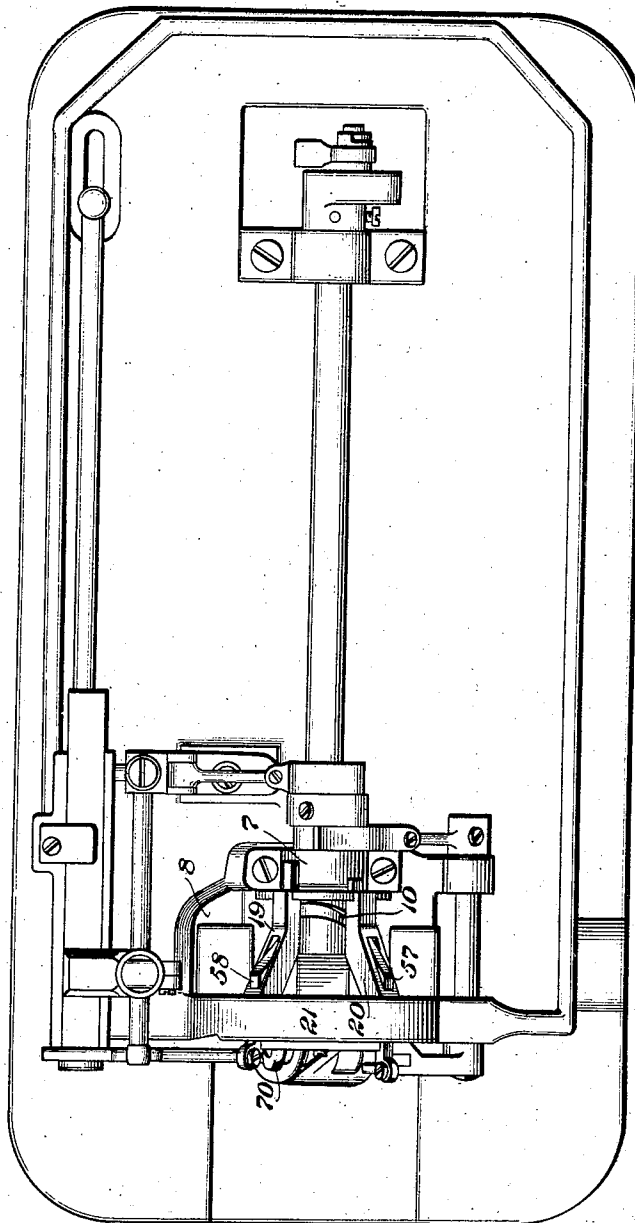


R. K. HOHMANN.
REVOLVING HOOK SEWING MACHINE.
APPLICATION FILED NOV. 3, 1910.

1,000,265.

Patented Aug. 8, 1911.
5 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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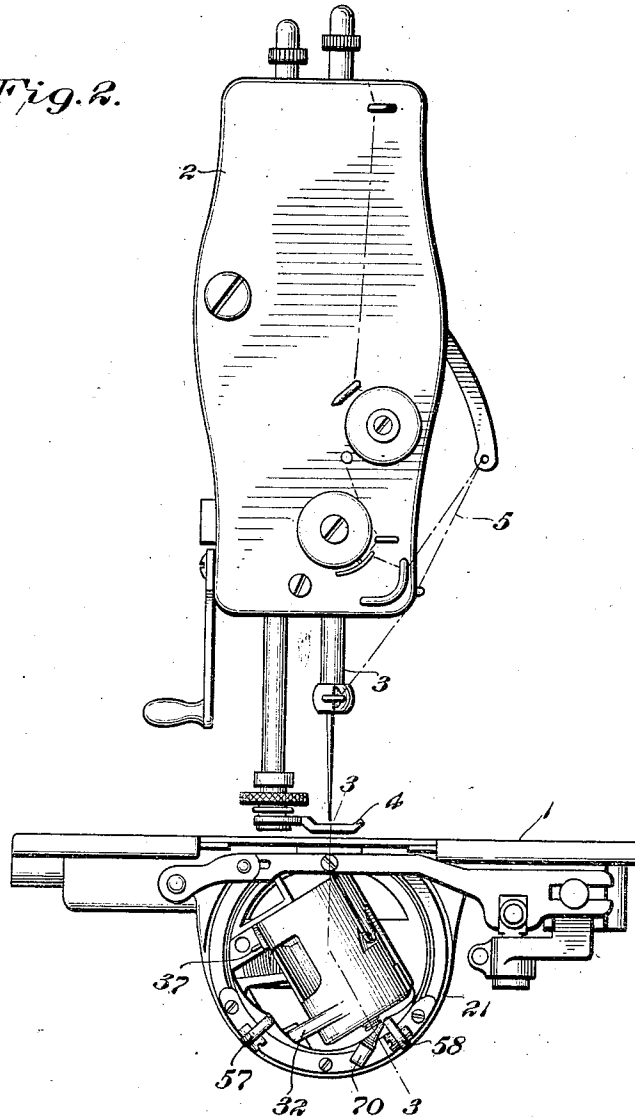
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5 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 4.

