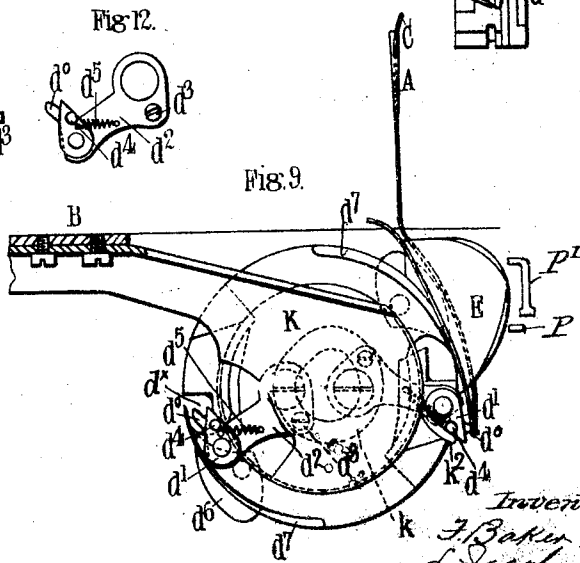
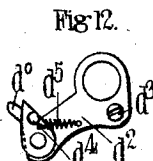
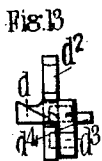
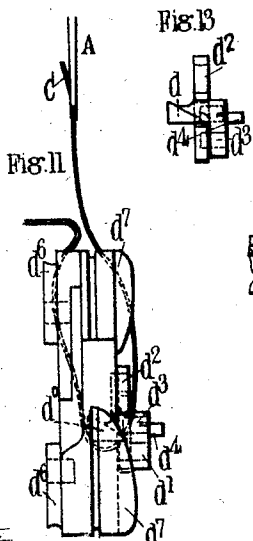
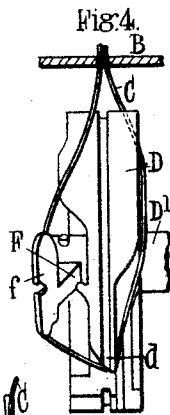
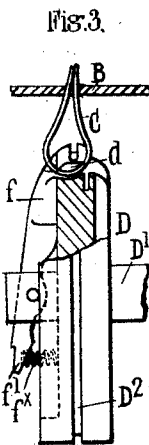
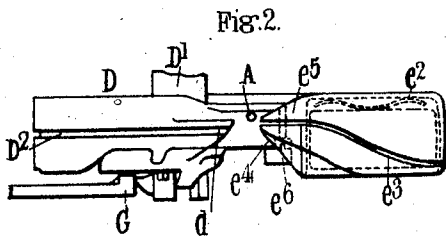
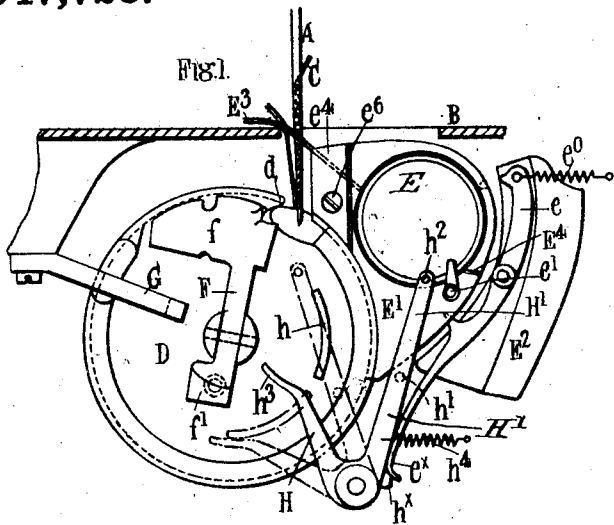


F. BAKER & L. JACOBS.
SEWING MACHINE.
APPLICATION FILED JAN. 29, 1909.

1,047,728.

Patented Dec. 17, 1912.

5 SHEETS—SHEET 1.



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F. BAKER & L. JACOBS.
SEWING MACHINE.
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1,047,728.

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5 SHEETS—SHEET 2.

Fig. 5.

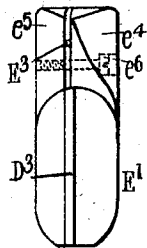


Fig. 6.

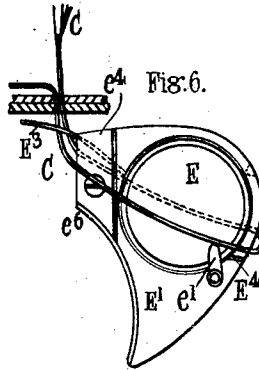


Fig. 7.

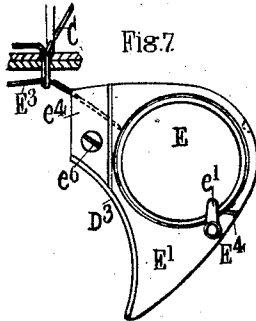


Fig. 8.

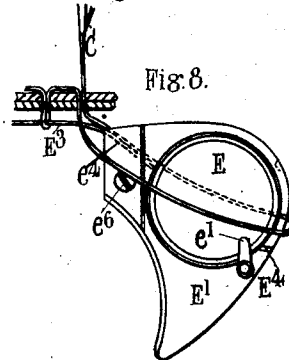
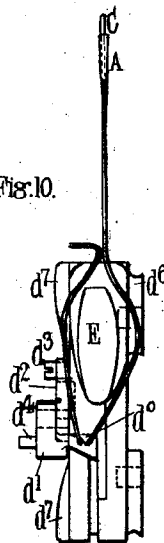


Fig. 10.



