This invention relates to improvements in lock-stitch sewing machines and has for an object to provide a hook and bobbin-case construction in which the bearing surfaces may be made of maximum dimensions and in which the parts presenting such surfaces can be readily replaced.

Another object of the invention is to provide simplified and improved means for lubricating the bobbin-case raceway in the hook.

More particularly the invention is applicable to rotary hook lock-stitch sewing machines, such as described for example in United States Patent No. 1,400,141, of Dec. 13, 1921, used largely for the darning or mending of sacks containing a large amount of abrasive matter.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the accompanying drawings Fig. 1 is a transverse vertical section through the cylinder-bed of a sewing machine embodying the invention, showing the hook mechanism in elevation. Fig. 2 is a top plan view with the cloth-plate removed.

Fig. 3 is a vertical section through the hook and bobbin-case on the line 3—3. Fig. 4 is a horizontal section through the hook body and lubricating reservoir. Fig. 5 is a section on the line 5—5. Fig. 1. Fig. 6 is a section on the line 6—6. Fig. 7 is a perspective view of the bobbin-case rotation-restraining bar. Fig. 8 is a disassembled perspective view of the rotary hook. Fig. 9 is a perspective view of the body element of the hook showing the slot for reception of a lubricant pad. Fig. 10 is a perspective view of the felt pad which is received in the slot shown in Fig. 9 in the hook body member. Fig. 11 is a disassembled perspective view of the bobbin-case, and Fig. 12 is a perspective view of the bobbin.

The cylinder bed or work-supporting arm of the sewing machine has journaled in it the rotary hook shaft 2 to which is secured the cup-shaped hook-body 3 preferably made as a drop forging and having a machined rim-face 4, cylindrical seat 5 and shoulder 6.

Detachably secured to the seat 5 by screws 7 is the plain cylindrical or annular race-forming member 8 having a loop-setting beak 9 and heel 10 between which is a gap bridged by the guard member 11 which is secured to the member 8 by screws 12. The race-forming member 8 may be cheaply made from tubular stock of suitable steel, such as high carbon steel containing chromium, which may be ground to size. The hooks at present in use are comparatively expensive to manufacture in that they must be machined from stock equal to the largest diameter of the hook.

The bobbin-case 13 is correspondingly provided with a detachable rim 14 presenting a flat end face 14' and a cylindrical rib 15 having its bearing in the raceway in the hook and having its flat face 14' secured to the body of the bobbin-case 13 by screws; the bobbin-case being partially received within the cylindrical bearing rib 15.

As the result of a practical test it is found that with the adoption of the invention the life of the body-portions of the hook and bobbin-case is practically indefinite, while the cost of replacement of the worn portions is reduced to a minimum.

The bobbin-case 13 is formed on its front or exposed face with a projecting diametrical rib 16 the upper end of which is formed with a vertical needle-clearance slot 16' and is received in the notch 17 in the rotation-restraining bar 18 which bridges the space between the side walls of the work-arm 1, below the usual cloth-plate 19 formed with the needle-hole 20 for the reciprocal needle 21. In the prior construction according to said U. S. Patent No. 1,400,141, the bobbin-case is held against rotation by a projection on the rotation-restraining bar entering a notch or slot in the bobbin-case in which the needle reciprocates. On account of the presence of the needle in this notch, the projection on the rotation-restraining bar cannot enter the notch deeply enough to avoid accidental release of the bobbin-case from the projection when the hook and bobbin-case become worn. In the present instance, by providing the bobbin-case with a projection having a needle-clearance notch and entering a notch in the rotation-restraining bar, the depth of the engagement between the projection on the bobbin-case and the rotation-restraining bar may be materially increased without regard to the needle, and hence increased life of the bobbin-case is realized and the maintenance of freedom between the hook and the bobbin-case permitting passage of the needle-loops around the bobbin-case and ready tightening of the stitch is ensured. The bobbin-case 13 is provided with the usual central post 13' on which is removably journaled the usual bobbin 13'.

As the hook illustrated is of the open race-
way type, a device is provided for holding the bobbin-case in the hook raceway. This device comprises a supporting stud 28 fixed at one end to the work-supporting arm 1 and having removably secured in its other end a headed pin 29 on which is swingably mounted a latch-arm 30 carrying a flat spring 31 having at its free end a rounded pressure tip 32 bearing lightly and yieldingly against the outside face of the bobbin-case. The hub 33 of the latch-arm 30 is formed at its lower side with a flat face 34 which is yieldingly engaged by the free end of a flat spring 35 secured at its other end to the stud pin 28. The latch-arm 30 is thus yieldingly held in its bobbin-case-retaining position, shown in full lines in Fig. 1, but may be instantly swung to dotted line position, Fig. 1, to free the bobbin-case for removal from the hook.

