

Aug. 3, 1937.

C. C. SMITH

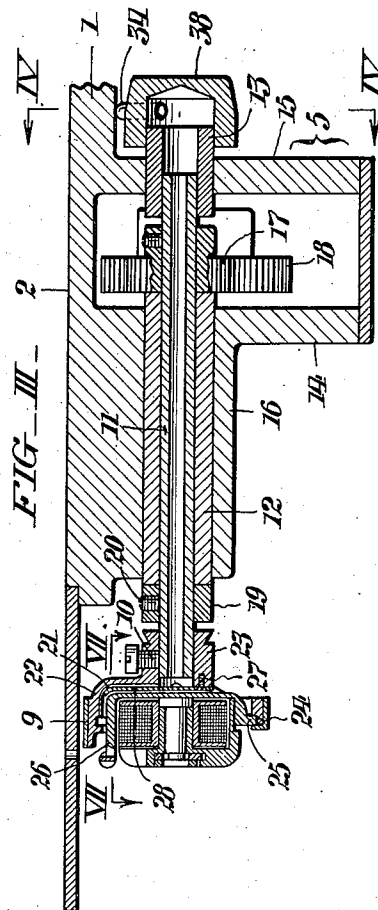
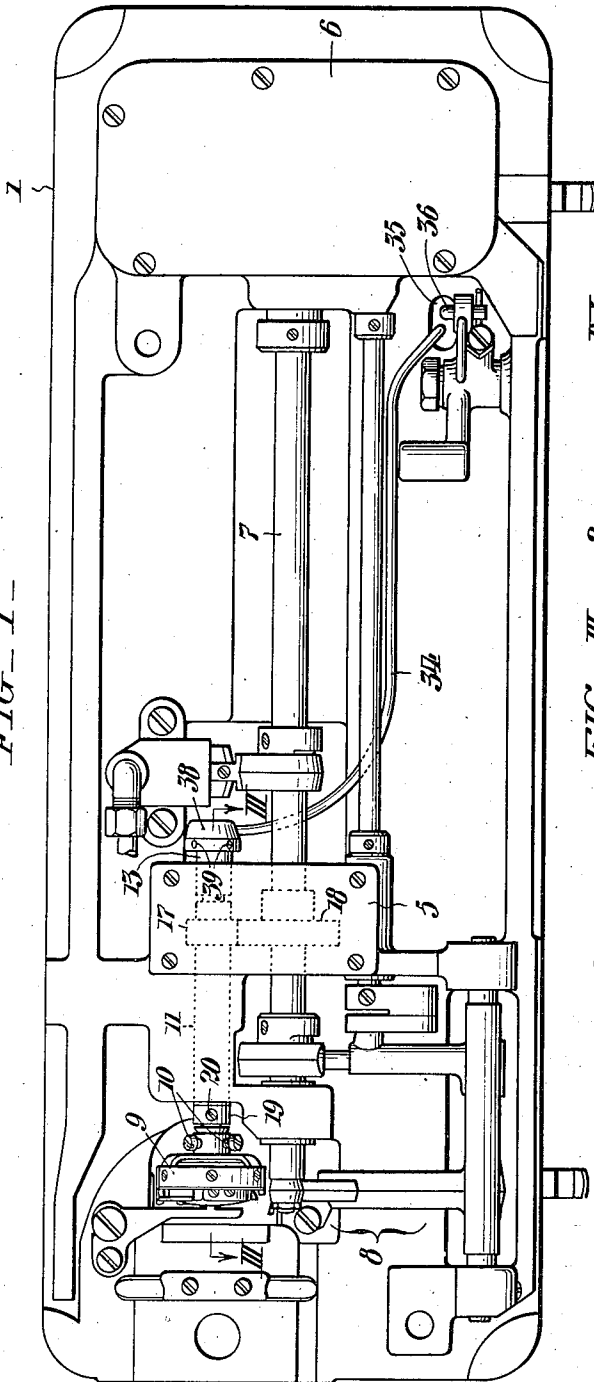
2,089,167