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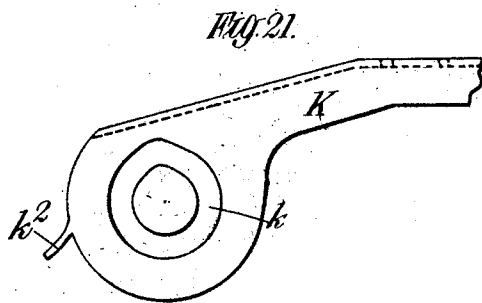
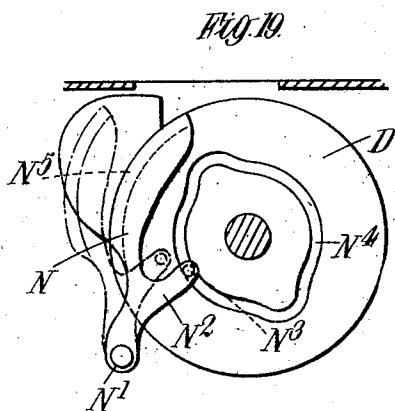
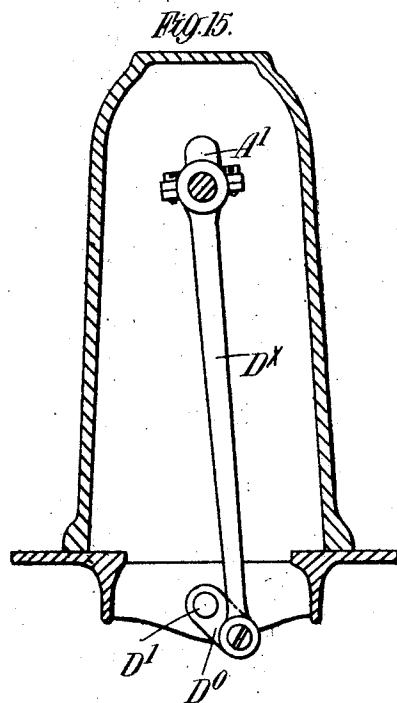
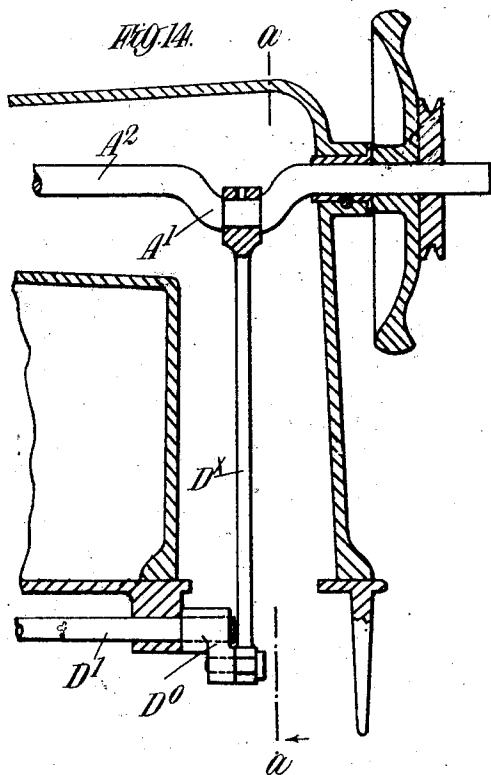
F. BAKER & L. JACOBS.
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1,047,728.

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5 SHEETS—SHEET 3.



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APPLICATION FILED JAN. 29, 1909.

Patented Dec. 17, 1912.

5 SHEETS—SHEET 4.

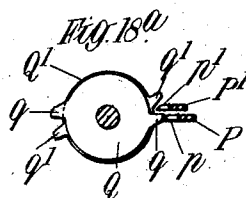
Fig. 16^a

Fig. 16!



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N. M. Downy
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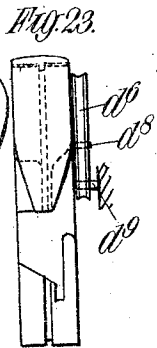
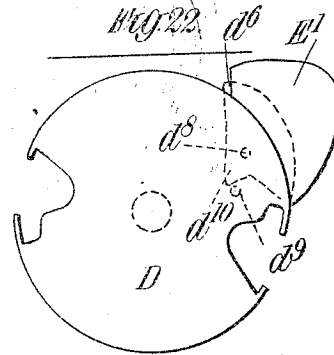
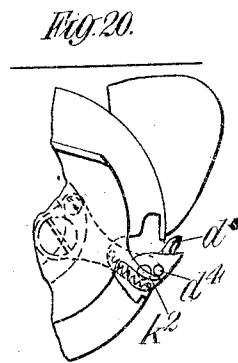
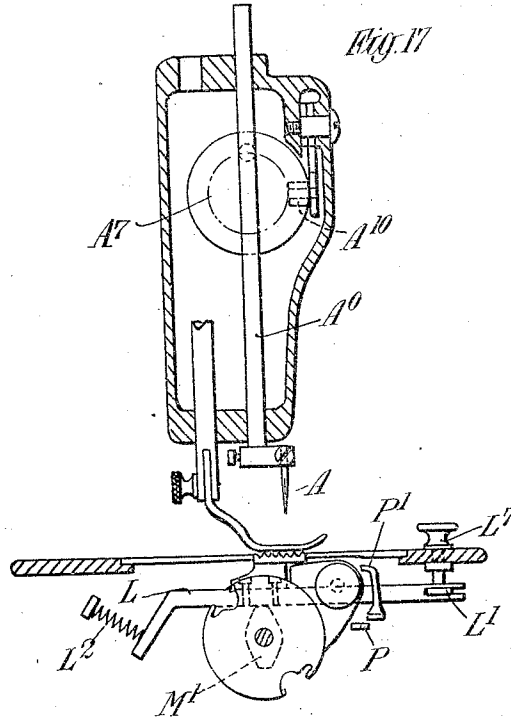
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F. BAKER & L. JACOBS.
SEWING MACHINE.
APPLICATION FILED JAN. 29, 1909.

Patented Dec. 17, 1912.

5 SHEETS—SHEET 5.

1,047,728.



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UNITED STATES PATENT OFFICE.

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SEWING-MACHINE.

1,047,728.

Specification of Letters Patent.

Patented Dec. 17, 1912.

Application filed January 29, 1909. Serial No. 474,977.

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 66 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 and Relating to Sewing-Machines, of which the following is a specification.

This invention relates to sewing machines and more particularly to the type of machine as set forth in the specification of our prior application Serial No. 434702.

The chief object of our present invention is to provide a machine having constructional and functional characteristics specially adapted for use on a double thread machine for producing the well known lock-stitch.

By the use of a single rotary or oscillatory loop-forming hook a single stitch during each rotation or oscillation of said hook will be produced; by the use of two or more hooks on a rotating member, two or more stitches may be formed and completed at each rotation, with the result that the speed of sewing can be made approximately two or more times that capable of being attained under equivalent conditions by the ordinary lock stitch machines heretofore in use.

