

Jan. 29, 1946.

G. SAUER ET AL

2,393,815

SEWING MACHINE

Filed Jan. 8, 1940

6 Sheets-Sheet 1

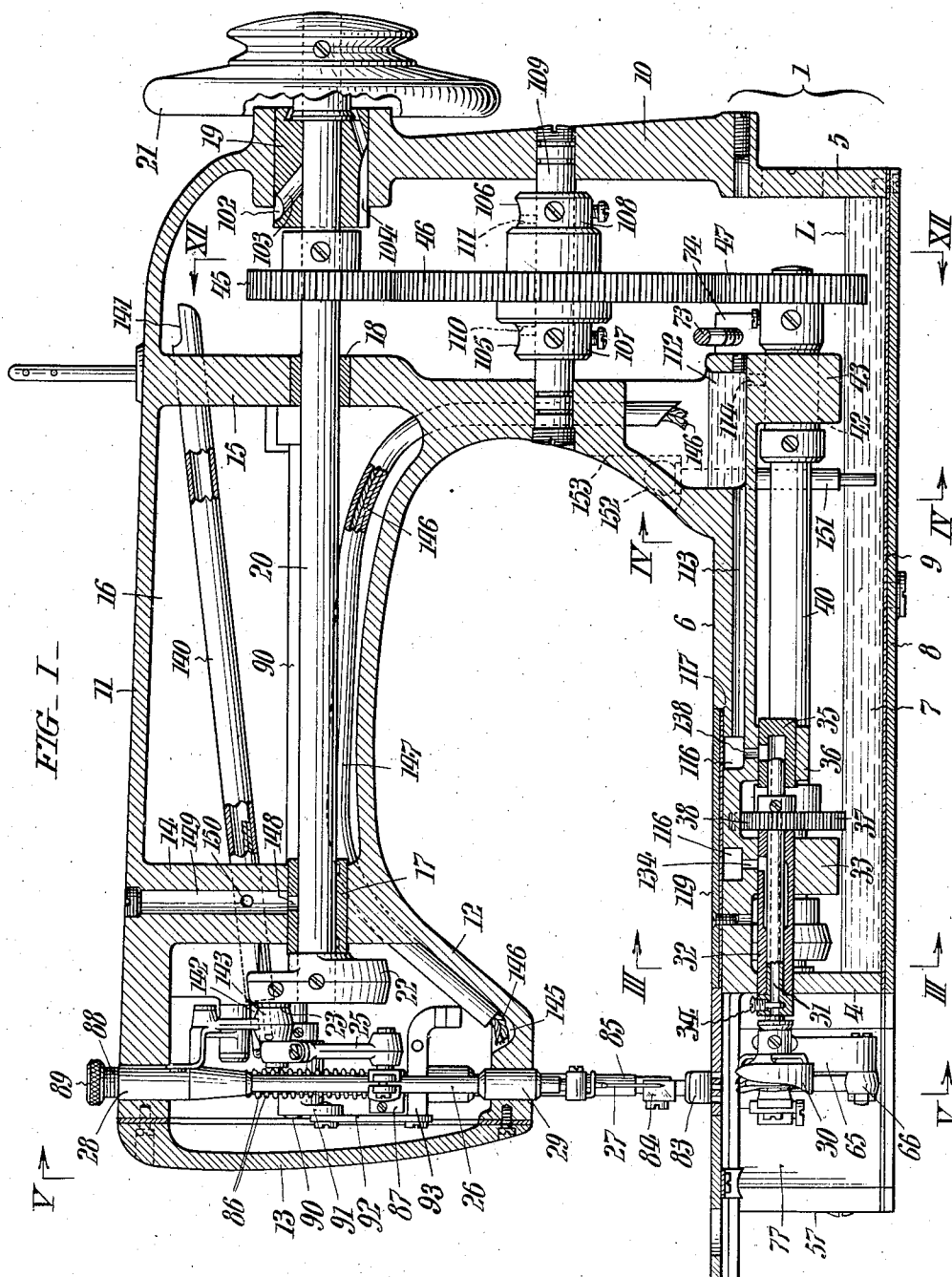


FIG. I -

WITNESSES:

Hubert Fuchs

George L. Comby

INVENTORS:

George Sauer

Albert M. Schweda

BY *& Clarence C. Smith,*

Paul Paul
ATTORNEYS.

Jan. 29, 1946.

