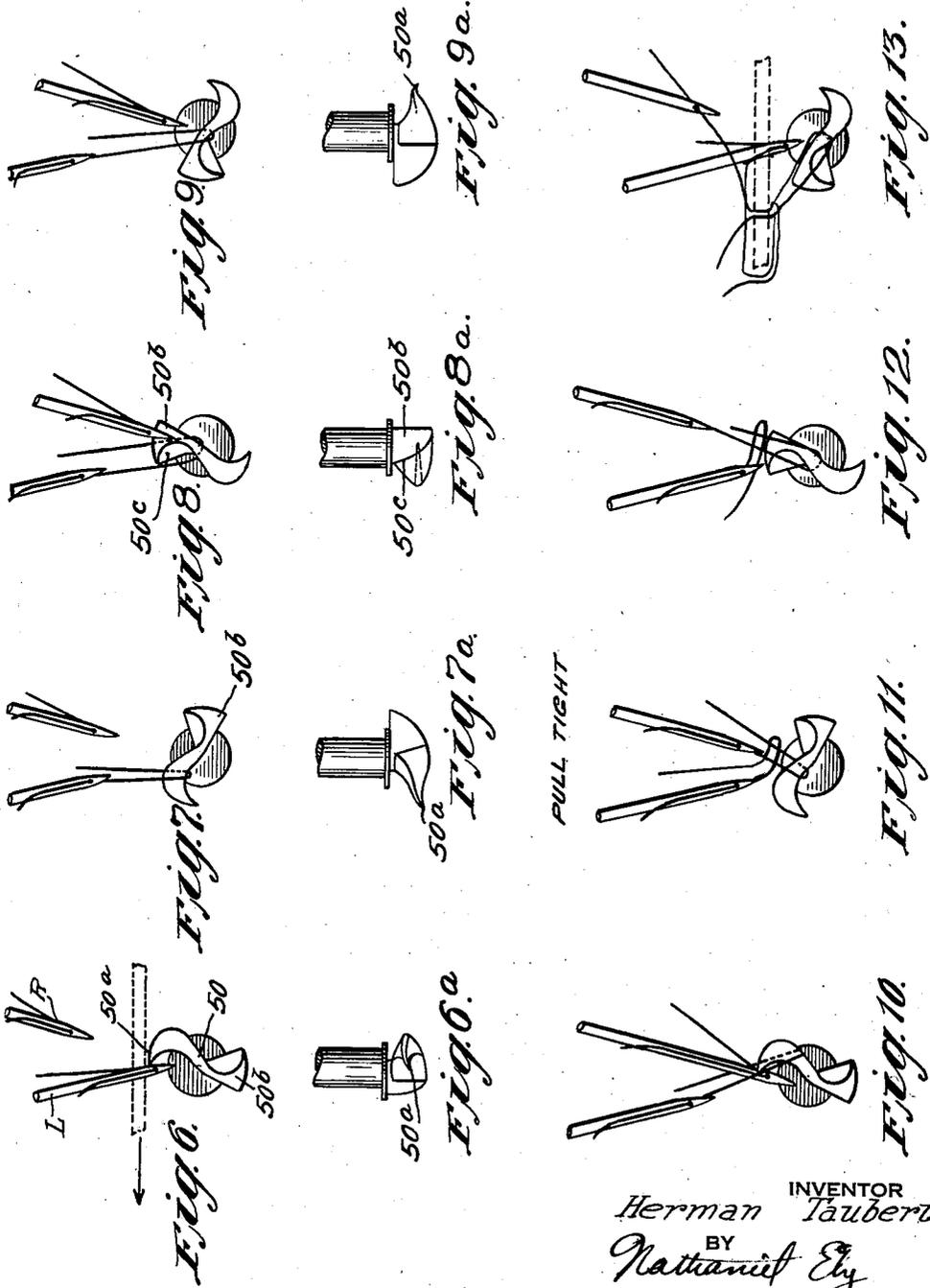
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2,058,271

SEWING MACHINE

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10 Claims. (Cl. 112—165)

This invention relates to improvements in sewing machines and more particularly to an improved stitching mechanism.

One of the principal objects of my invention is to provide a stitch forming mechanism that will operate much faster than the common shuttle type and will have many of the same advantages.

Another object of my invention is to provide a double needle type of sewing machine with a cooperating looper whereby an interlocking stitch may be formed.

Another object of my invention is to produce a double chain or interlocking stitch with a plurality of needles on a rotary looper type of machine in which the looper cooperates with each needle to interlock the multiple threads.

A further and more specific object of my invention is to provide a plurality of needles operating in cyclic order with a rotary looper, the looper operating at twice the speed of either needle, and each needle operating through a coincident point from the same side of the material to be sewed, the needles carrying separate threads for a more secure and quicker formed stitch.