The possibility of producing two or more stitches during one revolution of the hook-carrying member is due fundamentally to the fact that each loop of thread drawn from the needle is released or thrown off from the hook before the latter, after engaging the thread, has moved through an arc of one hundred eighty degrees; in fact each loop is conveniently released or thrown off after the hook has turned through an arc of less than ninety degrees.

According to our present invention instead of employing the stationary tension device described in the specification above referred to, we employ a device so constructed that it is capable of carrying a spool of thread which can be quickly inserted and removed from said device as desired, the other mechanism being adapted to act in conjunction with this spool carrying device in such a manner that loops are drawn off from the needle thread as in the previous case and thrown around and over the spool

carrying device and spool thread, the latter being drawn from said spool, in the ordinary manner.

In order that the 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 face view of part of the mechanism beneath the needle plate showing the spool carrying device, and the disk for drawing loops of thread from the needle, assembled together. Fig. 2 is a plan view of the mechanism shown in Fig. 1 with the needle plate omitted. Figs. 3 and 4 are end views showing the disk in two different positions. Fig. 5 is an end elevation of the spool carrying device. Figs. 6, 7 and 8 are diagrams showing two pieces of material in the course of being sewn together according to our invention. Fig. 9 is a face view of the disk and cooperating parts adapted for producing two stitches per revolution of said disk. Figs. 10 and 11 are end views from the right and left hands respectively of Fig. 9. Fig. 12 is a face view, and Fig. 13 is an end view of the modified form of hook shown in Fig. 9 detached. Fig. 14 is a longitudinal vertical section of part of a machine showing one form of driving mechanism which may be used when working with an oscillatory disk. Fig. 15 is an end sectional elevation taken on the line *a—*a** of Fig. 14. Fig. 16 is a longitudinal sectional elevation of a machine working with a rotary disk and producing two stitches per revolution of the same, and Figs. 16^a and 16^b are detail views of two cams on the disk shaft. Fig. 17 is an end sectional elevation of the machine shown in Fig. 16. Fig. 18 is a plan of the chief parts of the mechanism beneath the bed plate, which is shown broken away. Fig. 18^a is a section on the line *b—*b** of Fig. 18. Fig. 19 is a detail view of the back of the disk shown in Figs. 16, 17 and 18, and loop lifting means cooperating therewith as hereinafter described. Fig. 20 is similar to a portion of Fig. 9 but shows the hook in a different position. Fig. 21 is an elevation of the reverse side of a plate employed as shown in Fig. 9. Figs. 22 and 23 are a face A is the needle, B the bed plate of the machine, C the needle thread, and D the disk mounted on the shaft D. The disk D may

be caused to oscillate, and the hook d thereon for drawing a loop of thread from the needle A may be fixed or capable of rocking, but in the case of a rotary disk, the hook or
 5 hooks would be movable. In the construction shown by way of example in Fig. 1 of the accompanying drawings, the disk D is adapted to oscillate through about ninety
 10 degrees and a fixed hook d is shown, which is formed by cutting a hook-shaped recess in the periphery of the disk. Means for causing the oscillation of the disk shaft D^1 may comprise a crank arm D^o (Figs. 14 and
 15) on the end of the disk shaft D^1 and a connecting rod D^* connecting the said crank D^o with the cranked portion A^1 of the top or needle operating shaft A^2 , the latter being caused to rotate in any well known manner.

20 To make a plurality of stitches per revolution, the disk is made to rotate and is provided with a plurality of hooks, two being shown in the construction shown in Fig. 9. The needle is of course made to reciprocate
 25 accordingly. One arrangement of the driving mechanism for producing two stitches per revolution of the disk is shown generally in Fig. 16. In this construction the power is applied to the disk shaft D^1 , and the motion of the latter is transmitted
 30 through the two equal bevel gear wheels A^5 and A^6 , and the two bevel gear wheels A^3 and A^4 , which latter are in the ratio of 1 to 2, to the needle operating shaft A^2 , which is thereby rotated twice to every single revolution of the shaft D^1 and thus causes the
 35 needle bar A^o and needle A to descend twice to each revolution of the said disk and thus enable each of the two hooks on the disk D to draw off a loop of thread. The shaft A^2 carries the cam A^7 , from which the needle bar is reciprocated by means of the connecting rod A^8 , and from which the take
 40 up A^9 is also actuated in synchronism with the needle by means of the pin A^{10} on said take up A^9 engaging with the cam groove A^{11} on the periphery of the said cam A^7 . The feed mechanism for moving forward the material stitch by stitch must also be
 45 such as to synchronize with the needle movements. In Figs. 16, 17 and 18 this mechanism is shown comprising the feed bar L, one end of which is forked to engage with the feed regulating bar L^1 , and the other end
 50 of which is bent so as to present a surface upon which the spring L^2 normally bears. The feed bar L rests upon the feed-bar lifting cam M^1 on the shaft D^1 , which cam is shown in detail in Fig. 16^a and is so shaped
 55 that it raises the feed bar twice to each revolution of the shaft D^1 . In Fig. 16^b a cam M^2 , similar in action to the aforesaid cam M^1 , is shown; the cam M^2 is a feed-bar advancing cam, which imparts to the bar L^3 ,
 60 through the friction roller L^{3*} , a small axial

movement twice to each revolution of the shaft D^1 . The two cams M^1 and M^2 are related to one another as shown in Figs. 16^a and 16^b, from which it will be seen that the feed-bar advancing cam M^2 operates at the
 70 moment when the feed-bar lifting cam is operated. The bar L^3 is hinged to the arm L^4 , which is pivoted at L^5 and bears upon a projection L^6 on the feed regulating bar L^1 . The axial movements of the bar L^3 are imparted through the pivoted arm L^4 , projection L^6 , and feed regulating bar L^1 to the feed bar L.

L^7 is a set screw engaging with one end of the feed regulating bar L^1 ; by moving the set screw L^7 longitudinally the point of contact of the projection L^6 on the pivoted arm L^4 may be varied, and the extent of forward movement of the feed bar L, and hence the length of stitch, may be thereby regulated.