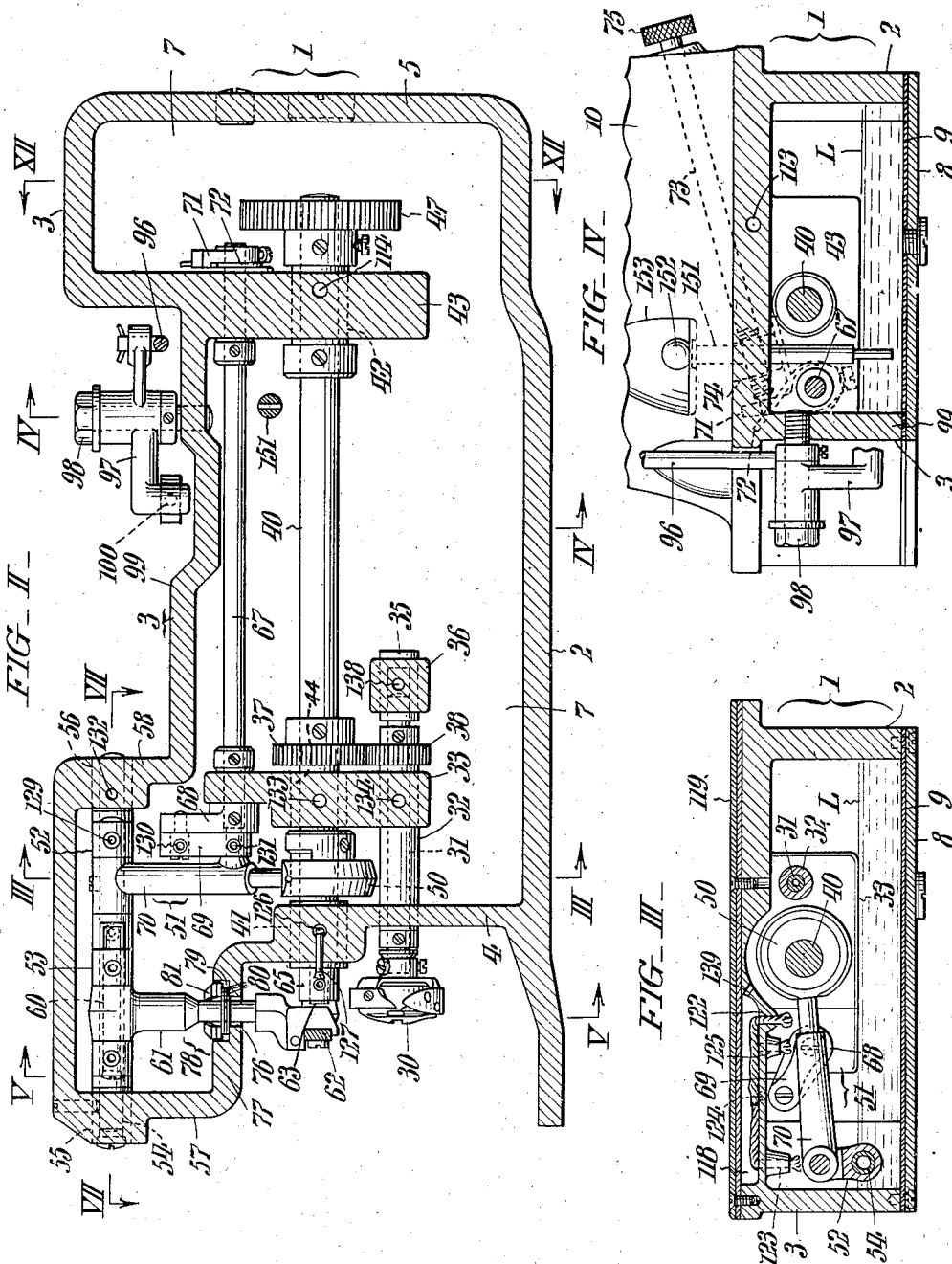
G. SAUER ET AL

2,393,815

SEWING MACHINE

Filed Jan. 8, 1940

6 Sheets-Sheet 2



WITNESSES:

Hubert Fuchs
George L. Comby

INVENTORS:

George Sauer,
Albert M. Schweda,
& Clarence C. Smith,
Paul Paul
ATTORNEYS.

Jan. 29, 1946.

G. SAUER ET AL

2,393,815

SEWING MACHINE

Filed Jan. 8, 1940

6 Sheets-Sheet 3

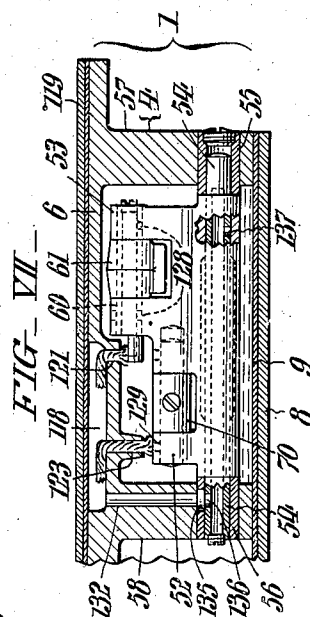
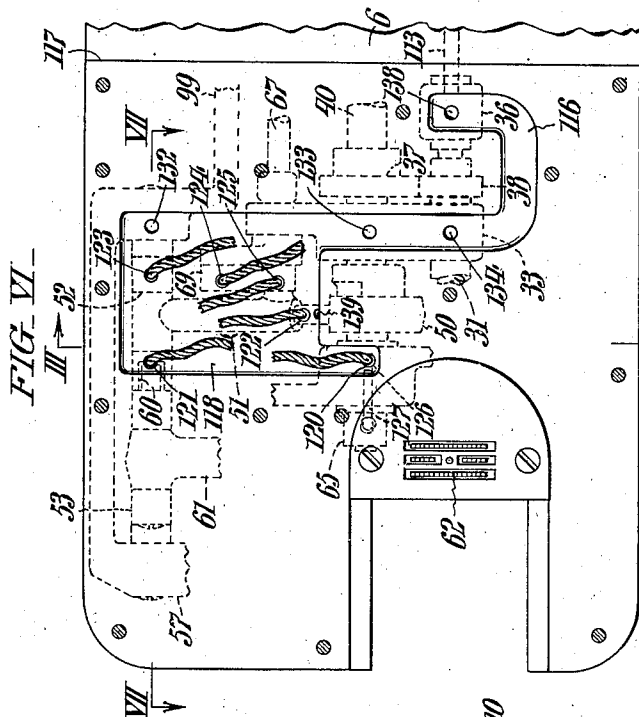


FIG. V

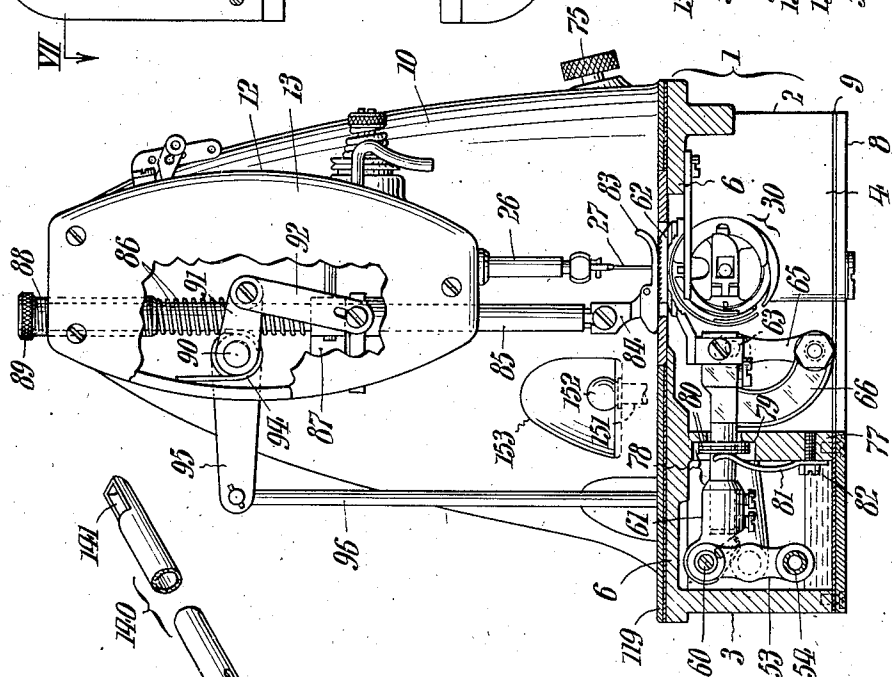
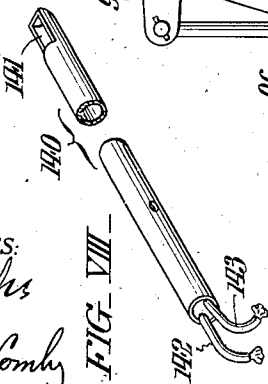


FIG. VIII



WITNESSES:
Hubert Fuchs
George L. Comby

INVENTORS:
George Sauer
Albert M. Schweda
& Clarence C. Smith,
Paul Paul
ATTORNEYS.

Jan. 29, 1946.

