June 9, 1936. N. V. CHRISTENSEN 2,043,737

SEWING MACHINE

Filed Nov. 16, 1935 3 Sheets-Sheet 1

FIG. I.

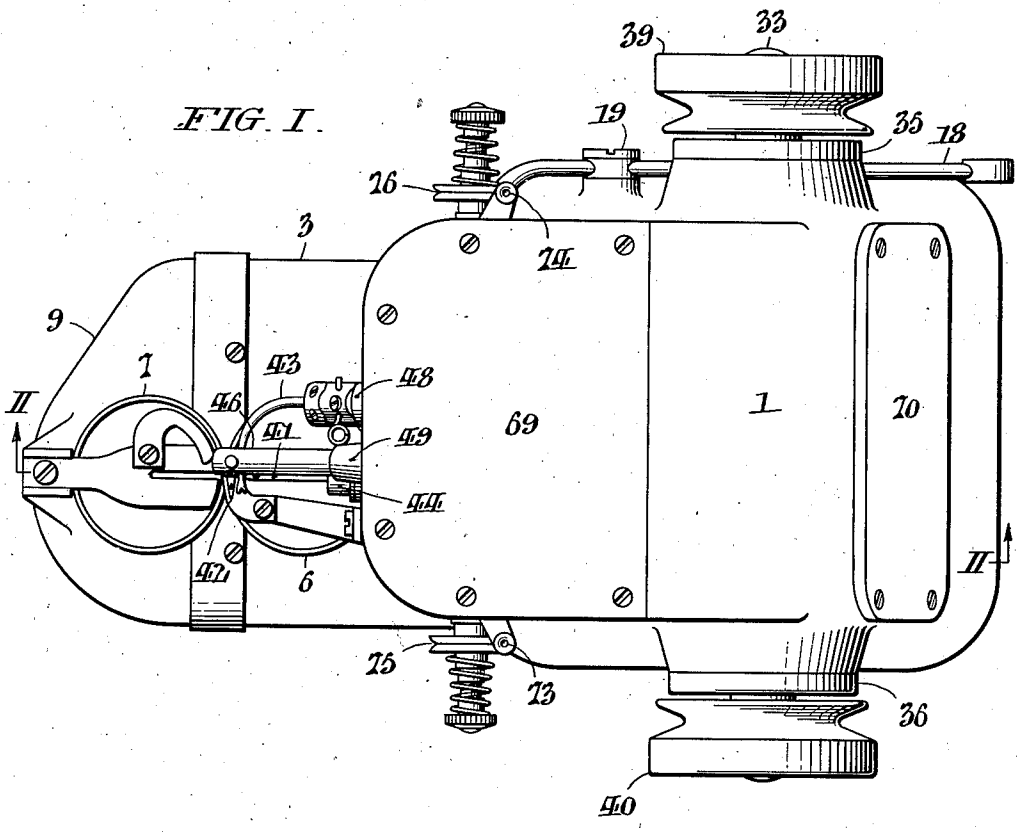
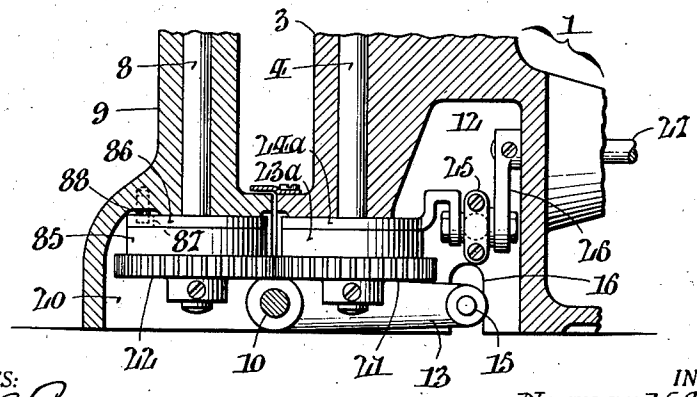


FIG. V.



WITNESSES:
John C. Bergner
John A. Weidler

INVENTOR:
Norman V. Christensen
BY Fraser & Paul
ATTORNEYS.

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FIG. II.

