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A. R. WOOD

2,431,292

HOOK LUBRICATION FOR SEWING MACHINES

Filed Sept. 4, 1944

2 Sheets-Sheet 1

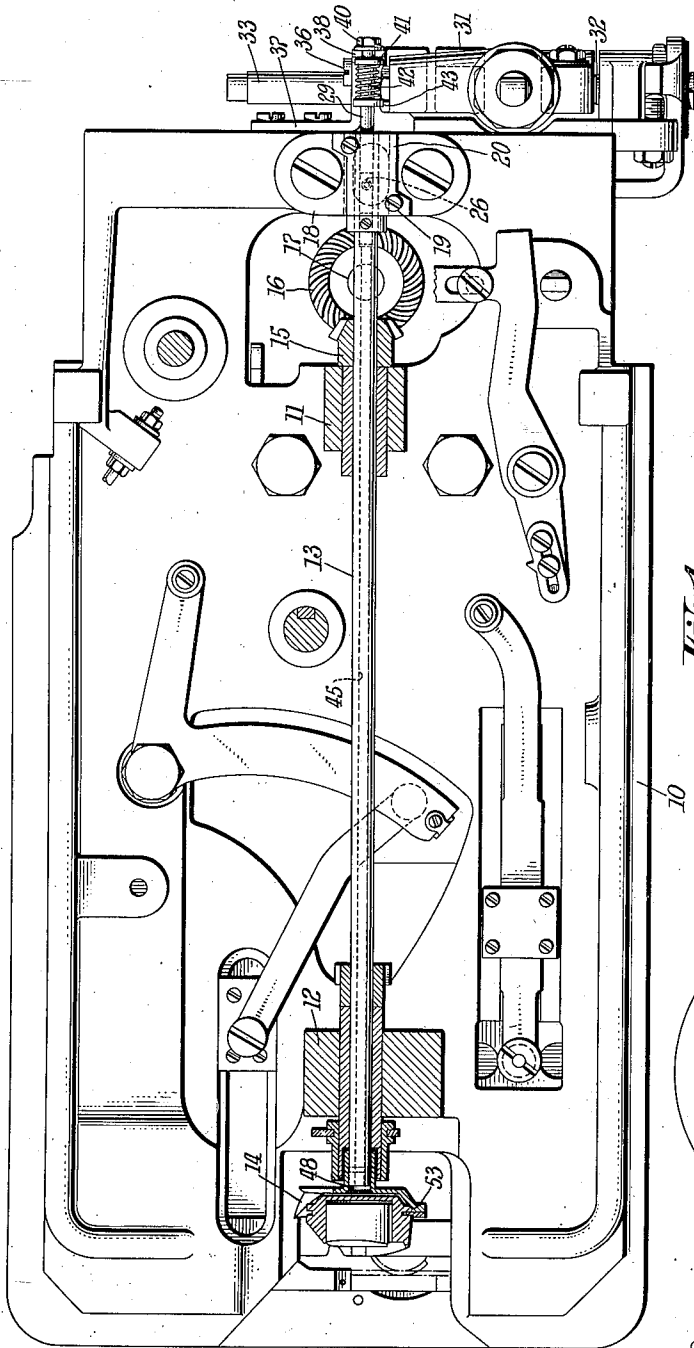


Fig. 1.

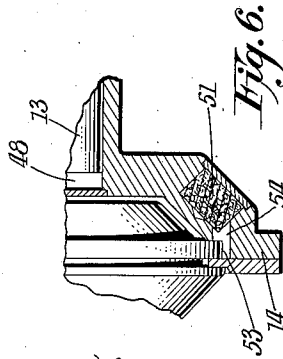


Fig. 6.

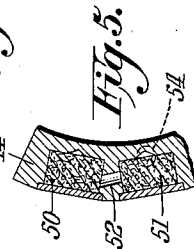


Fig. 5.

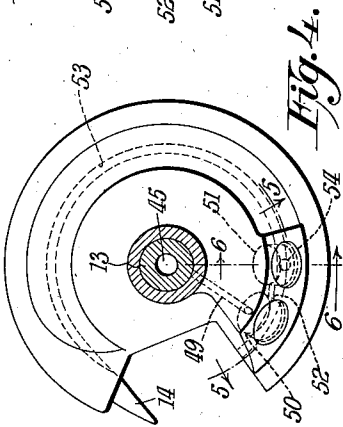


Fig. 4.