G. SAUER ET AL

2,393,815

SEWING MACHINE

Filed Jan. 8, 1940

6 Sheets-Sheet 4

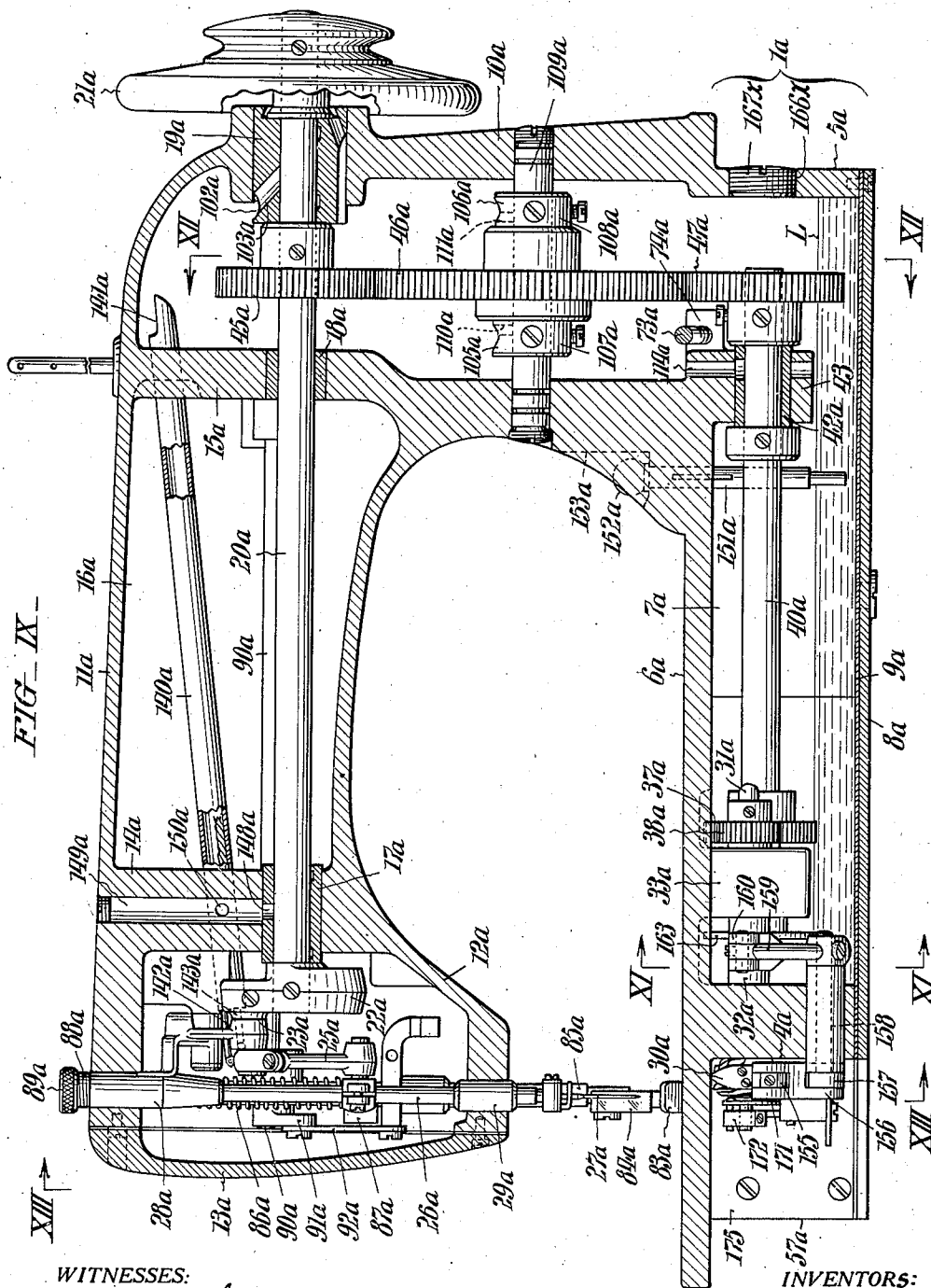


FIG. IX

WITNESSES:

Hubert Fuchs

George L. Comby

INVENTORS:

George Sauer,

Albert M. Schweda

BY Clarence C. Smith,

Paul Paul
ATTORNEYS.

Jan. 29, 1946.

