Aug. 12, 1924. 1,504,240

R. K. HOHMANN

STITCH FORMING MECHANISM

Original Filed Dec. 13, 1916 3 Sheets-Sheet 1

Fig. 1.

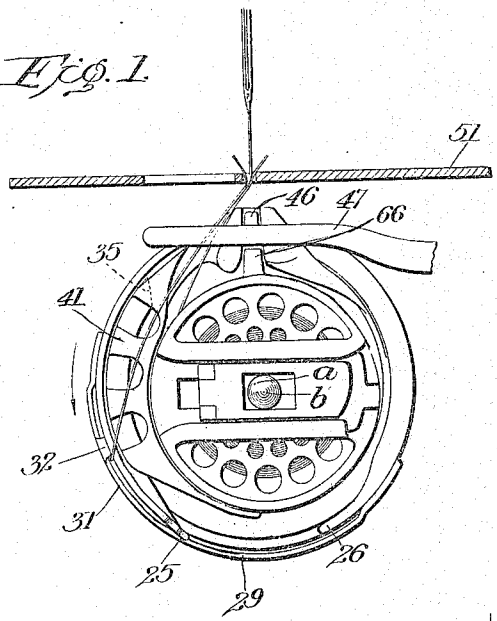


Fig. 2.

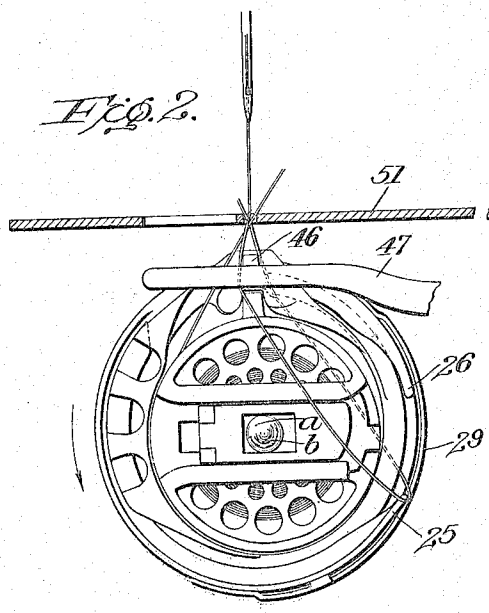
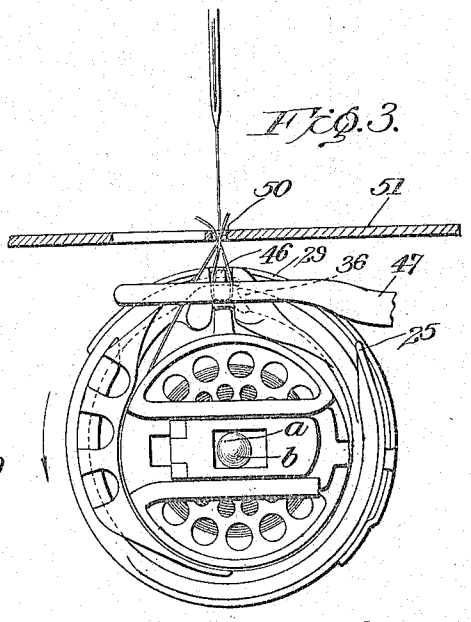


Fig. 3.



Inventor
Richard K. Hohmann

Witness
G. D. Baker.

By Foster Freeman Watson & Coit
Attorneys

Aug. 12, 1924. 1,504,240

R. K. HOHMANN

STITCH FORMING MECHANISM

Original Filed Dec. 13, 1916 3 Sheets-Sheet 2

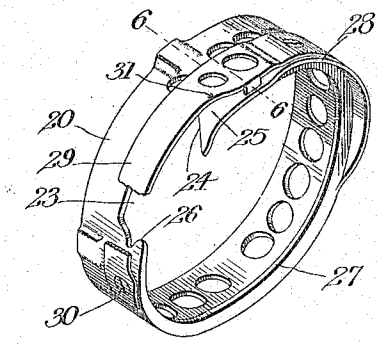
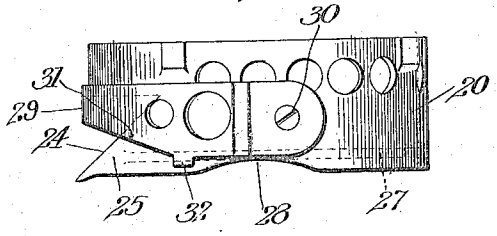


FIG. 4.

