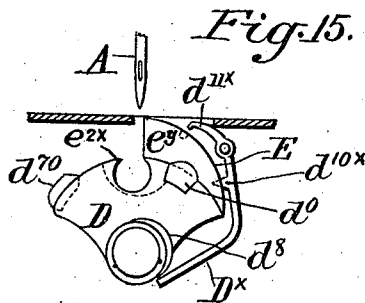
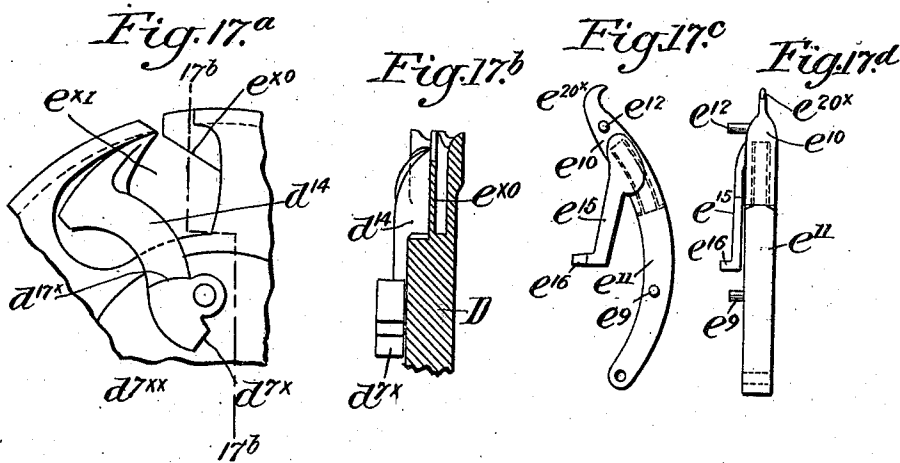
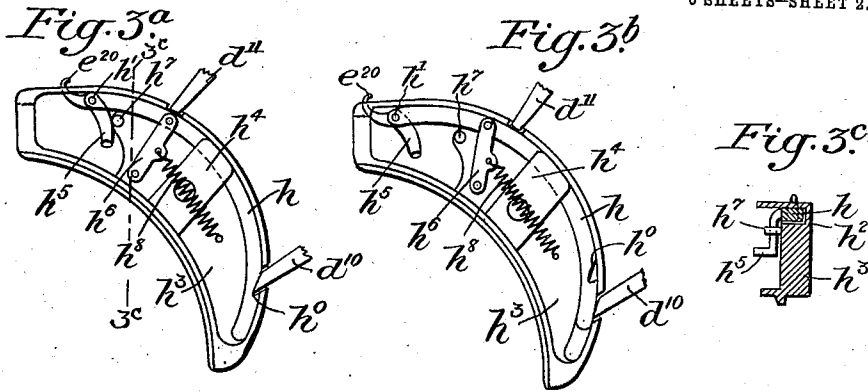


F. BAKER & L. JACOBS.
SEWING MACHINE.
APPLICATION FILED MAY 23, 1908.

1,014,033.

Patented Jan. 9, 1912.

6 SHEETS—SHEET 2.

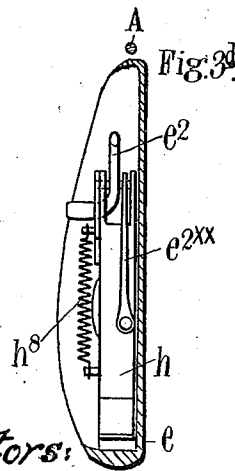
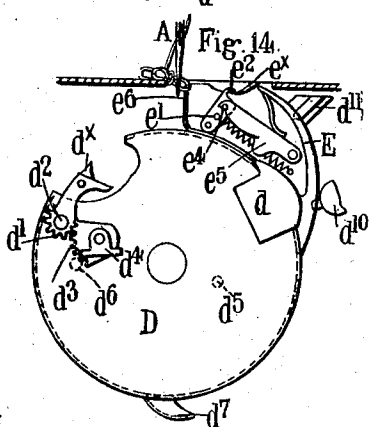
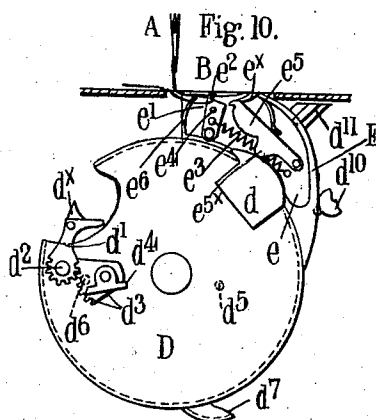
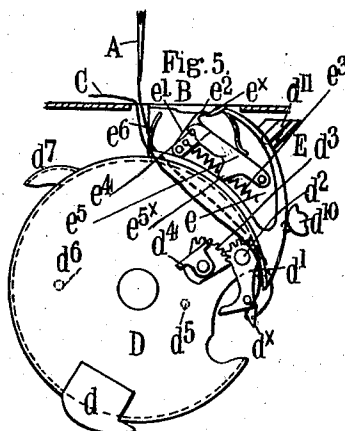


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APPLICATION FILED MAY 23, 1908.

6 SHEETS—SHEET 3.



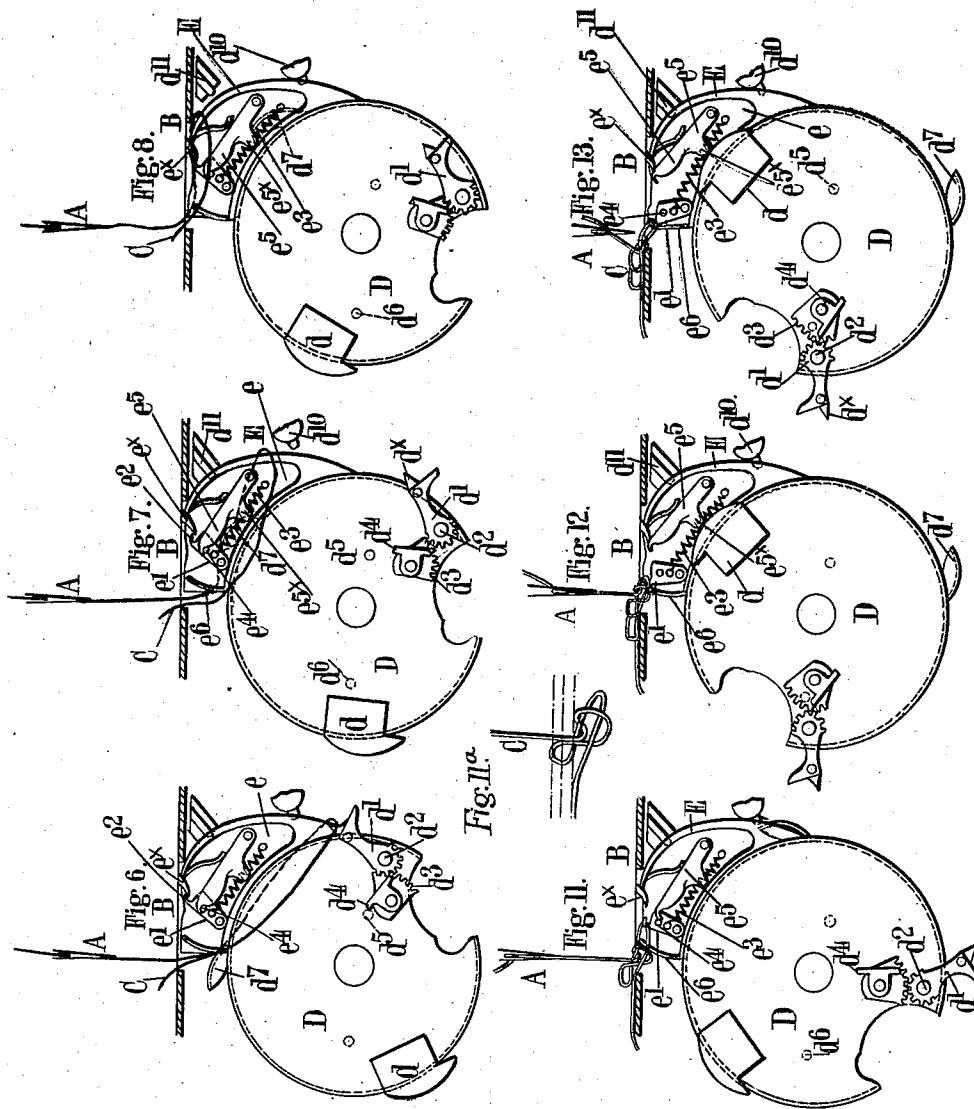
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F. BAKER & L. JACOBS.
SEWING MACHINE.
APPLICATION FILED MAY 23, 1908.