G. SAUER ET AL

2,393,815

SEWING MACHINE

Filed Jan. 8, 1940

6 Sheets-Sheet 5

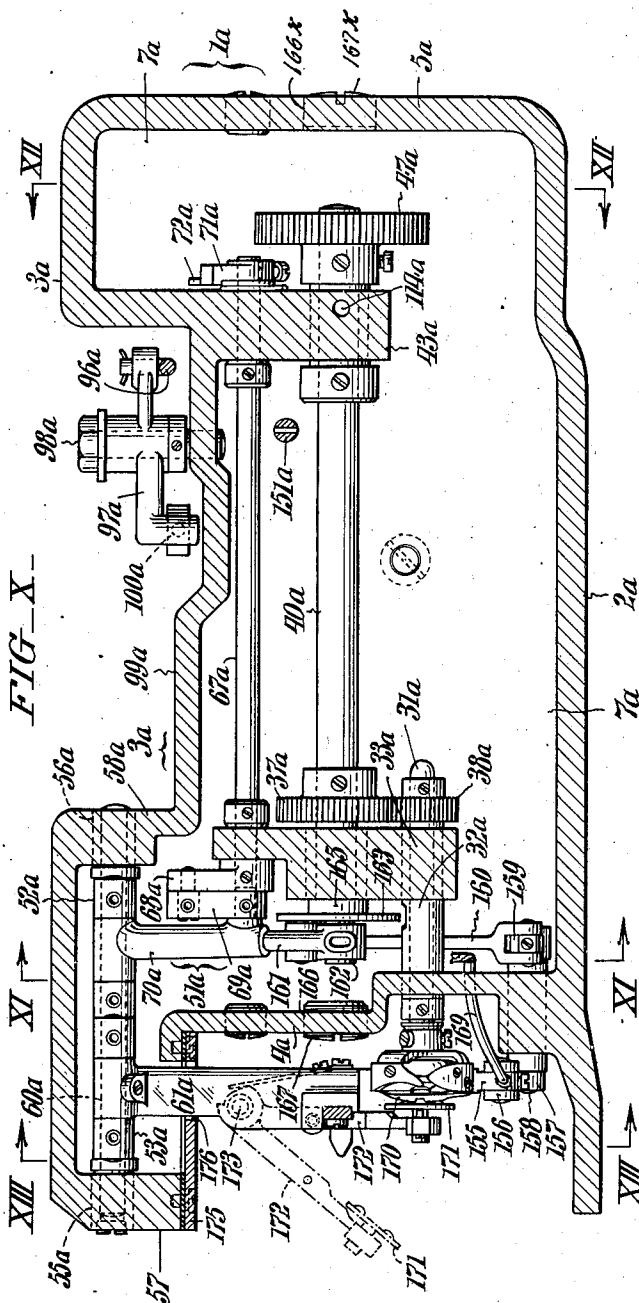


FIG. X

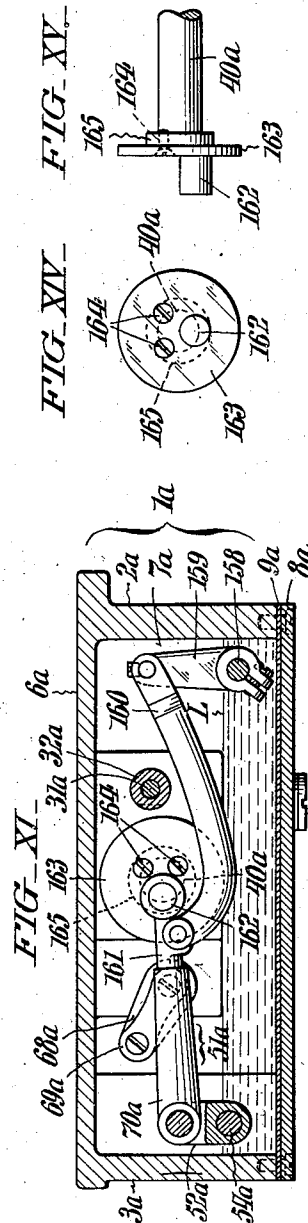


FIG. XI

FIG. XIV

FIG. XV

WITNESSES:
Hubert Fuchs
George L. Comby

INVENTORS:
George Sauer
Albert M. Schwela
BY Clarence C. Smith,
Paul Paul
ATTORNEYS.

Jan. 29, 1946.

G. SAUER ET AL

2,393,815

SEWING MACHINE

Filed Jan. 8, 1940

6 Sheets-Sheet 6

FIG. XII

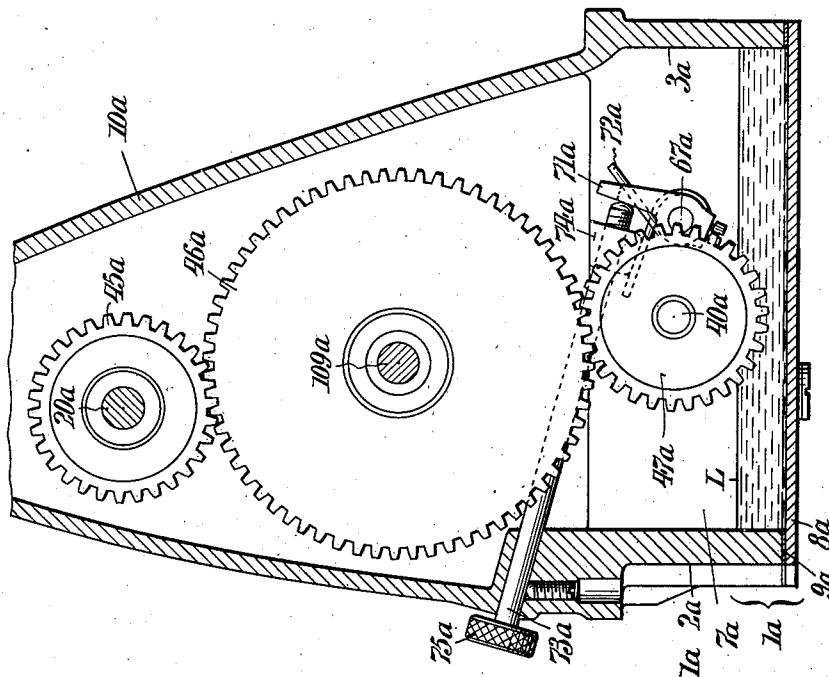
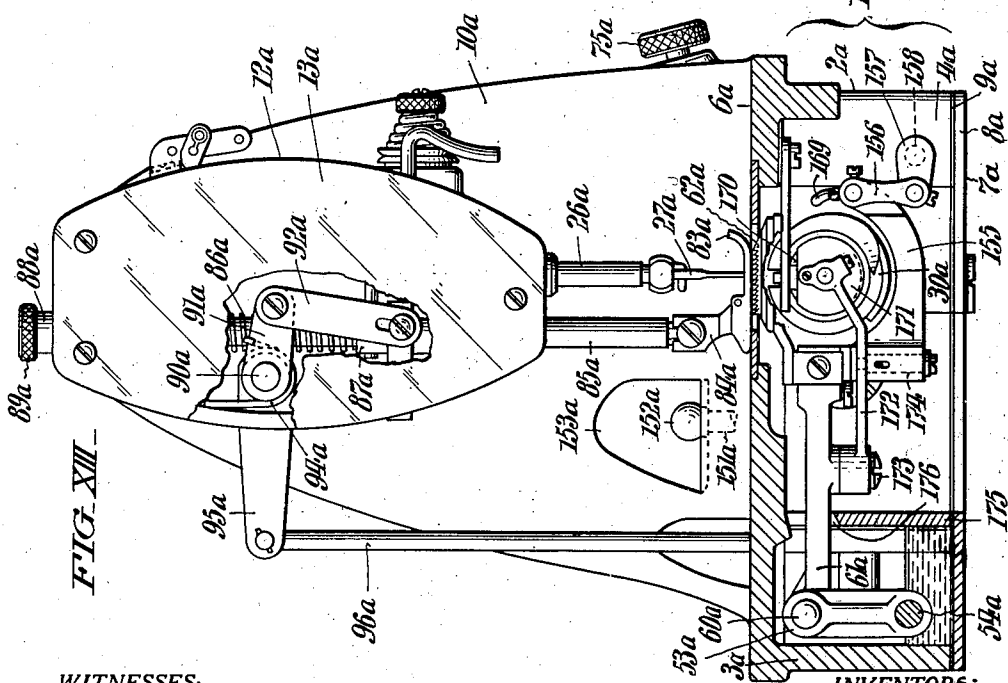


FIG. XIII



WITNESSES:

Hubert Fuchs

George L. Comby

INVENTORS:

George Sauer,

Albert M. Schweda

BY Clarence C. Smith,

Paul Paul

ATTORNEYS.

UNITED STATES PATENT OFFICE

2,393,815

SEWING MACHINE

George Sauer, Berwyn, and Albert M. Schweda
and Clarence C. Smith, Chicago, Ill., assignors
to Union Special Machine Company, Chicago,
Ill., a corporation of Illinois

Application January 8, 1940, Serial No. 312,898

16 Claims. (Cl. 112—256)

This invention relates to sewing machines. More particularly, it has reference to sewing machines of the flat bed type, and in certain of its phases is concerned with improvements useful in connection with both chain stitch and lock stitch machines.

The chief aim of our invention is to provide for automatic circulating lubrication, not only of the mechanisms of a sewing machine by which the complementary or lower stitch forming element and the feed element are operated, but also of the mechanism which imparts movement to the needle or needles and at the same time provide against the escape of lubricant to the outer surfaces of the machine frame and the parts which directly engage the work being sewed.

