Aug. 12, 1924. 1,504,241

R. K. HOHMANN

BOBBIN HOUSING FOR ROTARY HOOK SEWING MACHINES

Original Filed Dec. 13, 1916

Fig. 1.

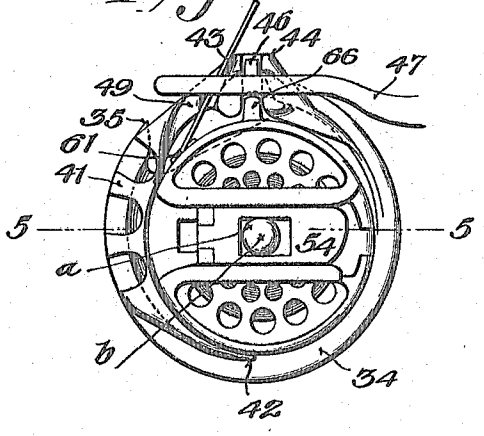



Fig. 2.

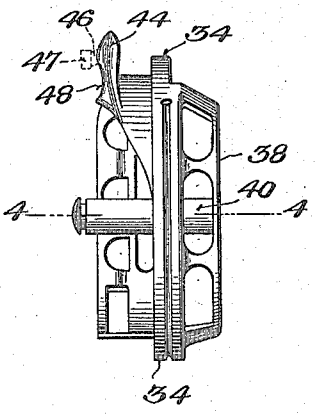



Fig. 3.

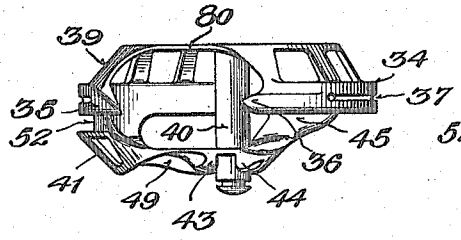



Fig. 4.

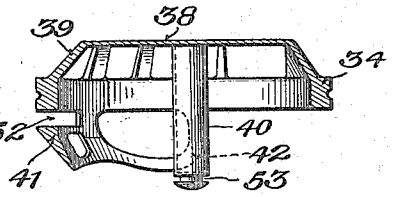



Fig. 5.

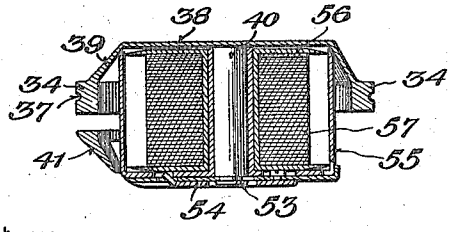
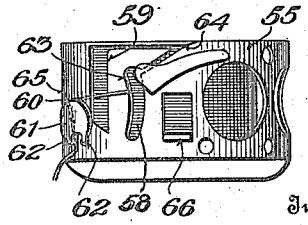



Fig. 6.




Witness

Chas. L. Griesbauer.

Inventor

Richard K. Hohmann

By Foster Freeman Watson & Coit

Attorneys

Patented Aug. 12, 1924. 1,504,241

# UNITED STATES PATENT OFFICE.

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

## BOBBIN HOUSING FOR ROTARY-HOOK SEWING MACHINES.

Original application filed December 13, 1916, Serial No. 136,688. Divided and this application filed March 22, 1918. Serial No. 224,002. Renewed March 17, 1924.

*To all whom it may concern:*

Be it known that I, RICHARD K. HOHMANN, a citizen of the United States, and residing at Peru, county of Miami and State of Indiana, have invented certain new and useful Improvements in Bobbin Housings for Rotary-Hook Sewing Machines, of which the following is a specification.

This application which is a division of my application #136,688, filed December 13, 1916, relates to improvements in stitch forming mechanism of the type having a reciprocating needle and an angularly movable loop taker and more particularly to the bobbin holder or carrier element of the bobbin housing, alone and in combination with the bobbin or bobbin casing element of the bobbin housing.

The 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 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 carrier or race constructed according to the present invention and showing the bobbin casing mounted therein;

Figure 2 is a side elevation of the carrier or race;

Figure 3 is a top plan view of the carrier;

Figure 4 is a sectional view of the carrier taken substantially on the line 4—4 of Figure 2;

Figure 5 is a sectional view of the carrier and bobbin casing taken substantially on the line 5—5 of Figure 1.