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6 SHEETS—SHEET 4.

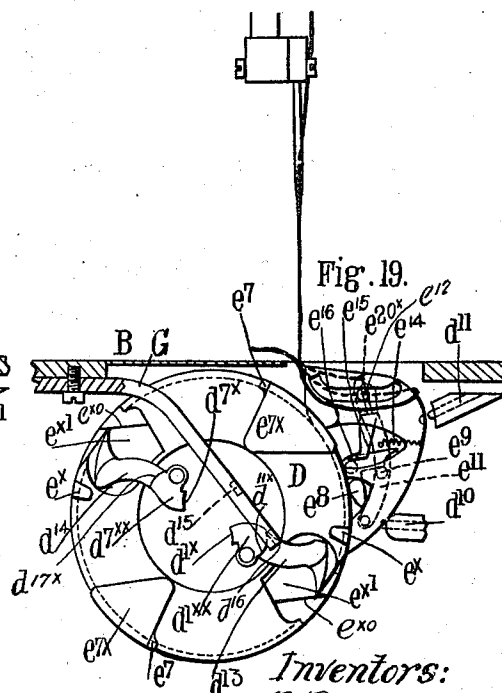
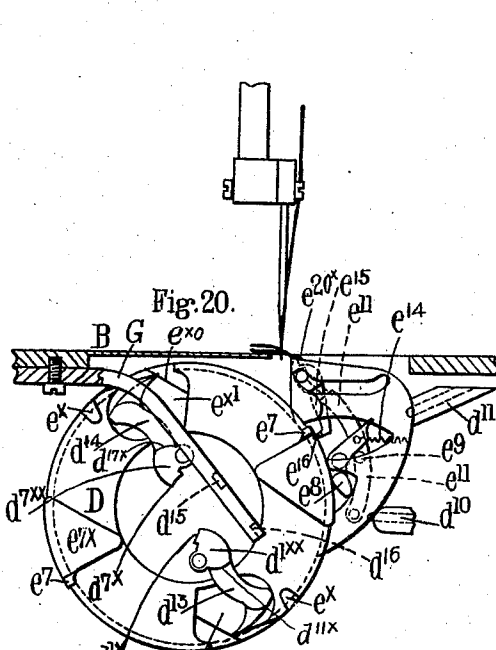
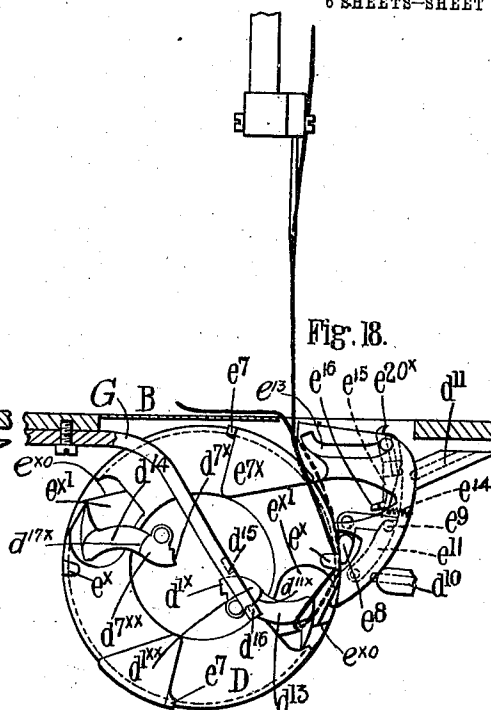
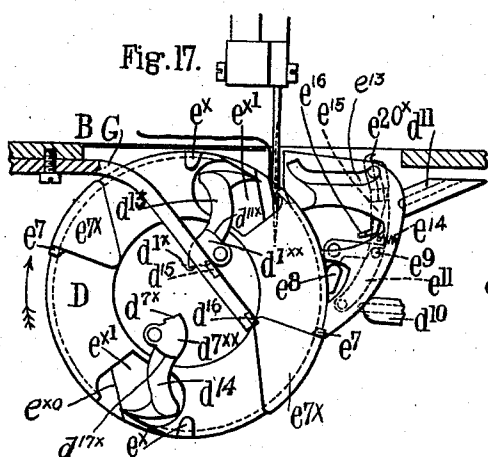


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1,014,033.