A further aim of our invention is to provide for controlled distribution of the oil from the supply source to the several mechanisms of the sewing machine without necessitating the aid of any special oil displacing means requiring additional power for its operation, and also to provide for the return to the base of the machine of the excess oil released from the several mechanisms likewise by means capable of functioning without requiring power for its actuation.

In connection with a lock stitch sewing machine having the above attributes, it is a further object of our invention to provide for the lubrication of the rotary hooks with oil taken from the same source of supply as is used for the other moving parts of the machine.

Other objects and attendant advantages of our invention will appear from the following detailed description of the attached drawings, wherein

Fig. I is a view in vertical longitudinal section of a sewing machine conveniently embodying the present improvements.

Fig. II is a horizontal section taken at a level below the top of the work-supporting base of the machine.

Figs. III and IV are cross sections of the machine taken as indicated respectively by the angled arrows III—III and IV—IV in Figs. I and II.

Fig. V is a view partly in end elevation and partly in transverse section taken as approximately indicated by the arrows V—V in Figs. I and II.

Fig. VI is a plan view of the free end portion of the work support with a supplemental cover plate therefor removed.

Fig. VII is a fragmentary detail sectional view taken as indicated by the angled arrows VII—VII in Figs. II and VI.

Fig. VIII is a detail view in perspective of a tube by which oil is conducted to the needle operating mechanism of the machine.

Figs. IX, X and XI are views corresponding to Figs. I, II and III showing a modified form of our invention.

Fig. XII is a fragmentary view in section taken as indicated by the angled arrows XII, XII in Figs. I, II, IX and X.

Fig. XIII is a view, partly in end elevation and partly in transverse section, taken as approximately indicated by the angled arrows XIII—XIII in Figs. IX and X; and

Figs. XIV and XV are detail views which will be more specifically referred to hereinafter.

In the form illustrated in Figs. I—VIII of these drawings, our improved sewing machine comprises a base 1 with front and rear side walls 2 and 3, end walls 4 and 5, and a top wall 6, which latter is adapted to serve as the work support. The hollow of the base 1 is closed at the bottom for the formation of an oil tight chamber 7, by a removable plate 8 between which and the lower edges of the side and end walls 2—5, a sealing gasket 9 is interposed. Rising from the base 1 at one end is a hollow standard 10 with an integrally formed hollow arm 11 which overreaches the work support 6. As shown, the arm 11 terminates in a hollow head 12 which is closed at the front by a removable cover 13. The hollow of the arm 11 is subdivided by partitions 14 and 15 whereof the former separates the hollow of the head 12 from the hollow of said arm. The partition 15 is in effect an upward continuation of the inner face wall of the standard 10, and, with the partition 14, defines an isolated central chamber 16 within the arm. Journaled in bearing bushings 17 and 18 respectively in the partitions 14 and 15, and also in a bearing bushing 19 set into the rear wall of the standard 10, is a rotary shaft 20 which protrudes through the end bearing 19, and which at the exterior is provided with a combined hand and belt wheel 21 whereby the machine may be operated either manually or under power. From Fig. I, it will be noted that at its left hand end, the shaft 20 extends through the bearing 17 into the hollow of the head 12 where it carries a disk 22 with a crank pin 23, which, through a link 25, induces endwise reciprocatory movements of a vertical bar 26 having a needle 27 at its lower end. As shown, the needle bar 26 is guided in its reciprocation by in-set bushings 28 and 29 respectively at the top and bottom of the head 12. Co-operating with the needle 27 beneath the work support of the machine is a loop taker in the form

of a rotary hook 30 at the outer end of a shaft 31 which extends into the chamber 7 and is journaled for the greater portion of its length in a bushing 32 set into the end wall 4 of the base 1. Within the chamber 7, the bushing 32 is further supported by a bearing lug 33 pendant from the top wall 6 of the base 1. At its inner end the hook shaft 31 protrudes through the sleeve 32 and is journaled in a cap bearing bushing 35 set into another lug 36 pendant from the top wall 6 of the base 1. Through the medium of a pair of intermeshing spur gears 37 and 38, the hook shaft 31 is driven from a rotary shaft 40 which is journaled in bearings 41 and 42 respectively set into the end wall 4 of the base 1 and into an integrally formed web 43 extending inward of the chamber 7 from the rear wall 3 of the base and in a bearing 44 in the lug 33, as best shown in Fig. II. The lower shaft 40 is driven in unison with the upper or power shaft 20 through a train of spur gears 45, 46 and 47 within the hollow of the standard 10. It is to be noted however, that the ratio of the gears 37 and 38 is such that the rotary hook 30 is caused to make two complete rotations for each reciprocation of the needle bar 26 as is more or less usual in lock stitch sewing machines.

The mechanism herein illustrated for feeding the work during the stitching is of a reversible type generally similar in construction and operation to that disclosed in U. S. Patent No. 2,035,508 granted to George Sauer, one of the present applicants, and Clarence C. Smith, on March 31, 1936. As shown, this feeding mechanism includes an eccentric 50 on the lower shaft 40, which, through a telescopic link 51, is connected to an upward arm 52 of a rocker 53 on a rock shaft 54. As seen in Fig. II, this rock shaft 54 is journaled in bushings 55 and 56 respectively set into the forwardly off-set portions 57 and 58 respectively of the end and rear side walls 4 and 3 of the base 1. Pivotally connected to the top of the rocker 53 by a pin 60 is a carrier bar 61 for a feed dog 62 (Fig. V). Thus the feed dog 62 receives its horizontal or work advancing movements as a consequence of the afore-described connections with the eccentric 50 on the shaft 40. Lift movements are imparted to the feed dog 62 by a crank 63 at the outer (left hand) end of the shaft 40, through a pendant strap link 65 which is connected at its lower end to a downwardly and forwardly curved arm 66 on the feed dog carrier 61, see Fig. V. For the purpose of controlling the stroke of the feed dog 62, there is provided a regulating mechanism including a shaft 67 which is suitably journaled in the bearing lug 33 and the web 43 within the chamber 7. At its left hand end in Fig. II, the regulating shaft 67 carries an arm 68, which, through a lazy bar 69, is connected to the tubular component 70 of the telescopic link 51. At its right hand end, beyond the web 43, the regulating shaft 67 is provided with a finger 71 which is subject to the influence of a torsion spring 72 and which is rotatively shiftable against the action of said spring by means of a setting stem 73 extending upward at an angle toward the front of the machine and passing through the front side wall of the standard 10. At its inner end, the stem 73 has screw threads engaging a lug 74 within the base 1, and at its outer end is provided with a knurled head 75 by which it can be conveniently manipulated in making the adjustments. While, as before noted, the feed mechanism herein shown is generally similar to

that of the patent referred to, it is to be particularly noted that except for its carrier bar 61, it is entirely enclosed within the lubrication chamber 7, said carrier bar extending to the exterior through a clearance opening 76 in the portion 77 of the end wall 4 of the base 1.