FIG. 5.



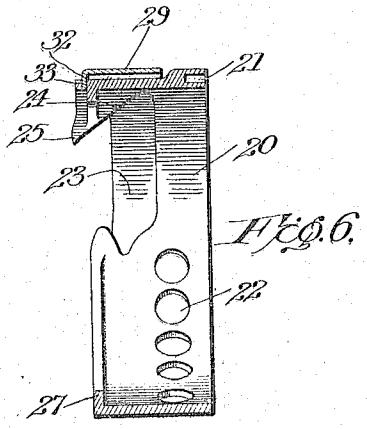


FIG. 6.

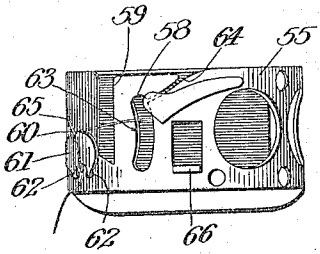


FIG. 7.

Inventor
Richard K. Hohmann

Witness
G. L. Baker.

By Foster Freeman Watson & Coit
Attorney

Aug. 12, 1924. 1,504,240

R. K. HOHMANN

STITCH FORMING MECHANISM

Original Filed Dec. 13, 1916 3 Sheets-Sheet 3

Fig. 8.

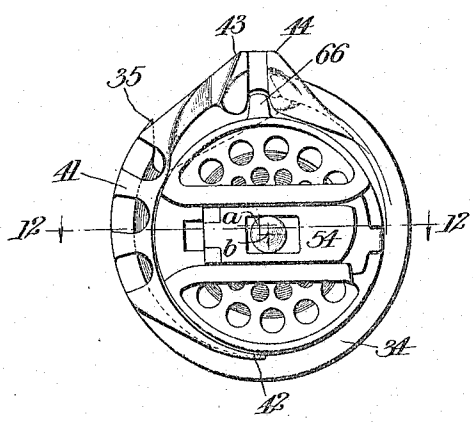


Fig. 9.

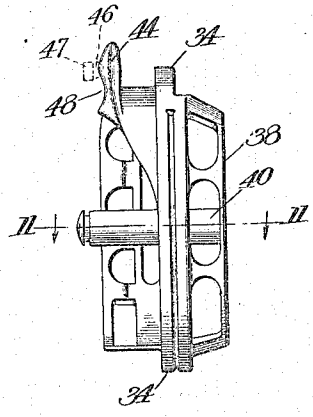
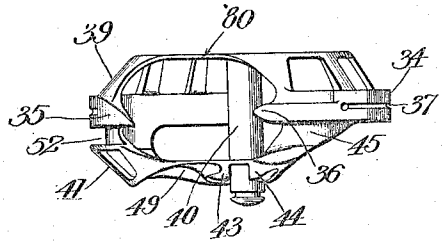


Fig. 10.



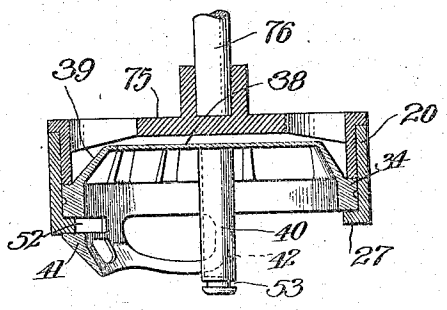
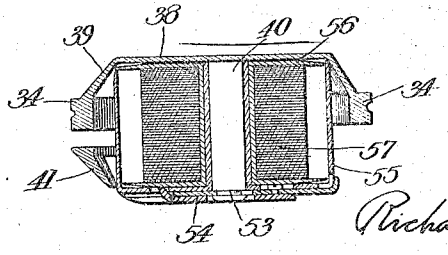


Fig. 11.