Another object of the invention is to provide a sewing machine with a plurality of separate thread carrying needles, multiple thread tensioning fingers and a rotary looper running at relatively double speed whereby a more rapid stitch may be made than is possible on prior machines and yet will have interlocking qualities and can not be drawn for more than one loop if damaged in any particular place.

A further object of the invention is to construct a sewing machine of the multiple needle type with a rotary looper than can be adjusted to develop an ordinary chain stitch if one of the multiple threads is omitted and which will develop an interlocking chain stitch which can not be accidentally pulled from the material sewed if broken, such machine having fewer operating parts and being more readily constructed than other machines forming interlock stitches.

Further objects and advantages of this invention will appear from the following description thereof taken in connection with the attached drawings illustrating a preferred form of embodiment of my invention, in which,

Fig. 1 is a side elevation, partly in section, of the upper part of a sewing machine.

Fig. 2 is an end elevation also partly in section of the machine shown in Fig. 1.

Fig. 3 is a partial end elevation similar to that

shown in Fig. 2 but showing an advanced step in the needle movement.

Fig. 4 is a horizontal section taken substantially on the line 4—4 of Fig. 3 and showing the tension fingers.

Fig. 5 is an elevation of the cloth moving mechanism below the head end of the machine.

Fig. 6 is a partial elevation diagrammatically showing the relation of the needle points to the looper in the first position.

Fig. 6a is a plan view of the looper in the position shown in Fig. 6.

Figs. 7 to 13 are further elevational views of the needles and loopers in subsequent steps in the cycle.

Figs. 7a to 9a are further plan views of the looper in the steps shown in Figs. 7 to 9, and,

Fig. 14 is a vertical section schematically showing the shape of the stitch, with one thread in solid lines and the second thread in dotted lines.

Sewing machines are commonly of the chain stitch or rotary looper type or of the shuttle or lock stitch type. The chain stitch, although more rapidly made, is unsatisfactory in most cases as the breakage of a loop in any place, will permit the entire thread to be drawn from the material sewn. The lock stitch or shuttle machine, avoids this difficulty by using a reciprocating or other form of shuttle which is slower acting and results in materially slowing up the stitch.

Other forms of stitch forming mechanism are also known such as the multiple needle type in which the needles enter either at different points in the cloth or from different sides of the material. These machines are unsatisfactory due not only to the complicated mechanism which increases the cost of the machine and requires frequent adjustment, but in most instances such machines are not generally satisfactory as they will not make fine stitches and be generally adaptable to sewing and the stitches formed are not satisfactory.

In the present instance, I have shown a preferred form of embodiment of my invention and while I believe it to be the better construction to carry out my purpose, I realize that certain changes may be made without changing its principle of operation. It is also to be understood that the device is primarily constructed to show the general arrangement of the parts to carry out the purpose of the invention.

The sewing machine shown in Fig. 1 consists of the usual frame 10 for example of the cantilever type which carries the working head generally indicated at 12. The main drive shaft 14

is suitably journaled in the frame near the top and extends into the head 12. Power may be furnished by any means not shown operating on the drive belt 15 adjacent the hand wheel 16.

5 The frame 10 is mounted as a rule on a base 18 and the looper drive shaft 20 may be secured thereto. A chain or gear drive 22 is preferably used to positively drive this looper shaft 20 at a fixed ratio to the rotation of the main drive shaft 14.

10 The operating head 12, as shown in Fig. 2 carries two needle bars 24 and 26 at slight angles to the vertical but directed to the same point on the base. The usual presser foot support 27 and foot 28 are provided to hold the material to be sewn in the proper position as is well known in the art.

15 The needle operating mechanism may be of any desired form which will reciprocate the needles at intervals of 180°. One form shown consists in a rotary member 30 carrying two cranks 31 and 32 each of which is secured to a needle bar by a cross head connection 33 and 34 one near the bottom and the other near the top. The needle bars are each separately guided and the motion will reciprocate them through the necessary working range and will move one downwardly while the other moves up.

20 The working head 12 also carries tension fingers 35 and 36 carried at the ends of pivoted arms 37 and 38, pivoted at 39 and 40 and carrying intermediate cam followers 42 and 43. A cam 44 is also carried by the rotary member 30 on the end of the main shaft 14 and this cam, having two cam tracks operating on the cam followers at the proper interval and in moving the respective pivoted levers, oscillates the tension fingers 35 and 36. Fixed thread guides 41 cooperate with the movable fingers.