ROTARY HOOK SEWING MACHINE

Filed March 12, 1935

2 Sheets-Sheet 1

FIG. I-



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FIG. II

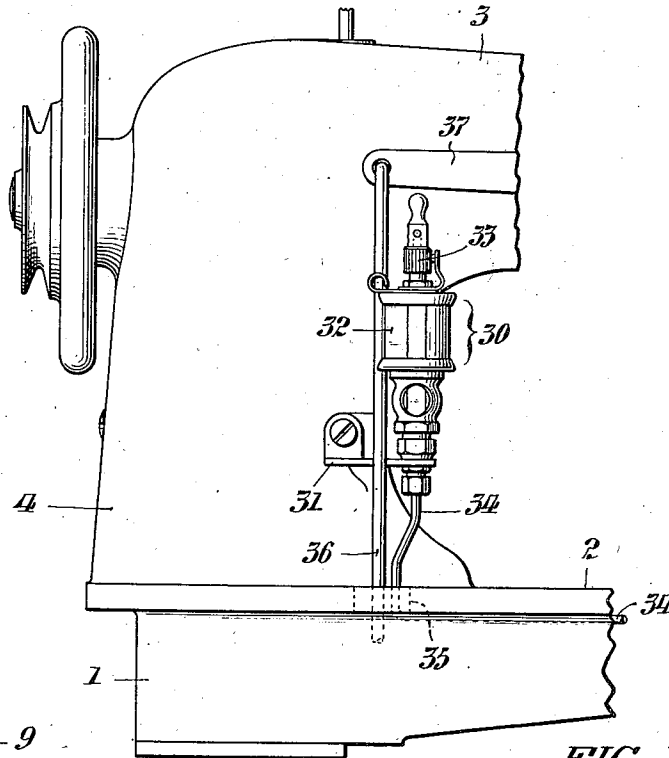


FIG. V

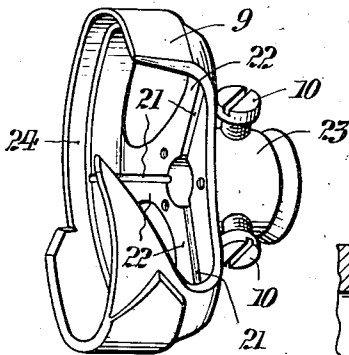


FIG. IV

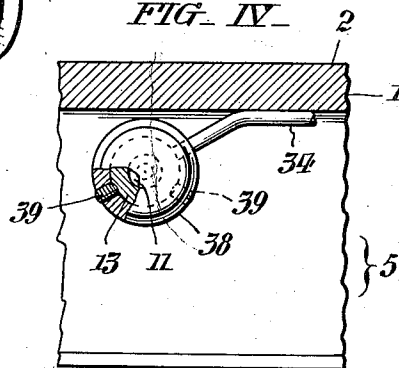


FIG. VI

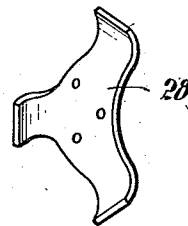
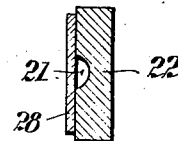


FIG. VII



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ROTARY HOOK SEWING MACHINE

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Application March 12, 1935, Serial No. 10,615

7 Claims. (Cl. 112-256)

This invention relates to sewing machines of the rotary hook type; and it is concerned more particularly with the lubrication of the rotary hooks of such machines.

Various forms of lubricating systems have been heretofore devised for conducting lubricating oil to the rotary hooks of sewing machines, through holes in the work supporting surfaces of the machines. Such rotary hook lubricating systems are objectionable in that, incident to replenishment at frequent intervals, the oil is spilled on the work supporting surface with attendant spotting or staining of the material being sewed, and further in that lint and dirt accumulate in the open oil holes, thereby clogging them and preventing flow of the lubricant to the rotary hooks.

My invention is directed toward overcoming the drawbacks which have been pointed out above. This objective I attain, as hereinafter more fully disclosed, through provision of a lubricating system including an oil supply receptacle beyond the confines of the work supporting surface of the machine, from which a tube leads and conducts the oil to one end of a hollow horizontal shaft beneath the work supporting surface whereon the rotary hook is mounted at the other end, and from the hollow of which the oil is conducted through one or more ducts in the rotary hook to the raceway of the latter and the interengaging circumferential rib of the associated stationary bobbin casing.

Other objects and attendant advantages of this invention will be manifest from the detailed description following of the attached drawings wherein Fig. I shows the bottom view of a rotary hook sewing machine conveniently embodying my invention.