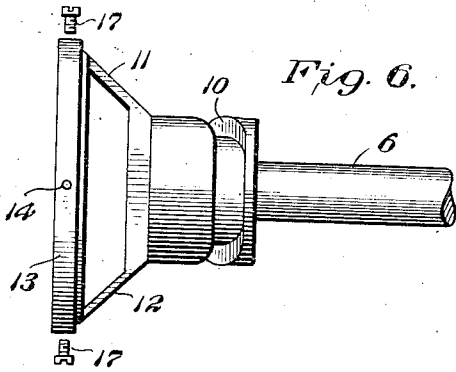


Fig. 6.

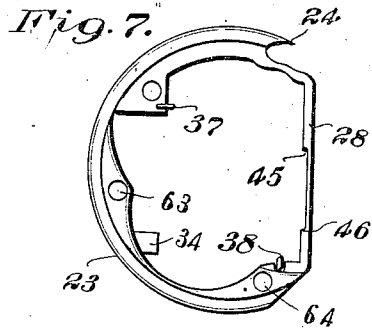


Fig. 7.

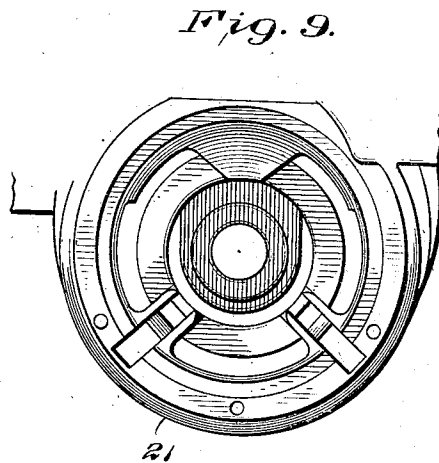


Fig. 9.

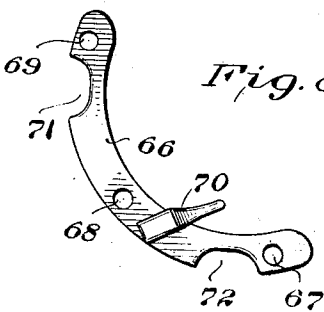


Fig. 8.

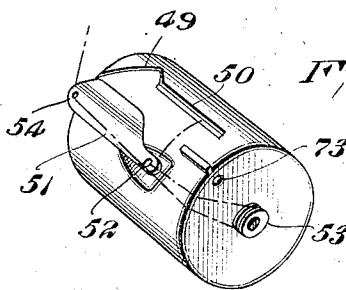


Fig. 10.

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1,000,265.

Patented Aug. 8, 1911.

5 SHEETS-SHEET 5.

Fig. 12.

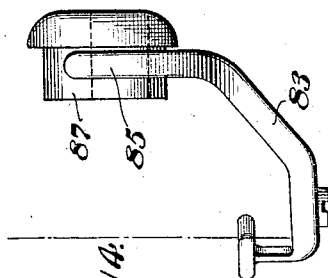
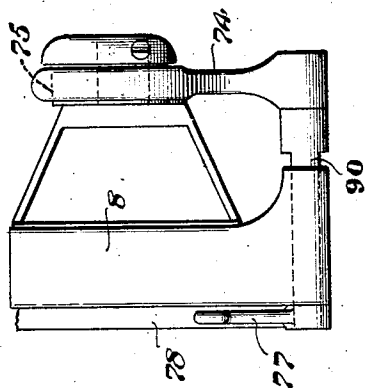


Fig. 14.