6 SHEETS—SHEET 5.



Witnesses:
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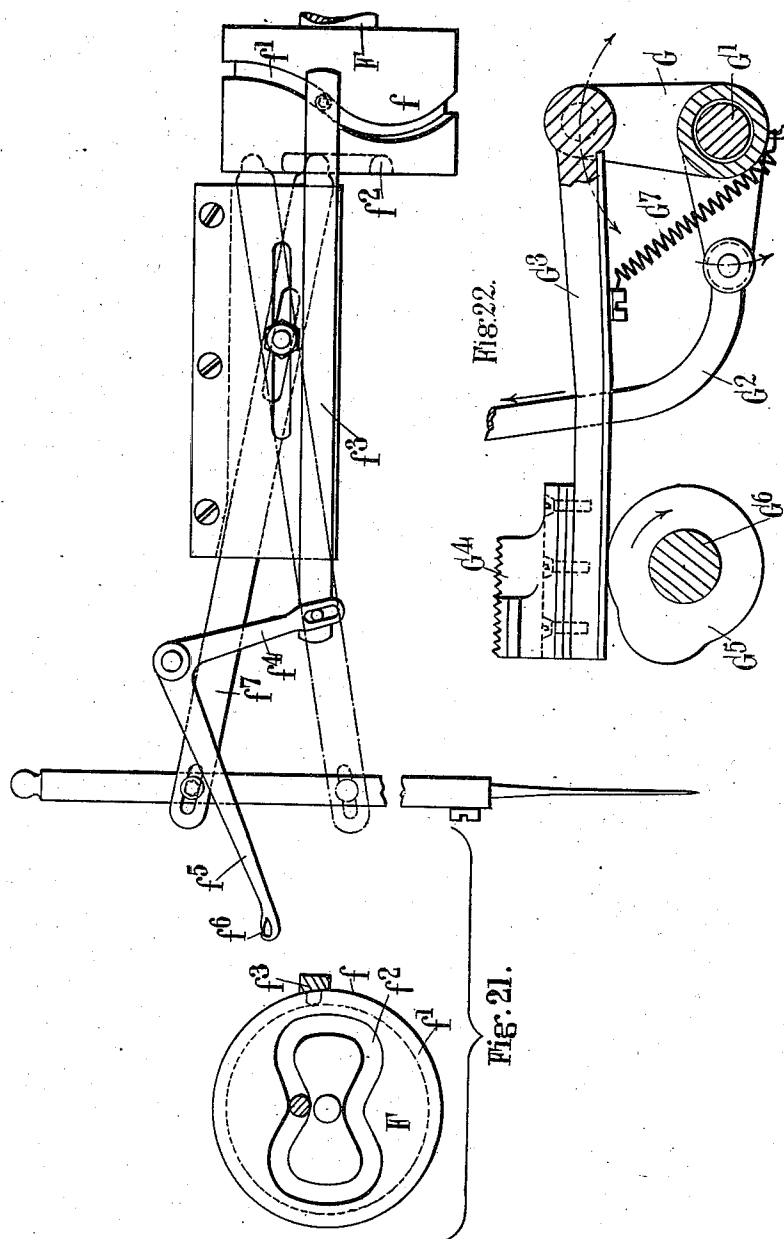
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F. BAKER & L. JACOBS.
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APPLICATION FILED MAY 23, 1908.

1,014,033.

Patented Jan. 9, 1912.

6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

FREDERICK BAKER, OF BLACKHEATH, AND LESSER JACOBS, OF LONDON, ENGLAND,
ASSIGNORS TO BAKER SEWING MACHINES TRUST LIMITED, OF LONDON, ENGLAND.

SEWING-MACHINE.

1,014,033.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed May 23, 1908. Serial No. 434,702.

To all whom it may concern:

Be it known that we, FREDERICK BAKER and LESSER JACOBS, both subjects of the King of Great Britain, residing, respectively, at Stafford House, Lee Road, Blackheath, in the county of Kent, England, and 17 Hanover Square, in the county of London, England, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

Our invention has reference to sewing machines.

It has for its object to produce a stitch possessing the unraveling property of a lock-stitch with the employment of but a single thread, that is to say the top or needle thread, thus dispensing with the use of a shuttle, or bobbin-carrier.

According to the present invention, we form a long loop of thread drawn from the needle supply, said long loop being knotted with one or more sub-loops drawn from the same supply, or embraced by two or more sub-loops drawn from the same supply, which in both cases form the stitches until the end of the long loop is reached, when the needle thread is passed through the bight of the long loop forming a new long loop which secures the end of the first long loop, the cycle of operations then being repeated.

The above described operations may be effected for example by arranging beneath the bed plate of a sewing machine a member such for example as a disk adapted to be rotated or oscillated by appropriate means as hereinafter described. Said member is provided with means such as a hook or nose or hooks or noses adapted to draw off from the thread carried by the needle the aforesaid long loop and cause it to engage in and be retained by a second member which we may term a tension device. This tension device comprises a member so arranged with relation to the member first above referred to that the loop of thread is retained in a recess therein being caught by a pivoted hook carried by a rod or the like adapted to slide or travel in said recess. This rod is adapted to travel in the recess and its movement is controlled by suitable means such as for example by providing a pivoted rocking piece or arm actuated by a cam or the like. Upon the next

descent of the needle another loop is drawn from the thread and is formed into a sub-loop which is engaged and locked with the aforesaid long loop, thus forming a stitch in the material being sewn.

Appropriate means hereinafter described are provided for feeding forward the material to be sewn.

In order that our said invention may be clearly understood and readily carried into effect we will proceed to describe the same more fully with reference to the accompanying drawings, in which:—

Figure 1 is a diagram on a large scale of one form of stitch. Fig. 2 is an elevation of the mechanism for producing the stitch shown in Fig. 1. Fig. 2^a is a back view of part of the mechanism shown in Fig. 2. Fig. 3 is a detail front elevation of the tension device. Fig. 3^a is a front elevation of a modification of the tension device. Fig. 3^b is a view similar to Fig. 3^a, but showing the parts in a different position. Fig. 3^c is a transverse section on the line 3^c—3^c of Fig. 3^a. Fig. 3^d is a sectional plan of a further modified form of the tension device, the casing being shown broken away to expose the parts of the tension device within the same. Fig. 4 is an edge view showing how the thread is drawn from the needle and Fig. 4^a is a corresponding front view. Figs. 5 to 14 are diagrammatic illustrations of the various stages arrived at during the formation of the stitches. Fig. 15 is a front elevation of a modification of the said invention. Fig. 16 is a modified form of stitch. Fig. 17 is a diagrammatic view of a modified form of the invention in which there are two loops formed and two throw offs of the thread per revolution of the disk—the complete cycle being illustrated in Figs. 17 to 20. Figs. 17^a to 17^d are details of the form of apparatus illustrated in Figs. 17 to 20, Fig. 17^b being a section on the line 17^b—17^b of Fig. 17^a. Fig. 21 is an elevation of a convenient manner of obtaining the synchronizing of the needle, for use with the arrangements shown in Figs. 17–20. Fig. 22 is a sectional elevation of the feeding mechanism for advancing the material to be sewn a stitch at a time.

A is the needle.

B the needle plate.

C the thread.

D the disk.

E the tension device.

We will refer first more particularly to Figs. 1 to 14. The disk D is preferably formed in one piece with its driven spindle or shaft, and carries the lug d , the purpose of which will be hereinafter explained. The disk D also carries the thread manipulating device which is composed of a rocking hooked member d^1 adapted to be rocked on a pivot d^2 by a toothed quadrant d^3 , the teeth of which engage with teeth on one end of the member d^1 . Carried on the quadrant d^3 is a cam like projection d^4 , adapted during a revolution of the disk to engage with projections d^5 , d^6 , projecting from a bridge piece G carried by the bearing plate H, in such a manner that upon meeting the projection d^5 , the hooked end of the member d^1 is thrown outward, while the meeting with the projection d^6 imparts motion to the hooked member again, in the opposite direction. The purpose of these movements will be apparent later on in the description. The said disk also carries a guide piece d^7 for insuring that the thread takes the correct course. This guide piece, the purpose of which will be hereinafter explained, is secured to the remote side of the disk as seen in Figs. 5 to 14. At the back of the disk are cam grooves d^8 and d^9 as shown in Fig. 2^a, and pins fixed to sliding members d^{8x} d^{9x} are arranged to work in the aforesaid grooves as the disk D rotates. The sliding members d^{8x} , d^{9x} extend beyond the periphery of the disk and beyond the casing e of the tension device and have lateral projections d^{10} and d^{11} which extend over the back face of the said casing and make contact with it to hold it in position on the periphery of the disk, which is grooved, as shown plainly in Fig. 4, to engage with said tension device casing. In order to prevent any loose or uncertain action of the projections d^{10} and d^{11} that might otherwise occur owing to the wearing of the walls of the groove d^8 and of the pin on the sliding member d^{8x} , a spring d^{10xx} may be provided to constantly press the said pin against the inner edge of the groove.