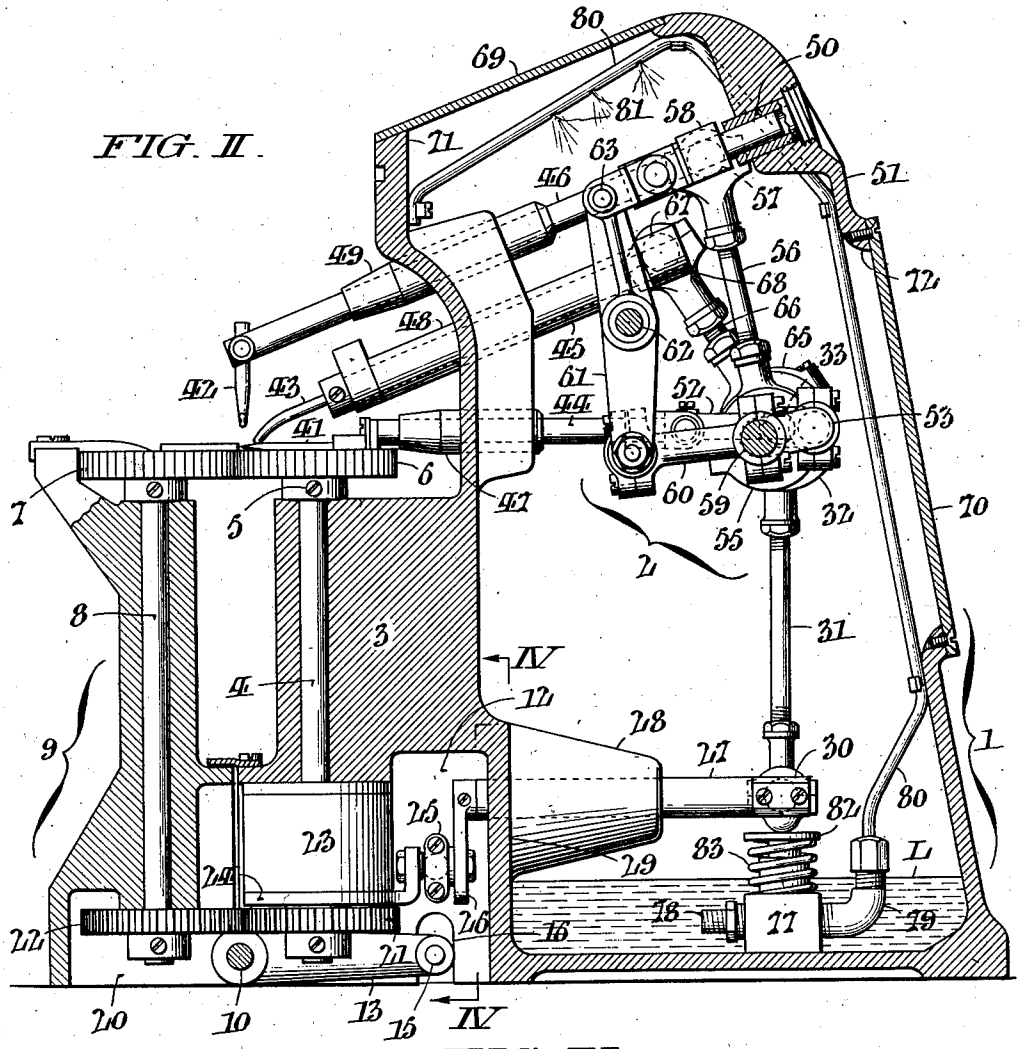
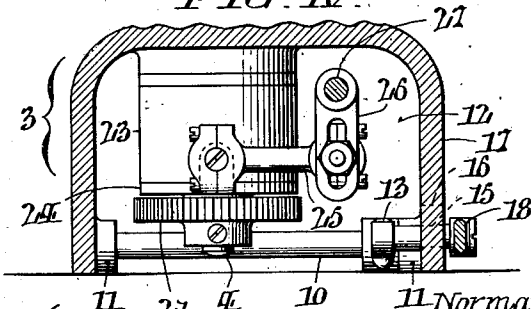


FIG. IV.