Fig. 11.

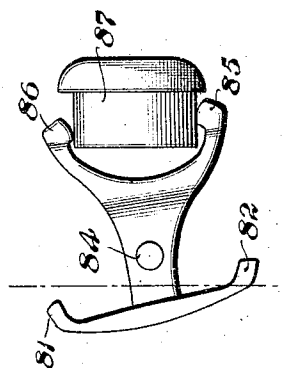
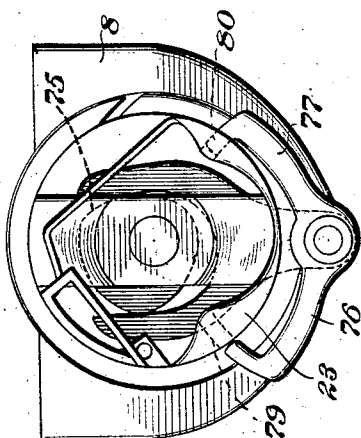


Fig. 13.

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UNITED STATES PATENT OFFICE.

RICHARD K. HOHMANN, OF SAN DIEGO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO
PERLE M. JOHNSON, OF SAN DIEGO, CALIFORNIA.

REVOLVING-HOOK SEWING-MACHINE.

1,000,265.

Specification of Letters Patent.

Patented Aug. 8, 1911.

Application filed November 3, 1910. Serial No. 590,584.

To all whom it may concern:

Be it known that I, RICHARD K. HOHMANN, a citizen of the United States, and resident of San Diego, in the county of San Diego and State of California, have invented certain new and useful Improvements in Revolving-Hook Sewing-Machines, of which the following is a specification.

This invention relates to revolving hook sewing machines and it has particular reference to the mechanism for holding the spool or bobbin carrying the lower thread and for passing the loop of the upper thread around such spool or bobbin.

One of my objects has been to make a simple and efficient structure by which the loop is passed freely around the holder for the lower bobbin or spool so that the machine may be run at a very high speed without any tangling or binding of the loop even where an ordinary size spool of thread is used in the bobbin holder.

Other objects and advantages of the invention will be apparent from the consideration of the following description in connection with the accompanying drawings.

In the drawings,—Figure 1 is a bottom plan view of a device embodying my invention; Fig. 2 is an end view, parts of the sewing machine being omitted; Fig. 3 is a longitudinal section through the bobbin holder and associated mechanism taken on the line 3—3 of Fig. 2; Fig. 4 is a detail perspective view of the parts of the bobbin holder separated; Fig. 5 is a detail perspective view of one of the retaining arms for the bobbin holder; Fig. 6 is an enlarged view of the end of the rotary shaft and attached parts; Fig. 7 is a side view of the frame which carries the shuttle with parts removed; Fig. 8 is a detailed view of the guide plate and finger; Fig. 9 is an end view of the casting which carries the operating parts; Fig. 10 is a perspective view of the shuttle holder showing the tension mechanism; Fig. 11 is an end view showing a modification; Fig. 12 is a side view of the modified construction; Fig. 13 is a top view showing detached another modification; Fig. 14 is a side view of the form shown in Fig. 13.

In the drawings, 1 represents the table of a sewing machine and 2 represents the head carrying the needle bar and presser foot.

The needle bar 3 and presser foot 4 are of the usual construction and the upper thread 5 may be carried and operated in any ordinary manner, so far as the present invention is concerned, so long as the take up is sufficient to draw the loop tight after it has passed around the bobbin holder.