25 It is understood that the other thread guides and tension head for the thread are omitted as they are well known and may be of any preferred construction. It is understood however that at certain points in the operation of the needles, a tension guide or equivalent means prevents the thread from freely moving to the needle and at that time the tensioning fingers 35 and 36 operate on the thread to pull it taut at the needle thus making the stitch tight. The particular arrangement of the tensioning fingers will be more clearly understood from Figs. 3 and 4 in which the relation of the cam and cam followers is more clearly shown. In Fig. 3 an advanced movement of the needle is also shown.

30 The looper 50 is carried at the end of the looper operating shaft 20 and, is preferably rotated at twice the speed of the main operating shaft 14 so that the point end 50a of the looper comes into the proper top position at the same relative time for each needle. The looper is placed below the base 18 and adjacent thereto is the material moving jaw 52 which is linked in a well known manner to the base 18 and the eccentrics 53 so that on a complete cycle the jaw moves upwardly and forwardly and the cloth or material to be sewn is thus urged forward for the next needle. As this operation is well known in the art, no further explanation is thought necessary.

35 The formation of the stitch is brought about by the cooperation of the looper and the two needles. To more clearly describe this cooperation, a series of diagrams, Figs. 6 to 13 may be referred to, each of the diagrams representing a part of the cycle of stitch formation. As the two needles each form part of the stitch, a cycle thus includes one revolution of the main operating

shaft and thus two complete revolutions of the looper. It is to be noted that the looper 50 has the pointed end 50a for engaging the thread and drawing it from the needle point and also has a blunt end 50b for spreading the loop after opening it. The needle points in the diagrams may be designated L and R for left and right needle to facilitate the explanation, either being any particular needle in the operative mechanism.

40 The first operative position may be as shown in Fig. 6 which shows the looper point adjacent the tip of the left needle. The left needle has already reached the bottom of its stroke and is moving upwards; the thread is thus slightly bulged to be engaged by the looper point. At this time the right needle is moving downwards.

45 The second operative position is shown at Fig. 7. The left needle having moved upwards and the looper point having moved from the top, a thread loop is being opened. The right needle is still moving down. At this point, where the needles are approximately equally spaced above the base, the cloth is moved forward.

50 The third operative position is shown at Fig. 8. The blunt end 50b of the looper has now come into position to spread the looper for the insertion of the second needle. In order to throw off the loop, the beveled edge 50c of the blunt end 50b of the looper has now come into play and pushes the loop away from the machine with the blunt end 50b of the looper between the sides of the loop.

55 The fourth and fifth operative positions are shown in Figs. 9 and 10 in which the loop is held by the curved end of the looper only and as soon as the right needle has crossed into the open loop, the loop will pull off the curved end of the looper.

60 In the fifth position, shown in Fig. 10 at the end of the first half of the cycle, the looper point 50a engages the second thread which is carried by the right needle and again starts to carry the thread around as is more clearly shown in Fig. 11 or the sixth operative position. At this time however, the tension finger on the operating head of the machine works to draw the thread in the left needle tight and simultaneously the cloth is moved to prepare for the reception of the left needle again.

65 In the seventh and eighth operating positions as shown in Figs. 12 and 13, the second loop is carried off the blunt end 50b of the looper by the beveled edge 50c and the loop is again held open and the left needle then comes into position between the sides of the loop before the loop comes off the curved edge of the looper point 50a. This begins the repetition of the first stitch action.

70 The resulting stitch is more clearly shown in Fig. 14 in which, one thread is shown in full lines and the other in dotted lines to more clearly illustrate the relation. It will be noted that the threads are interlocked with each other so that no matter which thread is broken or at what point, the entire thread can not be removed by any amount of pulling. The interlock forms a plurality of separate thread sections which are independent of other thread sections and can not be broken.

75 The stitch can be formed at high rates of speed without injury to the cloth or damage to the machine. The looper operates at double normal speed but it is a rotary device and can rotate without any stress on the machine. It operates far faster than any possible shuttle type of ma-

chine, due to the limitations of the movement of the shuttle and will operate as fast as any chain stitch machine at the same time making double stitches which are interlocked. The machine
 5 furthermore avoids any complicated constructions and may be made from standard machines by simple conversion of certain operating parts such as the operating head and the looper. The machine will also operate as a single thread, normal chain stitch machine if one thread is omitted
 10 and the proper ratio of one to one of looper and main operating shaft is used. In some instances this may be highly desirable for basting and other purposes.

15 While I have shown a preferred form of embodiment to which my device is adapted, I am aware that other modifications may be made herein and I therefore desire a broad interpretation of my device within the scope and spirit of my description herein and of the claims appended hereinafter.

I claim:

1. In a sewing machine of the class described the combination of a main drive shaft, a pair of
 25 needles oscillated by said shaft and maintained at 180 degree intervals, each of said needles carrying a separate thread, a second shaft, means to drive said second shaft at twice the speed of said first shaft, a looper mounted on said second shaft
 30 adjacent the end of the needles, said looper being adapted to draw one loop from one of said needles and hold said loop open until the looper carries the loop from the second needle into the first loop.