Fig. 12.



Witness
G. L. Baker.

Inventor
Richard K. Hohmann

By Foster Freeman Watson & Coit
Attorney

Patented Aug. 12, 1924. 1,504,240

UNITED STATES PATENT OFFICE.

RICHARD K. HOHMANN, OF PERU, INDIANA, ASSIGNOR TO HOHMANN SEWING MACHINE COMPANY, OF PERU, INDIANA.

STITCH-FORMING MECHANISM.

Application filed December 13, 1916, Serial No. 136,688. Renewed November 22, 1922.

To all whom it may concern:

Be it known that I, RICHARD K. HOHMANN, a citizen of the United States, residing at Peru, county of Miami, State of Indiana, have invented certain new and useful Improvements in Stitch-Forming Mechanism, of which the following is a specification.

This invention relates to improvements in stitch forming mechanism of the type having a reciprocating needle and an angularly movable loop taker. Objects of the invention are to provide a mechanism of this type which will accommodate a large bobbin and yet have the diameter of the race or carrier a minimum; and to improve the construction of the loop taker or hook, the race or carrier and the bobbin casing so as to successfully operate with a large bobbin. Other objects will appear from the description and drawings in which,

Figure 1 is a front elevation of the assembled loop taker, carrier and bobbin and showing the loop taker in the position which it assumes after it has revolved a little more than 90 degrees from the point at which it seized the loop from the needle, and particularly illustrating the position of the front limb of the loop as it is being guided toward the front surface of the bobbin casing by the inclined front wall of the carrier;

Figure 2 is a similar front elevation but showing the loop taker after it has rotated through a further angle and illustrating the position of the thread loop as it is being drawn upward by the take-up;

Figure 3 is a front elevation similar to Figure 1 but showing the loop taker and thread loop in the positions which they occupy after the rotary hook has made almost one complete rotation from the point at which it seized the loop from the needle;

Figure 4 is a perspective view of the loop taker;

Figure 5 is a top plan view of the loop taker;

Figure 6 is a sectional view of the loop taker taken on a diametral plane determined by the line 6—6 of Figure 4;

Figure 7 is a top plan view of the thread or bobbin casing;

Figure 8 is a front elevation of the carrier or race and showing the bobbin casing mounted therein;

Figure 9 is a side elevation of the carrier or race;

Fig. 10 is a top plan view of the carrier;

Figure 11 is a sectional view of the carrier and loop taker taken substantially on the line 11—11 of Figure 9;

Figure 12 is a sectional view of the carrier and bobbin casing taken substantially on the line 12—12 of Figure 8.

One of the principal defects of high speed power driven sewing machines as constructed today, arises from the relatively small amount of thread which can be carried by the largest sized bobbins in use in such machines. Because of the very small bobbin thread holding capacity, frequent bobbin replacements are necessary in the operation of a machine, and this involves a waste of time and effort on the part of the operator, and a waste of thread, and limits the production of the machine.

It is the principal object of this invention to provide a high speed sewing machine mechanism which will accommodate a bobbin carrying a much larger supply of thread than is carried in any such mechanism heretofore in commercial use. It is obvious that the size of the bobbin may be increased, either by making it longer, or of greater diameter or by increasing both of these dimensions. It is not feasible, from a practical standpoint, to obtain a substantial increase in bobbin thread holding capacity by a mere general increase in the dimensions of the bobbin, bobbin housing or carrier, and looptaker, because such an increase in dimensions results in a corresponding increase in the length of the thread loop which must be cast around the bobbin, and this increase in thread loop length results in objectionable strains on the thread. An increase in thread loop length increases the amount of take-up movement which must be given to the thread by the take-up mechanism, moreover, and the resultant modifica-

tion of the take-up mechanism, and the increased dimensions of the stitch forming mechanism proper, each add to the difficulty of avoiding surfaces and parts where the thread may catch, or where dirt, oil, lint or the like may collect and produce friction as the thread is drawn over them.