Fig. 6 is a plan view of the bobbin casing with the bobbin therein.

One of the principal defects of high speed power driven sewing machines as constructed to-day consists in the limitation of the size of the bobbin and consequently the supply of thread which said machines will accommodate. The bobbin is so small that it must be replaced at very frequent intervals, with a consequent loss of time and production of the machine. It is the principal object of this invention to provide a sewing machine mechanism which will accommodate and use a bobbin carrying a much larger supply of thread than any 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 combination of these two dimensions. In any case as the size of the bobbin will be increased the size of the thread loop, which must be cast around the bobbin, is also greater and because of this severe strains are placed on the thread and the mechanism must be designed and constructed with the greatest care in order to operate successfully. Because of the increased size of the thread loop a larger amount of thread is drawn through the eye of the needle and must be later pulled up by the take-up. Consequently the take-up must be modified to give the proper motion and the surfaces over which the thread loop is cast must be designed so that there will be no places where the thread will catch or dirt, oil, lint or other things collect so as to produce friction as the thread is drawn over them. If the bobbin is made longer in order to increase the quantity of thread it will carry, the inclined edge of the beak or other means for casting one limb of the thread loop toward the rear of the bobbin must be so long that in the short time taken for the rotation of the hook from its top to its bottom position, or 180 degrees, the thread will not have passed to the rear of the bobbin casing when the hook has reached said lower position, with the result that the thread will be caught between the hook and carrier, producing a snarl. On the other hand, if the diameter of the bobbin is increased in order to carry a larger amount of thread, the peripheral speed of the hook will be correspondingly increased so that the loop seizing beak will strike the thread loop at the needle violently and the great acceleration placed on the thread at that instant will produce considerable tension therein with the liability of breakage. By increasing both of these dimensions, that is, the length and diameter, a little, and constructing the parts of the mechanism to properly cooperate with the increased size of bobbin, a rotary hook mechanism may be produced which can be operated at a rate of 3,000 or 4,000 stitches per minute and yet

carry a bobbin having several times as much thread thereon as any machine heretofore used.

In the aforementioned application a complete rotary hook sewing mechanism has been described, and reference may be had thereto for a description of one type of rotary hook adapted to be used with the bobbin housing, to which this application is limited. It is to be understood, however, that the structure described and claimed herein is not limited for use with the said rotary hook.

Referring to the drawings it will be observed that the bobbin housing comprises a carrier or race element having a bearing rim 34, and a bobbin casing element 55 removably held in the carrier element. The bearing rim 34 of the carrier element is cut away adjacent the top of the carrier to form a thread loop engaging hook 35 slightly to one side of, and below, and pointing toward the top of the carrier. At the top this bearing rim is formed with a nose or blunt hook 36 facing toward the hook 35, said nose acting to prevent the rear limb of the thread loop from being tangled or cut when the loop is being pulled up by the take-up. The periphery of the bearing rim 34 is formed with a lubricating channel 37. The rear of the carrier 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 casing 55. As clearly shown in Figure 1, 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 rim being at *a* and of the pin at *b* as shown in Figure 1. 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 3 and 4, 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 55 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 5 the bobbin casing 55 projects forward of the bearing rim 34 and in order to guide the portion of the limb of the thread loop onto the front surface of the bobbin casing 55 immediately in front of the enclosed bobbin an inclined front wall 41 similar to the rear wall 39 is provided and extends from the bearing rim to said bobbin casing-surface portion. 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 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 and 3 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 in the throat plate of the machine. The outer edge of the front inclined wall 41 is not jointed directly to the bearing rim 34 but is spaced therefrom thereby forming a groove 52. As fully explained in my Patent Number 1,105,197, granted July 28, 1914, it is necessary to have the walls 39 and 41, shown in Figure 3 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, 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 bobbin housing with the groove 52 between the bearing rim 34 and the outer edge of the inclined front wall 41 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 a 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 5 and 6, the bobbin casing 55 comprises a cylindrical shell 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 6 the thread from the bobbin extends through the slot 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 in the throat plate (not shown), 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 of 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 there across. 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.