Below the table 1, I make use of a rotary shaft 6 which is mounted in bearings parallel to the table, one of these bearings being shown in Fig. 3 as formed in the lug 7 on the casting 8, secured to the table 1. The shaft 6 has an enlarged cylindrical portion 9 immediately in front of the lug 7 and this cylindrical portion has in it the circumferential cam groove 10 for a purpose hereafter described. On the forward end of the shaft the outwardly inclined arms 11 and 12 are formed, and they carry at their outer ends the ring 13. This ring has on its outer surface a pin 14 which fits in a slot 15 in the revolving hook ring 16. It is also provided with screw threaded apertures which receive the screws 17 which pass through the ring 16 to hold it in place. The shaft 6 and the parts carried by it are rotated in the usual way being driven from the driving mechanism of the sewing machine. The casting 8 has formed thereon a ring 18 surrounding the cylindrical portion 9 and arms 19, 20 extend from this ring forward and outwardly to an enlarged ring 21 which closely surrounds the ring 13 and the revolving hook ring 16. It should be understood that while the ring 16 fits within the ring 21 it is not in contact with it and does not furnish a bearing for it. A frame 22 for carrying the bobbin holder 23 is shown in Fig. 4 and it fits within the ring 16 and against the edge of the ring 13, a shoulder 24 being provided on the ring 16 for holding it in place. This frame has a bearing surface 25 semi-circular in form and one end is sharpened at 26 to form a point or hook to engage the loop of thread. This hook operates with the hook 27 formed on the ring 16 facing in the opposite direction so that when the two hooks pass each other the loop of thread will be caught and spread around the bobbin carrier as hereafter described. The hook 27 is formed on the edge of the ring 16 and the portion of the ring immediately in advance of it is cut away at 28 and in addition to this the metal constituting the hook is cut away on the outer

side to a certain extent at the point 27 so as to leave room on the outer side of this hook between it and the margin of the ring for the free passage of the thread. The frame 5 for receiving the bobbin holder is cut away for something over one fourth of its circumference, and the ends of the semi-circular portion are joined by the arm 28 which is curved at the upper end immediately below the hook 24, as shown. The cylindrical spool or bobbin holder 29 fits within this frame 88, one side being immediately adjacent the arm 28, and parallel therewith. This bobbin holder has on its outer surface 15 the tension plate 30 and a lug 31 in line with each other, the edge of the plate and the lug being adapted to come in contact with the arm 28 when the holder is placed in position. The opposite side of the holder has 20 a strip 32 cut therefrom and bent at right angles to form an elbow 33, as shown, this elbow resting against the lug 34 on the frame when the device is in position. In line with the elbow there is also a lug 35 at 25 the opposite end which strikes against the shoulder 36 to properly position the holder in the frame. A small spring 37 projects from the shoulder 36 over the lug 35 so as to releasably hold the parts in position. A spring 38 is also carried on the frame and bears against the lower end of the holder 29, the curved portion of this spring entering a small depression 73 in the end of the holder to yieldingly retain it in position. 35 The frame 88 has at its upper portion the curved arms 39, 40 and the straight arms 42 and 43 forming frames extending over the open upper end of the bobbin holder to serve as shields. A curved arm 44 projects 40 from the frame 88 on its rear side so as to bear against the surface of the bobbin holder 29 when it is pushed in position, and it thus limits the inward movement of the holder.

45 Since the holder lies close to the arm 28 I cut away a portion of that arm between the points 45, 46 so as to permit the easy passage of the thread between the holder and the arm. In order to permit the easy 50 removal of the holder and at the same time lessen its weight, I provide the hole 47 in such position that it may be engaged by the finger of the operator so as to turn the holder and release it from the spring 37.

55 The holder is provided with a central shaft 48 which is preferably made hollow for lightness, and it is of such size and shape as to receive either an ordinary spool of thread or an ordinary bobbin containing thread.

60 The thread from the bobbin or spool is passed through the angular entrance slot 49 in the holder down into the longitudinal slot 50 and from that point it is carried beneath the lower end of the tension plate 51 65 through the slot into the eye 52, and from

there it passes over the end of the holder around the roller 53 which is loosely mounted in the lower end of the hollow shaft 48. The thread is wrapped one full turn around this roller and is then brought back over the 70 edge of the holder, thus making almost two turns around the roller, and it is then carried up through the eye 54 in the upper end of the tension plate. This roller with the other parts mentioned constitutes an automatic tension device which always keeps the 75 thread tight while permitting it to be withdrawn as desired, and it is equally effective without regard to the size of the thread which is used.

It will be observed by reference to Fig. 4 that a portion of the forward edge of the revolving hook ring 16 between the point 55 and the hook 25 is cut away to allow for the passage of the thread along this portion of 85 the ring. The ring itself has on its inner surface a shoulder 56 which fits against the ring 13, thus holding the parts in position and holding the bearing surface 23 of the frame 88 in place. The ring 13 and the revolving hook ring 16 of course revolve with 90 the revolving shaft 6, and they would by their friction naturally carry with them the frame 88 containing the spool holder, but in my device it is not desired that the spool holder revolve, and therefore I provide 95 means for retaining it stationary while the revolving hook ring rotates about it.