An undue increase in the length of the bobbin to thereby increase its thread holding capacity, requires the inclined edge of the beak or other means for casting one limb of the thread loop toward the rear of the bobbin, to be elongated, so that in the short time taken for the 180° rotative movement of the hook from its top to its bottom position, the thread will not have passed to the rear of the bobbin casing, when the hook has reached its lower position, with the result that the thread will be caught between the hook and carrier, producing a snarl. An undue increase in the diameter of the bobbin to correspondingly increase its thread holding capacity, necessarily results in an increase in the already high peripheral speed of the hook, so that the loop seizing beak will strike the thread loop at the needle violently, and the great acceleration given the thread at that instant will produce considerable tension therein, with a resultant liability to thread breakage.

I have found, however, that by increasing both the length and the diameter of the bobbin somewhat, and by modifying the co-operating stitch forming parts in accordance with the present invention, a rotary hook mechanism may be produced which can be satisfactorily operated at a rate of three or four thousand stitches per minute, with a bobbin holding several times as much thread as has heretofore been used in any machine operating at similar high speed.

As clearly shown in the drawings, the stitch forming mechanism comprises a loop taker, a bobbin housing consisting of a carrier or race mounted in the loop taker, and a separable bobbin casing removably mounted in said carrier, a carrier or race mounted therein, and a thread or bobbin case carried by the carrier. Referring to Figures 4, 5 and 6, which show the loop taker, it will be noted that it consists of a cylindrical ring 20 provided at the rear end thereof with apertures 21 for connection to a spider 75 (see Fig. 11) whereby it may be rotatably connected with the hook shaft 76 of the sewing machine. Of course, any other suitable means might be used for mounting the said loop taker on the hook shaft. Wherever possible the ring is formed with apertures such as 22 for the purpose of reducing the weight thereof. At the front end thereof the ring is formed with a notch 23 extending about half way axially toward the rear end. One of the edges of this aperture is inclined as at 24 whereby the meeting of the same with the front edge of the ring forms a pointed beak 25. This inclined edge 24 is for the purpose of carrying one limb of the thread loop toward the rear of the bobbin casing. As means is provided on the carrier for guiding the said limb the remaining distance to the rear of the bottom casing, it is not necessary to have the inclined edge 24 extend for as great a distance toward the rear of the loop taker as it would be if this edge alone carried the said limb of the thread loop the entire distance to the rear of the bobbin casing. At the edge of the notch 23 opposite the inclined edge 24 a blunt circumferentially extending projection or nose 26 is provided for a purpose which will be described later. The interior of the ring at the front end thereof is formed with an inwardly extending radial flange or rib 27 which cooperates with the carrier to hold the latter in position in the loop taker. As clearly illustrated in Figures 4 and 5 the point of the beak 25 and a portion of the front edge of the ring extending for about 90 degrees project forwardly of the flange 27, and just in rear of the base of the beak 25, this projecting edge is formed with a concave recess 28. A deflector member 29 is arranged to extend circumferentially across and over the notch 23. As clearly shown in the drawings this member is adapted to be secured to the ring by the screws 30, although it is obvious that this deflector might be formed integrally with the ring or attached thereto in any other suitable manner.

Referring to Figures 4 and 5 it will be noted that a portion 31 of the forward edge of this member is arranged at an opposite inclination with respect to the inclined edge 24 of the beak 25 to thereby constitute a deflecting surface to carry the upper thread of the thread loop toward the front end of the loop taker. At the base of the beak 25 and at the forward edge of the inclined surface 31 the member 29 is formed with a lug or inwardly extending projection 32 which fits tightly in a recess 33 formed in the ring 20. Thus it will be apparent that this lug or projection 32 forms a throat between the deflector and the beak. Heretofore it has been the practice to form this throat by attaching one member to another and although the greatest accuracy were used a slight crack generally appeared between the members in which lint, grease and dirt would accumulate and cause broken threads. It will be observed that by providing a lug on one of the members extending into a recess in the other no cracks result and furthermore the thread passes over a very small surface on the lug and as the surface is so very small it is obvious that it does not afford opportunity for the lodg-

ment of dirt, grease or other foreign matter. Moreover, because of the simple structure the device can be made very cheaply and secured in position without the requirement of a skilled workman. In rotary loop taker structures heretofore produced it has been customary to deflect the upper limb of the thread loop toward the front of the loop taker by means of a hook pointing in the same direction as the loop seizing beak. When the thread breaks or the supply of needle thread is exhausted so that the end thereof leaves the tension the end of the thread will be drawn down by the hook and as the thread is loose and not held by the tension and the machine is running at a high speed, the point of this deflector will at times catch the loose thread and carry the end between the loop taker and carrier, often clogging the machine. It will be noted that the member 29 in this structure, however, has a continuous edge surface and the difficulty above described is therefore entirely overcome.