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. Furtheremore, by locating the axis of the bobbin casing below an axis of the bearing rim, the upper part of said casing is positioned low enough so that the needle will not strike the same.

Although a specific embodiment of the invention has been described it is to be understood that the structure thereof may be varied within the scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. A carrier for a rotary hook sewing machine comprising a casing having a circumferential bearing rim formed with a hook near the top facing the top, and having means to receive a bobbin therein with the axis of the bobbin offset below and on the side opposite the hook with respect to the axis of the rim.

2. A bobbin housing for a rotary hook sewing machine comprising a circumferential bearing rim formed with a hook near the top facing the top, and a rear wall of less diameter than the rim joined to the rim by an inclined wall, and a similarly oppositely inclined wall at the front of the rim and extending from adjacent the hook around the rim for a part only of its circumference.

3. A bobbin housing for a rotary hook sewing machine comprising a circumferential bearing rim formed with a hook near the top facing the top, and a rear wall of

less diameter than the rim the center of which is located below and to the side opposite the hook with respect to the axis of the rim, said rear wall being joined to said rim by an inclined wall and a similar oppositely inclined wall at the front of the rim and extending from adjacent the hook around the rim for a part only of its circumference.

4. A bobbin housing for a rotary hook sewing machine comprising a circumferential bearing rim formed with a hook at the top facing the top and adapted to removably enclose and support a bobbin with the axis of the bobbin below and to the side opposite the hook with respect to the axis of the rim, and also comprising an inclined front wall in front of the rim and extending from adjacent the hook around the rim for a part only of its circumference, the inside edge of said inclined wall being substantially flush with the portion of said housing immediately in front of the bobbin.

5. A bobbin housing for a rotary hook sewing machine comprising a carrier casing having a bearing rim formed with a hook near the top and facing the top, and a bobbin casing held in the carrier casing and comprising a cylindrical bobbin enclosing portion, said housing comprising a partial front wall extending outward from the front end of the cylindrical portion of the bobbin casing adjacent said hook with its outer edge in front of and spaced axially from the rim thereby forming an annular groove between the rim and wall portion, said front wall portion extending circumferentially not more than half way around the cylindrical portion of the bobbin casing.

6. A bobbin housing for a rotary hook sewing machine comprising a circumferential bearing rim formed with a hook at the top facing the top, and adapted to removably enclose and support a bobbin with the axis of the bobbin below and to the side opposite the hook with respect to the axis of the rim, and also comprising an inclined front wall extending from adjacent the hook around the rim for a part only of its circumference, the inside edge of said inclined wall being substantially flush with the portion of the housing immediately in front of the bobbin casing, and the outer edge of said inclined wall being parallel to and spaced axially away from the rim thereby forming an annular groove between said rim and inclined wall.

7. A carrier for a rotary hook sewing machine comprising a casing having a bearing rim formed with a hook at the top facing the top and also formed with a convexly rounded nose at the top facing the said hook, said casing being formed with an uninterrupted opening between said hook and nose.

8. In a rotary hook sewing mechanism, a bobbin housing comprising a circumferential bearing rim formed with a hook near the top facing the top, and adapted to enclose and support a bobbin with the axis of the latter below and to the side opposite the hook with respect to the axis of the said rim, and also comprising a rear wall constructed with means to cooperate with the said hook in guiding the rear limb of the thread loop to the rear of the bobbin and comprising an inclined front wall between the said hook and the portion of the housing immediately in front of the bobbin to guide the front limb of the loop onto said portion.

9. A bobbin housing for a rotary hook sewing mechanism comprising a bearing rim formed with a hook near the top facing the top and adapted to enclose and support a bobbin with the axis of the bobbin offset below and to the side of the said hook with respect to the axis of the rim, said housing having a rear wall of smaller diameter than the rim and an inclined wall connecting the rear wall and rim, and an inclined front wall at the side only of the bobbin farthest from the rim extending from the rim to the portion of the housing immediately in front of the bobbin.

In testimony whereof I affix my signature.

RICHARD K. HOHMANN.