WITNESSES:
John C. Bergner
John A. Weidler

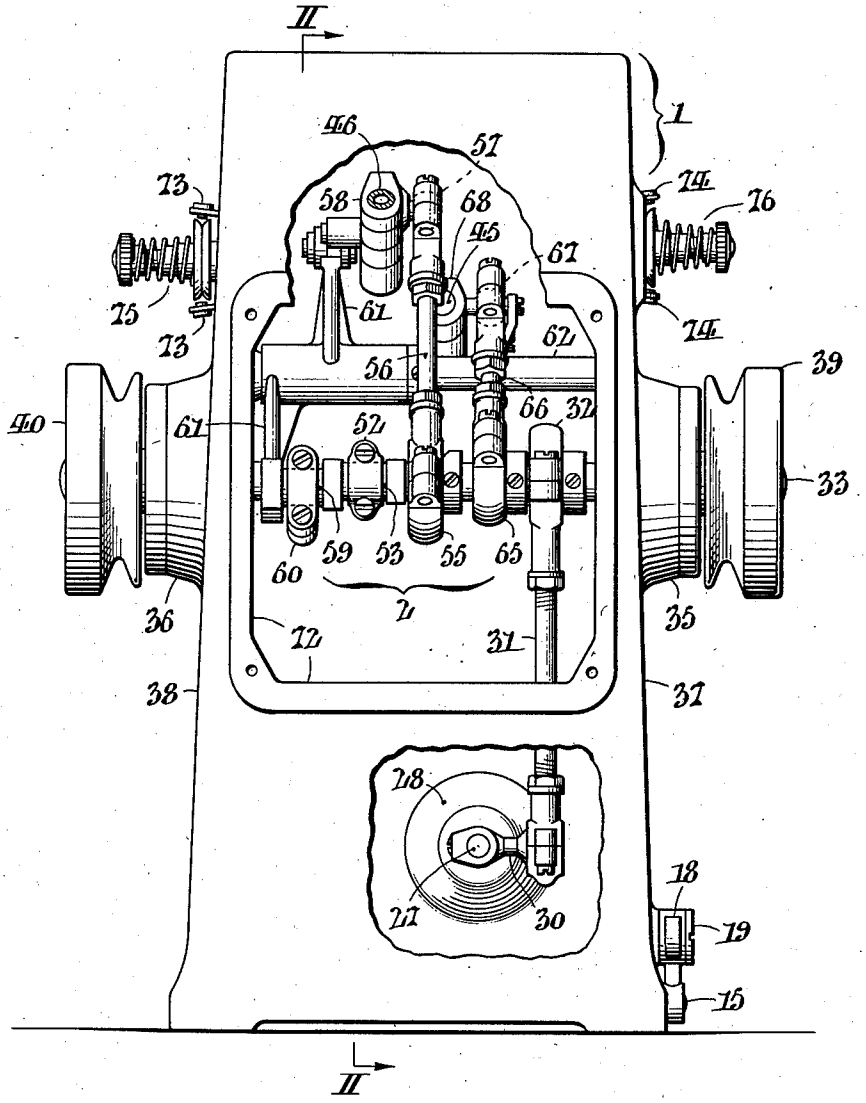
INVENTOR:
Norman V. Christensen
BY Fraser & Paul
ATTORNEYS.

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SEWING MACHINE

Filed Nov. 16, 1935 3 Sheets-Sheet 3

FIG. III.



WITNESSES:
John C. Berger
John A. Weidler

INVENTOR:
Norman V. Christensen
BY Fraley & Paul
ATTORNEYS.

Patented June 9, 1936 2,043,737

UNITED STATES PATENT OFFICE

2,043,737

SEWING MACHINE

Norman V. Christensen, Chicago, Ill., assignor to Union Special Machine Company, Chicago, Ill., a corporation of Illinois

Application November 16, 1935, Serial No. 50,132

7 Claims. (Cl. 112—16)

This invention relates to sewing machines, particularly of the kind known as "cup-feed" machines wherein aligned edge margins of two or more layers or sections of fabric are passed between a pair of cooperating feed wheels or "cups", and incidentally seamed by the stitch forming instrumentalities, i. e., the needles, loopers, spreaders, etc. operating above said feed wheels. In such machines, as heretofore constructed, considerable of the mechanism for actuating the stitch forming instrumentalities and the feed cups was disposed exteriorly of the machine frames or housings, so that the work being operated upon would often become soiled by splashings or droppings of lubricating oil applied to the exterior parts.