The carrier which is adapted to be used in the loop taker will now be described. Referring to Figures 8, 9, 10 and 11, it will be observed that this carrier or race comprises a casing having a bearing rim 34, which, near the top of the carrier is formed with a hook 35 facing or pointing toward the top. At the top this bearing rim is formed with a nose or blunt hook 36 facing toward the hook 35. The periphery of the bearing rim 34 is formed with a lubricating channel 37. The rear of the casing consists of a circular wall 38 which is connected to the bearing rim by means of an inclined wall 39. At the center of the rear wall 38 the hollow projecting post or pin 40 is mounted, which is adapted to receive and hold in position the thread or bobbin case. As clearly shown in Figure 8, the axis of this pin is located eccentrically with respect to the axis of the bearing rim 34, that is, it is located below and to the side opposite the hook 35 with respect to the axis of the bearing rim, the axis of the bearing rim being at *a* (Fig. 8) and the axis of the bobbin at *b*. Because the center of the rear wall 38 is eccentric with respect to the bearing rim it will be observed that the inclination of the connecting wall 39 varies, that is, referring to Figures 10 and 11, the right hand portion of the inclined wall 39 is more nearly vertical than the left hand portion shown in these figures, and the bobbin casing is mounted eccentrically in the carrier for this very purpose, as will be explained later. This inclined wall 39 is formed with an aperture 80 extending between the hooks 35 and 36 and to the rear circular wall 38 and the edge of this aperture adjacent the hook 35 is formed so that it constitutes a surface flush and tangent to the hook so that the limb of the thread loop caught by the hook 35 will be guided by the said smooth edge toward the rear of the carrier. As illustrated in Figure 12 the bobbin casing projects forward of the bearing rim 34 and in order to guide the front limb of the thread loop onto the front surface of the bobbin casing an inclined front wall 41 similar to the rear wall 39 is provided and extends from the bearing rim to the front of the bobbin case. In the particular construction shown, this wall 41 is not formed on the bobbin casing element itself, but on the carrier element of the bobbin housing. It should be noted, however, that this wall is not continuous entirely around the bobbin case but merely extends from adjacent the hook 35 to a point 42 approximately at the bottom of the bobbin casing. At the top and front of the carrier this wall 41 is constructed to extend vertically upward to form two spaced apart shoulders 43 and 44, this portion being connected to the bearing rim adjacent the hook 36 by means of a web 45. The shoulders 43 and 44 are provided to loosely receive therebetween a lug 46 on a stationary member 47 (Figures 1, 2 and 3), whereby the carrier is prevented from rotating with the loop taker. Just below this lug 46 the front faces of the shoulders are formed with a concave depression 48 for the purpose of guiding the thread under the said lug 46.

Referring to Figures 1, 2, 3, 8 and 10, it will be observed that just to the left of the shoulder 43 the material of the carrier is formed with a vertically extending depression 49 whereby the lower bobbin thread extends in substantially a straight line from the bobbin case along this depression to the needle aperture 50 in the throat plate 51. The outer edge of the front inclined wall 41 is not joined directly to the bearing rim 34 but is spaced therefrom thereby forming a groove 52. As fully explained in my Patent No. 1,105,197, granted July 28, 1914, it is necessary to have the walls 39 and 41, shown in Figure 10, or the walls at the left hand side of the bobbin case steeper with respect to the vertical than those at the right hand side. This results because the thread loop is being drawn downward over said surfaces by the loop taker and if the walls were not sufficiently inclined towards the axis the limbs of the thread loop would not be carried toward the rear and front, respectively, of the bobbin case. On the other hand, as the loop when it reaches the right hand side of the structure is being pulled upward by means of the take-up, it is obvious that as both limbs of the loop have been moved to the end and front surfaces, practically no inclination of the side walls is required. Consequently by placing the bobbin casing eccentrically within the carrier the

required inclination of the side walls is obtained and yet the maximum diameter of the casing is permitted. Furthermore, by locating the axis of the bobbin case below instead of on the same horizontal plane with the axis of the bearing rim of the carrier, the entire bobbin casing is located lower down in the carrier and consequently no part of the same is in the path of movement of the needle.