The tension device casing, shown on a larger scale in Fig. 3, is equipped with a rocking member e^1 provided with a hook e^2 and controlled by a spring e^3 , the casing e being slotted to expose the hook e^2 . The rocking member e^1 carries a pin or projection e^4 which is normally engaged by a pivoted arm e^5 to prevent the rocking of the member e^1 . The member e^1 is however released during a certain part of the revolution of the disk D by the lug d in the manner to be hereinafter described.

The mechanism for feeding the material forward step by step is of the well known kind, and is shown in Fig. 22. The bell crank lever G is intermittently rocked about

the axis of the shaft G^1 by means of the rod G^2 , and a horizontal reciprocating movement is thereby imparted to the pivoted arm G^3 which carries the serrated member G^4 . The pivoted arm G^3 is held down upon the cam G^5 on the main shaft G^6 of the machine by the spring G^7 . After each reciprocation of the needle the serrated member G^4 is given a vertical movement by means of the cam G^5 sufficiently to raise it into contact with the underside of the material being sewn, and is simultaneously given a horizontal movement by means of the bell crank lever G, with the result that the material is urged forward the distance of a stitch.

Assuming that a piece of material is now placed on the machine to be stitched, the operation may be described as follows:—As soon as the needle descends through the material to be sewn, the hook d^x on the member d^1 which is at this point in its inward position, engages the thread as shown in Figs. 4 and 4^a, and carries it around as it proceeds on its revolution (Fig. 5), the sides of the loop falling one on each side of the disk and tension device, until the projection d^4 comes into contact with the projection d^5 on the bridge piece G (Fig. 6). This contact causes the member d^1 to assume its outward position and allows the loop of thread to escape from the hook d^x . It is to be noted that this release of the loop has taken place before the hook has moved through 180° from its point of engagement with the thread. Consequently, the loop, when drawn up, can do so on the same side of the axis of the disk as that on which it was drawn out instead of having to cross this axis, as is the case in prior rotary disk machines. The loop of thread is now pulled by the take up back over the tension device, (Fig. 7), the retaining sliding pieces d^{10} and d^{11} being operated successively (Figs. 7 and 8) by the cam grooves d^8 and d^9 at this moment, in order to allow the thread to pass between them and the tension device casing e . The loop is then arrested by the hook e^2 on the rocking member e^1 and held taut (Fig. 9). The loop cannot avoid entering the hook e^2 owing to the guide e^x on the underside of the needle plate B. As the disk continues its rotation the lug d comes into contact with a projection e^{5x} , on the arm e^5 , (Fig. 10), causing it to lift clear of the pin e^4 and allowing the member e^1 to move forward as the material is fed onward. The member d^4 also comes into contact with the projection d^6 which brings the member d^1 inward (Fig. 10), and a guide bar d^{x1} as shown in Fig. 2 prevents its tendency to fly outward on its upward journey before engaging the thread and beginning its downward course. The needle is by this time descending again (Fig. 10) and in doing so, passes down between the sides of the loop. The thread is

again caught by the hook d^x , and a second loop is drawn and carried around to the lower end of the tension device and then thrown off as before. Owing to the hook e^2 having been released as above described and drawn away from the guide e^x by the forward movement of the material, this second loop called a sub-loop in being drawn over the tension device casing escapes the hook e^2 and therefore passes over the first loop which is still being held by the hook e^2 (Fig. 11) and is drawn taut against the material forming a knot with the first loop firmly locking it at one portion against the material. The formation of the sub-loop in the course of being drawn up is shown in detail in Fig. 11^a. On the next descent of the needle (Fig. 12) it passes again through the remaining portion of the long loop and a sub-loop is again passed over it as just previously described, the long loop again moving a step forward owing to the feeding of the material. This last step forward, of the long loop, causes it to overcome the tension of the spring e^3 and escape from the hook e^2 (Figs. 13 and 14), after which it is arrested by the upwardly projecting spring e^6 secured to the end of the casing e . In this position, the bight of the loop is ready for the needle to pass through it (Fig. 14). As soon as the loop escapes from the hook e^2 , the member e^4 springs back to its normal position (Fig. 14), the pin e^4 engaging with the pivoted arm e^5 and securely retaining the member e^4 in its locked position. On the next descent of the needle, it passes through the bight of the loop which is held as above stated, and a new long loop is drawn off and caught on the hook e^2 , as in the original formation of the first loop but it has been drawn through the bight of the now old loop. As the new loop is pulled taut on the hook e^2 , it lifts the bight of the old loop clear of the spring e^6 , which returns to its normal position. The bight of the old loop is thus secured by the new loop which is again locked in two places as before.

When the needle descends through the bight of the old long loop it is desirable that it should do so as close as possible to the end of the bight so as to prevent the bight, when released a moment later, from being free to move out of place, and to insure the old loop being under control until the needle has entered the extreme end of its bight in the act of descending to enable a new long loop to be drawn. To enable the needle to descend as described, the needle plate is recessed to allow the tension device casing to be placed in such a position as to cause the bight of the loop, just prior to its release, to be placed close against the underside of the material and close against the needle when the latter descends. In this

way, the bight of the old loop immediately upon its release is under the control of the new long loop.

It will be understood that as each loop of thread, whether main loop or sub-loop, is being drawn by the take-up over the back of the tension device casing, the loop may tend to drag and not slip easily unless the back of the said casing is very smooth and accurately shaped. To assist the drawing up of the loop, the thread on one side of the loop may be positively lifted across the face of the tension device casing. The guide plate d^7 hereinbefore referred to performs this function. In Fig. 6 the said guide piece d^7 is seen just about to travel past but close up against the rear face of the casing e . In Figs. 7 and 8 the guide plate is shown in dotted lines assisting the loop to be drawn over the back of the tension device casing by lifting the part of the thread that stretches across the rear face of the casing.

In order to prevent the loops of thread at the moment of being released and prior to being drawn up over the tension device casing from straying outward away from the said casing and becoming entangled with the projection d^{10} (Fig. 2) for instance, a guard piece d^{20} is provided.