We will refer now more particularly to Figs. 1-8. E is the spool and E^1 the stationary spool carrier which takes the place of the tension device casing used in our prior construction of sewing machine; the said spool carrier is shaped so as to fit neatly
 90 against the disk D, which is grooved at D^2 to enable a rib D^3 on the spool carrier E^1 to fit loosely but neatly therein.

The spool E might be in the form of an ordinary bobbin or of other convenient shape, the spool carrier being correspondingly shaped to receive or carry it, but in the drawings we have shown a spool of the ordinary disk-shaped kind, which revolves
 95 within a cylindrical recess in the spool carrier. The spool is conveniently held in position in the aforesaid recess by a pivoted arm, such as e^1 , on the spool carrier; so that on turning back the arm the spool will fall out of place, being assisted if necessary by a spring e^2 situated at the back of the spool and normally under compression.

When the spool E is placed within its carrier E^1 , the spool thread E^3 is slipped, through the opening E^4 in the carrier E^1 , into the channel e^3 , and when the spool thread is pulled it folds back and passes along the said channel e^3 , which is curved so as to guide the thread into a central position in the carrier by the time it has reached the upper part of the said carrier. The thread on being further pulled passes directly out at the left hand side of the spool and between the cheeks e^4 e^5 of the carrier E^1 , the cheek e^4 being detachably secured to the cheek e^5 by a set screw e^6 ; by tightening or loosening the set screw e^6 the spool thread E^3 is more or less firmly held, the cheeks e^4 e^5 thus constituting a convenient form of tension device for the spool thread.

Referring now more particularly to Figs. 1, 14 and 15, it will be seen that as the disk D oscillates, the needle A reciprocates pass-

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ing slightly on one side of the spool thread, and when the needle is rising from its depressed position the hook *d* on the disk D engages with the needle thread C and draws out a loop of thread. After the disk has completed its forward movement, which happens when the hook *d* has passed a short way beyond the lower end of the spool carrier *E*¹, the said disk returns, and the loop that has been drawn off passes around and over the spool carrier as shown in Fig. 6, and around and over the spool thread *E*³ which is drawn from the spool *E* as in the ordinary lock stitch sewing machines. After the loop of thread C, which now embraces the spool thread *E*³ as shown in Fig. 7, has been pulled by the take up tight against and into the material, a second loop is drawn from the needle thread C and passed around the spool carrier *E* as shown in Fig. 8, and the same operations are repeated. It will thus be clearly seen that a lock stitch is produced.

In the above description of the operations, it has been assumed that the loop can slide over the curved back of the spool carrier *E*¹. This carrier however has to be held in position against the periphery of the disk D, the means shown in Fig. 1 comprising a rocking arm *e* which is pivoted on a guard plate *E*², which normally bears upon the spool carrier and thrusts it toward the disk D and away from actual contact with the guard plate. The manner in which this rocking arm is actuated so as to offer no obstruction to the travel of the loop over the back of the spool carrier will be hereinafter described.

In some cases, especially when large spools are being used, it may be desirable to provide a device for expanding the needle thread loop so as to make it pass easily over the spool carrier. For this purpose the loop expanding device may in the case of an oscillating disk as shown in Fig. 1 comprise an arm F pivoted on the shaft D¹ so as to be capable of rocking in a plane perpendicular to that of the disk D; one end of this arm is formed with a block *f* shaped as shown in the drawings so as to lie alongside the hook *d* when in its normal position, the other end of the arm F is provided with a cam-shaped projection *f*¹ for engagement with a projecting bar G. When the disk is nearing the end of its forward movement and the needle thread loop is about to pass over the spool carrier *E*¹, the cam-shaped projection *f*¹ on the arm F engages with the bar G and thereby becomes tilted in opposition to the spring *f*^{*} in such a way that the other end or block *f* moves outwardly away from the hook *d* and from the face of the disk; the needle thread loop, being looped over the hook *d* and block *f*, becomes expanded by the outward movement of the said block,

and is thus able to pass around and over the spool carrying device *E*¹ more easily than if it were merely dragged over it. We may provide further means to assist the needle thread loop to pass easily over the spool carrier; such means may comprise a bent lever pivoted to some stationary part of the machine, one arm H of said bent lever being adapted to engage with a segmental stop *h* on the face of the disk D and the other arm H¹ being provided with fingers *h*¹ *h*² projecting laterally from the arm H¹ and so situated that when the said bent lever is rocked, the said fingers *h*¹ *h*² on the arm H¹ thereof just graze the flat side of the spool carrier *E*¹ and therefore engage with the loop of thread C and help to carry it over the said carrier.

During the forward movement of the disk D, the segmental stop *h* comes into contact with the concentric segment *h*³ on the arm H, thus moving the said bent lever into the dotted position shown in Fig. 1 in opposition to a spring *h*⁴ which tends to return the said bent lever to the position shown in full lines; while the disk finishes its forward movement and starts its return movement the stop *h* is holding the bent lever in the position shown in dotted lines, and when the disk has moved in its return movement through a sufficient angle to release the loop, from the hook *d*, the segmental stop *h* moves away from the segment *h*³, thereby allowing the spring *h*⁴ to rock the bent lever into the position shown in full lines with the result that the fingers *h*¹ *h*² carry the loop across the flat side of the spool carrier *E*¹.

As the loop passes between the spool carrier *E*¹ and the rocking arm *e*, the latter is momentarily rocked so as to allow the loop to pass beyond it. This rocking of the arm *e* may be effected in any convenient way; a projection *h*^x on the arm H¹ may for example be caused to engage with a tail piece *e*^x on the said rocking arm, so that when the loop of thread C is about to pass over the spool carrier *E*¹, the projection *h*^x will engage with said tail piece *e*^x and move the lower end of said rocking arm away from the surface of the spool carrier in opposition to a spring *e*^o. The spool carrier is meanwhile held in position by the upper end of said rocking arm bearing against it. When the loop has passed beyond the lower end of the spool carrier, the projection *h*^x passes beyond the end of the tail piece *e*^x owing to the further rocking of the lever arm H¹, and the spring *e*^o then returns the rocking arm *e* to its normal position thereby allowing the loop to pass over the upper part of the spool carrier.