By forming the carrier with the groove 52 between the bearing rim and the outer edge of the inclined front wall the diameter of the bearing rim is kept down because if the groove were done away with and the said front wall were continued at the same inclination until it met the bearing rim it is obvious that the diameter of the same would have to be increased. Thus by forming the loop taker with the projecting edge at the base of the loop seizing beak so that the front limb of the thread loop is moved forward thereby and guided onto the inclined front wall 41, the diameters of both the carrier and loop taker are kept at a minimum. The post 40 may be made hollow for the greater part of its length thereby reducing the weight thereof. The forward end of this post is formed with a groove 53 which is adapted to cooperate with a latch 54 carried by the bobbin casing to hold the same in position in the carrier. Any other suitable means might be used for retaining the bobbin casing in position within the carrier.

Referring to Figures 7 and 12, the bobbin casing comprises a cylindrical shell 55 which is open at its rear end and at its front end carries the latch means 54. This shell is adapted to receive the bobbin 56 having the thread 57 arranged thereon. As shown in Figure 7 the thread from the bobbin extends through an aperture 58, thence for a short distance on the outer surface of the shell, then inward through the slot 59 and outward through the aperture 60, thence in an axial direction under the tab 61 and outward between the two inwardly extending projections 62, formed on said tab. From this point the thread extends in an upward direction to the thread aperture 50, the carrier being formed with the depression 49 previously described, so that the thread extends between these two points in a practically straight line. The slot 58 is curved and has the edge 63 formed on the arc of a circle with the aperture 60 as the center thereof. In bobbin casings as heretofore used the edge 63 has been straight and in consequence thereof when the thread is being drawn from any portion of the bobbin except the central part there is a component or force due to the pull in the thread tending to carry said thread to the central part of the said straight edge. It will be obvious that by forming the slot with the curved edge 63 there is no component tending to carry the thread to one side or the other. Thus, even if the thread is being withdrawn from the bobbin at the very ends thereof it will pass in substantially a straight path from the bobbin to the aperture 60. The thread may be carried into the slot 58 by inserting it through the obliquely arranged slit 64 which extends from the end of the shell to the said slot. Likewise the thread may be carried to the aperture 60 by inserting the same through the slit 65 which connects the said aperture 60 with the rear edge of the shell. Because the front limb of the thread loop is cast across the front of the bobbin casing this front must be constructed so that no projections or rough surfaces are presented to hinder the passage of the thread thereacross. The shell is formed at the top thereof with an up-standing lug 66, which is adapted to extend between the shoulders 43 and 44 to thereby hold the bobbin casing against rotation. It will thus be apparent that the shoulders 43 and 44 by engaging with the lug 46 on the stationary member 47 hold the carrier against rotation and by receiving the lug 66 on the bobbin casing in turn hold the latter from rotating.

In Figures 1, 2 and 3 the loop taker is shown as rotating in a counter-clockwise direction, although it is obvious that it might rotate in the opposite direction or be oscillatably mounted only. As the loop taker rotates and the beak 25 thereof arrives at its top position, it seizes the thread loop from the needle and begins to carry it around the bobbin casing. The inclined edge 24 of the said beak carries the rear limb of the loop toward the rear of the said casing, and as the loop taker continues to rotate this limb is caught by the hook 35 on the carrier and guided by the inclined edge thereof and the inclined wall 39 onto the rear wall 38 of the carrier. The front limb of the loop is guided by the inclined edge 31 of the deflector toward the front of the loop taker until it reaches the throat formed by the lug 32 between the said deflector and the beak 25. Thus as the loop taker continues to rotate this front limb will be carried downward and the projecting front edge of the loop taker will carry the same onto the front inclined wall 41 of the carrier. As this limb of the loop is carried down by the rotation of the hook it should be noted that the recess 28 operates to prevent the limb from remaining on the cylindrical surface of the loop taker and winding itself thereon. Because of the inclined front wall 41, the said front limb of the loop is guided onto the front of the bobbin casing and thence across the same until the loop occupies the position illustrated in Figure 2. Just prior to assuming this position the take-up of the sewing ma-