In the modified tension device shown in Fig. 3^a, the hook in its final position before delivering the loop is itself brought close up into contact with the under side of the recessed needle plate, thus preventing the bight from escaping from the hook accidentally or prematurely. Moreover, the bight is released by the movement of the hook itself when required and not by the pull exerted by a new loop as in the previous case. In this arrangement, the member h , which corresponds to the member e^1 of Fig. 3, carries a hook e^{20} pivoted thereon at h^1 and is arranged to slide in a segmental groove h^2 in the casing or body portion h^3 , being retained in said groove by a plate h^4 .

h^6 is a pivoted lever which engages at one end with the sliding member h and serves under the influence of a spring h^8 to pull the said member h into a position in which a lug or tail piece h^5 on the hook e^{20} catches against the stationary pin h^7 on the casing or body portion h^3 . The mouth of the hook e^{20} is then, as shown in Fig. 3^a, projecting beyond the casing or body portion h^3 through an opening in it and is ready to catch a main loop of thread.

d^{10} and d^{11} are the projections operating similarly to those already described with reference to Fig. 3, with the exception that while the projection d^{11} engages with the casing or body portion h^3 only, the projection d^{10} projects through the latter, and engages with a notch h^6 on the member h . When therefore a main loop of thread has been caught by the hook e^{20} , the projection

d^{10} prevents the member h from moving while the thread of the main loop is being drawn by the take-up. Prior however, to the next loop which is the first sub-loop being drawn over the casing or body portion, the projection d^{10} is temporarily retracted as hereinbefore described, and, the feeding mechanism having now caused a tension to be exerted on the hook e^{20} by the thread, the sliding member h slides to the left toward the needle against the influence of the spring h^s . The lug or tail piece h^5 then moves away from the pin h^7 and assumes a more horizontal attitude in which position the mouth of the hook e^{20} lies below the top edge of the casing or body portion h^3 and therefore allows the sub-loops to pass over it. The next sub-loop also passes over the hook, the latter being drawn stitch by stitch to the left in opposition to the action of the spring h^s until it has reached a position in which the lug h^5 approaches the periphery of the disk D as shown in Fig. 3^b. A projection, such as d in Figs. 5 to 14, then engages with the end of the lug h^5 as the disk rotates and thereby tilts the said lug h^5 ; the hook e^{20} is consequently rocked sufficiently to release the loop. The hook e^{20} and sliding member h are then returned by the spring h^s to their normal position and the hook e^{20} is then ready to engage with another main loop.

In the modification shown in Fig. 15 we have provided an oscillatory quadrant D in place of a rotating disk. The hook e^{2x} is formed integrally with the quadrant by suitably removing a portion of the disk as shown. With this construction the tension device E is shown in outline only being the same in detail as that shown in Fig. 3. In this case the tension device is held in a groove on the periphery of the quadrant, by one or other of the two lugs d^{10x} , d^{11x} formed on one arm of the rocking lever D^x . This lever normally causes one of the lugs to be in contact with the tension device, but is rocked by means of a cam d^s on the machine shaft or on the boss of the quadrant so as to cause the lug d^{10x} to be raised momentarily and allow the thread to pass between it and the casing e at the right moment as before. Meanwhile the tension device is engaged by the lug d^{11x} . When the thread has passed the lug d^{10x} , the travel of the cam d^s allows the rocking lever D^x to return to its normal position, and the thread can then pass under the lug d^{11x} . The operation of pulling a loop in this case is similar to that previously described, except that instead of the hook e^{2x} releasing the loop by throwing it off, the hook now retreats and leaves the loop to be drawn over the tension device as before, and as the cam d^s retreats with the hook, the lugs d^{10x} and d^{11x} accordingly open the passage for the

thread, which is caught on the hook of the tension device as before. The quadrant is provided with a lug d^o corresponding to and serving the same purpose as the lug d in Figs. 5-14 and with the guide d^{7o} corresponding to and serving the same purpose as the plate d^7 in Figs. 5-14.

In the tension device shown in Figs. 17 to 20, the hook e^{20x} is carried by a rocking member e^{11} pivoted at one end to the tension device casing, the free end of the rocking member supporting a sliding member e^{10} on which the hook e^{20x} is formed. The sliding member e^{10} carries a laterally projecting pin e^{12} working in a slot e^{13} in the tension device casing, and a depending portion e^{15} having a lug e^{16} which is normally clear of the periphery of the disk. The pivoted member e^{11} is normally held in the position shown in Figs. 17 and 18 by a spring e^{14} . In this position the curved end of the slot e^{13} forces the pin e^{12} and sliding member e^{10} into a position in which the mouth of the hook projects beyond the tension device casing ready to catch a main loop of thread. A rocking member having one end e^8 resting on the periphery of the disk is pivoted to the tension device casing, the other end of said rocking member engaging with a pin e^9 on the pivoted member e^{11} to prevent the latter from moving while a main loop of thread, after being caught by the hook, is being drawn taut by the take-up. After a main loop of thread has been drawn and passed over the tension device casing, and has been caught by the hook e^{20x} and drawn taut by the take-up, the lug or projection e^{7x} on the periphery of the disk D engages with the end e^8 of the rocking member thereby releasing its other end from the pin e^9 and allowing the pull exerted by the loop on the hook e^{20x} to draw the hook, the sliding member e^{10} and the pivoted member e^{11} to the left against the action of the spring e^{14} as shown in Fig. 19. From the shape of the slot e^{13} it will be seen that the mouth of the hook e^{20x} is depressed below the edge of the tension device casing thereby allowing sub-loops to be formed and passed over the tension device casing and over the long loop while it is still held by the hook e^{20x} . The left hand end of the slot is however curved so that the sliding member e^{10} is finally caused to slide a sufficient distance to bring the mouth of the hook e^{20x} to the extreme left hand corner of the tension device casing close against the under side of the material and against the line of travel of the needle in its descent. In this position the sliding member e^{10} and pivoted member e^{11} have been pulled sufficiently far for the lug e^{16} to touch and trail on the periphery of the disk D ; a projection e^7 on the disk then engages with it as shown in Fig. 20, so as to momentarily jerk or draw down the hook e^{20x}

and thereby release bight of the long loop. The hook and other parts then return to their former position under the action of the spring e^{14} the pin on the pivoted member e^{11} being engaged by the rocking member as before.

In Fig. 1, we have shown the type of stitch that is produced by a single thread machine constructed in accordance with our invention and operating as above described.

In Fig. 16 we have shown another form of stitch which we can also produce. In this case the needle descends at the side of the long loop each time, to form the sub-loop but the sub-loops are thrown over the long-loop as in the case of the stitch shown in Fig. 1. To effect this form of stitch we employ the modified form of tension device shown in Fig. 3^d. This tension device is similar to that shown in Fig. 3^a with the exception that the spring h^8 is secured directly to the sliding member h , and the pivoted lever h^6 is dispensed with. The hook e^2 is pivoted on a pin in the sliding member h in such a way that it can slide laterally on the pin. A spring e^{2xx} is secured to the sliding member h and its free end reaches over the aforesaid pin on one or other side of the pivoted hook e^2 . In the position shown in Fig. 3^a, a long loop when caught and held by the hook e^2 will be kept to one side of the needle with the result that the sub-loops are drawn down to one side of the main loop; the needle however passes through the bight of the old long loop in forming the new long loop.