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HOOK LUBRICATION FOR SEWING MACHINES

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2 Sheets-Sheet 2

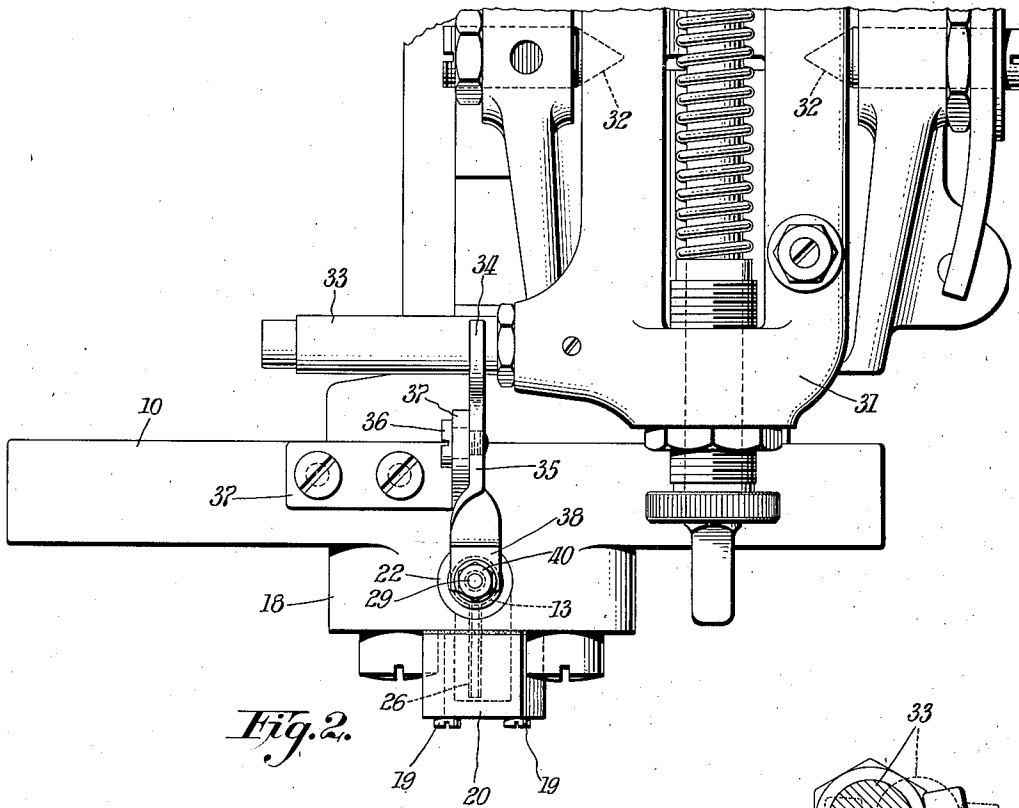


Fig. 2.

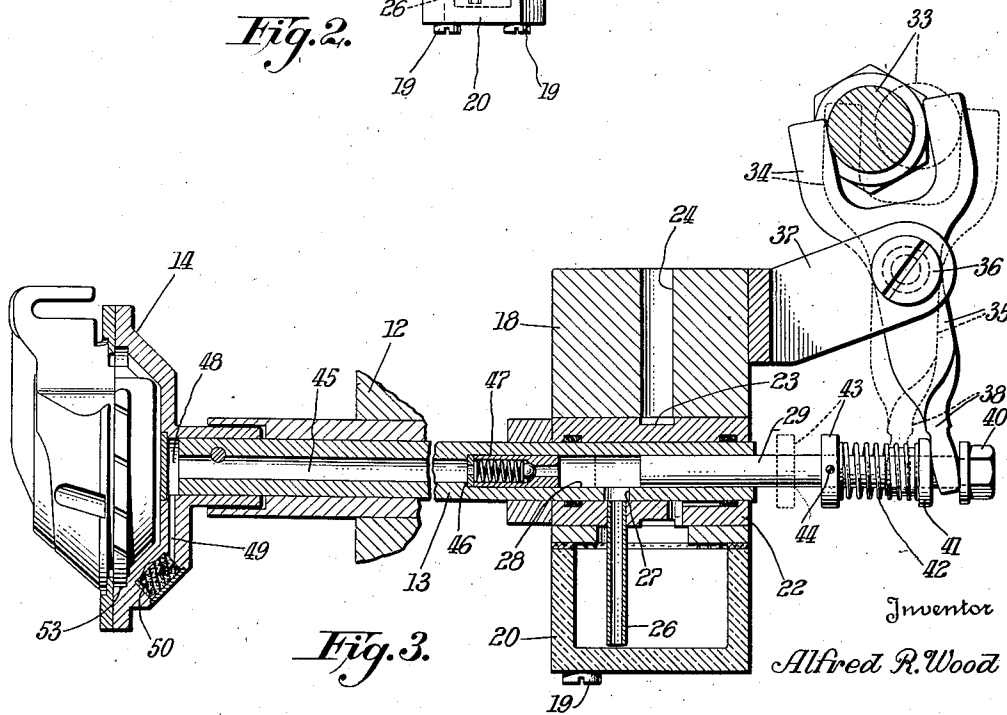


Fig. 3.