chine has begun to operate to pull the thread upward and thereby decrease the size of the loop. It will be obvious that because of the shape of the bobbin casing and its location in the carrier no wall is necessary at the right hand side of the carrier to properly guide the loop. Thus it is possible to arrange the bobbin casing, as previously described, eccentrically in the carrier and with the right hand side of the shell very close to the bearing rim 34 of the carrier. Furthermore, by locating the axis of the bobbin casing below the axis of the bearing rim, the upper part of said casing is positioned low enough so that the needle will not strike the same. When the loop has reached the position illustrated in Figure 2, the take-up operates very quickly so that the loop is pulled upward until it is caught by the nose 26 on the loop taker and is thereby prevented from snarling or catching in other parts of the mechanism. The loop is held by this nose 26 until the latter in its rotation clears the nose 36; then the loop is entirely free and may be pulled up into the cloth to form the stitch. It will be observed that the front limb of the loop when being drawn through between the lug 46 and the shoulders 43 and 44 is guided under the lug by the recesses 48 formed in the front portions of the shoulder.

The carrier is mounted in the loop taker with the flange 27 of the latter in the groove 52 of the carrier and the bearing rim 34 in contact with the inner cylindrical surface of the loop taker. The groove is wider than the flange and consequently a slight amount of play between these parts is permitted.

Having this described the invention, what is claimed and desired to be secured by Letters Patent is:

1. In a rotary hook sewing mechanism, a rotating looptaker having an interior raceway formed with a notch having a beak at one side to seize the thread loop formed by the needle, and a loop deflector extending circumferentially across the notch forward and rearward of the beak, the edge of the looptaker in which said notch is formed also having a curved recess extending rearwardly from near the base of said beak.

2. A rotating looptaker having an interior raceway and formed with a notch having a loop seizing beak at one side thereof, a segmental loop deflector extending across said notch and circumferentially in rear of said beak, the edge of the looptaker in which the beak is formed also having a recess extending circumferentially rearwardly from the base of said beak.

3. The combination with a rotating looptaker having an interior raceway and provided with a loop deflector, of a carrier mounted in said raceway, a bobbin within said carrier disposed with its axis below the axis of the looptaker, and means for guiding one limb of the thread loop over said bobbin.

4. In a rotary hook sewing machine, the combination with a looptaker having an interior raceway and mounted to revolve about a substantially horizontal axis, a carrier mounted in said raceway, deflecting means on the carrier for guiding one limb of the thread loop toward the rear of said carrier, a bobbin case within the carrier disposed with its axis below the axis of the looptaker, and means for guiding the other limb of the loop over said bobbin case.

5. The combination with a looptaker having an interior raceway and mounted to revolve about a substantially horizontal axis, a bobbin casing having means for supporting a bobbin with its axis located below the axis of the looptaker, and means for guiding one limb of the thread loop over the outside of said bobbin case.

6. A loop taker comprising a cylindrical ring formed with a notch and a beak at one side of the notch, a radially inwardly projecting flange at one end and a portion of the end adjoining the beak projecting axially outside of the flange.

7. A loop taker comprising a ring having a beak and a radial inwardly projecting flange at one end, the point of the beak located axially outside of the flange, a portion of the end adjoining the beak also extending outside of the flange, said portion having a concave recess formed in its edge adjoining the base of the beak.

8. In a loop taker having a beak member and a deflector member spaced therefrom, the improvement which consists in a throat formed between said members by a projection on one member fitting into a recess in the other.

9. A loop taker comprising a ring formed with a notch, a beak member at one side of the notch, a deflector member spaced from the beak member connected to the ring adjacent the base of the beak and a lug or projection on one member fitting into a recess in the other to form a throat between said members at the base of the beak.