Referring now to the mechanism for producing two stitches per revolution of the disk, and illustrated in Figs. 9-13 and 16-23, more particularly in Fig. 9, it will be

seen that two hooks d^o , d^o are provided. Each of these hooks forms part of a rocking piece d^1 loosely mounted on an arm d^2 pivoted to the front face of the disk. Facing the disk D is a stationary plate K on the inner face of which is a cam groove k (Fig. 21) in which a pin d^3 on the pivoted arm d^2 slides. The stationary plate K is fixed to the underside of the bed plate B of the machine. The position of the pin d^3 and the shape of the cam groove k is such that as the hook d is carried around on the pivoted arm d^2 and approaches the needle to take a loop of thread therefrom during the rotation of the disk, the said cam groove k causes the pivoted arm d^2 and hook d^o to be moved forward relatively to the disk with the result that the hook by reason of its increased speed fully enters the needle thread loop thereby obtaining a firm hold of the thread, shaping the loop, and easing the action of and giving more time for the take up than if the hook traveled only at the speed of the disk.

It will be understood that when the needle has descended into the cavity d^s in the disk formed to receive it and is beginning to ascend, the hook d^o engages the thread and draws a loop therefrom. When the hook reaches the position shown in Fig. 9, the hook requires to be tilted backward to allow the loop to escape and be drawn by the take up around and over the spool carrier. The required tilting of the hook may be effected by any appropriate means, such as those shown which comprises a pin d^4 projecting from the rocking piece d^1 outward away from the disk and adapted to engage with a projection k^2 (Figs. 9, 20 and 21) on the stationary plate K; as the disk rotates, the pin d^4 first engages with the projection k^2 and the continued movement of the disk and hook then causes the said projection k^2 to tilt the hook d^o backward sufficiently to release the loop of thread as shown in Fig. 20. The hook d^o and rocking piece d^1 are alternately tilted to such an extent that the outward angular movement of the rocking piece d^1 carries the pin d^4 beyond the end of the projection k^2 , the latter being of such a length as to enable this to take place. As soon as the pin d^4 has passed beyond the end of the projection k^2 , a suitable contrivance such as a spring d^5 connected from a point on the pivoted arm d^2 to a point on the rocking piece d^1 returns the said rocking piece and with it the hook d^o to their normal position. The further movement of the disk causes the pivoted arm d^2 to ultimately assume its normal position by the aid of the cam groove k and pin d^3 ready to engage with the needle thread again in due course. In this form of mechanism the means for assisting each loop of thread over the sides of the spool carrier may comprise a guide

piece d^6 pivoted at d^8 to the rear face of the disk. A pin d^9 (Figs. 22 and 23) fixed to or forming part of some stationary part of the machine is so situated as to engage with the hooked portion d^{10} of said guide piece, so that as the disk continues its movement, the pin d^9 causes the guide piece d^6 to be turned outward about its pivot d^8 at the correct moment and thus assist the thread over the flat side of the spool carrier. The guide piece d^6 may afterward be brought back to its normal position by grazing against some stationary portion of the machine such as the bed plate B as the disk continues its movement and carries the said guide piece d^6 with it. The outer edge of the guide piece d^6 is preferably concave in shape so that when a loop of thread is being drawn up over the spool carrier, the thread on the rear face of the carrier will be engaged by and lie in the depressed region of the guide piece and be lifted across the rear face of said spool carrier as aforesaid. On the front face of the spool carrier the thread may be expanded and assisted by a flange d^7 on the disk extending laterally slightly beyond or at least as far as the face of the spool carrier. The forward end of the flange is sloped off down to the face of the disk so that as the loop of thread is being drawn off from the needle, the front thread of the loop will be guided outward away from contact with the front face of the disk sufficiently to pass freely over the front face of the spool carrier.

A modified construction of means for assisting the back thread of the loop over the back face of the spool carrier is shown in Fig. 19. In this construction a curved segmental arm N pivoted at N^1 to a stationary part of the machine is provided with a lug N^2 carrying a pin N^3 which works in a cam groove N^4 on the back of the disk D. The arm N when in its inward position lies adjacent to and on one side of the periphery of the disk, and, as the disk rotates, the cam groove N^4 causes the arm N to move outward into the dotted position twice to each revolution of the disk. The thread of each loop when being drawn up is engaged by and lies in the groove N^5 formed on the edge of the segmental arm, and is assisted by it across the flat face of the spool carrier.

In Figs. 9 and 10 the outline only of the spool carrier is shown, but it will be understood that it may be constructed to carry a spool in the same way as described with reference to Figs. 1-8. In order to keep the spool carrier in position on the periphery of the disk, suitably modified means will however be required. Such means may comprise two prongs P, P^1 , each of which is pivoted at one end on a spindle P^2 depending from the underside of the bed plate, and has its free end normally pressed

against the back of the spool carrier by a spring P^3 coiled around a pin P^4 formed on the under framework of the machine. The two prongs P, P^1 which are clearly seen in Figs. 17, 18 and 18^a, are formed with projections p, p^1 respectively, which engage with disks Q, Q^1 respectively secured on the disk shaft D^1 . The disks Q, Q^1 are provided with diametrically situated projections or cam surfaces q, q and q^1, q^1 respectively, and these projections or cam surfaces are so placed relatively to each other that the free end of each of the prongs P, P^1 is caused to recede a small distance away from the spool carrier E twice during each revolution of the disk shaft. The receding movement takes place at the correct interval for allowing the bight of each loop of thread, as it is being drawn up, to pass over the back of the spool carrier. It will be seen that the lower prong P receives its receding movements slightly prior to the upper prong P^1 , as, it will be understood, should be the case.

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

1. In a double thread sewing machine, the combination with a reciprocating needle, of a loop drawing device for the needle thread movable about an axis, a lower thread bobbin carrier supported by and exterior to the path of movement of said loop drawing device, and means for causing the needle thread loop to pass bodily around the bobbin carrier to form a lock stitch with a lower thread.

2. In a double thread sewing machine, the combination with a reciprocating needle, of a revoluble loop drawing device for the needle thread, a lower thread bobbin carrier supported by and exterior to the path of movement of said loop drawing device, and means for causing the needle thread loop to pass around the bobbin carrier to form a lock stitch with said lower thread.