My invention is directed toward overcoming the drawback just mentioned, which objective I realize in practice, as hereinafter more fully disclosed, by placing the entire actuating mechanism of the machine within a closed sealed housing containing a supply of oil for its lubrication, and by communicating the necessary movements to the stitching instrumentalities and the feed cups by shafts or bars confined to rotary or rocking and endwise reciprocatory movements or combinations of these movements, and having a close working fit in a wall of the housing, to the exclusion of openings in the latter through which the oil could escape to the exterior and soil the work being operated upon in the machine.

In the drawings Fig. I is a view in plan of a cup feed sewing machine conveniently embodying the present improvements.

Fig. II is a longitudinal sectional view of the machine taken as indicated by the arrows II—II in Figs. I and III.

Fig. III is an end elevation of the machine looking from the right of Figs. I and II with portions of the machine housing broken out to expose the parts at the interior.

Fig. IV is a fragmentary detail sectional view taken as indicated by the arrows IV—IV in Fig. II; and

Fig. V is a fragmentary detail sectional view corresponding to Fig. II and showing a slight modification.

As herein illustrated, my improved sewing machine has an upright hollow oil-tight housing 1 in which the actuating mechanism 2 is enclosed, said housing being formed exteriorly at one end thereof with an integral lateral shelf-like bearing extension 3 wherein is journaled a vertical shaft 4. To the upper end of this shaft 4 above the extension is secured, by means of a set screw 5, a feed wheel or cup 6 which is peripherally serrated and with which cooperates a similar feed wheel or cup 7 at the top of another vertical shaft 8 journaled in an upright bracket arm 9. At its lower end the bracket arm 9 is secured to a transverse pin 10 having its ends rotative in bosses 11 (Fig. IV) within a bottom hollow 12 of the extension 3 of the housing 1, so that during the operation of the machine, the feed wheel 7 can automatically move away from the companion wheel 6 against the pressure of a spring (not shown) as fabric is passed between them. Also affixed to the pin 10 is a horizontal arm 13 (Figs. II and IV) with a lateral stud 15 at its swinging end which extends outward through a vertical clearance notch 16 in the side wall 17 of the hollow 12 for engagement with one end of an actuating arm 18 which pivots on a fixed fulcrum screw 19 at the exterior of the housing, see Fig. I. The opposite end of the arm 18 is adapted to be coupled by means of a rod (not shown) with a suitable foot control treadle or a knee lever. By this arrangement, the bracket 9 can be swung about the pivot 10 to retract the feed cup 7 from the feed cup 6 and thereby facilitate starting of the fabric through the machine. Respectively secured to the lower ends of the shafts 4 and 8 within the hollow 12 and a complemental bottom hollow 20 of the vertical bracket arm 9, are intermeshing spur gears 21, 22 of like diameter. Also mounted on the shaft 4 within the hollow 12 is a driving clutch device 23 of the form disclosed in U. S. Patent No. 1,692,130 granted to W. B. Long et al., by which intermittent motion is imparted to said shaft in one direction through oscillation of an associated disk 24, for communication in like degree to the shaft 8 through the intermeshing gears 21, 22. The feed wheels or cups 6 and 7 are thus positively rotated in unison. From Figs. II and IV it will be observed that the oscillating clutch disk 24 is adjustably coupled, by means of a horizontal link 25, with a pendant arm 26 at the outer end of a shaft 27 which extends, with a close working fit, through a relatively long bearing 28 in the front end wall 29 of the housing 1 into the interior of the latter. A ball arm 30 at the inner end of the horizontal shaft 27 is in turn coupled, by means of a link 31, with an eccentric 32 on the main shaft 33 of the machine which is journaled in bearings 35, 36 afforded by the front and rear walls 37, 38 of the housing 1. To the protruding ends of the main shaft 33 are affixed belt wheels 39, 40, either of which may be used in driving the machine from an electric motor or other suitable power device.

