Sept. 14, 1943. G. SAUER 2,329,487

SEWING MACHINE

Filed April 2, 1940 2 Sheets-Sheet 1

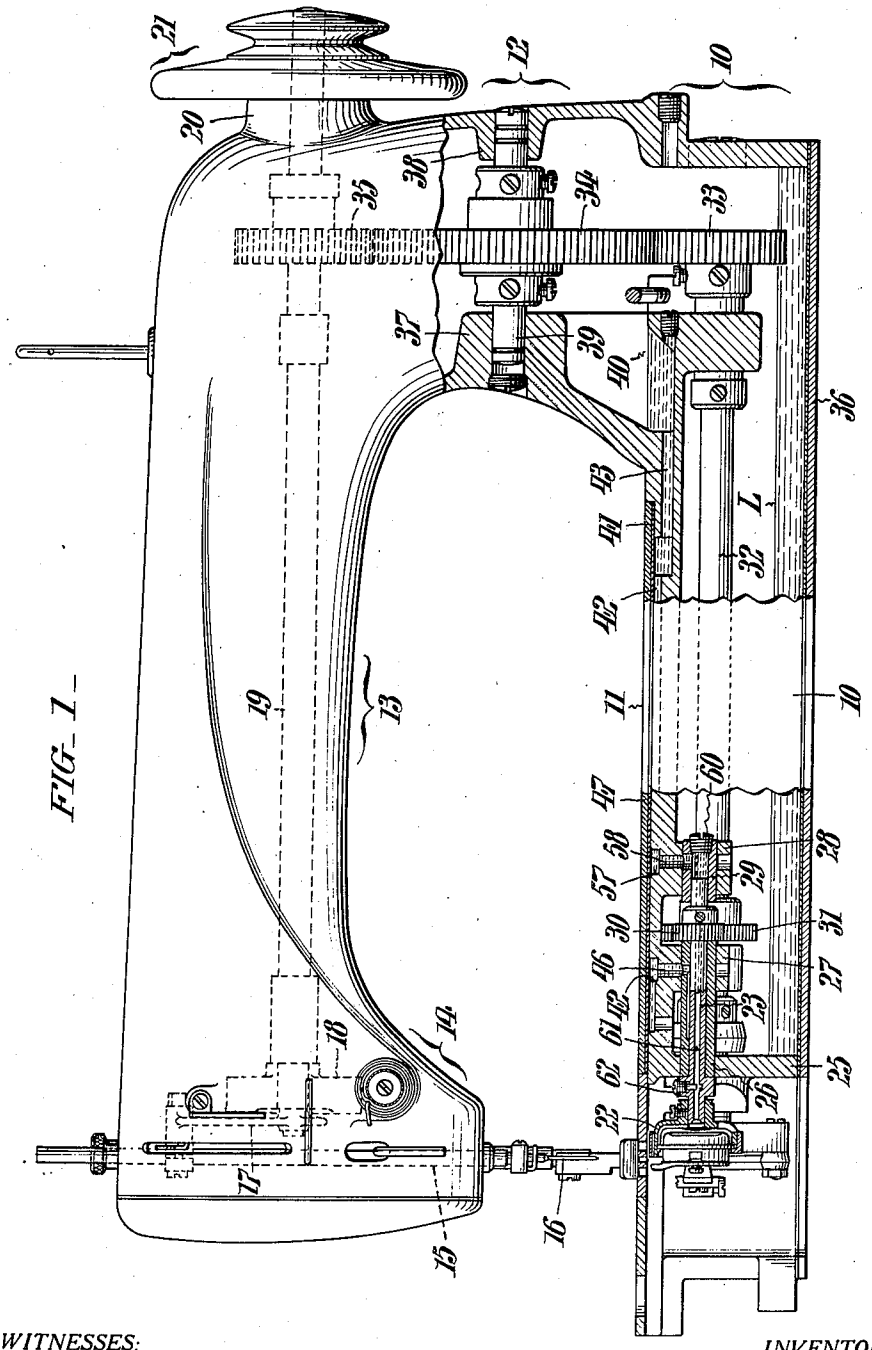


FIG. 1

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FIG. 2.

