July 1, 1941. A. B. CLAYTON 2,247,570

LOOPER MECHANISM FOR SEWING MACHINES

Filed Feb. 2, 1939 3 Sheets-Sheet 1

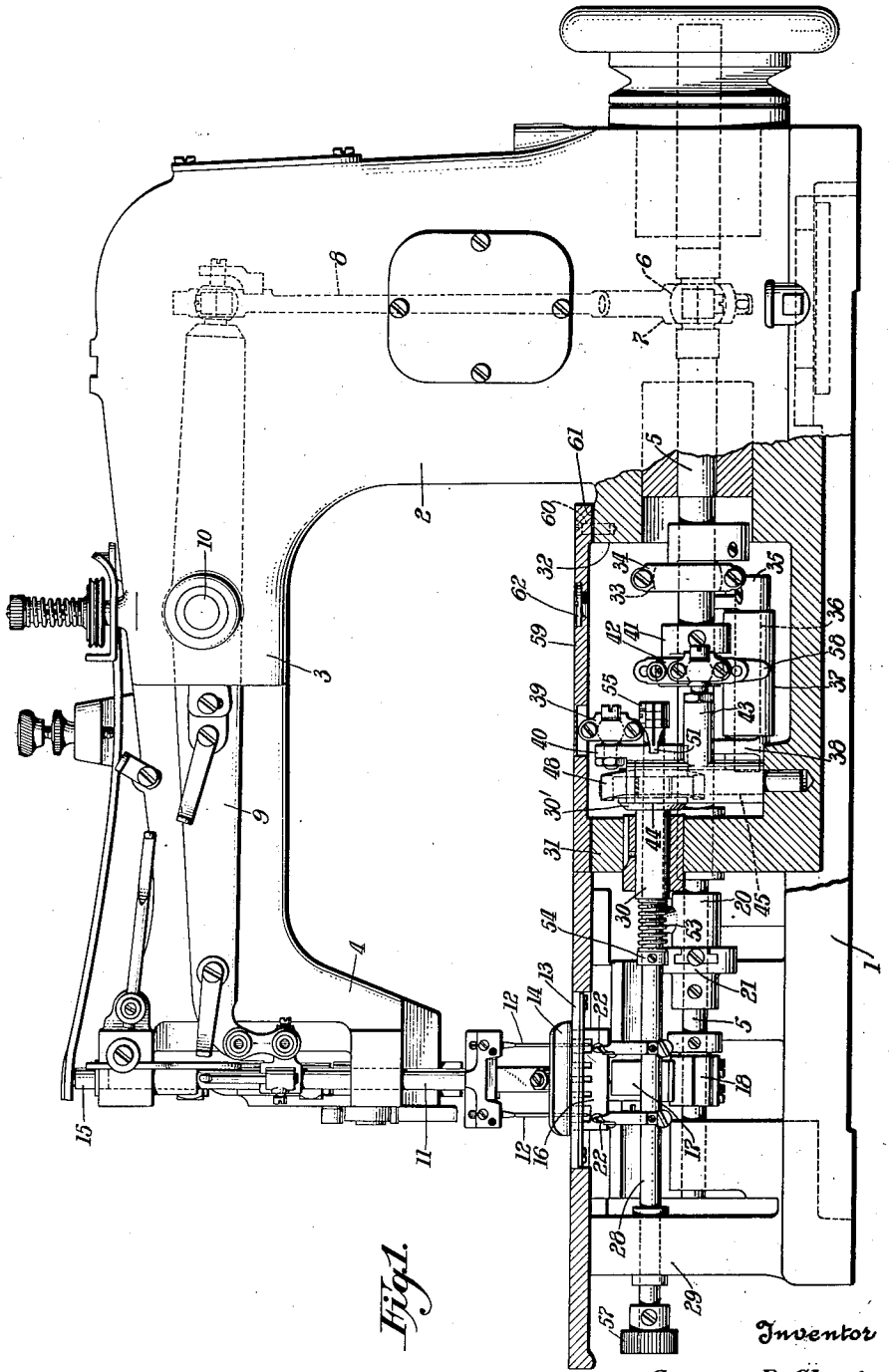


Fig. 1.