In order to preclude the escape of lubricant through the opening 76, a moving seal 78 is provided to bear fluid-tight against the face of a circular recess 79 machined into the inner side of the wall portion 77. As shown, the seal 78 comprises a plurality of washers 80 which snugly fit around the cylindric shank of the carrier bar 61. A forked leaf spring 81 secured at its lower end to the wall portion 77 within the chamber 7 by a screw 82 presses upon the washers 80 to maintain the fluid seal.

Arranged to hold the work down on the top wall 6 normally and to oppose the feed dog 62 during feeding is a presser foot 83, see Fig. V. As shown, this presser foot 83 is pivotally connected to a shank member 84 at the lower end of a presser bar 85 which extends upward into the needle head 12. The presser bar 85 is yieldingly urged downward by a helical spring 86 which surrounds it and bears at its lower end upon a collar 87 affixed to said bar. At the top, the spring 86 bears against a screw bushing 88 whereby said bar is guided at its upper end. As shown, the bushing 88 has a knurled head 89 whereby it may be manipulated to regulate the tension of the spring 86 from the exterior of the needle head 12.

For the purpose of controlling the presser foot 83, there is shown a means which includes a shaft 90 located in the frame arm 11 in parallel relation to the drive shaft 20 and journaled in the partitions 14 and 15. From Figs. I and V it will be observed that the shaft 90 extends into the head 12 and is there provided with an arm 91, which, through a slotted link 92, is connected to another collar 93 on the presser bar 85. This collar 93 is free to slide on the bar 85 and is spaced somewhat from the lower face of the collar 87 so that said bar is subject only to the spring 86 normally. A torsion spring 94 exerting its influence upon the arm 91 tends to rotate the shaft 90 clockwise in Fig. V. Secured to the shaft 90 within the central compartment 16 of the frame arm 11 is an operating lever 95 (Fig. V) which extends laterally through a clearance opening in the rear side of said arm for connection to the upper end of a pendant link rod 96. This rod 96 passes through a guide hole in the top wall 6 of the base 1 and is connected at its lower end to one extremity of a motion translating lever 97, see Figs. II and IV, which is fulcrumed medially on a stud 98 projecting outward from the inwardly recessed portion 99 of the rear side wall 3 of the base 1. The other extremity of the lever 97 is engaged from beneath by a pad at the top of a vertical thrust rod 100 which may extend to a suitable actuating knee press or foot treadle, not illustrated. Thus, by the means just described, the presser foot 83 can be lifted for convenience of initially inserting the work beneath it or at other times when desired or necessary.

In practice, the chamber 7 within the base 1 is kept filled with lubricating oil to the level indicated at L in Fig. I so that the driving gear wheel 47 on the lower shaft 40 normally dips into it. As a consequence, oil is carried up to the gears 46 and 45 to lubricate them, and by rapid rotation of the three gears, part of this

oil is thrown off and dispersed in the form of a mist within the hollow standard 10. Some of this dispersed oil is trapped in a recess 102 in the top of the right hand end bearing 19 (Fig. I) for the upper left shaft 20 and led through a connecting duct 103 to the surface of the shaft within said bearing, and the excess which oozes from the outer end of said bearing returned into the standard by way of a duct shown at 104. Part of the dispersed oil moreover enters the bearing 18 to lubricate it, and some of it also finds its way into recesses 105 and 106 respectively, in the tops of thrust collars 107 and 108 at opposite sides of the gear 46 on the fixed shaft 109 whereon said gear revolves, and, through connecting ducts 110 and 111 respectively, reaches the rotary bearing surface of said gear. Still another portion of the dispersed oil is trapped in a well 112 integrally formed on the machine frame within the standard 10 at a level above the lower shaft 40. Leading from the well 112 through the top wall 6 of the base 1 is a horizontal duct 113 which terminates in a recess 116 in the depressed portion 117 of the upper surface of the left hand end of the base top wall 6. Also leading from the well 112 is a duct 114 which carries oil down to the right hand bearing 42 for the lower shaft 40. As shown in Fig. VI, the recess 116 is considerably enlarged in area as at 118 for provision of an auxiliary oil distributing reservoir and is closed by a removable oil sealed cover plate 119 which fits the depression 117 in the base wall 6 and which is held in place by screws. At the bottom the reservoir 118 has a plurality of wick filled holes 120, 121, 122, 123, 124 and 125. The hole 120 discharges oil into a duct 126 (Figs. II and VI) which leads down through the end wall 4 of the base 1 to the bearing 41 for the shaft 40, and extending laterally from said duct is a wick filled tube 127 from which oil is carried onto the feed lift link 65 at the outer end of said shaft. From the hole 121 oil is released into the open end of the pivot pin 60 for the rear end of the feed dog carrier bar 61, which pin, as clearly shown in Figs. II and VII, is hollow and the oil carried from thence, through ports 128, to the upper bearing bosses of the feed rocker 53. The hole 122 releases oil onto the telescopic link 51 to lubricate it and its eccentric 50, while the hole 123 releases lubricant into a port 129 in the top of the arm 52 of the feed rocker 53, see Figs. II and VII. The holes 124 and 125 lie directly above the pivot ends of the lazy bar 69 and release oil to drop into ports 130 and 131 in the top of said bar. Leading down from the auxiliary reservoir 118 respectively in the rear wall 3 of its base 1 and in the bearing lug 33 are ducts 132 and 133, 134 respectively. From Fig. VII it will be noted that the duct 132 discharges oil into the feed rocker shaft 54 which is hollow, by way of registering ports 135 and 136 respectively, in the tops of the bearing 56 and said shaft. The ducts 133 and 134 on the other hand carry oil down into the bearings 44 and 32 respectively, for the lower shaft 40 and the hook shaft 31. Another port 137 at the bottom of the shaft 54 conducts oil to the bearing surfaces of the feed rocker 53 as is also clearly shown in Fig. VII. Another duct 138 extends down through the lug 36 from the auxiliary reservoir 118 to the inner or cap bearing 35 for the rotary hook shaft 31 which is tubular and open at its inner end within said bearing. Oil so received within the hook shaft 31 is conducted to the interior of the hook 30 which may be of

the construction disclosed in U. S. Patent No. 2,035,984 granted to one of the present applicants on March 31, 1936. The hole shown at 139 in Figs. III and VI serves as a vent to keep the auxiliary reservoir 118 from becoming air bound. The rotary hook 30, as well as the bearings for its shaft 31 and its actuating gears 37 and 38 are thus lubricated from the same source as the other mechanisms of the machine. As a means for controlling flow of oil into the rotary hook 30 we have shown in Fig. I, a regulatable screw 34 which laterally enters the hook shaft 31 exteriorly of the base 1 in the interval between the end wall 4 of the latter and the hook 30, and which forms a partial obstruction crosswise of the duct of said shaft.