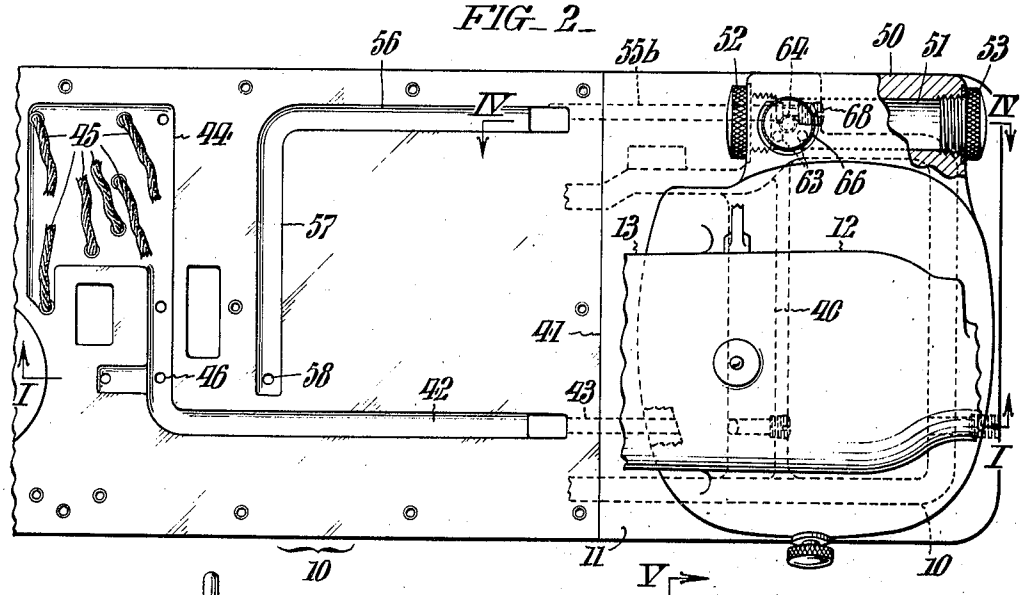
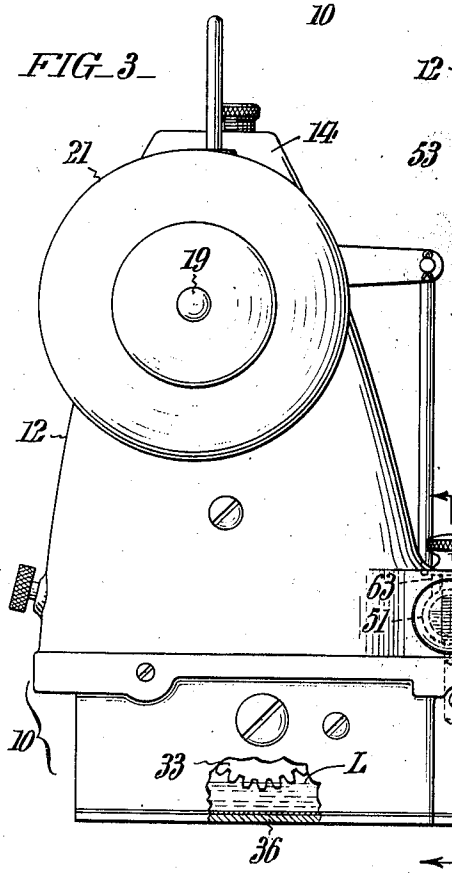


FIG. 3.



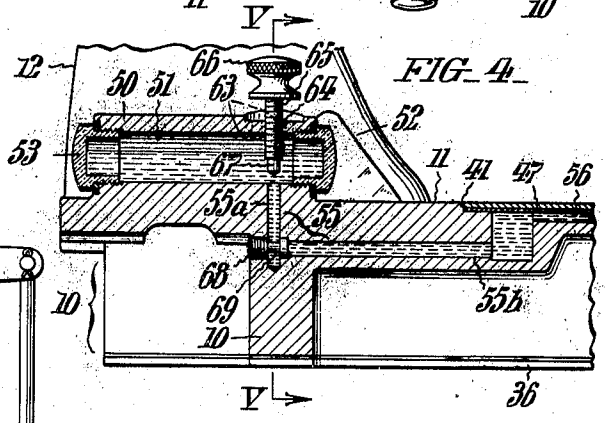


FIG. 5.

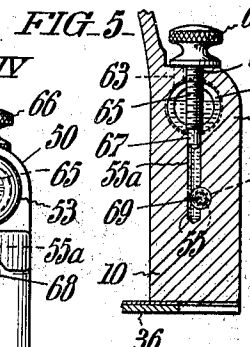
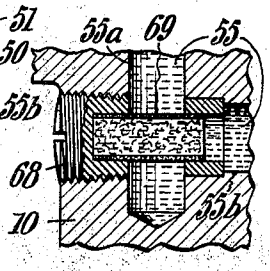


FIG. 6.