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LOOPER MECHANISM FOR SEWING MACHINES

Filed Feb. 2, 1939 3 Sheets-Sheet 2

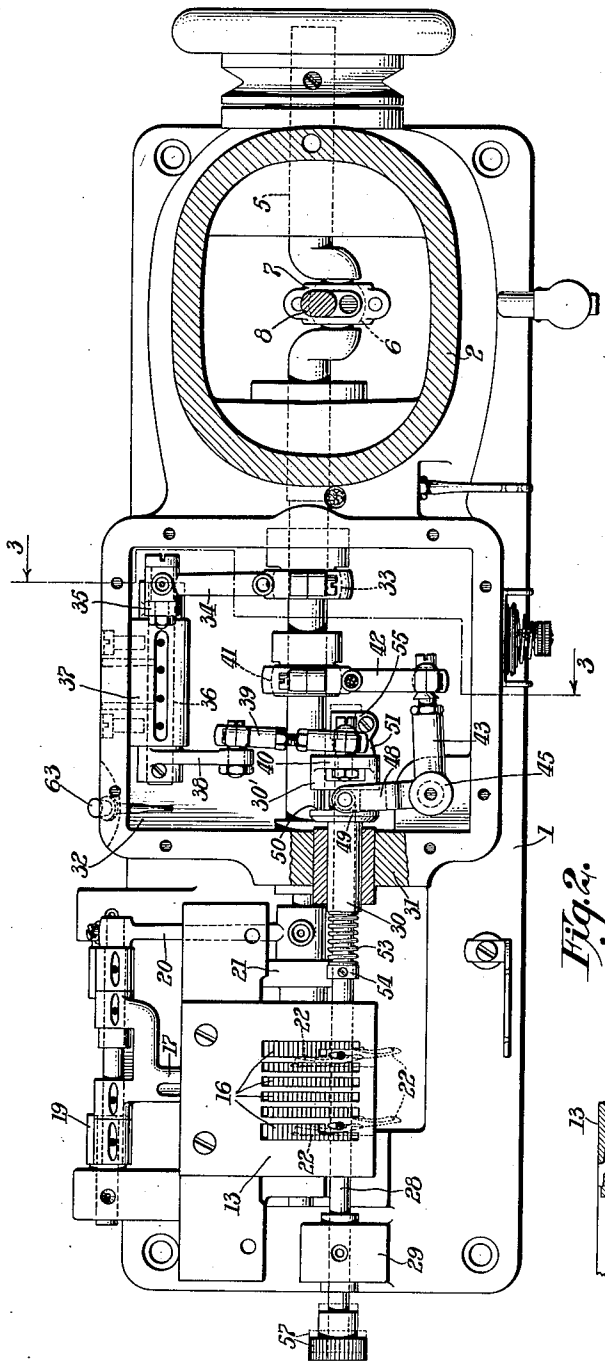


Fig. 2.

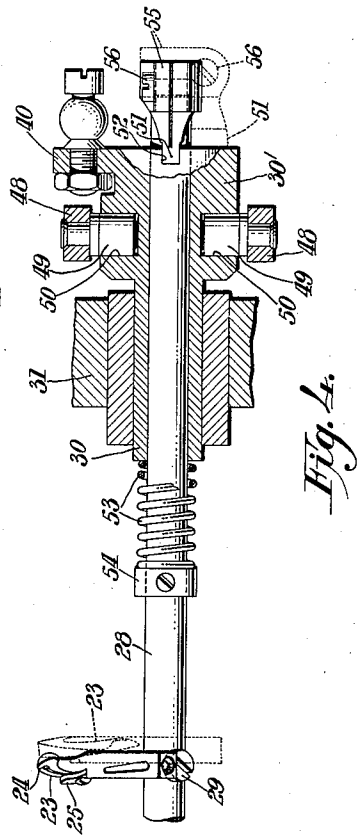


Fig. 4.

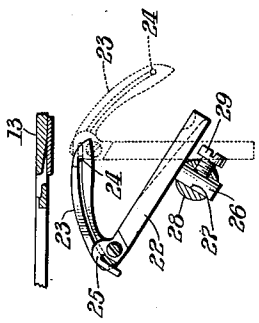


Fig. 5.