The number of loops per revolution is not necessarily limited to one, as it will be understood that by providing two or more hooks on the disk, and causing the needle to descend synchronously two or more times per revolution of the disk, two or more loops can be drawn per revolution of the disk, and two or more stitches thereby effected. For example, in Figs. 17 to 20, the disk is shown carrying two hooks d^{13} and d^{14} each of which is pivoted to the disk. These hooks are controlled by the projections in such a manner that upon taking off a loop, the hooks are thrown forward relatively to the disk itself and therefore travel momentarily at a greater speed than that of a point on the periphery of the disk relatively to a stationary point outside the disk. Similarly on releasing the loops, the hooks are caused to travel backwardly relatively to the disk itself, and therefore travel momentarily at a slower speed than that of a point on the periphery of the disk. These movements are effected by the alternate contact of the stationary projections d^{15} and d^{16} on the bridge piece G with the rear edges d^{1x} and d^{1x} and the front edges d^{11x} and d^{17x} of the raised portions d^{1xx} and d^{17xx} on the hooks d^{13} and d^{14} . When the parts arrive at the

position shown in Fig. 17 the rear edge d^{1x} of the raised portion d^{1xx} on the hook d^{13} is brought into contact with the projection d^{15} , and the further movement of the disk causes the hook d^{13} to be thrown forward relatively to the disk. Ultimately the rear edge d^{1x} is carried away from contact with the projection d^{15} . When the parts arrive at the position shown in Fig. 18, the front edge d^{11x} of the raised portion d^{1xx} comes into contact with the projection d^{16} , and the further movement of the disk causes the hook d^{13} to be thrown rearwardly relatively to the disk as shown in Fig. 19. The hook d^{14} is actuated in a similar manner.

To assist the throwing off of the loops and guide them over the tension device we provide on the face of the disk, lugs e^x near its periphery, and we form inclined or beveled edges e^{xo} on the sunk portions e^{x1} in which the ends of the hooks d^{13} and d^{14} work. As the loops of thread are drawn out into the position shown in Fig. 18, the thread of each loop is held near the periphery of the disk owing to its being retained between the face of the disk and the inner face of the lug e^x . When the hook retreats to release the loop as hereinbefore described, the bight of the loop slides along the inclined edge e^{xo} of the sunk portion e^{x1} , and is thus assisted in becoming transferred to the tension device.

It may be observed that in Figs. 17-20 the axis of the disk is shifted laterally with regard to the line of travel of the needle. This position effects a considerable economy of time and working advantages, and may readily be adapted for use where there is one hook only on the disk.

In Fig. 21 we have illustrated one way of effecting the synchronism of the needle movements for use with the device shown in Figs. 17-20. The needle operating shaft F is provided with the collar f which is provided with the cam grooves f^1 and f^2 . In rotating, the cam groove f^1 imparts to the link f^3 a reciprocatory motion, this motion being translated to a rocking movement by the rocking crank lever f^4 , an arm f^5 which terminates in a hook f^6 forming the take up. The cam groove f^2 operates the pivoted rocking lever f^7 which is slidably pivoted to the needle bar. In rotating, the cam groove f^2 thus imparts a reciprocating motion to the needle, the groove being so shaped so as to cause the needle to descend and rise twice during one revolution of the sleeve f . It will thus be observed that the take up is timed accordingly.

What we claim and desire to secure by Letters Patent of the United States is:—

1. In a single thread sewing machine, the combination with a reciprocating needle, of a common means for drawing out from said needle loops of thread which alternately

form a main loop and a sub-loop through the main loop, means for inter-engaging said main loops one with another, and means for carrying each sub-loop around and over the main loop through which it passes, before said main loop inter-engages with the next succeeding main loop, to enable said sub-loop to interlock with the main loop.

2. In a single thread sewing machine, the combination with a reciprocating needle, of a common means for drawing out from said needle loops of thread which form main loops and a plurality of sub-loops passing through each of said main loops, means for inter-engaging said main loops one with another, and means for carrying the sub-loops in succession around and over the main loop through which they pass, before said main loop inter-engages with the next succeeding main loop, to enable the sub-loops to interlock with the main loop.

3. In a single thread sewing machine, the combination with the reciprocating needle and the needle plate, of means located below the needle plate for drawing loops of thread from the needle, and a stationary tension device over which a main loop is drawn and by which it is retained while a sub-loop is pulled from the same source by said means through the main loop, drawn over the tension device and over the main loop, and a second main loop is pulled by said means through the bight of the first main loop.

4. In a single thread sewing machine, the combination with the reciprocating needle and the needle plate, of a hook located below the needle plate for drawing loops of thread from the needle, and a stationary tension device over which a main loop is drawn and by which it is retained while a sub-loop is pulled from the same source by said hook through the main loop, drawn over the tension device and over the main loop, and a second main loop is pulled by said hook through the bight of the first main loop.

5. In a single thread sewing machine, the combination with the reciprocating needle and the needle plate, of means located below the needle plate for drawing loops of thread from the needle, and a stationary tension device over which a main loop is drawn and by which it is retained while a plurality of sub-loops is pulled from the same source by said means through the main loop, drawn over the tension device and over the main loop, and a second main loop is pulled by said means through the bight of the first main loop.

6. In a single thread sewing machine, the combination with the reciprocating needle and the needle plate, of a hook located below the needle plate for drawing loops of thread from the needle, and a stationary tension device over which a main loop is drawn and

by which it is retained while a plurality of sub-loops is pulled from the same source by said hook through the main loop, drawn over the tension device and over the main loop, and a second main loop is pulled by said hook through the bight of the first main loop.

7. In a single thread sewing machine, the combination with the reciprocating needle, and the needle plate, of a rotary disk located below the needle plate, a hook pivoted thereon for drawing loops of thread from the needle, means for rocking said hook before the disk has turned through a semi-circle so as to release the loops when drawn, and a stationary tension device over which a main loop is drawn and by which it is retained while a sub-loop is pulled from the same source by said hook through the main loop, drawn over the tension device and over the main loop, and a second main loop is pulled by said hook through the bight of the first main loop.

8. In a single thread sewing machine, the combination with the reciprocating needle, and the needle plate, of a rotary disk located below the needle plate, a hook pivoted thereon for drawing loops of thread from the needle, means for rocking said hook so as to release the loops when drawn, and a stationary tension device over which a main loop is drawn and by which it is retained while a plurality of sub-loops is pulled from the same source by said hook through the main loop, drawn over the tension device and over the main loop, and a second main loop is pulled by said hook through the bight of the first main loop.

9. In a single thread sewing machine, the combination with the main shaft, the needle plate, and the needle, of means for causing said needle to perform a plurality of reciprocations during one revolution of the main shaft, a corresponding number of hooks located below the needle plate for drawing loops of thread from the needle at the reciprocations of said needle, and a stationary tension device over which a main loop is drawn and by which it is retained while a sub-loop is pulled from the same source by one of said hooks through the main loop, drawn over the tension device and over the main loop, and a second main loop is pulled by another of said hooks through the bight of the first main loop.