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Patented Sept. 14, 1943 2,329,487

UNITED STATES PATENT OFFICE

2,329,487

SEWING MACHINE

George Sauer, Berwyn, Ill., assignor to Union Special Machine Company, Chicago, Ill., a corporation of Illinois

Application April 2, 1940, Serial No. 327,394

8 Claims. (Cl. 112—256)

This invention relates to sewing machines, and has reference more especially to automatic lubricating systems for such machines.

Sewing machine lubricating systems have heretofore been constructed with separately attached reservoirs, and with tubing for conveying the oil from the reservoirs to various individual moving elements which require constant oiling for efficient performance at high speeds. Oiling systems of this type are costly, not only by reason of the great number of parts involved, but also from the standpoint of assembling them, and, were moreover liable to leakage at joints.

The chief aim of my invention is to obviate the above mentioned and other drawbacks. This objective I realize, as hereinafter more fully disclosed, by constructing the oil reservoirs integrally with the machine frames at regions where they will not interfere with the passage of the work or with the manipulation of it by the machine operators, and by forming in the frames, channels or passages whereby the oil is conducted to the parts requiring lubrication.

In connection with lockstitch sewing machines, it is a further aim of my invention to provide for the automatic lubrication of the rotary hooks with oil different than that employed for the other parts of the machines, from auxiliary reservoirs likewise integrally constructed with the machine frames and by way of passages formed in said frames.

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

Fig. 1 is a view partly in side elevation and partly in longitudinal section, of a sewing machine conveniently embodying my invention, the section being taken as indicated by the angled arrows I—I in Fig. 2.

Fig. 2 is a view of the machine in top plan with certain portions of the machine frame broken away and removed, and with other portions shown in section to expose important structural details within.

Fig. 3 shows the right hand drive end of the machine in elevation.

Fig. 4 is a detail sectional view taken as indicated by the angled arrows IV—IV in Figs. 2 and 3.

Fig. 5 is a fragmentary detail sectional view taken as indicated by the angled arrows V—V in Fig. 4.

Fig. 6 is a detail view corresponding to Fig. 4 drawn to a larger scale.

The machine herein depicted is of the type having a hollow base 10 whereof the top 11 constitutes the work support. Rising from the base at the right hand end is a standard 12 from the top of which extends horizontally an overhanging arm 13 terminating in a head 14 at its free end, and suitably guided for up and down movement in said head is a bar 15 with a needle 16 at its lower end. Within the head 14, the bar 15 is connected, by means of a pitman 17, with a crank 18 at the left hand end of a horizontal shaft 19 which is suitably journalled within the overhanging arm 13. At its right hand end, the shaft 19 passes through a bearing boss 20 for attachment thereto at the exterior, of a combined hand and belt wheel 21 by which the machine may be driven manually or under power. Arranged to cooperate with the needle below the work support 11 is a complemental stitch forming means including, in this instance, a rotary hook 22 at the outer end of a shaft 23 which extends through the left hand end wall 25 of the machine base and is journalled in bearing sleeve 26. As shown, the bearing sleeve 26 is supported adjacent one end in the wall 25 and adjacent its other end in a lug projection 27 pendent from the work support 11. Spaced from the projection 27 is another pendant lug 28 which supports a bearing 29 wherein the inner end of the rotary hook shaft 23 is journalled. Through a train of intermeshing spur gears 30 and 31, the rotary hook shaft 23 is driven from a shaft 32 which extends lengthwise of and is suitably journalled within the hollow of the base 10. The shaft 32 is in turn driven, through a train of intermeshing spur gears 33, 34 and 35 within the standard 12, from the upper shaft 19 previously referred to. The base 10 is closed at the bottom by a removable plate 36 and is kept filled with lubricating oil to the level indicated at L in Figs. 1 and 3 with the gear pinion 33 on the shaft 32 dipping into the oil. Thus, by rotation of the gears 33—35, oil is carried up within the hollow of the standard 12 and dispersed therein, some of such dispersed oil finding its way into the bearings 37 and 38 for the shaft 39 of the intermediate gear 34, and some of it finding its way into a catch receptacle 40 formed within the standard 12 substantially at the level of the work support 11. The work support 11 is recessed as at 41, and the recessed portion has a lengthwise extending channel 42 which communicates by way of a duct 43 with the catch receptacle 40 as shown in Fig. 1, and which has a laterally widened terminal end portion or branch 44 (Fig. 2) with openings at the bottom wherefrom a plurality of wicks 45 lead to various