Fig. II is a fragmentary view showing the machine in rear elevation.

Fig. III is a detail sectional view taken as indicated by the arrows III-III in Fig. I and drawn to a larger scale.

Fig. IV is a fragmentary detail sectional view taken as indicated by the arrows IV-IV in Fig. III.

Fig. V is a perspective view of the rotary hook of the machine.

Fig. VI is a perspective view of a plate element forming a part of the rotary hook; and

Fig. VII is a detail sectional view taken as indicated by the arrows VII-VII in Fig. III.

The sewing machine herein delineated is of the high speed rotary hook type comprising an elongate hollow base 1 which affords a flat work-supporting surface 2, and an overhanging arm 3 extending horizontally from a standard 4 at one end of the base. Journaled in gear housings 5 and 6 within the hollow of the base 1 is a longitudinal drive shaft 7 from which the fabric feeding

mechanism comprehensively indicated at 8, and the rotary hook, indicated at 9, derive their movements.

The boss or hub of the rotary hook 9, see Figs. I and III, is secured by set screws 10 to the forward end of a horizontal countershaft 11 within the base 1 beneath the work supporting surface 2. In accordance with my invention, the shaft 11 is made tubular and is journaled for free rotation in aligned bearing bushings 12 and 13 fixed respectively in opposite side walls 14 and 15 of the gear housing 5, the bushing 12 being the longer of the two and partly accommodated in a bearing lug 16 integrally formed with the base 1 and the housing side wall 14. It is to be particularly noted that the shaft 11 extends only part way into the rotary hook 9 with resultant formation within the hub of the latter of a central cavity in communication with the hollow of said shaft. Secured to the rotary hook shaft 11 within the gear housing 5 is a small spur gear pinion 17 which meshes with a relatively large spur gear wheel 18 on the longitudinal drive shaft 7, the shaft 11 being thus driven at correspondingly increased speed. Also as shown in Fig. III, one face of the gear wheel 17 abuts the contiguous end of the bushing 12; while a collar 19, secured to the countershaft 11 by a set screw 20, abuts the other end of the bearing bushing, said shaft being thereby held against shifting axially.

From Figs. III and V it will be noted that radial grooves 21 in the spokes 22 (of which there are three in the present instance) of the rotary hook 9 extend from the central cavity within the hub or boss 23 of said hook to the internal raceway 24 which engages the circumferential rib 25 of the associated stationary held bobbin casing 26. Secured within the rotary hook 9 by means of screws 27, is a plate 28 (Figs. III, VI and VII) having the form of a tri-arm which serves as a cover over the radial grooves 21 as well as over the end of the central chamber in the boss or hub 23 of the hook, with resultant formation of ducts for conducting lubricating oil from said chamber to the raceway 24. The number of the ducts 21 may be increased or decreased if desired or required, and the grooves formed in the cover plate 28 instead of in the spokes of the rotary hook 9 as illustrated by way of example herein.

Located at a level above the shaft 11 and beyond the confines of the work supporting surface 2 of the base 1, is a gravity feed oil receptacle in the form of a cup 30, see Fig. II, which, in the present instance, is supported by a bracket 31 fastened to the standard 4 of the machine. The oil cup 30 is preferably of a conventional type having a sight glass 32, and adjusting means 33 at the top thereof whereby the flow of oil

from the cup can be controlled. Leading downward from the oil cup 30 is a tube 34 which enters the base 1 of the machine by way of the clearance aperture 35 for the pedal rod 36 of the presser foot lifting arm 37, and which from thence extends horizontally to a cap 38 secured by fluid-tight set screws 39 over the projecting end of the bearing bushing 13, see Figs. III and IV. By virtue of this construction, oil is prevented from leaking out at the point of connection of the tube 34 with the shaft 11, any oil passing between said shaft and the bushing 13 draining into the gear housing 5 which thus serves as a collecting receptacle therefor.

In practice, with the adjusting means 33 properly set, oil is permitted to flow at a predetermined rate from the oil cup 30 through the tube 34 and the hollow of the shaft 11 to the central distributing chamber within the hub 23 of the rotary hook, the oil finding its way from thence to the internal raceway of said hook through the radial duct or ducts 21 in the latter, thereby maintaining the interengaging surfaces of the raceway 24 and the rib 25 on the bobbin casing 26 well lubricated at all speeds of the machine.