10. In a single thread sewing machine, the combination with the main shaft, the needle plate, and the needle, of means for causing said needle to perform a plurality of reciprocations during one revolution of the main shaft, a corresponding number of hooks located below the needle plate for drawing loops of thread from the needle at the reciprocations of said needle, and a stationary tension device over which a main

loop is drawn and by which it is retained while a plurality of sub-loops is pulled from the same source by said hooks through the main loop, drawn over the tension device and over the main loop, and a second loop is pulled by one of said hooks through the bight of the first main loop.

11. In a single thread sewing machine, the combination with the main shaft, the needle plate, and the needle, of means for causing said needle to perform a plurality of reciprocations during one revolution of the main shaft, a rotary disk located below the needle plate, a plurality of hooks equal in number to the reciprocations of the needle during one revolution of the main shaft, said hooks being pivoted to the rotary disk and adapted to draw loops of thread from the needle, means for rocking said hooks so as to release the loops when drawn, and a stationary tension device over which a main loop is drawn, and by which it is retained while a sub-loop is pulled from the same source by one of said hooks through the main loop, drawn over the tension device and over the main loop, and a second main loop is pulled by another of said hooks through the bight of the first main loop.

12. In a single thread sewing machine, the combination with the main shaft, the needle plate, and the needle, of means for causing said needle to perform a plurality of reciprocations during one revolution of the main shaft, a rotary disk located below the needle plate, a plurality of hooks equal in number to the reciprocations of the needle during one revolution of the main shaft, said hooks being pivoted to the rotary disk and adapted to draw loops of thread from the needle, means for rocking said hooks so as to release the loops when drawn, and a stationary tension device over which a main loop is drawn and by which it is retained while a plurality of sub-loops is pulled from the same source by said hooks through main loop, drawn over the tension device and over the main loop, and a second main loop is pulled by one of said hooks through the bight of the first main loop.

13. In a single thread sewing machine, the combination with the reciprocating needle, and the needle plate, of a rotary disk located below the needle plate, means carried by said disk for drawing loops of thread from the needle, a stationary casing resting upon the periphery of said rotary disk, retaining means for keeping the casing in position thereon, means for intermittently withdrawing the aforesaid retaining means to allow the loops of thread to pass over said casing, means for releasing the loops from the loop-pulling means when they have been drawn out sufficiently to pass over the aforesaid casing, and means contained within said casing for retaining a main loop in tension

while a sub-loop is pulled from the same source through the main loop, drawn over the casing and over the main loop, and a second main loop is pulled through the bight of the first main loop.

14. In a single thread sewing machine, the combination with the reciprocating needle, and the needle plate, of a rotary disk located below the needle plate, means carried by said disk for drawing loops of thread from the needle, a stationary casing resting upon the periphery of said rotary disk, retaining means for keeping the casing in position thereon, means for intermittently withdrawing the aforesaid retaining means to allow the loops of thread to pass over said casing, means for releasing the loops from the loop-pulling means when they have been drawn out sufficiently to pass over the aforesaid casing, and means contained within said casing for retaining a main loop in tension while a plurality of sub-loops is pulled from the same source through the main loop, drawn over the casing and over the long loop, and a second main loop is pulled through the bight of the first main loop.

15. In a single thread sewing machine, the combination with the reciprocating needle, and the needle plate, of means located below the needle plate for drawing loops of thread from the needle, a stationary casing, a movable hooked member mounted in said casing, means for guiding a main loop of thread, after being drawn from the needle over the aforesaid casing, into the mouth of said hooked member, means for normally holding said hooked member in position to receive the main loop of thread, and means for releasing said hooked member after the main loop is caught, so that its hooked end may be shifted out of the path of succeeding sub-loops as they are drawn from the needle by the loop-pulling means and drawn over the casing.

16. In a single thread sewing machine, the combination with the reciprocating needle, and the needle plate, of a rotary disk located below the needle plate, means carried by said rotary disk for drawing loops of thread from the needle, a stationary casing resting upon the periphery of the disk, retaining means for keeping said casing in position thereon, a hooked member within said casing means for releasing the loops of thread from the loop pulling means when they have been pulled sufficiently to pass over the aforesaid casing, means for intermittently operating the said retaining means to allow the loops to pass over the casing, means for guiding a main loop of thread, after being drawn from the needle and over the aforesaid casing, into the mouth of said hooked member, means for normally holding said hooked member in position to receive the

main loop of thread, and means for releasing said hooked member when the main loop is caught, so that its hooked end may become depressed out of the path of succeeding sub-loops as they are drawn from the needle by the loop-pulling means and drawn over the casing.

17. In a single thread sewing machine, the combination with the main shaft the needle plate, and the needle, of means for causing said needle to perform a plurality of reciprocations during one revolution of the main shaft, a rotary disk located below the needle plate, a plurality of hooks equal in number to the reciprocations of the needle during one revolution of the main shaft, said hooks being pivoted to the rotary disk and adapted to draw loops of thread from the needle, means for causing said hooks to travel faster than the periphery of the disk when taking loops of thread from the needle, but slower when releasing said loops, and a stationary tension device over which a main loop is drawn and by which it is retained while a sub-loop is pulled from the same source by one of said hooks through the main loop, drawn over the tension device and over the main loop, and a second main loop is pulled by another of said hooks through the bight of the first main loop.

18. In a single thread sewing machine, the combination of a reciprocating needle, a tension device, a needle plate recessed to enable said tension device to be raised close to the material to be sewn and thus effect neat sewing, and means whereby a main loop of thread is pulled from the needle and transferred to the tension device and retained thereby in tension while a sub-loop is pulled from the same source through the main loop, drawn over the tension device and over the main loop, and a second main loop is pulled through the bight of the first main loop.

19. In a single thread sewing machine, the combination with a reciprocating needle, of means for drawing out from said needle loops of thread which form inter-engaging main loops and sub-loops, means for successively holding each of said main loops open, and under tension, to permit said needle to descend therethrough so that a sub-loop may be drawn from the needle thread, means for causing said sub-loop to pass around said main loop and its holding means and interlock with said main loop, means for removing the loop-holding means from the bight of the main loop, means for returning the loop holding means to initial position, and means for keeping the bight of the main loop open until the needle is again descending for the next main inter-engaging loop to be drawn out.

20. In a single thread sewing machine, the combination with the main shaft, the needle

plate, and the needle, of means for causing said needle to perform a plurality of reciprocations during one revolution of the main shaft, a corresponding number of hooks located below the needle plate for drawing loops of thread from the needle at the reciprocations of said needle, and a stationary tension device over which a main loop is drawn and by which it is retained, while, externally to said main loop, a plurality of sub-loops is pulled from the same source by said hooks drawn over the tension device and over the main loop, and a second main loop is pulled by one of said hooks through the bight of the first main loop.

21. In a single-thread sewing machine, the combination with the reciprocating needle, of rotary means for drawing successive loops of thread from the needle, means for releasing the loops soon enough for them to be drawn up on the same side of the center line of the rotary means as that on which they are drawn out, and means situated externally to said rotary means for controlling one loop until a succeeding loop is drawn out and passes over and around the same forming a stitch, and the following loop is drawn out through the bight of the controlled loop, whereupon the latter is released and the last mentioned loop is brought under control.