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LOOPER MECHANISM FOR SEWING MACHINES

Filed Feb. 2, 1939 3 Sheets-Sheet 3

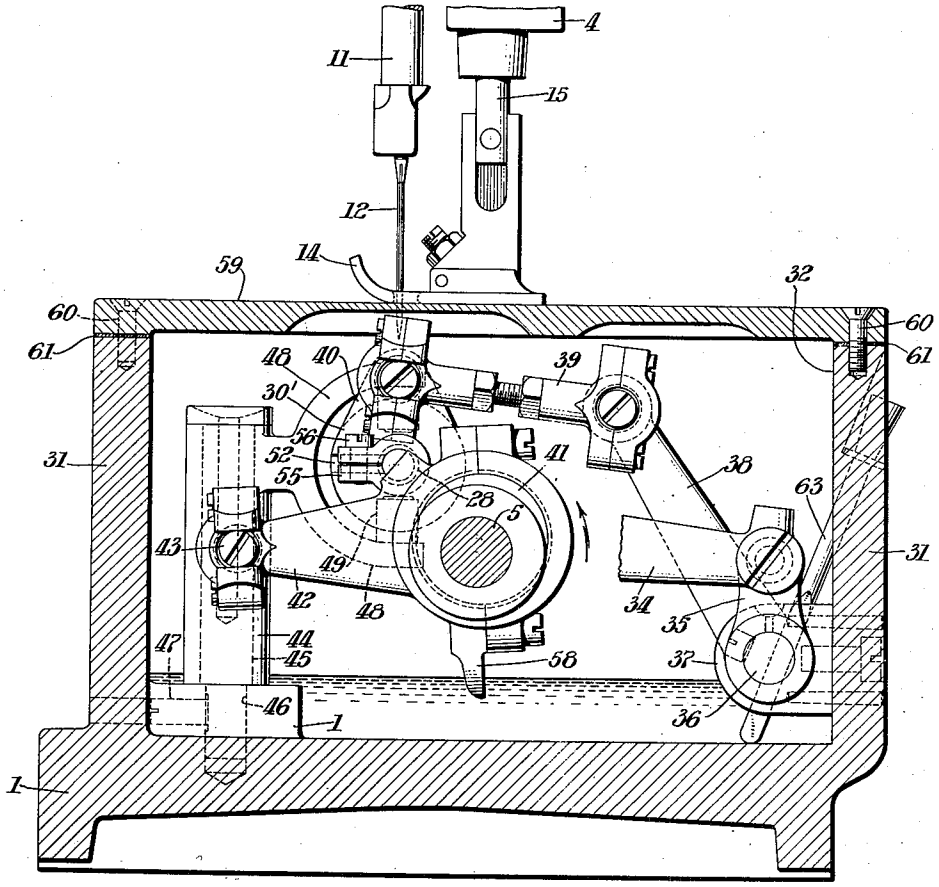


Fig. 3.

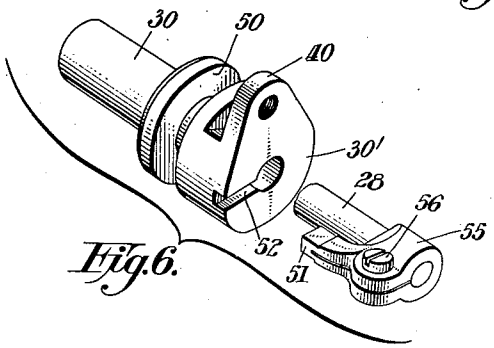


Fig. 6.

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Patented July 1, 1941

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UNITED STATES PATENT OFFICE

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LOOPER MECHANISM FOR SEWING MACHINES

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Application February 2, 1939, Serial No. 254,139

11 Claims. (Cl. 112—200)

This invention relates to improvements in looper-mechanisms for sewing machines and particularly for chain-stitch sewing machines in which endwise and sidewise movements are imparted to a looper for cooperation with a reciprocating needle in the formation of chain-stitches.

The primary object of the present invention is the provision of a sewing machine high-speed looper-mechanism wherein the actuating connections therefor are disposed within a closed lubricant-chamber and adapted to operate in a bath of oil with only the looper-shaft and driving shaft therefor projecting outwardly from the lubricant-chamber through oil-tight connections.

A further object of the invention is to provide a looper-mechanism wherein the loopers are supported directly upon the looper-shaft so that additional loopers may be added for multiple line stitching by merely drilling suitable looper-receiving apertures into the looper-shaft spaced apart according to the gauge requirements and inserting suitable loopers therein.

A still further object of the invention is to provide a looper-mechanism of the above type with means whereby the looper may be moved to a position where it is readily accessible for threading.

The foregoing and other objects of the invention, together with means whereby the same may be carried into effect, will best be understood from the following description of one form or embodiment thereof illustrated in the accompanying drawings. It will be understood, however, that the particular mechanism described and shown has been chosen for illustrative purposes merely, and that the invention, as defined by the appended claims, may be otherwise practiced without departure from its spirit and scope.