3. In a double thread sewing machine, the combination with a reciprocating needle, of a loop drawing device for the upper thread movable about an axis, a lower thread bobbin carrier supported by and exterior to the loop drawing device toward which said device is movable when drawing the thread, means disengaging the upper loop thread from the drawing device, and means for causing the said loop to pass around the outer end of said bobbin carrier and over the same and the lower thread to form a lock stitch.

4. In a double thread sewing machine, the combination with a reciprocating needle, of a disk angularly movable about its axis, a stationary spool thread carrier exterior to and in sliding contact with the peripheral edge of said disk, and a hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom in

such manner that when said loop is disengaged and drawn up it will pass around and over said spool thread carrier and over the spool thread to form an ordinary lock stitch.

5. In a double thread sewing machine, the combination with the reciprocating needle, of a needle thread loop drawing device angularly displaceable about an axis, a spool thread carrier situated exterior to said loop-drawing device and in peripheral contact therewith, and means whereby a loop of the needle thread in the course of being drawn out and drawn up embraces and passes completely over the aforesaid spool thread carrier forming a lock stitch with the spool thread.

6. In a double thread sewing machine, the combination with the reciprocating needle, of a needle thread loop drawing device angularly displaceable about an axis, a stationary spool thread carrier situated exterior to said loop-drawing device and in sliding contact with its periphery, and means whereby a loop of the needle thread in the course of being drawn out and drawn up embraces and passes completely over the aforesaid spool thread carrier forming a lock stitch with the spool thread.

7. In a double thread sewing machine, the combination with the reciprocating needle, of a needle thread loop drawing device angularly displaceable about an axis, a spool thread carrier situated exterior to said loop drawing device and in sliding contact with its periphery on one side of its axis, and means whereby a loop of the needle thread in the course of being drawn out and drawn up embraces and passes completely over the aforesaid spool thread carrier forming a lock stitch with the spool thread, and means for assisting the loop over the spool thread carrier.

8. In a double thread sewing machine, the combination with the reciprocating needle, of a disk angularly movable about its axis, a spool thread carrier exterior to and extending concentrically over a portion of the periphery of the disk, and a hook on said disk for engaging the needle thread and drawing a loop of thread therefrom in such a way that the loop when disengaged and being drawn up will pass around and over the spool thread carrier to form with the spool thread a lock stitch.

9. In a double thread sewing machine, the combination with the reciprocating needle, of a disk angularly movable about its axis, a stationary spool thread carrier exterior to and extending over less than half the periphery of the disk, and a hook on said disk for engaging the needle thread and drawing a loop of thread therefrom in such a way that the loop when disengaged and being drawn up will pass around and over the

spool thread carrier to form with the spool thread a lock stitch.

10. In a double thread sewing machine the combination with the reciprocating needle, of a disk angularly movable about its axis, a stationary spool carrier riding on the exterior of the disk and on approximately one quadrant of its periphery, and a hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom on one side of the spool thread in such a manner that when disengaged and being drawn up the loop will pass around and over the said spool carrier and around the spool thread to form an ordinary lock stitch.

11. In a double thread sewing machine, the combination with the reciprocating needle, of a disk angularly movable about its axis, a spool thread carrier exterior to the disk, a movable hook on said disk for engaging the needle thread and drawing a loop therefrom, and means for actuating the hook relatively to the disk to release the thread before the disk has turned through one hundred and eighty degrees from the point of engagement of the loop in such a manner that when disengaged and being drawn up the loop will pass around and over the spool carrier and around the spool thread to form an ordinary lock stitch.

12. In a double thread sewing machine, the combination with the reciprocating needle, of a rotary disk, a stationary spool carrier exterior to and riding on the periphery of said disk, a hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom, and means for actuating said hook to release the thread before said hook after taking the loop has turned through an arc of one hundred and eighty degrees in such a manner that when disengaged and being drawn up the loop will pass around and over the said spool carrier and around the spool thread to form an ordinary lock stitch.

13. In a double thread sewing machine, the combination with the reciprocating needle, of a disk, angularly movable about an axis, a stationary spool carrier exterior to and riding on the periphery of said disk, a hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom in such a manner that when disengaged and being drawn up the loop will pass around and over the said spool carrier and around the spool thread to form an ordinary lock stitch, and means for assisting the loop over the spool carrier.

14. In a double thread sewing machine the combination with the reciprocating needle, of a disk angularly movable about its axis, a stationary spool thread carrier exterior to and situated against a portion of the periphery of said disk, a hook carried

by said disk for engaging the needle thread and drawing a loop of thread therefrom in such a manner that when disengaged and being drawn up the loop will pass around and over the said spool thread carrier away from said disk and around the spool thread to form an ordinary lock stitch, and means for assisting the loop over the spool thread carrier.

15. In a double thread sewing machine the combination with the reciprocating needle, of a rotary disk, a stationary spool thread carrier exterior to and situated against a portion of the periphery of said disk, a hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom in the direction of the spool thread carrier, means for actuating said hook to release the loop soon enough for it when being drawn up to pass around and over the said spool thread carrier and around the spool thread to form an ordinary lock stitch, and movable means for assisting the loop over the spool thread carrier.

16. In a double thread sewing machine, the combination with the reciprocating needle, of a disk angularly movable about an axis, a stationary spool carrier riding on said disk, a hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom in such a manner that when disengaged and being drawn up the loop will pass around and over the said spool carrier and around the spool thread to form an ordinary lock stitch, means for retaining the spool carrier in contact with the periphery of the disk, and means for actuating said spool carrier retaining means to allow the loop of thread to pass the latter and over the spool carrier.

17. In a double thread sewing machine, the combination with the reciprocating needle, of a rotary disk, a stationary spool carrier in contact with said disk, a movable hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom, means for actuating said hook to release the thread before the disk has turned through one hundred and eighty degrees in such a manner that when disengaged and being drawn up the loop will pass around and over the said spool carrier and around the spool thread to form an ordinary lock stitch, means for retaining the spool carrier in contact with the periphery of the disk, and means for actuating said spool carrier retaining means to allow the loop of thread to pass the latter and over the spool carrier.

18. In a double thread sewing machine, the combination with the reciprocating needle, of a disk angularly movable about its axis, a spool thread carrier exterior to the disk, a movable hook on said disk for engaging the needle thread and drawing a loop therefrom, means for actuating the

hook to release the thread before the disk has turned through one hundred and eighty degrees from the point of engagement of the loops in such a manner that when disengaged and being drawn up the loop will pass around and over the spool carrier and around the spool thread to form an ordinary lock stitch, and means for causing the hook to move forward relatively to the disk when the hook is engaging the needle thread and for causing it to move rearward relatively to the disk when the needle thread is being released from engagement with said hook.