35 2. In a sewing machine of the class described, a loop forming mechanism including two needles operating from the same side of the cloth to be sewn, means to operate said needles through the cloth at 180 degree intervals, a looper, said looper
 40 having a point, a loop opening portion, and a bevel thread removing portion thereon, means to rotate said looper for each needle, said looper forming a first loop, holding said loop open, drawing a second loop through the first loop, and releasing the first loop.

45 3. In a sewing machine of the class described, a loop forming mechanism including two needles operating from the same side of the cloth to be sewn, means to operate said needles through the cloth at 180 degree intervals, a looper, said looper
 50 having a point, a loop opening portion, and a bevel thread removing portion thereon, means to rotate said looper for each needle, said looper forming a first loop, holding said loop open, drawing a second loop through the first loop, and releasing the first loop and means to tension said first loop, and means to repeat said steps.

60 4. A sewing machine of the class described, comprising a frame, a plurality of needles carried by said frame, a base, said needles respectively passing through a common point of said base and from the same side of the base, a separate thread carried by each of said needles, and a looper mounted on said base and cooperating with said needles, means to reciprocate
 65 said needles at spaced intervals and means to hold the thread from one of said needles until the other needle passes therethrough.

70 5. A sewing machine of the class described, comprising a frame, a plurality of needles carried by said frame, a base, said needles respectively passing through a common point of said base and from the same side of the base, a separate thread carried by each of said needles,
 75 and a looper mounted on said base and coop-

erating with said needles, means to reciprocate said needles at spaced intervals and means to hold the thread from one of said needles until the other needle passes therethrough said holding means including a looper, a pointed end on
 5 said looper to engage said threads, a blunt portion on said looper to spread the thread loops, a biasing portion on said looper to divert the thread from said looper and curved portion on said looper to hold the thread loop until the
 10 pointed portion of the looper is in position to engage a second thread.

6. A sewing machine of the class described, comprising a frame, a plurality of needles carried
 15 by said frame, a base, said needles respectively passing through a common point of said base and from the same side of the base, a separate thread carried by each of said needles, and a looper mounted on said base and cooperating with said needles, means to reciprocate said
 20 needles at spaced intervals and means to hold the thread from one of said needles until the other needle passes therethrough said holding means including a looper, a pointed end on said looper to engage said threads, a blunt portion
 25 on said looper to spread the thread loops, a biasing portion on said looper to divert the thread from said looper and a curved portion on said looper to hold the thread loop until the pointed portion of the looper is in position to en-
 30 gage a second thread and means to move the material to be sewn each time a needle leaves said material and means to cooperate with said movement to tighten the thread loops and draw the stitch tight.

7. In a sewing machine of the class described, the combination of a plurality of stitch forming
 35 needles, means to operate the needles at a cyclic period of 180 degrees including a drive shaft, a looper axially mounted on said shaft and rotating in a single plane, means to rotate said looper a full rotation on each needle cycle, said looper cooperating with each of said needles in the same relative position to form a single row
 40 of a double interlock stitch.

8. In a sewing machine of the class described, means to form an interlocking stitch at high
 45 speeds in a material to be sewn which comprises a plurality of needles, each of said needles carrying a separate thread, means to reciprocate said needles through a common point in cyclic sequence, looper means to engage each thread as the respective needle passes through the material, said looper forming a loop and holding said loop open and discharging said
 50 loop, said looper forming a loop of the other thread at substantially the point of release of the first loop, and means to rotate said looper one complete revolution for each thread.

9. In a sewing machine of the class described, 60 means to form an interlocking stitch at high speeds in a material to be sewn which include a plurality of needles each having a separate thread, means to reciprocate said needle in angular relation through a common point, and a
 65 rotary looper in driven relation with the needle reciprocating means making one revolution for each cycle of operation of each needle, said looper having thread engaging means to engage each thread in sequence and to form thread
 70 loops and hold said loops open, said looper having thread releasing means to release one loop after the beginning of the second loop, and tension means to tension the released loops.

10. In a sewing machine of the class described 75

having a frame, a needle, means to reciprocate said needle and a looper to cooperate with said needle to form a single chain stitch when the ratio of rotation of the looper to the reciprocation of the needle is one, of means to convert said machine to form an interlocking stitch which comprises in addition a second needle and means to reciprocate said needle through a point common to a point through which the first needle reciprocates and from the same side of a cloth to be sewn, said machine being adapted to form an interlocking stitch when the ratio of rotation of the looper to the reciprocation of each needle is two. 5

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