In the drawings,

Fig. 1 is a side elevation, partly in section, of a sewing machine embodying the present invention.

Fig. 2 is a top plan view of the sewing machine bed with the bracket-arm standard in section, and with the cloth-plate and housing cover removed so as to disclose in detail the looper-actuating mechanism.

Fig. 3 represents an enlarged vertical sectional view taken substantially along the line 3—3, Fig. 2.

Fig. 4 represents an enlarged vertical view, partly in section, taken substantially along the longitudinal axis of the looper-shaft, illustrating the looper throw-out mechanism.

Fig. 5 represents a vertical sectional view taken substantially along the line of seam formation, showing, in full lines, the looper in normal operating position and, in dotted lines, the looper in threading position.

Fig. 6 represents an enlarged perspective view of the oscillatable and endwise movable bushing and the disengageable tooth which is secured upon the looper-shaft.

As represented, the machine is constructed with the usual bed 1 from which rises a standard 2 supporting an overhanging bracket-arm 3 terminating in a head 4. Journaled in suitable bearings in the bed 1 is a main-shaft 5 extending longitudinally thereof and provided upon its forward portion with eccentrics (not shown) for actuating the feeding mechanism and in its rearward portion with a needle-actuating crank 6.

The crank 6 is embraced by a strap 7 at the lower end of the pitman 8 whose opposite end is connected to the rearward end of a pivotally mounted needle-lever 9 fulcrumed substantially midway its ends upon a fulcrum-stud 10 threaded into the bracket-arm 3. The needle-lever 9 at its forward end is connected to a needle-bar 11 carrying at its lower end laterally spaced needles 12.

The material is held upon the work-support or throat-plate 13 by a presser-foot 14 secured upon the lower end of the usual spring-biased presser-bar 15 mounted in the head 4. Cooperating with the presser-foot is a feed-dog 16 adjustably secured upon a feed-bar 17, which is raised and lowered by a suitable eccentric 18 on the main-shaft 5, and which feed-bar 17 is moved back and forth through a connection with a feed-rocker 19, which feed-rocker in turn is operated by a pitman 20 connected to an adjustable eccentric 21 on the main-shaft 5. It is to be understood that the length of stitch can be adjusted by merely setting the eccentric 21 to the desired eccentricity.

Cooperating with the needles 12 are two loopers 22, each of which is provided with a blade 23 having at its forward end the usual thread-eye 24 and at its rearward end a "self-threading" eye in the form of a detachable hook 25. In Fig. 5, it will be seen that each looper 22 is formed with a cylindrical shank 26 adapted to be received in an aperture 27 in the looper-shaft 28 and secured in set position by a screw 29 threaded into the looper-shaft 28. The salient advantage of mounting the loopers upon the looper-shaft in the manner just described is that additional loopers may be added by simply drilling more looper-receiving apertures in the looper-shaft

and providing the necessary set-screws for these apertures. In other words, more or less loopers may be used without changing the details of design of the looper-carrying mechanism, or providing an expensive looper-carrying clamp.

Referring now to Figs. 1, 2 and 4, it will be observed that the looper-shaft **28** is journaled at its forward end in the bearing lug **29** and at its rearward end in an oscillatable and endwise movable bushing **30** penetrating the wall **31** of the closed lubricant-chamber **32**, and restricted to movement on a fixed axial line, which in the present case is the longitudinal axis of the bushing **30**. During the normal operation of the machine, the looper-shaft **28** partakes of the same movements of the oscillatable and endwise movable bushing, which movements impart to the loopers their usual loop-seizing and -shedding movements and their sidewise movements. The mechanism utilized to obtain these movements is completely housed within the lubricant-chamber **32** and is splash-lubricated by the oil contained therein.

The oscillations of the bushing **30**, or the loop-seizing and -shedding movements of the looper, are derived preferably from an eccentric **33** through mechanism comprising a pitman **34** connected to an upstanding rock-lever **35** secured upon one end of a stub-shaft **36** journaled in a bearing lug **37** provided adjacent the bottom of the lubricant-chamber **32**. Secured upon the other end of the stub-shaft **36** is an upwardly inclined rock-lever **38**, the upper end of which is connected by a link **39** to a crank-arm **40** formed integral with the enlarged inner end, or head **30'**, of the bushing **30**. In order to provide for universal movement between the link **39** and the crank-arm **40**, the points of connection of the link **39** with the rock-lever **38** and the crank-arm **40** are preferably of the so-called ball-and-socket type.