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UNITED STATES PATENT OFFICE

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HOOK LUBRICATION FOR SEWING
MACHINES

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5 Claims. (Cl. 112-256)

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This invention relates to sewing machines and more particularly to a device for supplying lubricant to the raceway of a rotary hook.

One of the objects of this invention is to provide improved means for supplying oil to the rotary hook raceway of a sewing machine.

Another object of this invention is to provide pump means, under control of a periodically operated part of the machine, for injecting oil from a reservoir located below the level of the hook shaft to a bore in said shaft connected with the raceway in the hook.

A further object of this invention is to provide a pump for supplying oil to the raceway of the hook at a predetermined pressure and to discontinue supplying oil to the hook if desired.

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 drawings:

Fig. 1 is a bottom plan view of a sewing machine having my invention embodied therein.

Fig. 2 is a right end elevation of a portion of the machine illustrated in Fig. 1.

Fig. 3 is a vertical section through the hook, hook-shaft and reservoir.

Fig. 4 is a back view of the rotary hook.

Fig. 5 is a sectional view taken along the line 5-5 of Fig. 4.

Fig. 6 is a section along the line 6-6 of Fig. 4.

In the embodiment of the invention selected for illustration I have shown my improved hook lubricating system applied to a buttonhole machine of the kind shown and described in the U. S. patent of Allen et al., No. 2,056,759, dated October 6, 1936. The machine has a bed 10 formed with depending lugs 11 and 12 in which is journaled a rotary shaft 13 carrying a hook 14 which cooperates with a reciprocatory needle in the formation of lock-stitches. The shaft 13 is rotated by means of a gear 15 meshing with a gear 16 fixed to a vertical shaft 17 which is actuated by gearing from the needle-bar shaft of the machine in the usual and well known manner.

Cast integral with the bed 10 is a depending bearing lug 18, and secured to the lug 18 by the screws 19 is an oil reservoir 20, preferably made of transparent material. Pressed into a suitable

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opening in the lug 18 is a bushing 22 in which the end of the hook shaft 13 is journaled. The bushing is peripherally provided with a circumferential groove 23 which communicates with an oil hole 24 formed in the lug 18. This arrangement permits the oil reservoir 20 to be filled from above the bed 10, the oil flowing down the hole 24, through the groove 23 in the bushing and into the reservoir 20.

Depending from the bushing 22 and into close proximity to the bottom of the reservoir 20 is a tube 26 which is adapted to communicate with a radial hole 27 in the hook-shaft 13. The hook-shaft is formed with a bore 28 in which is fitted a piston rod 29 adapted in the present machine to be reciprocated once for each cycle of operation by the stop-motion mechanism of the machine.

The stop-motion mechanism is old and well known and includes a rocker 31 which is arranged to swing about the pivots 32 towards the machine frame when the machine is stopped, and to swing outwardly away from the machine frame when the machine is brought to rest. The rocker 31 carries a laterally extending cylindrical rod 33 which is straddled by the bifurcated end 34 of a lever 35 pivoted at 36 on an arm 37 suitably fixed to the lug 18. The other end 38 of the lever 35 is twisted at an angle of 90° to the end 34 and is bifurcated so as to straddle the piston rod 29. A nut 40 is screwed on the free end of the piston rod 29 at one side of the end 38 of the lever and a freely sliding sleeve 41 is located on the other side of the end 38 of the lever. A compression spring 42 has one of its ends reacting against the sleeve 41 and its other end reacts against a collar 43 which is adjustably secured to the rod by a set screw 44.

The shaft 13 is longitudinally provided with a conduit 45 which is slightly smaller in diameter and is coaxial with the bore 28, thereby providing a shoulder 46. Pressed against the shoulder 46 is a spring pressed ball valve 47. The conduit 45 opens into a chamber 48 which communicates with an oil duct 49 formed in the body of the hook 14. The duct 49 leads to a wick filled oil-well 50 in the hook-body; said oil-well 50 being connected to a second wick filled oil well 51 in the hook body by a duct 52. The well 51 is connected to the raceway 53 of the hook by a duct 54. (Fig. 6.)