The stitch forming instrumentalities of the machine include a reciprocating needle 41, a looper 42 having four motions, and an oscillating spreader 43, all of which cooperate in a well known manner in forming a line of chain stitches to unite abutted marginal edges of a number of fabric sections concurrently passed between the feed wheels 6 and 7. The needle 41, looper 42 and spreader 43 are respectively secured to the ends of members in the form of shafts or rods 44, 45 and 46 which extend with a close working fit through relatively long bushings 47, 48 and 49 set into the left hand end wall 29 of the housing 1 into the upper part of the latter for actuation by the mechanism 2. The looper rod or shaft 46 is longer than the needle and spreader shafts 44 and 45 and is therefore given additional support at its inner or right hand end within a bushing 50 set into the right hand end wall 51 of the housing 1. From Fig. I it will be seen that the needle 41 moves radially of the two feed wheels 6 and 7 crosswise of the line of tangency, and that its carrier bar or shaft 44 is horizontally disposed. The necessary longitudinal reciprocating movements are imparted to the needle bar or shaft 44 through a link 52 by a crank 53 on the main shaft 33. In order that the looper 42 may be caused to perform its loop taking and loop positioning movements both rotary and longitudinal motion are imparted to its rod or shaft 46. The means for effecting the rotary movements of the shaft 46 include an eccentric 55 on the main shaft 33, which, through a link 56, is coupled with a lateral ball arm 57 of a collar 58 on the shaft or rod 46 within the housing. The endwise movements of the looper rod or shaft 46 are effected by another crank 59 on the main shaft 33 which is coordinated, through a horizontal link 60, with the lower end of a rocker arm 61 fulcrumed about a fixed transverse axis 62 within the housing 1. As shown, the upper end of the rocker arm 61 is in turn pivotally connected at 63 to the collar 58 on the looper bar or shaft 46. The required rotary movements of the spreader 43 are also obtained from the main shaft 33, which is accordingly provided with a third eccentric 65 whereof the link 66 is coupled at its upper end with a lateral ball arm 67 of a collar 68 at the inner end of said spreader rod or shaft.

In order that ready access may be had to the parts of the actuating mechanism 2, for inspection and adjustment, the housing 1 is provided at the top and at the right hand end with removable covers 69, 70 which close access openings 71, 72.

As shown in Figs. I and III, the machine is equipped with suitable guides 73, 74 and tension devices 75, 76 respectively for the needle and looper threads.

The bottom of the housing 1 is utilized as a sump or reservoir for lubricating oil L which is maintained at the level as indicated below any of the moving parts within said housing so as not to be agitated by them or heated through friction resulting from their movement during operation of the machine at high speeds. In order to keep the mechanism 2 lubricated from the oil supply, any suitable circulating spray system may be used. Preferably, I employ the system illustrated in Fig. II, which comprises a plunger pump 77 whereof the inlet 78 is submerged in the oil L. To the discharge outlet 79 of the pump 77 is connected a tube 80 which extends upward and terminates in a horizontal branch within the top of the housing 1, said branch having suitably allocated holes along its bottom through which the pumped oil is discharged in spray form in all directions upon the internally exposed portions of the shafts 27, 44, 45 and 46 as well as upon the parts of the mechanism 2. The plunger 82 of the pump 77 is held, by a compression spring 83, in contact engagement with a rounded protuberance at the bottom end of the eccentric rod 31, and therefore partakes of the up and down movements of said rod. The lubricating system just described forms the subject of a separate application Serial No. 50,088, concurrently filed herewith by Harold J. LeVesconte and Albert M. Schweda.

Due to the relatively short rotary and reciprocating movements of the shafts 44, 45 and 46 and their close fit in the long bearing sleeves 47, 48 and 49 in the wall 29 of the housing above the oil level in the sump, the oil does not leak past said bushings and collect on the needle 41, the looper 42 or the spreader 43. For the same reasons there is no oil leakage around the shaft 27 past the elongated bearing 28. And since the gearing 21, 22 and the associated moving parts are disposed within the complemental base hollows 12 and 20 of the housing extension 3 and the upright bracket arm 9, the work served in the machine is effectually safeguarded against being soiled with oil.