The endwise movement of the bushing **30** or in other words, the sidewise movement of the looper, is derived from an eccentric **41** on the main-shaft **5** through a pitman **42** connected to one arm **43** of a bell-crank lever **44** pivoted upon a vertically disposed fulcrum stud **45** received in the aperture **46** in the bed **1** and fixed therein by the set-screw **47**, Fig. 3. The other arm **48** of the bell-crank lever **44** is formed as a yoke, the respective arms of which carry rollers **49** which enter an annular groove **50** formed in the head **30'** of the bushing **30**. It will be seen from Fig. 2 that, as the main-shaft **5** is rotated, eccentrics **33** and **41**, through the connections operated thereby, impart to the bushing **30** and hence to the loopers **22** the requisite motions for stitch-formation.

In order to render the loopers readily accessible for threading, means is provided whereby the loopers may be shifted from beneath the throat-plate **13** forwardly toward the operator and into the position illustrated in dotted lines in Figs. 4 and 5. The means by which the shifting of the loopers is effected is best shown in Fig. 4. From this figure, it will be observed that the looper-shaft **28** is journaled in the bushing **30** and is connected to operate therewith through the medium of a disengageable tooth **51** adapted to be received in a radial recess or groove **52** formed in the face of the head **30'** of the bushing **30**. The tooth **51** is normally held seated in the radial recess **52** by the coil-spring **53** which encircles the looper-shaft **28** and acts between the outer end of the bushing **30** and a collar **54** fixed on the looper-shaft **28**. To facilitate the timing of the loopers **22** with the reciprocating needles **12**, the base of the tooth **51** is formed as a split collar **55** which is frictionally clamped upon the inner end of the looper-shaft **28** by the screw **56**. In the timing of the machine, it will be understood that the screw **56** can be retracted and the tooth **51** turned about the looper-shaft **28** until the correct cooperation between the loopers **22** and the needles **12** is established.

In order to retract the loopers **22** for convenient threading, the looper-shaft **28** is manually shifted in an endwise direction toward the standard **2** of the machine, thereby compressing the coil-spring **53** and disengaging the tooth **51** from the radial recess **52**, as shown in dotted lines in Figs. 2 and 4. The looper-shaft **28** may then be moved circularly relative to the movable bushing **30** so as to bring the loopers **22** out from beneath the throat-plate **13**. In this retracted position the sewing threads may be readily inserted into the thread-eyes **24** of the loopers **22**. In repositioning the loopers for sewing after they have been threaded, it is necessary only to manually turn the looper-shaft **28** until the tooth **51** and radial recess **52** in the bushing **30** are in alinement with one another, when these parts will become interlocked and held in this position by the coil-spring **53**. To assist the operator in shifting the looper-shaft from one position to another, the latter has secured upon its outer end a knurled thumb-button **57** which is in position beneath the work-support for convenient manipulation by the operator.

From the above it will be apparent that I have provided a high-speed chain-stitch looper-mechanism in which the actuating connections therefor are disposed within the closed lubricant-chamber **32** and are adapted to operate in an oil mist created by the contact with the oil in the bottom of the lubricant-chamber **32** of the oil-scoop or agitator **58** formed upon the pitman **42**. The oil-laden atmosphere in the chamber **32** thoroughly lubricates all the bearing points while the machine is operating.

Access to the mechanism within the closed lubricant-chamber **32** is gained by removing the cover-plate **59** secured in place by screws **60**. A gasket **61** is interposed between the cover-plate **59** and the top of the walls **31** of the lubricant-chamber **32** to prevent the egress of oil. To permit the replenishment of lubricant, the cover-plate **59** is provided with a removable plug **62**, and the amount of lubricant in the chamber is indicated on a removable oil-gauge rod **63** extending into the lubricant-chamber through the rear wall thereof.

While I have provided a sewing mechanism having a splash-lubricated looper-mechanism, the loopers themselves and thread are maintained dry and uncontaminated by oil. By providing a closed lubricant-chamber the looper-actuating mechanism will require attention only at protracted periods for the purpose of oil replenishment or renewal.

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

1. In a sewing machine, a frame, a closed lubricant-chamber supported thereby, an actuating shaft extending through at least one wall of said chamber, mechanism disposed within said chamber and actuated by said shaft, a bushing extending through at least one wall of said chamber and adapted to be actuated by the mechanism within said chamber, and a shaft journaled in said bushing and releasably connected thereto so

that said shaft may be shifted relative to said bushing.