parts of the feed mechanism (not illustrated) of the machine. Part of the oil conveyed through the channel 42 finds its way through a downward port 46 into the bearing sleeve 26 to lubricate the outer surface of the rotary hook shaft 23. As further shown in Fig. 1, a cover plate 47 fits into the recess 40 in the work support 11 to close the channel 42 and its branches at the top. Insofar as described up to this point, the machine is generally like that forming the subject matter of a copending application, Serial No. 311,722, filed by Norman V. Christensen, George Sauer and Oscar Quist on December 30, 1939, to which reference may be had if deemed necessary.

For the purpose of lubricating the rotary hook 22 with different or lighter oil than that used in the base 10, provisions have been made in accordance with my invention as follows:

Integrally formed with the work support 11 at the rear of the standard 12, see Figs. 2 and 3, is a vertically-shallow horizontally-elongate external projection 50 with an axial bore 51 which is closed at opposite ends by removable screw caps 52 and 53 so that it may serve as an auxiliary reservoir for oil. The screw caps 52 and 53 are preferably made of transparent material so that the level of the oil may be observed at all times from the exterior. By reason of its location behind the standard 12, the auxiliary reservoir 51 cannot interfere with the advance of the material being sewed across the work support, and is not in the way of the hands of the operator in manipulating the material. Extending first downwardly from the auxiliary reservoir 51 and then horizontally through the work support 11 is a duct 55 by which the oil is conducted to another channel 56 in the recessed portion 41 of the work support, the last mentioned channel having an inwardly-reaching lateral branch 57 with a terminal port 58 that leads down into the interior of the inner bearing for the rotary hook shaft 23, see Fig. 1. From Fig. 1, it will also be noted that the bearing 29 is closed at one end by a screw plug 60 and that the rotary hook shaft 23 is tubular, i. e., has a lengthwise extending duct 61 which is open at its rear end to the interior of the bearing 29. Consequently, oil will flow by gravity from the auxiliary reservoir 51 by way of the passages 55, 56, 57 and 58, into the duct 61 of the rotary hook shaft 23 and conveyed by the latter to the parts of the rotary hook 22 which require lubrication. Flow of such oil to the rotary hook is controllable by a screw valve 62 whereof the inner end enters the duct 61 within said shaft and forms a regulatable obstruction across it. The breather holes shown at 63 in Figs. 2 and 4 prevent the reservoir 51 from becoming air bound.

The oil supply in the auxiliary reservoir can be replenished from time to time through a filling opening 64 in its top, see Figs. 2 and 5, said opening being threaded to receive a screw plug 65 with a manipulating knob 66 at its upper end. The lower end 67 of the screw plug 65 is reduced in diameter and smooth so that it may enter the vertical branch 55*a* of the passage 55 when the plug is screwed home as shown in Fig. 5, and thereby stop the flow of the oil from the auxiliary reservoir in the event that it should for any reason be necessary to disassemble the parts of the complemental stitch forming mechanism. By reference to Figs. 4 and 6, it will be noted that the horizontal portion 55*b* of the passage 55 is closed at one end by a removable screw plug 68 to permit withdrawal for cleaning, from time to time of a filter screen 69 which, when in position, extends crosswise of the vertical portion 55*a* of the passage 55 and which is packed with a suitable fibrous filtering material, as conventionally indicated in Fig. 6 to intercept any particles of foreign matter carried along in the oil.

Having thus described my invention, I claim:

1. In a sewing machine, a frame providing a work support; a needle movable up and down through the work support; complemental stitch forming means to cooperate with the needle below the work support; an integral projection on the work support having a horizontal bore extending through it and accessible for cleaning from the exterior; removable caps closing the ends of the bore to form a reservoir for lubricating oil; and a gravity flow duct below the surface of the work support by way of which oil is conducted from the reservoir to the complemental stitch forming means.

2. A sewing machine according to claim 1, in which the caps closing the ends of the bore of the projection are of transparent material to enable observation of the oil content of the reservoir from the exterior.