19. In a double thread sewing machine, the combination with the reciprocating needle, of a disk angularly movable about its axis, a spool thread carrier situated on a portion of the periphery of the disk, a hook on said disk for engaging the needle thread and drawing a loop of thread therefrom in such a way that the loop when disengaged and being drawn up will pass around and over the spool thread carrier to form with the spool thread a lock stitch, and means for causing the hook to move forward relatively to the disk when the hook is engaging the needle thread, and for causing it to move rearward relatively to the disk when the needle thread is being released from engagement with said hook.

20. In a double thread sewing machine the combination with the reciprocating needle, of a rotary disk, a spool thread carrier exterior to and situated against a portion of the periphery of said disk, a rocking hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom in the direction of the spool thread carrier, and means for actuating said hook to release the loop soon enough for it, when being drawn up, to pass around and over the said spool thread carrier and around the spool thread to form an ordinary lock stitch.

21. In a double thread sewing machine the combination with the reciprocating needle, of a disk angularly movable about its axis, a stationary spool thread carrier situated against a portion of the periphery of said disk, means for preventing lateral movement thereon, a hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom in such a manner that when disengaged and being drawn up the loop will pass around and over the said spool carrier and around the spool thread to form an ordinary lock stitch, means for retaining the spool thread carrier in contact with the periphery of the disk, and means for actuating said spool thread carrier retaining means to allow the loop of thread to pass the latter and over the spool thread carrier.

22. In a double thread sewing machine, the combination with the reciprocating needle, of a rotary disk, a stationary spool carrier in

contact with said disk, a hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom, means for actuating said hook to release the thread before the disk has turned through one hundred and eighty degrees in such a manner that when disengaged and being drawn up the loop will pass around and over the said spool carrier and around the spool thread to form an ordinary lock stitch, and means for causing the hook to travel forwardly relatively to the disk when the hook is engaging the needle thread and for causing it to move rearward relatively to the disk when the needle thread is being released from engagement with said hook.

23. In a double thread sewing machine, the combination with the reciprocating needle, of a rotary disk, a stationary spool thread carrier situated against a portion of the periphery of said disk, means for preventing lateral movement thereon, a hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom in the direction of the spool thread carrier, means for actuating said hook to release the loop soon enough for it when being drawn up to pass around and over the said spool thread carrier and around the spool thread to form an ordinary lock stitch, means for retaining the spool thread carrier in contact with the periphery of the disk, and means for actuating the spool thread carrier retaining means to allow the loop of thread to pass the latter and over the spool thread carrier.

24. In a double thread sewing machine, the combination with the reciprocating needle, of a rotary disk, a rocking piece carried by said disk, a stationary spool carrier, a hook on said rocking piece for engaging the needle thread and drawing a loop of thread therefrom, a pin on said rocking piece, a stationary projection engaging with said pin to tilt the rocking piece and thereby release the loop from the hook when the latter has drawn out said loop sufficiently to enable it when being drawn up to pass over the spool carrier, and means for causing the hook to travel forwardly relatively to the disk when said hook is engaging the needle thread, and for causing it to travel rearwardly relatively to the disk when the needle thread is being released from engagement with said hook.

25. In a double thread sewing machine, the combination with the reciprocating needle of a rotary disk, a stationary spool carrier, an arm pivoted on said disk, a rocking piece mounted on said arm, a hook on said rocking piece for engaging the needle thread and drawing a loop of thread therefrom, a pin on said rocking piece, a pin on said pivoted arm, a stationary cam groove in which the pin on the pivoted arm slides for

rocking said pivoted arm forward and backward relatively to the disk at the required periods, and a stationary projection for engaging with the pin on the rocking piece to tilt the latter and thereby release the loop from the hook when said hook has drawn out the loop sufficiently to enable it when being drawn up to pass over the spool carrier.

26. In a double thread sewing machine of the kind hereinbefore described, the combination with the reciprocating needle, of a rotary disk, a stationary spool thread carrier situated against a portion of the periphery of said disk, a hook carried by said disk for engaging the needle thread and drawing a loop of thread therefrom in the direction of the spool thread carrier, means for actuating said hook to release the loop soon enough for it when being drawn up to pass around and over the said spool thread carrier and around the spool thread to form an ordinary lock stitch, and means for causing the hook to travel forwardly relatively to the disk when said hook is engaging the needle thread, and for causing it to travel rearwardly relatively to the disk when the needle thread is being released from engagement with said hook.

27. In a double thread sewing machine the combination with the reciprocating needle, of a rotary disk, a stationary spool thread carrier situated against a portion of the periphery of said disk, a rocking piece carried by said disk, a hook on said rocking piece for engaging the needle thread and drawing a loop of thread therefrom in the direction of the spool thread carrier, a pin on said rocking piece, and a stationary projection engaging with said pin to tilt the rocking piece and thereby release the loop from the hook when the latter has drawn out said loop sufficiently to enable it when being drawn up to pass over the spool thread carrier.

28. In a double thread sewing machine, the combination with the reciprocating needle and a spool thread carrier, of loop-pulling means for engaging the needle thread a plurality of times in succession during one complete cycle of movements of the aforesaid means, and a take-up for causing each loop after being drawn out to cooperate with the spool thread and form a completed lock stitch before the succeeding loop is engaged.

29. In a double thread machine, the combination with the reciprocating needle and a stationary spool thread carrier, of a rotary member having thereon a plurality of hooks for successively engaging the needle thread during one revolution of the said rotary member, and a take-up for causing each loop after being drawn out to cooperate with the spool thread and form a completed lock stitch before the succeeding loop is engaged.

30. In a double thread machine, the com-

bination with the reciprocating needle, and a stationary spool thread carrier, of a rotary disk, a plurality of hooks attached thereto for, each in turn, engaging the needle thread during one revolution of the disk, and a take-up for causing each loop after being drawn out to cooperate with the spool thread and form a completed lock stitch before the succeeding loop is engaged.