2. In a sewing machine, a frame, a closed lubricant-chamber supported thereby, an actuating shaft extending through at least one wall of said chamber, mechanism disposed within said chamber and actuated by said shaft, a bushing extending through at least one wall of said chamber and adapted to be actuated by the mechanism within said chamber, a looper-shaft journaled in said bushing, a looper carried thereby, and means for releasably connecting said looper-shaft to said bushing so that the looper can be shifted into threading position.

3. In combination, a looper-shaft, a looper carried thereby, a bushing in which said looper-shaft is journaled, means for actuating said bushing, and means for releasably connecting said looper-shaft to said bushing so that the looper can be shifted to a position facilitating the threading thereof.

4. In combination, a looper-shaft, a looper supported thereby, a bushing coaxial with and supporting one end of said looper-shaft, means for actuating said bushing, and yieldable means for connecting said looper-shaft to said bushing to permit the looper supported by said looper-shaft to be shifted into threading position.

5. A sewing machine looper-mechanism having, in combination, a looper-shaft, a looper supported thereby, a bushing in which said looper-shaft is journaled having a recess formed therein, means for actuating said bushing, and a tooth secured upon said looper-shaft and adapted to be received in the recess formed in said bushing.

6. A sewing machine looper-mechanism having, in combination, a looper-shaft, a looper supported thereby, a bushing coaxial with and supporting a portion of said looper-shaft and having a recess formed therein, means for actuating said bushing, a tooth secured upon said looper-shaft and adapted to be received in the recess formed in said bushing, and a spring for maintaining said tooth seated in said recess.

7. In a sewing machine having a frame including a bed, a rotary shaft journaled in said bed, a bushing mounted in said bed for movement on a fixed axial line, a looper-shaft releasably connected to said bushing and having formed therein an aperture, a looper provided with a shank adapted to be received in said aperture, and mechanism actuated by said rotary shaft and connected to said bushing for moving the latter on a fixed axial line.

8. In a sewing machine, a frame including a work-support and an overhanging head, a closed lubricant-chamber beneath said work-support, an actuating shaft journaled in at least one wall of said chamber above the level of the oil contained therein, stitch-forming devices including a threaded needle sustained by said overhanging head and a cooperating chain-stitch looper beneath said work-support, a looper-shaft supporting said looper and journaled in at least one wall of said lubricant-chamber above the horizontal plane of the longitudinal axis of the actuating shaft for axial movement, and mechanism housed within said chamber for connecting said looper-shaft to said actuating shaft and imparting to said looper loop-seizing and -shedding movements, said mechanism having a portion thereof disposed so that during its movement it contacts the lubricant in said chamber and splashes the same throughout said chamber.

9. In a sewing machine, a frame including a work-support and an overhanging head, a closed lubricant-chamber beneath said work-support, an actuating shaft journaled in at least one wall of said chamber above the level of the oil contained therein, stitch-forming devices including a threaded needle sustained by said overhanging head and a cooperating chain-stitch looper beneath said work-support, a bushing journaled in a wall of said lubricant-chamber above the horizontal plane of the horizontal axis of said actuating shaft, a looper-shaft supporting said looper and releasably connected to said bushing, and mechanism housed within said chamber for connecting said bushing to said actuating shaft to impart to said looper loop-seizing and -shedding movements, said mechanism contacting the lubricant in said chamber to splash oil on the operating parts within said chamber during the operation of the machine.

10. A sewing machine having in combination, a frame including a work-support and an overhanging head, a closed lubricant-chamber beneath said work-support, an actuating shaft journaled in at least one wall of said chamber above the level of the oil contained therein, stitch-forming devices including a threaded needle sustained by said overhanging head and a cooperating chain-stitch looper beneath said work-support, a looper-shaft supporting said looper and journaled in at least one wall of said lubricant-chamber above the horizontal plane of the longitudinal axis of the actuating shaft for endwise as well as oscillatory movements, means within said lubricant-chamber including a stub-shaft for oscillating said looper-shaft, and means within said lubricant-chamber for imparting endwise movements to said looper-shaft, said mechanism within said chamber disposed to contact the lubricant contained therein thereby to splash oil on the operating parts within said chamber.

11. A sewing machine looper-mechanism having, in combination, a looper-shaft, a looper supported thereby, a bushing coaxial with and supporting a portion of said looper-shaft and having formed at one end thereof an enlarged head provided with a recess in the face thereof, means connected to the head of said bushing for actuating the same, and a tooth secured upon said looper-shaft and adapted to be yieldingly maintained in the recess formed in said bushing.

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