In order that the one source of lubrication may be utilized as well for the needle operating mechanism, we have provided within the frame arm 10, a tube 140 which passes through both partitions 14 and 15 and which inclines downwardly toward the needle head 12. At its rear end within the standard 10, the top of the tube 140 is cut away as at 141 to form a trap in which some of the oil dispersed within said standard is caught. Wicks 142 and 143 at the left hand end of the tube 140 carry the trapped oil to various moving parts of the needle operating mechanism in a manner obvious from Fig. I.

The excess oil dripping from the needle actuating mechanism is collected in a small sump 145 at the bottom of the head 12 for return to the main supply source of lubricant in the base 1 by a wick 146. As shown, the wick 146 is enclosed in a tube 147 which extends up within the head 12 and through the partition 14, then continues through the central chamber 16 of the arm 11, and finally extends down through the wall of the standard 10, terminating at a level below the sump 145 in the head 12 immediately above the oil well 112. This difference of level between the wick ends insures flow of oil rearward from the needle head 12 to the base 1 by capillary action. The left hand bearing 17 (Fig. I) for the needle shaft 20 is lubricated by oil entering it from a port 148 at the top in registry with a vertical duct 149 in the partition 14, said duct communicating through a transverse duct 150 with the tube 140.

For convenience of checking the level of the oil in the base from time to time, there is shown in Figs. I and IV a gauge rod 151 which fits tightly into a hole in the work support 6. A grasp knob 152 at the top of the gauge rod 151 is conveniently accessible from the exterior within a recess 153 at the back of the standard 10.

Except as presently pointed out, the sewing machine illustrated in Figs. IX-XV is generally similar to the one first described, and accordingly, in order to preclude repetitive description, all corresponding elements of the second machine are identified by the same reference characters previously employed, with addition in each instance however of the letter "a" for convenience of distinction. In the second embodiment of our invention, see Fig. XIII, the feed dog carrier bar 51a is extended as at 155 to underreach the rotary hook 30a, and connected by a drop link 156 to an arm 157 on a rock shaft 158 which extends through the end wall 4a of the base 1a into the lubricant chamber 7a, see Figs. IX and X. To the inner end of the shaft 158 is secured an upwardly extending arm 159 which is coupled, by means of a downwardly curved link 160 with component 161 of the telescopic link 51a, see

Fig. X also. Through the means just described, lift movements are imparted to the feed dog 62a in precisely the same manner as set forth in U. S. Patent 2,156,525 granted to Norman V. Christensen et al. on May 2, 1939. The important feature to be noted here, however, is that part of the feed lift means is enclosed within the lubricant chamber 7a.

Another change to be noted in the present instance is that instead of an eccentric, a crank pin 162 is provided on the lower shaft 40a, and moreover that said shaft does not extend through the end wall 4a of the base 1a. As shown, the crank pin 162 is fixed in a disk 163 secured by a pair of screws 164 to a small head 165 at the corresponding end of the shaft 40a. In assembling the machine, the shaft 40a is introduced endwise through an opening 166 in the end wall 4a of the base or through an opening 166x in the opposite end wall 5a, said openings being just large enough to admit the head 165, and closed by screw plugs 167 and 167x respectively, and the crank disk 163 thereafter applied to said shaft. This construction obviates the necessity for unduly large openings which would have to be provided in the base 1a if the crank disk 163 were integrally formed with the shaft 40a. The disk 163 dips into the oil supply L within the base 1a, as shown in Fig. IX, and by its rotation splashes oil about in the forward part of said base. This locally splashed oil finds its way into ports at the tops of various parts of the feeding mechanism (Fig. X) to lubricate the pivots and shafts of the said mechanism. Some of this splash oil is, moreover, carried by wick tube 169 through the end wall 4a of the base 1a, to the parts of the feed lift means externally of the base as shown in Fig. X.

Another difference to be noted in the form of machine illustrated in Figs. IX and X is that no provision is made for lubrication of the rotary hook 30a which is of a "dry" type such as featured in co-pending application 159,646 filed by Charles F. Rubel on August 18, 1937 and now matured into Patent No. 2,246,010, dated June 17, 1941. As in the application just referred to, the bobbin case holder 170 of the rotary hook 30a has axial play which is controlled by a keeper disk 171. This keeper disk 171 is supported by an arm 172 which is swingable outward about a fulcrum 173 on the feed dog carrier bar 61a to the position shown in dot and dash lines in Fig. X, to enable bobbin changes to be made. The arm 172 is normally held in the full line position by a spring latch bolt shown at 174 in Fig. XIII.

Still another departure from the first described embodiment of our invention is that, in the present instance, the end wall 4a is formed with a removable plate section 175 with a clearance opening 176 through which the feed carrier bar 61a extends. If desired the opening 176 may be sealed oil tight in the same manner as in Fig. II. While in Fig. IX we have not shown any means for returning oil accumulation from the needle head 12a to the base, a tube such as shown at 140 in the first embodiment may be installed for that purpose.

Having thus described our invention, we claim:

1. A sewing machine comprising a frame with a hollow work support containing a supply of lubricating oil, and a hollow communicating standard rising from the work support and sustaining an overreaching arm which terminates in a hollow head; needle operating mechanism within the head; a shaft extending horizontally

through the frame arm from which the needle operating mechanism derives its motion; complementary stitch forming mechanism actuated from another shaft which extends horizontally through the work support; a train of gears within the hollow of the standard connecting the two shafts, one of said gears dipping into the lubricant within the work support, and, by its rotation, dispersing oil within the standard; an open ended duct extending from the needle head to the top of the hollow within the standard whereby some of the oil dispersed as aforesaid is caught and conducted to the needle operating mechanism; and means operative by capillary action for lifting and returning the excess oil from the needle head to the supply within the work support including a wick which extends from the bottom of the head and terminates at a lower level but above the supply in said work support.

2. A sewing machine according to claim 1, wherein a well within the frame traps some of the dispersed oil; wherein a duct conducts oil from the well to the bearings of the lower shaft; and wherein the wick discharges directly into said well.

3. A sewing machine according to claim 1, wherein the arm provides front and rear bearings for the upper shaft; wherein the front bearing is lubricated by oil delivered through a port connecting with the duct by which oil is carried to the needle operating mechanism; and wherein the rear bearing of the upper shaft is formed at the top with a port which receives some of the dispersed oil and conducts it to the shaft surface within said bearing.

4. A sewing machine comprising a frame with a hollow work supporting base containing a supply of lubricating oil, and a standard rising from the base and sustaining an overreaching arm; a needle with operating mechanism therefor at the free end of the arm; a rotary hook to cooperate with the needle in stitch formation; a shaft whereon the hook is mounted extending horizontally into the interior of the base; an actuating shaft extending horizontally within the base to which the hook shaft is geared; means on the latter shaft dipping into the oil and by its rotation dispersing the oil within the hollow of the standards; inclined conduit means from within the upper part of the standard trapping some of the dispersed oil and conducting it downwardly through the frame arm to the needle operating mechanism; an oil well within the frame base and lower part of the standard for trapping some of the dispersed oil; and a duct for carrying oil from said well to an auxiliary reservoir in the base top wall for distribution to the bearings of the rotary hook shaft as well as the shaft to which said hook shaft is geared.