31. In a double thread sewing machine, the combination with a reciprocating needle, of a revoluble loop pulling means for engaging the needle thread and drawing out a loop, means for releasing the loop within an arc of 180° of angular movement, a lower thread bobbin carrier supported by and exterior to the path of movement of the revoluble loop pulling means, and a take-up for drawing up the loop around the spool thread and spool carrier and thereby completing the stitch before the said loop pulling means has completed a semi-revolution.

32. In a double thread sewing machine, the combination with the reciprocating needle, and a spool thread carrier, of a plurality of loop drawing devices revoluble about a common axis for engaging in succession the needle thread and each in turn drawing out a loop and releasing the same within an arc of one hundred and eighty degrees of angular movement.

33. In a double thread sewing machine, the combination with the reciprocating needle, and a spool thread carrier, of a rotary disk, and a plurality of loop drawing devices upon said disk for engaging in succession the needle thread and each in turn drawing out a loop and releasing the same within an arc of one hundred and eighty degrees of angular movement.

34. In a double thread sewing machine the combination with the reciprocating needle and a spool thread carrier, of rotary means provided with a plurality of loop drawing devices for engaging in succession the needle thread and each in turn drawing out a loop of the same, and means for disengaging, in the order of their drawing, said loops from the loop drawing devices before they have traveled through an angular distance of 180 degrees from the point of picking up the loop, and in position to engage the spool thread and produce therewith a plurality of completed lock stitches during one rotation of the loop pulling means.

35. In a double thread sewing machine, the combination with the reciprocating needle, of a rotary disk, a stationary spool carrier, a plurality of hooks carried by said disk for engaging the needle thread and drawing a plurality of loops of thread therefrom during one rotation of said disk, and means for actuating each of said hooks in its turn to release the corresponding loop be-

fore the disk has turned through one hundred and eighty degrees in such a manner that the loops when released and drawn back over the spool carrier form a plurality of lock stitches with the spool thread.

36. In a double thread sewing machine, the combination with the reciprocating needle, of a rotary disk, a stationary carrier, a plurality of hooks carried by said disk for engaging the needle thread and drawing a plurality of loops of thread therefrom during one rotation of said disk, means for actuating each of said hooks in its turn to release the corresponding loop of thread before the disk has turned through one hundred and eighty degrees in such a manner that the loops when released and drawn back over the spool carrier form a plurality of lock stitches with the spool thread, and means for assisting the loops over the spool carrier.

37. In a double thread sewing machine, the combination with the reciprocating needle, of a rotary disk, a stationary carrier, a plurality of hooks carried by said disk for engaging the needle thread and drawing a plurality of loops of thread therefrom during one rotation of said disk, means for actuating each of said hooks in its turn to release the thread before the disk has turned through one hundred and eighty degrees in such a manner that the loops when released and drawn back over the spool carrier form a plurality of lock stitches with the spool thread, and means for causing the hook to travel forward relatively to the disk when said hook is engaging the needle thread and for causing it to travel rearward relatively to the disk when the needle thread is being released from engagement with said hook.

38. In a double thread sewing machine, the combination with the reciprocating needle, of a rotary disk, a stationary carrier, a plurality of arms pivoted on said disk, a rocking piece on each of said arms, a hook on each of said rocking pieces for engaging the needle thread and drawing a loop of thread therefrom at each corresponding reciprocation of the needle, a pin on each of said rocking pieces, a pin on each of said pivoted arms, a stationary cam groove in which the pins on the pivoted arms slide for rocking said pivoted arms forward and backward relatively to the disk at the required periods, and a stationary projection for engaging with the pins on the rocking pieces to tilt the latter and thereby release the loops from the hooks when said hooks have drawn out the loops sufficiently to enable them when being drawn up to pass over the spool carrier.

39. In a double thread sewing machine, the combination with the reciprocating needle, of a rotary disk, a stationary spool

thread carrier situated against a portion of the periphery of said disk, a plurality of hooks carried by said disk for engaging the needle thread and drawing a plurality of loops of thread therefrom in the direction of the spool thread carrier during one rotation of said disk, and means for actuating each of said hooks in its turn to release each loop soon enough for each when being drawn up to pass over the spool thread carrier and thereby form a plurality of lock stitches with the spool thread.

40. In a double thread sewing machine the combination with the reciprocating needle, of a rotary disk, a stationary spool thread carrier situated against a portion of the periphery of the disk, a plurality of hooks carried by said disk for engaging the needle thread and drawing a plurality of loops of thread therefrom in the direction of the spool thread carrier during one rotation of the said disk, means for actuating each of said hooks in its turn to release each loop soon enough for each when being drawn up to pass over the spool thread carrier and thereby form a plurality of lock stitches with the spool thread, and means for assisting the loops over the spool carrier.

41. In a double thread sewing machine the combination with the reciprocating needle, of a rotary disk, a stationary spool thread carrier situated against a portion of the periphery of the disk, a plurality of hooks carried by said disk for engaging the needle thread and drawing a plurality of loops of thread therefrom in the direction of the spool carrier during one rotation of said disk, means for actuating each of said hooks in its turn to release each loop soon enough for each when being drawn up to pass over the spool carrier and thereby form a plurality of lock stitches with the spool thread, and means for causing each hook to travel forward relatively to the disk when such hook is engaging the needle thread and for causing it to travel rearward relatively to the disk when the needle thread is being released from engagement with said hook.

42. In a double thread sewing machine the combination with the reciprocating needle, of a rotary disk, a stationary spool thread carrier situated against a portion of the periphery of the disk, a plurality of arms pivoted on said disk, a rocking piece on each of said arms, a hook on each of said rocking pieces for engaging the needle thread and drawing a loop of thread therefrom in the direction of the spool carrier at each corresponding reciprocation of the needle, a pin on each of said rocking pieces, a pin on each of said pivoted arms, a stationary cam groove in which the pins on the pivoted arm slide for rocking said pivoted arms forward and backward relatively

to the disk at the required periods, and a stationary projection for engaging with the pins on the rocking pieces to tilt the latter and thereby release the loops from the hooks
5 when said hooks have drawn out the loops sufficiently to enable them when being drawn up to pass over the spool thread carrier.

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

FREDERICK BAKER.
LESSER JACOBS.

Witnesses:

H. D. JAMESON,
F. L. RAND.