Since my improved lubricating system is a closed one, it is immune against becoming clogged through lint or dirt accumulations. My invention moreover dispenses with oil holes in the work supporting surface of the machine, the source of oil supply being located beyond the confines of said work supporting surface, so that the danger of soiling of the materials worked in the machine is effectively obviated.

Having thus described my invention, I claim:

1. In a sewing machine, a work supporting surface, a tubular horizontal shaft beneath the work supporting surface; bearings for the shaft in opposite end walls of a closed oil catching receptacle pendant from the supporting surface, the outer end of one of said bearings being closed over the corresponding end of the shaft; a gravity feed oil cup above the shaft beyond the confines of the work supporting surface; a tube leading from the oil cup and conducting the oil to the closed bearing aforesaid; and a rotary hook secured to the other end of the shaft, said hook having an internal raceway in engagement with a circumferential rib on an associated stationary bobbin casing, and an oil duct leading from the hollow of the shaft to the raceway.

2. In a sewing machine, a base affording a work-supporting surface; a drive shaft journaled beneath the work supporting surface; a tubular horizontal counter shaft also beneath said surface and driven from the drive shaft by intermeshing gears within a closed gear housing; bearings for the tubular shaft in opposite side walls of the gear housing, the outer end of one of which bearings is closed over the corresponding end of the shaft; a gravity feed oil cup above the tubular shaft beyond the confines of the work-supporting surface; a tube leading from the oil cup and conducting the oil to the closed bearing aforesaid; and a rotary hook secured to the other end of the tubular shaft, said hook having an internal raceway in engagement with a circumferential rib on an associated stationary bobbin casing and an oil duct leading from the hollow of the tubular shaft to the raceway.

3. In a sewing machine, a tubular horizontal

shaft; a gravity feed oil supply above the shaft; a chamber around one end of the shaft; a tube leading from the oil supply to said chamber for continuous delivery of oil into the open end of the tubular shaft; and a rotary hook with a hub secured to the other end of the shaft, said hook having an internal raceway in engagement with a central rib on an associated stationary bobbin casing, a central distributing chamber within its hub in communication with the hollow of the shaft, and an oil duct leading from said chamber to said raceway.

4. In a sewing machine, a base affording a work-supporting surface; a standard at one end of the base; a horizontal tubular shaft beneath said surface; a chamber around one end of the shaft; a gravity feed oil cup secured to the standard within the confines of the work-supporting surface; a tube leading from the cup to the aforesaid chamber for continuous delivery of oil into the open end of the tubular shaft; and a rotary hook with a hub secured to the other end of the shaft, said hook having an internal raceway in engagement with a circumferential rib on an associated bobbin casing, a central distributing chamber within its hub in communication with the hollow of the shaft, and a duct leading from said distributing chamber to the raceway.

5. In a sewing machine, a tubular horizontal shaft; a gravity feed oil supply above the shaft; a chamber around one end of the shaft; a tube leading from the oil supply to the chamber for continuous delivery of oil into the open end of the tubular shaft; a rotary hook with a hub secured to the other end of the shaft, said hook having an internal raceway in engagement with a central rib on an associated stationary bobbin casing, a central distributing chamber within its hub in communication with the hollow of the shaft, and an oil duct leading from said distributing chamber to the raceway; and means whereby the flow of oil from the supply may be regulated.

6. In a sewing machine, a tubular horizontal shaft; a chamber around one end of the shaft; a gravity feed oil cup with regulatable control means above the shaft; a tube leading from the oil cup to the aforesaid chamber for continuous delivery of oil into the open end of the shaft; and a rotary hook with a hub secured to the other end of the shaft, said hook having an internal raceway in engagement with a circumferential rib on an associated stationary bobbin casing, a central distributing chamber within its hub in communication with the hollow of the shaft, and an oil duct leading from said distributing chamber to the raceway.

7. In a sewing machine, a tubular horizontal shaft; a gravity feed oil supply above the shaft; a chamber around one end of the shaft; a tube leading from the oil supply to said chamber for continuous delivery of oil into the open end of the tubular shaft; and a rotary hook with a hub secured to the other end of the shaft, said hook having circumferential bearing engagement with an associated stationary bobbin casing, and being formed with a central distributing chamber within its hub in communication with the hollow of the shaft and with an oil duct which leads from said chamber to the bearing.

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