Preferably, provision is made for automatic lubrication of the raceway presented by the hook. To this end a small cup-shaped lubricant container or reservoir 22 is secured within the work-arm 1 adjacent to the rear side of the hook body 3 by means of the tubular screw 23 passing through the side wall of the work-arm 1 and through which oil may be introduced into the container. Projecting laterally from the container 22 is a tube 24 through which projects a wick 26. There is milled in the hook-body 3, Fig. 9, a slot 28 for reception of a felt pad or wick 27 leading to the hook raceway. As the hook revolves, the rotating wick 27 wipes against the end of the stationary wick 28 and absorbs oil therefrom which oil is conducted to the tip end of the wick 27 and applied to the bearing rib 16 of the bobbin-case journalized in the hook raceway.

The invention is not to be understood as limited to the details of construction and relative arrangements of parts shown and described, as various modifications may obviously be readily made by those skilled in the art within the scope of the invention.

Having thus set forth the nature of the invention, what we claim herein is:

1. In rotary hook mechanism for lock-stitch sewing machines, a rotary hook and a bobbin-case journalized therein, said hook and bobbin-case comprises body members and complementary bearing rings detachably secured to each of a respective one of said body members.

2. In rotary hook mechanism for lock-stitch sewing machines, a cup-shaped hook-body, a bobbin-case-body and a raceway-forming ring-shaped member detachably mounted on said hook-body and in which said bobbin-case bearing rib is journaled, said member being formed with a loop-seizing beak.

3. The combination with a rotary hook presenting a raceway, of a bobbin-case comprising a ring-shaped bearing member journalized in said raceway, and a bobbin-case body detachably secured to said bearing member.

4. The combination with a rotary hook presenting a raceway, of a bobbin-case comprising a ring-shaped bearing member journalized in said raceway, and formed with a flat face portion and a cylindrical bearing rib portion, and a bobbin-case body partially received within a cylindrical bearing rib portion and detachably secured to said flat face portion.

5. In rotary hook mechanism for lock-stitch sewing machines, a reciprocatory-needle, a rotary hook, a bobbin-case received within said hook having a bearing engagement with said hook, said bobbin-case having at its outer side face a rotation restraining projection having parallel side-walls and formed with an open sided needle-clearance slot, and a stationary member of said restraining element having a recess with parallel side-walls entered by said bobbin-case projection.

6. In a sewing machine, a rotary hook, a hook shaft, a stationary bobbin-case having a bearing in said hook, said hook having an oil passage-way leading from the rearward side thereof to said bearing, and means external to and independent of said shaft for supplying oil to said passage-way while the hook is running.

7. In a sewing machine, a frame, a rotary hook, a hook-shaft, a stationary bobbin-case having a bearing in said hook, said hook having a rotating wick in communication with said bearing and exposed at the rear of said hook at a distance away from said hook-shaft, a stationary oil reservoir secured to said frame, and a stationary wick projecting from said reservoir into the path of circular movement of said exposed rotating wick.

8. In a sewing machine, a hollow frame, an oil reservoir disposed within said hollow frame, a tubular screw passing through a wall of said frame and threaded into said oil reservoir, a stationary wick projecting from said reservoir secured to said frame, a rotary hook journalized in said frame and disposed adjacent said stationary wick, said hook having a raceway, a rotary wick carried by said hook and leading to said raceway, said rotary wick being adapted to wipe against said stationary wick, and a stationary bobbin-case journalized in said raceway.

9. In a sewing machine, a rotary hook, a hook-shaft, a hook-shaft bearing, a bobbin-case having a bearing in said hook, a rotary wick carried by said hook for feeding oil to said bobbin-case bearing, and stationary means for feeding oil to said rotary wick at a point externally of said hook-shaft and hook-shaft bearing while the hook is running.

10. In a rotary hook sewing machine, a cup-shaped rotary hook body having a cylindrical seat and a groove extending across said seat in a direction parallel to the axis of rotation of said hook-body, a cylindrical ring-shaped member having a loop-seizing beak, said member being detachably secured to said seat in overlapping relation with said groove and presenting a raceway, a stationary bobbin-case received in said raceway, a lubricant absorbent packing disposed in said groove and leading to said raceway, and means external to said hook-body for feeding lubricant to said packing while the said hook-body is running.

HERBERT CORRALL
JAMES HEGGIE.