10. A loop taker comprising a ring formed with a notch, a beak member at one side of the notch, a deflector member spaced from the beak and extending over the notch, and a projection on one member fitting into a recess in the other, said projection and recess located at the base of the beak and at the edge of the ring thereby forming a throat between the members.

11. A loop taker comprising a ring formed with a notch, a beak member at one side of the notch, a deflector member spaced from the beak and connected to the ring

adjacent the base of the beak and a lug or projection on one member fitting into a recess in the other to form a throat between said members at the base of the beak and the edge of the ring in rear of the base of the beak being formed with a concave recess.

12. A loop taker comprising a ring formed with a notch, a beak member at one side of the notch, a deflector member spaced from the beak and extending over the notch, and a projection on one member fitting into a recess in the other, said projection and recess located at the base of the beak and at the edge of the ring thereby forming a throat between the members, and the edge of the ring in rear of the said projection and recess being formed with a concave recess.

13. A loop taker comprising a ring formed with a notch therein and a beak at one side of the notch having a recess at its base and near the edge of the ring, a deflector spaced from the beak and having a projection fitting into said recess thereby forming a throat.

14. In combination with an angularly movable loop taker, a circular carrier having means for receiving and retaining a bobbin with the axis of the bobbin below and to one side of the axis of the loop taker.

15. In a sewing mechanism, the combination with a rotary looptaker, of a bobbin housing therein comprising a carrier and a bobbin casing separable from the carrier, said rotary looptaker having a loop seizing beak with one edge formed to carry one limb of the loop part of the distance toward the rear of the bobbin housing, means on the bobbin housing for leading the said limb the remainder of said distance, and means on the front of the bobbin housing for guiding the other limb of the loop on to the surface of the bobbin housing immediately in front of the position occupied by a bobbin held therein, said last mentioned means comprising an inclined wall extending part way only around the bobbin axis.

16. In a rotary hook sewing machine, the combination with a rotating looptaker provided with a bearing including an internal circumferentially extending rib, of a non-rotating housing mounted in said bearing and provided with a loop opening flange in front of, and extending radially outward beyond the inner edge of said rib.

17. In a rotary hook sewing machine, the combination with a rotating looptaker provided with a bearing including an internal circumferentially extending rib, of a non-rotating bobbin housing formed with an external bearing rim back of said rib and formed with a beveled loop opening flange extending radially outward from the base of said rim and lying in front of said rib.

18. In a rotary hook sewing machine, the combination with a rotating looptaker provided with an internal bearing comprising an internal circumferentially extending rib, of a non-rotating bobbin housing comprising a peripheral bearing rim mounted in said bearing back of said rib and cut away to provide a thread engaging hook, and also comprising an inclined front wall adjacent said hook and extending radially outward from the base of said rim in front of said rib.

19. In a rotary hook sewing machine, the combination of a reciprocating needle, a rotating looptaker provided with a loop drawing beak and with a bobbin housing bearing, a non-rotatable bobbin housing mounted in said bearing and comprising a peripheral bearing rim cut away to provide a thread engaging shoulder laterally displaced from the plane which includes the needle axis and is parallel to the looptaker axis of rotation, said bobbin housing also comprising walls portions of which, at opposite sides of said rim and adjacent the latter and immediately in advance of said shoulder, having reference to the direction of the looptaker rotation, are oppositely inclined to exert a wedge-like thread loop opening action, and means for mounting a rotatable bobbin in said housing with its axis of rotation displaced from the axis of rotation of the looptaker in a direction transverse to said plane and away from said shoulder, and in a direction parallel to said plane and away from the needle.

20. A loop taker comprising a ring having a beak at one edge thereof, said edge having a recess rearwardly of the base of the beak to prevent the limbs of the loop climbing on to the periphery of said ring.

21. A loop taker comprising a ring having a beak the point of which is located axially outside the adjacent edge of the loop taker and said ring having a recess formed in the said edge adjacent the base of the beak to prevent the limbs of the loop climbing on to the periphery of said ring.

In testimony whereof I affix my signature.

RICHARD K. HOHMANN.