In order to prevent rotation of the spool holder I make use of two sliding/retaining 100 arms 57, 58 of the particular form shown in Fig. 5, these arms being mounted in slots in the arms 19 and 20 of the casting 8. These arms have at their rear ends a reduced portion 59 which passes through the opening 60 105 so as to properly guide the arms in their forward and backward motion. Each arm has at its forward end an inwardly projecting portion 61 which may be formed with or attached to the arm in any suitable manner, it being shown in Fig. 5 as attached by 110 a screw. This projection has a pin 62, extending inwardly in the line of the motion of the arm and adapted to enter an opening 63 in the frame 88 which carries the spool 115 holder. The arms 57 and 58 are alike, and while the finger on one enters the opening 63, the finger on the other enters opening 64. Each arm has near its rear end a roller 65 120 working in the cam groove 10 in the cylindrical portion 9 of the rotary shaft, and the shape of the cam groove and the position of the arms around its surface are such that one of the pins 62 will always be held in the corresponding opening in the frame 88 so 125 as to always keep that frame from turning. At the forward limit of its motion however, the pin 62 is outside of the opening in the frame and thus a passageway is formed for the loop of thread moving around the 130

thread holder and frame, and the timing is such that each arm moves to this position to permit the free passage of the thread just as the thread reaches that arm. By this means the thread holder is prevented from rotating and at the same time no obstruction whatever is presented to the free passage of the loop of thread around it. In order to prevent any accidental engagement by the loop of thread with the end of the pin 62, I secure to the face of the ring 21 a plate 66 by means of screws passing through the openings 67, 68 and 69. On this plate I place a curved finger 70 which is placed immediately adjacent the end of the arm 57 so that it will guide and retain the loop so as to prevent it from accidentally extending out so as to catch on the pin 62. The outer surface of the plate is cut away at 71 and 72 to permit the passage of the two arms.

The purpose of extending the plate 66 around the ring 21 over the arms 57 and 58 is to serve as a retaining member to guide those arms at their forward ends and prevent them from coming in contact with the revolving hook 16. The curved finger 70 is not absolutely necessary, but I find that it assists in the free operation of the device when placed adjacent the end of that arm which is reached last by the loop of thread as it passes around the holder. At this point the loop is being released and drawn up and is therefore more likely to extend outwardly from the holder.

It will be observed from the above description of the structure that the cylindrical holder 29 is adapted to contain either an ordinary spool of thread or a bobbin, and that the spool may be easily and quickly inserted through the open end fitting on the shaft 48. The holder itself may be easily and quickly secured in or removed from the frame 23 in operative position in the machine. It is simply snapped into position against the slight tension of springs 37, 38 and is removed by a slight pull by the finger engaged in the opening 47.

In operation a loop of thread formed by the descent of the needle is engaged by the hook 25 and is carried forward by that hook past the stationary hook 24, and is engaged thereby. One side of the loop will lie over the top of the hook 25 extending along the cut-away portion at the point 27 until the hook moves some distance and reaches its lower position when it will travel up over the guard arm 39 and the strip 32 and thus pass over the holder 29. The other end of the loop passes up the guard arm 40 and the arm 4+ and is thus guided over the holder. After the loop has traveled something over half the revolution of the hook it is released and may be drawn tight by the take up. As the hook 25 approaches each arm 57, 58 that arm is moved forward by the action of

the cam groove 10 so that its pin is disengaged from the frame 88 so as to permit the free passage of the thread by that arm. The arm is moved back into position as soon as the thread passes, and before it reaches the next arm.

While I have shown and described one form of device embodying my invention it will be understood that its principles are applicable to other forms and that I do not limit myself to the precise construction shown. In the particular form shown however I have found that the machine may be successfully run at a speed of two thousand revolutions per minute.