22. In a single-thread sewing machine, the combination with the reciprocating needle, of rotary means for drawing successive loops of thread from the needle, means for releasing the loops soon enough for them to be drawn up on the same side of the center line of the rotary means as that on which they are drawn out, and stationary means situated externally to said rotary means for controlling one loop until a succeeding loop is drawn out and passes over and around the same forming a stitch, and the following loop is drawn out through the bight of the controlled loop, whereupon the latter is released and the last mentioned loop is brought under control.

23. In a single-thread sewing machine, the combination with the reciprocating needle, of rotary means for drawing successive loops of thread from the needle, means for releasing the loops soon enough for them to be drawn up on the same side of the center line of the rotary means as that on which they are drawn out, and means situated externally to said rotary means for controlling one loop until a plurality of succeeding loops are drawn out and pass over and around the same forming successively completed stitches and the following loop is drawn out through the bight of the controlled loop, whereupon the latter is released, and the last mentioned loop is brought under control.

24. In a single-thread sewing machine, the combination with the reciprocating needle, 130

of rotary means for drawing successive loops of thread from the needle, means for releasing the loops soon enough for them to be drawn up on the same side of the center line of the rotary means as that on which they are drawn out, and stationary means situated externally to said rotary means for controlling one loop until a plurality of succeeding loops are drawn out and pass over and around the same forming successively completed stitches and the following loop is drawn out through the bight of the controlled loop, whereupon the latter is released, and the last mentioned loop is brought under control.

25. In a single thread sewing machine, the combination with the reciprocating needle, of rotary means for drawing loops of thread from the needle, means for releasing the loops soon enough for them to be drawn up on the same side of the center line of the rotary means as that on which they are drawn out, means situated externally to said rotary means for arresting one loop, means for allowing the latter to move stitch by stitch, but not to be released until a succeeding loop is drawn out and passes over and around the same forming a stitch and the following loop is drawn out through the bight of the arrested loop to be in turn arrested.

26. In a single thread sewing machine, the combination with the reciprocating needle, of rotary means for drawing loops of thread from the needle, means for releasing the loops soon enough for them to be drawn up on the same side of the center line of the rotary means as that on which they are drawn out, means situated externally to said rotary means for arresting one loop, means for allowing the latter to move stitch by stitch, but not to be released until a plurality of succeeding loops are drawn out and pass over and around the same forming successively completed stitches and the following loop is drawn out through the bight of the arrested loop to be in turn arrested.

27. In a sewing machine, the combination with a needle plate, a main shaft below said plate, and a reciprocating needle, of loop drawing means mounted directly upon the main shaft and movable in a circular pathway for drawing out a loop of thread from said needle, and means for releasing the loop below the needle plate clear of the field of movement of the loop drawing means and soon enough for it when being drawn up to pass back without crossing the axis of movement of the aforesaid loop-drawing means.

28. In a sewing machine, the combination with a needle plate, a main shaft below said plate, and a reciprocating needle, of means mounted directly upon the main shaft and movable in a circular path-way for drawing out a loop of thread from said needle,

and means for enabling the loop to be released below the needle plate clear of the field of movement of the loop-drawing means and before the aforesaid loop-drawing means has turned through two right angles from its position of engagement with the thread.

29. In a sewing machine, the combination with a reciprocating needle, of a rotary disk, a hook on said disk for engaging the needle thread to draw out a loop of thread therefrom, and means for enabling the hook to release the loop clear of the field of movement of the hook before said disk has turned through two right angles of angular movement from the position of engagement of the hook with the thread.

30. In a sewing machine, the combination with a reciprocating needle, of a rotary member having thereon a plurality of hooks each of which operates to draw out a loop from the needle thread but allow the loop to be drawn up before its bight has been carried through two right angles of angular movement.

31. In a sewing machine, the combination with a reciprocating needle, of a rotary member, and a plurality of hooks thereon each of which in turn, during one rotation of the said rotary member, draws out a loop from the needle thread but becomes disengaged therefrom before the bight has been carried through two right angles of angular movement.

32. In a sewing machine, the combination with a reciprocating needle, of a rotary disk, a plurality of hooks on said disk for engaging the needle thread to draw out a loop of thread therefrom, and means for enabling each loop to be released from its hook before the disk has turned through two right angles of angular movement from the position of engagement of the loops by the hooks.

33. In a sewing machine, the combination with a needle plate, a main shaft below said plate, and a reciprocating needle, of loop-drawing means mounted directly upon the main shaft and movable in a circular pathway for drawing out a loop of thread from said needle, means for enabling the loop to be released below the needle plate clear of the field of movement of the loop drawing means and before said loop-drawing means has turned through two right angles from its position of engagement with the thread, and means for accelerating the motion of the loop-drawing means when engaging the loop and for retarding its movement when releasing the loop.

34. In a sewing machine, the combination with a reciprocating needle, of a rotary disk, a hook on said disk for engaging the needle thread to draw out a loop of thread therefrom, means for enabling the hook to re-

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- lease the loop before said disk has turned through two right angles of angular movement from the position of engagement of the hook with the thread, and means for
- 5 accelerating the motion of the hook relatively to the disk at the moment when the hook engages the thread and for retarding the motion of the hook relatively to the disk at the moment of releasing the loop.
- 10 35. In a sewing machine, the combination with a reciprocating needle, of a rotary disk, a plurality of hooks on said disk for engaging the needle thread to draw out a loop of thread therefrom, means for enabling each
- 15 hook to release the loop engaged by it before the disk has turned through two right angles of angular movement from the position of engagement of each hook with the corresponding loop of thread and means for
- 20 accelerating the motion of each hook relatively to the disk at the moment when the hook engages the thread and for retarding the motion of the hook relatively to the disk at the moment of releasing the loop.
- 25 36. In a sewing machine, the combination with a needle plate, a main shaft below said plate, and a reciprocating needle, of loop-drawing means mounted directly upon the main shaft and movable in a circular path-
- 30 way for drawing out a loop of thread from said needle, means for enabling the loop to be released below the needle plate clear of the field of movement of the loop-drawing means and before said loop-drawing means
- 35 has turned through two right angles of angular movement from its position of en-

gagement with the thread, and means for drawing up the released loop into the material being sewn before the formation of the next loop begins.

40 37. In a sewing machine, the combination with a needle plate, a main shaft below said plate, and a reciprocating needle, of a member mounted directly upon the main shaft and movable in a circular path-way and 45 having thereon a loop-drawing hook, means for enabling the loop to be released below the needle plate clear of the field of movement of the hook before the aforesaid member has turned through two right angles of 50 angular movement from the position of engagement of the hook with the thread, and a take-up for drawing up the loop of thread before the formation of the next loop begins.

55 38. In a sewing machine, the combination with a reciprocating needle, of a rotary member having thereon a plurality of hooks each of which operates to draw out a loop from the needle thread but allow the loop to be drawn up before its bight has been 60 carried through two right angles of angular movement, and a take-up for drawing up each loop of thread before the formation of the next loop begins.

In testimony whereof we affix our signatures in presence of two witnesses.

FREDERICK BAKER.
LESSER JACOBS.

Witnesses:

T. SELBY WARDLE,
HAROLD W. LAKE.