Assuming the machine to be performing a cycle of operation, my improved lubricating system for the raceway of the hook operates as follows: When the machine completes the cycle, the stop motion

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mechanism comes into action and stops the machine. As the stop motion acts, the rocker 31 swings about the pivots 32 and moves the rod 33 from the full line position shown in Fig. 3 to the dotted line position. This movement of the rod 33 swings the lever 35 about its pivot 36 and causes the end 38 of the lever to partially compress the spring 42 which yieldingly urges the piston rod 29 into the bore 28 to substantially the position indicated in dotted lines. Due to the last intake stroke of the piston rod 29, later described, the bore 28 is filled with lubricant and when the piston rod makes its inward or compression stroke a small amount of the lubricant is forced through the ball valve 47 into the bore 45 in the shaft 13. The oil which is forced into the bore 45 travels along the bore to the chamber 43, along the radial duct 49 to the wick filled well 50, thence through the connecting duct 52 to the well 51 and finally through the duct or opening 54 to the raceway 53 of the hook 14.

When the machine is started so as to perform another cycle of operation the stop-motion is released and the rocker 31 swings about its pivotal axis. This causes the rod 33 to move from the dotted line position, indicated in Fig. 3, to the full line position. This movement of the rod 33 swings the lever 35 about its pivot 36 and the end 38 of the lever 35 engages the nut 40 and moves the piston rod 29 to the right thereby causing it to execute its intake stroke.

As the ball valve 47 is shut, the movement of this piston rod draws oil from the reservoir 20 through the tube 26 and opening 27 so as to fill the bore 28 in the shaft.

From the above, it will be understood that the piston rod 29 executes a forward and backward motion in the bore or cylinder 28 once for each cycle of operation and that this movement of the piston rod draws oil from the reservoir 20 and injects it into the bore 45 of the hook shaft 13. The oil thus injected is led through the described passageway to the raceway of the hook. It is apparent that the wick filled wells 50, 51 act to retard the flow of the oil and thus insure that oil will be gradually supplied to the raceway of the hook throughout the cycle of operation of the machine.

It will also be understood that the collar 43 may be adjusted to various positions on the rod 29 and that such adjustment will determine the pressure and amount of oil that will be injected into the bore 45 by the piston and that when the back pressure of the oil in the shaft bore exceeds a predetermined amount then the spring will be compressed and no additional oil will be injected into the shaft bore. Also if the collar is adjusted to the extreme left position it is apparent that the end 38 of the lever 35 will not reciprocate the piston rod 29 and consequently, oil will not be supplied to the hook.

From the foregoing it will be understood that my improved lubricating system for the rotary hook of a sewing machine has a wide variety of uses and that it is not limited in its use to cyclically operable machines, but may be used on various types of machines and the piston rod 29 operated by the presser-foot lifter or any other manually control of the machine. Therefore the privilege is reserved of resorting to all such legitimate changes therein as may be fairly embodied in the scope of the appended claims.

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

1. A sewing machine having in combination, an

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actuating shaft having a longitudinal bore, a loop-taker carried by said shaft and having a raceway, an oil passageway connecting the bore in the shaft with the raceway, an oil reservoir for supplying oil to the bore in said shaft, a piston rod extending into the bore of said shaft, and automatic mechanism for reciprocating said piston rod to cause it to force oil through said bore and passageway to said raceway.

2. A sewing machine having in combination, a hook shaft formed with an internal longitudinal bore, a hook actuated by said shaft and having a raceway, said hook being formed with ducts leading from the bore in the shaft to said raceway, a reservoir for supplying oil to the bore in said shaft, a piston rod having one end slidably fitted in the bore of said shaft, and automatic means for yieldingly urging said piston rod inwardly into the bore to force oil through said bore and ducts to said raceway.

3. A sewing machine having in combination, a hook shaft formed with an internal longitudinal bore, a hook actuated by said shaft and having a raceway, said hook being formed with ducts leading from the bore in the shaft to said raceway, an oil reservoir located below the shaft, a piston rod extending into said shaft, a conduit leading from the reservoir to the bore in the shaft, and automatic means for reciprocating said piston rod to cause it to suck oil from said reservoir and inject it into the bore of said shaft for transmission through said bore and ducts to said raceway.

4. A sewing machine having in combination, a rotary shaft having a longitudinal bore, a valve located in the bore between the ends of the shaft, sewing machine mechanism located at one end of said shaft and having a bearing to be lubricated, an oil passageway leading from the bore in said shaft to said bearing, a reciprocating pump having a piston located in the other end of the shaft, automatic mechanism for reciprocating said piston to cause it to inject oil through said valve into the bore of said shaft for transmission to said bearing, and an oil reservoir for supplying oil to said pump.

5. A sewing machine having in combination, a rotary shaft having a longitudinal bore, a valve located in the bore between the ends of the shaft, sewing machine mechanism located at one end of said shaft and having a bearing to be lubricated, an oil passageway leading from the bore in said shaft to said bearing, a reciprocating piston fitted in the other end of the shaft, an oil reservoir, and automatic mechanism for reciprocating said piston for causing it to draw oil from said reservoir and inject it through said valve into the bore in said shaft for transmission to said bearing.

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The following references are of record in the file of this patent:

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