Instead of using the longitudinally sliding arms 57 and 58 for holding the shuttle frame against rotation, I may make use of the modified construction shown in Figs. 11 and 12. In this instance a shaft 90 is rotatively mounted in the casting 8 parallel with the direction of the rotary shaft 6 and at the rear end of this shaft there is secured a forked arm 74 which embraces the cam 75 which rotates with the rotary shaft. On the opposite end of the shaft 90 is secured a part having two arms 76, 77, each arm having at its end a finger or lug for the purpose hereafter described. The frame 88 instead of having holes in its side for engagement by the fingers, as shown in Figs. 4 and 7, is provided with a flange 78 extending beyond the edge of the rotary hook ring and this flange has the radial holes 79, 80, to receive the fingers on the arms 76, and 77. It will be noted that the arms 76 and 77 are rocked by means of the cam 75 which engages the forked arm and the finger on one arm will enter one of the holes in the frame before the finger on the other arm is entirely withdrawn so that the frame is at all times held against rotation. The shape of the cam and the consequent oscillation of the arms is such that the fingers are withdrawn just at the time that the loop of thread reaches that point in passing around the holder.

In Figs. 13 and 14 I have shown fingers 81, 82, which are adapted to enter openings in the face of the frame corresponding to 63 and 64 shown in Fig. 7, but instead of sliding these fingers are mounted upon an oscillating frame 83 pivoted at 84. One end of this frame is the upwardly extending forked arms 85, 86, which are engaged and operated by a cam surface 87 which may be continuously rotated with the rotary shaft. This cam surface oscillates the frame 83, thus withdrawing the fingers 81 and 82 successively and the timing is such that they will be withdrawn as the thread approaches them.

Having thus described the invention, what is claimed is:

1. In a device of the class described, the combination with a rotary shaft, of a re-

volving ring having a hook formed on one edge, and a practically continuous bearing groove on its interior, of a frame constituting a bobbin carrier having a bearing rim fitting in said groove throughout more than half of its circumference and extending through the bottom quarter of the circumference of said groove, a plurality of means for alternately engaging said frame within about one quarter of its circumference at the bottom.

2. In a device of the class described, the combination with a rotary shaft, of a revolving ring, having a hook formed on one edge, and a practically continuous bearing groove on its interior, of a bobbin holder having a bearing rim fitting in said groove throughout more than half of the circumference, and being cut away on one side from a point near the bottom to the top and means for completely taking up the thread at each revolution of the hook the said means constructed to operate as the thread reaches said cut away portion.

3. In a device of the class described, the combination with a revolving hook having a practically continuous interior circular bearing surface, of a bobbin carrier having a rim fitting in said bearing, and means within the bottom quarter of said holder for preventing rotation of said holder, the said means being so constructed as to permit the free passage of the thread, and the rim of said holder being cut away from the edge of said bottom quarter to the top and means for completely taking up the thread at each revolution of the hook the said means constructed to operate as the thread reaches said cut away portion.

4. In a device of the class described, the combination with a revolving hook having a practically continuous interior circular bearing surface, of a bobbin carrier having a rim fitting in said bearing surface cut away on one side from the top to a point near the bottom but leaving a bearing surface throughout the bottom quarter, means for securing a spool or bobbin in said carrier with its axis centrally of said bearing surface but at a slight inclination to the vertical, and means for preventing the rotation of said carrier while permitting the passage of a loop of thread around it and means for completely taking up the thread at each revolution of the hook the said means constructed to operate as the thread reaches said cut away portion.

5. In a device of the class described, the combination with a revolving hook having a practically continuous interior circular bearing, of a bobbin carrier having a rim fitting in said bearing, said rim being cut away circumferentially from a point at the top to a point at the side, and a plurality of

pins adapted to engage said carrier within about one quarter of the circumference at the bottom, and means for operating said pins alternately whereby a loop of thread may pass freely.

6. In a device of the class described, the combination with a bobbin holder having a bearing rim in the arc of a circle, of means for passing a loop of thread around said holder, a plurality of engaging means for holding said bobbin against rotation within about one-quarter of the circumference at the bottom, means for disengaging said holding means alternately whereby the loop may pass freely around the holder, and means for completely drawing up said loop to form the stitch before passing a second loop around the holder.

7. In a device of the class described, the combination with a bobbin holder, of a rotary shaft in line therewith, divergent arms on the end of said shaft carrying a revolving hook ring at their outer ends, a frame closely surrounding said arms and ring the said frame being provided on its inner side with two separated longitudinal slots, arms slidably mounted in said slots having their outer ends extended around said ring and back toward the same, and cam slot connection between the inner ends of said slidably mounted arms and rotary shaft.