3. In a sewing machine, a frame providing a work support with an overhanging needle arm sustained by a standard at one end of said support; a bar guided for reciprocation in the needle arm and carrying a needle for movement up and down through the work support; complemental stitch forming means to cooperate with the needle below the work support; an integral projection on the work support located out of the way at the rear of the standard, said projection having a horizontal cylindric bore extending through it and accessible for cleaning from the exterior; removable caps closing the ends of the bore to form a reservoir for lubricating oil; and a gravity flow duct below the surface of the work support by which oil is conducted from the reservoir to the complemental stitch forming means.

4. In a sewing machine, a frame providing a work support; a needle movable up and down through the work support; complemental stitch forming means to cooperate with the needle below the work support; an integral projection on the work support having a horizontal bore extending through it and accessible for cleaning from the exterior; removable caps closing the ends of the bore to form a reservoir for lubricating oil; a horizontal gravity flow duct below the surface of the work support for conducting oil to the complemental stitch forming means; a bore extending from the bottom of the reservoir through the work support to the horizontal duct; a filling opening in the top of the reservoir in line with said vertical bore and permitting access to the latter for cleaning; and a removable plug closing said filling opening.

5. In a sewing machine, a frame providing a work support; a needle movable up and down through the work support; complemental stitch forming means to cooperate with the needle below the work support; an integral projection on the work support with a horizontal bore extending through it and accessible for cleaning from the exterior; removable caps closing the opposite ends of the bore to form a reservoir for lubricating oil; a horizontal bore in the thickness of the work support constituting a duct which leads from the reservoir to the complemental stitch forming means; and a removable plug closing one end of the horizontal bore in the work sup-

port and permitting access to said bore for cleaning.

6. In a sewing machine, a frame with a hollow base which contains a supply of lubricating oil and of which the top serves as a work support, and a communicating hollow standard rising from the base and sustaining a horizontal overhanging arm; a needle guided for up and down movement at the free end of the arm; means taking oil from the supply in the base and dispersing it within the standard; a catch receptacle within the standard for trapping some of the dispersed oil; a rotary hook to cooperate with the needle below the work support; a bearing for the shaft of the rotary hook; a gravity duct for conducting oil from the catch receptacle to the surface of the hook shaft within the bearing; an external auxiliary reservoir for lubricating oil integrally formed with the frame above the work support, said reservoir having a smooth cylindric bore with an open end closed by a removable plug; and a gravity duct independent of the first mentioned duct leading from the auxiliary reservoir to conduct oil to the rotary hook.

7. In a sewing machine, a frame with a hollow base which contains a supply of lubricating oil and of which the top serves as a work support, and a communicating hollow standard rising from the base and sustaining a horizontal overhanging arm above the base; a needle at the lower end of a bar guided for up and down movement in the free end of the arm; means taking oil from the supply in the base and dispersing it within the standard; a catch receptacle within the standard substantially at the level of the work support for trapping some of the dispersed oil; complemental stitch forming means to cooperate with the needle below the work support including a rotary hook, and a hollow shaft to one end of which the hook is secured; a bearing on the work support for the hook shaft; a passage in the work support for conducting oil from the catch receptacle to the surface of the hook shaft within the bearing; an external auxiliary reservoir for lubricating oil integrally formed on the frame above the work support at the rear of the standard; another flow passage independent of the first mentioned passage, leading from the auxiliary reservoir through the work support; and means for conducting oil from the last mentioned flow passage into the opposite end of the rotary hook shaft for lubrication of the rotary hook.

8. In a sewing machine, a frame with a hollow base which contains a supply of lubricating oil and of which the top serves as a work support, and a communicating hollow standard which rises from the base and sustains a horizontal overhanging arm; a needle at the lower end of a bar guided for up and down movement in the free end of the overhanging arm; means taking oil from the supply in the base and dispersing it within the standard; a catch receptacle within the standard substantially at the level of the work support for trapping some of the dispersed oil; complemental stitch forming means to cooperate with the needle below the work support comprising a rotary hook, and a hollow shaft to one end of which the hook is secured; a main bearing on the machine frame for the hook shaft; a passage in the work support for conducting oil from the catch receptacle to the surface of the hook shaft within the bearing; an external auxiliary reservoir for lubricating oil integrally formed on the machine frame above the work support at the rear of the standard; another flow passage independent of the first mentioned passage leading from the auxiliary reservoir through the work support; a supplemental bearing on the machine frame into which the opposite open end of the hook shaft extends; and a port extending down into the supplemental bearing from the last mentioned flow passage.

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