In the modification of Fig. V, I have embodied a clutch and brake means of the character featured in application Ser. No. 690,487 filed by Harold J. LeVesconte on September 21, 1933 for intermittently rotating the feed cups 6, 7 of the machine. As shown, the clutch unit 23*a* is associated, as in the first described embodiment, with the shaft 4, and operated by an oscillating disk 24*a* which is connected, through the link 25, with the arm 26 on the shaft 27. Immediately above the gear wheel 22, the shaft 8 carries a brake drum 85 with a cam plate 86 held against rotation through engagement of an edge notch 87 therein with a dowel pin 88 fixed within the bottom hollow 20 of the pivoted bracket arm 9. All the other elements shown in Fig. V and having their counterparts in the first described embodiment, have been indicated by the same references previously employed to obviate the necessity for repetitive description.

Having thus described my invention, I claim:

1. In a cup feed sewing machine, a closed housing with a sump in its base for lubricating oil; a pair of feed cups located exteriorly of the housing and driven from below; stitch forming instrumentalities also exteriorly of the housing above said feed cups; actuating mechanism within the housing; and rods or shafts confined to rotation and endwise reciprocation or to combinations of these movements and having a close working fit in the wall of the housing, for communicating the necessary movements from the actuating mechanism to the feed cups and the stitch forming instrumentalities.

2. In a sewing machine, a closed hollow housing with a sump in its base for lubricating oil, said housing having a lateral extension exteriorly thereof; cooperative wheels above said extension for feeding the work to be sewn; stitch-forming means above the wheels; movable members for operating the feed wheels and the stitch forming means, having a close working fit in bearings in a wall of the housing above the oil level; and mechanism within the housing for actuating all of said movable members.

3. In a sewing machine, a closed hollow housing with a sump in its base for lubricating oil,

said housing having a lateral extension exteriorly thereof; cooperating wheels above said support for feeding the work to be sewn; stitch forming means above said wheels; movable shafts for operating the feed wheels and the stitch-forming means, extending through bearings in a wall of the housing with a close working fit; and mechanism within said housing for actuating all of said shafts.

4. In a sewing machine, a closed hollow housing containing lubricating oil, said housing having a lateral extension exteriorly thereof; a bracket arm pivoted to said extension; cooperating wheels mounted for rotation respectively on said extension and bracket arm for feeding the work to be sewn; means above said wheels for stitching the work; driving means for said wheels including interconnected drive elements disposed at the base of said support and bracket respectively; movable members for operating the stitch-forming means and the driving means extending through bearings in the wall of the housing with a close working fit; and mechanism within said housing for operating all said movable members.

5. In a sewing machine, a closed hollow housing with an oil sump in its base and having a lateral extension exteriorly thereof; cooperating wheels above the extension for feeding the work to be sewn; means above the wheels for stitching the work; driving means for the feed wheels disposed at the base of the extension and separated by a wall of the housing from the oil sump; and mechanism within the housing including a shaft extending through an oil-tight opening in said wall for actuating the wheel driving means.

6. In a sewing machine, a closed hollow housing with a sump for lubricating oil in its base, said housing having a lateral extension exteriorly thereof with a hollow in its base; cooperating wheels above the extension for feeding the work to be sewn; means above the wheels for stitching the work; driving means for said feed wheels disposed within the hollow at the base of said extension; actuating mechanism within the housing; a horizontal shaft extending from said mechanism with a close working fit through a bearing in said wall above the oil level; and connections between the shaft and the wheel driving means within the hollow base of the housing extension.

7. In a sewing machine, a closed hollow housing with a sump for lubricating oil in its base, said housing having a lateral extension exteriorly thereof with a hollow in its base; a bracket arm with a hollow base pivoted to said extension; cooperating wheels above said extension and bracket arm respectively for feeding the work to be sewn; means above the wheels for stitching the work; driving means for said feed wheels within the base hollows of the extension and bracket; actuating mechanism within said housing; a horizontal shaft extending from said mechanism with a close working fit through a bearing in a wall of the housing; and connections within the hollow of the housing extension between the horizontal shaft and the wheel driving means.

NORMAN V. CHRISTENSEN.