8. In a device of the class described, the combination with a revolving ring having a hook formed on one edge and a continuous bearing groove on its interior, of a frame having a semi-circular bearing fitting in said bearing groove, a cylindrical bobbin holder removably fitting in said frame, springs for yieldingly holding said bobbin holder in place, and means for preventing the rotation of said frame in said bearing groove and for holding it with the continuous portion of its bearing throughout the lower quarter of the circumference.

9. In a device of the class described, the combination with a bobbin holder, of a rotary shaft in line therewith, divergent arms on the end of said shaft carrying a revolving hook ring at their outer ends, a frame closely surrounding said arms and ring, the said frame being provided on its inner side with two separated longitudinal slots, arms slidably mounted in said slots having their outer ends extended around said ring and back toward the same, cam slot connection between the inner ends of said slidably mounted arms and rotary shaft, and a guard finger mounted on the end of said frame and extending adjacent to the inturned end of one of said arms to protect it from catching the thread when withdrawn.

10. In a device of the class described, the combination with a semi-circular ring like supporting frame having an exterior bear-

ing rim, of a hook on one end of said rim, a cross arm connecting the ends of said rim, a cylindrical bobbin holder fitting in said frame along said arm and having a projecting part longitudinally thereof abutting against said arm to properly position said holder, cooperating stops on said frame and on the side of said holder opposite said projecting part, and spring catches between said frame and holder to retain it in position.

11. In a device of the class described, the combination with a semi-circular ring like supporting frame having an exterior bearing rim, of a hook on one end of said rim, a cross arm connecting the ends of said rim, a cylindrical bobbin holder fitting in said frame along said arm and having a projecting part longitudinally thereof abutting against said arm to properly position said holder, cooperating stops on said frame and on the side of said holder opposite said projecting part, and spring catches between said frame and holder to retain it in position, the said bobbin holder being centrally arranged in said frame with its axis at right angles to the axis of said bearing rim.

12. In a device of the class described, the combination with a semi-circular ring like supporting frame having an exterior bearing rim, of a hook on one end of said rim, a cross arm connecting the ends of said rim, the said cross arm forming one side of an opening in said frame adapted to receive a spool holder, stops on said frame adapted to cooperate with said holder to retain it in position along said cross arm, and guards having semi-circular outer margins extending at one end from said frame over the end of said opening.

13. In a device of the class described, the combination with a semi-circular ring-like supporting frame having an exterior bearing rim, of a hook on one end of said rim, a cross arm connecting the ends of said rim, the arm at the end adjacent the hook being extended beneath the same in the direction in which it points and then across to the other end of the frame forming an opening therein adapted to receive a bobbin holder rectangular in longitudinal section, and guards having semi-circular outer margins

extending from said frame adjacent said hook over said opening.

14. The combination with a cylindrical bobbin holder having a thread slot therein and open at one end, of a post therein adapted to receive an ordinary spool or bobbin, a tension plate extending longitudinally of said holder on one side, stops in line on the opposite side, a frame having an opening provided with marginal stops adapted to receive said holder, the said marginal stops therein cooperating with said tension plate and stops on the holder to limit the insertion of the holder, and yielding means for retaining the holder in place.

15. The combination with a cylindrical bobbin holder having a thread slot therein and open at one end, of a post therein adapted to receive an ordinary spool or bobbin, a tension plate extending longitudinally of said holder on one side, stops in line on the opposite side, a frame having an opening provided with stops adapted to receive said holder, the said stops therein cooperating with said tension plate and stops on the holder to limit the insertion of the holder, yielding means for retaining the holder in place, and guards on the frame extending over the open end of said holder.

16. In a sewing machine, the combination with a needle and operating mechanism to form a loop of thread, of a revolving ring having a hook to engage said loop and a practically continuous circular bearing on its interior, a bobbin holder having a bearing fitting said first mentioned bearing and being cut away circumferentially from the top to a point near the bottom, a hook on said holder facing said cut away portion at the top cooperating with the hook on said ring to spread the loop, means at the bottom portion of said holder to prevent its rotation, and means for completely taking up the thread at each revolution of the hook the said means constructed to operate as the thread reaches said cut away portion.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD K. HOHMANN.

Witnesses:

ARTHUR L. BRYANT,
JOHN M. COIT.