5. A sewing machine according to claim 4, wherein the hook shaft is hollow; and wherein lubricating oil is conducted from the auxiliary reservoir to the hollow of the rotary hook shaft for conveyance to the rotary hook.

6. In a lock stitch sewing machine having a hollow base and a rotary hook, a hollow shaft passing through a bearing in a side wall of the base to the interior of the latter to the outer end of which shaft the rotary hook is secured; means within the top wall of the base for conducting oil into the shaft for lubrication of the hook; and a regulatable screw which enters the shaft laterally between the hook and the base wall with its shank forming a partial obstruction crosswise of

the hollow of said shaft to control flow of oil to the hook for lubrication of the latter.

7. In a sewing machine, a frame with a hollow base containing a supply of lubricant, and a standard rising from the base and sustaining an overreaching arm which terminates in a hollow head having a sump below the level of said arm; needle operating mechanism within the head; means for conducting lubricant from the supply in the base to the interior of said hollow head for lubricating said needle operating mechanism; and means disposed wholly within said arm operative by automatic siphonal action independently of the operation of the machine to return through said arm excess lubricant released from said needle operating mechanism within the head and collected in said sump to the supply in the base.

8. In a sewing machine, a frame with a hollow base containing a supply of lubricant, and a standard rising from the base and sustaining an overreaching arm which terminates in a hollow head; needle operating mechanism within the head; means for conducting lubricant from the supply in the base to the needle operating mechanism; and means operative by combined capillary and siphonal action for returning excess lubricant released from the needle operating mechanism in the head to the supply in the base, including a tube with a wick therein which extends from the bottom of said head and terminates at a lower level within the standard above said oil supply.

9. In a sewing machine, a frame with a hollow base containing a supply of lubricant, and a hollow communicating standard rising from the base and sustaining a hollow overreaching arm which terminates in a hollow head; needle operating mechanism within the head; means for conducting lubricant from the supply in the base to the needle operating mechanism; and means operative by combined capillary and siphonal action for returning excess lubricant released from the needle operating mechanism in the head to the supply in the base, including a tube with a wick therein which extends from the bottom of the head horizontally through the overhanging arm, and which terminates at a lower level within the standard above the lubricant supply.

10. In a sewing machine, a frame with a hollow base containing a supply of lubricant, and a hollow communicating standard rising from the base and sustaining an overreaching arm which terminates in a hollow head having a sump below the level of said arm; needle operating mechanism within the head; means for conducting lubricant from the supply in the base to the needle operating mechanism including a substantially horizontal open-ended duct which extends from within the needle head to the top of the hollow of the standard, and means within the standard for elevating lubricant from the supply within the base to the receiving end of the duct; and means including a tube with a wick therein extending through said arm operative by combined capillary and siphonal action for returning excess lubricant released from the needle operating mechanism in the head and collected in said sump to the supply in the base.

11. In a sewing machine, a frame with a hollow base containing a supply of lubricant and a standard rising from the base and sustaining an overhanging arm which terminates in a hollow head having a sump below the level of said

arm; needle operating mechanism within the head; cooperating mechanism within the base beneath said overhanging arm, constantly operative means for delivering lubricant withdrawn from the supply in the base to the interior of said head for lubricating said needle operating mechanism; and constantly operative means disposed wholly within said arm for collecting and conducting through said arm excess lubricant released from the needle operating mechanism within the head to said cooperating mechanism to lubricate the latter and thence to said supply in the base.

12. In a sewing machine, the combination of a frame with a hollow base containing a supply of lubricant, and a standard rising from the base and sustaining an overreaching arm which terminates in a hollow head; needle operating mechanism within the head; means for delivering lubricant by combined splash action and gravity from the supply in the base to the interior of said hollow head for lubricating said needle operating mechanism; a sump in the needle head below the level of said arm for collecting excess oil released from the needle operating mechanism; feed actuating mechanism within the hollow of the base beneath said overreaching arm; and constantly operative means for elevating lubricant from the sump in the needle head and conducting the same through said arm directly to the feed actuating mechanism to lubricate the latter.

13. In a sewing machine, a combination of a frame with a hollow base containing a supply of lubricant, and a standard rising from the base and sustaining an overreaching arm which terminates in a hollow head; needle operating mechanism within the head; means for delivering lubricant by combined splash action and gravity from the supply in the base to the interior of said hollow head for lubricating said needle operating mechanism; a sump in the needle head below the level of said arm for collecting excess oil released from the needle operating mechanism; feed actuating mechanism within the hollow of the base; and constantly operative means including a self-starting siphon for conducting lubricant from the sump in the needle head through said arm to said feed actuating mechanism to lubricate the latter.

14. In a sewing machine, the combination of a frame with a hollow base containing a supply of lubricant, and a standard rising from the base and sustaining an overreaching arm which terminates in a hollow head; needle operating mechanism within the head including a reciprocable member carrying a needle; constantly operative means for delivering lubricant withdrawn from the supply in the base to the interior of said hollow head for lubricating said needle operating mechanism; a sump in the needle head below the level of said arm; a rotary hook cooperating with the needle beneath the work support and having a bearing surface between its rotating and non-rotating components; and means effective independently of the operation of the machine for elevating the lubricant from the sump in the needle head and conducting the same through said arm and thence to the bearing surface of the hook.

15. In a sewing machine, the combination of a frame with a hollow base containing a supply of lubricant, and a standard rising from the base and sustaining an overreaching arm which terminates in a hollow head; needle operating mech-

anism within the head including a reciprocable member carrying a needle; constantly operative means for delivering lubricant withdrawn from the supply in the base to the interior of said hollow head for lubricating said needle actuating mechanism; a sump in the needle head below the level of said arm; a rotary hook cooperating with the needle beneath the work support and having a bearing surface between its rotating and non-rotating components; means for conducting lubricant from the sump in the needle head through said arm to the bearing surface of the hook; and means adjacent to and accessible exteriorly of said hook for controlling the amount of lubricant flowing to said bearing surface, the construction and arrangement being such that excess lubricant withdrawn from the sump is returned to said supply in the base.

16. In a sewing machine, a frame with a hollow base containing a supply of lubricant and

a standard rising from the base and sustaining an overreaching arm which terminates in a hollow head; needle operating mechanism within the head; cooperating mechanism within the base beneath said arm; means for transferring lubricant from the supply in the base to the interior of said head for lubricating said needle operating mechanism at a substantially invariable rate which is independent of the operation of the machine during a normal operating period; a sump in said needle head below the level of said arm for collecting surplus lubricant released from the needle operating mechanism; and constantly operable means for elevating lubricant from the sump in the head and delivering it through said arm to said cooperating mechanism within the base to lubricate it.

GEORGE SAUER.
ALBERT M. SCHWEDA.
CLARENCE C. SMITH.