F. JACOB.

SEWING MACHINE.

APPLICATION FILED JULY 15, 1908.

961,135.

Patented June 14, 1910.

2 SHEETS—SHEET 1.

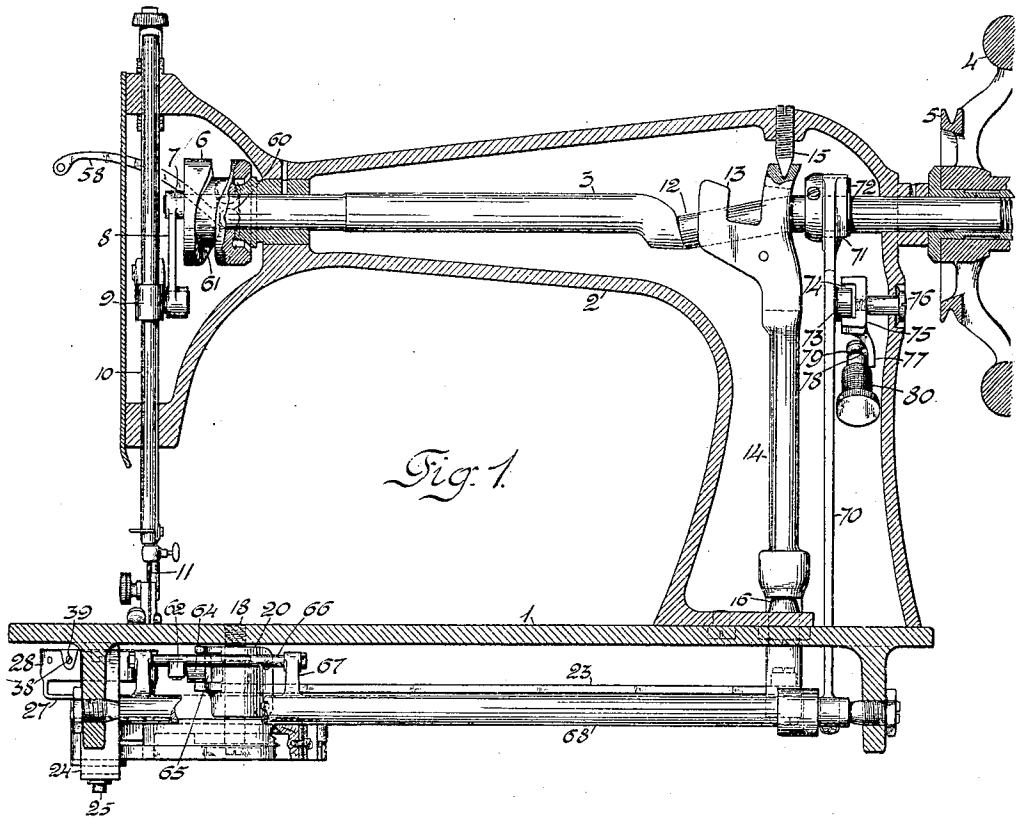

Fig. 1.

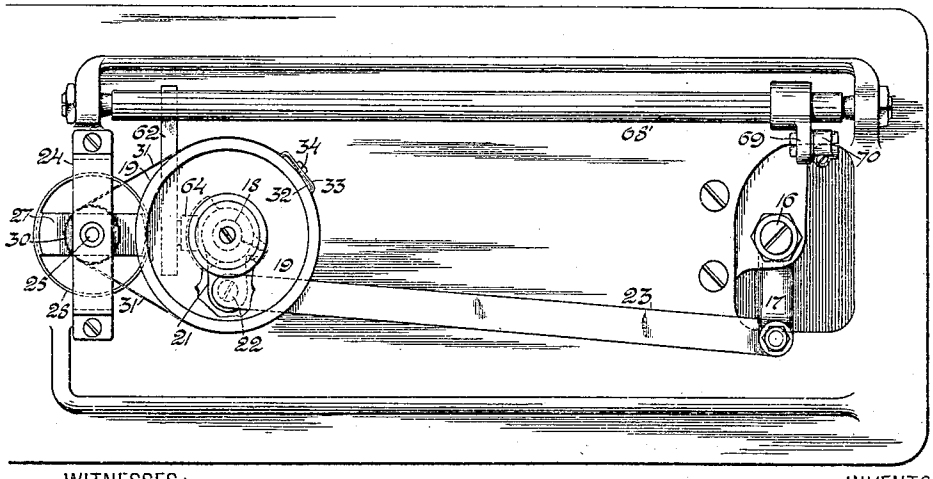

Fig. 2.

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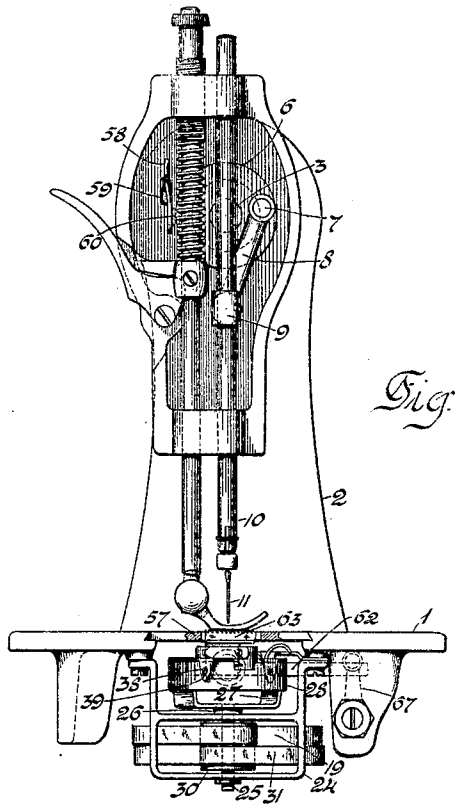

Fig. 3.

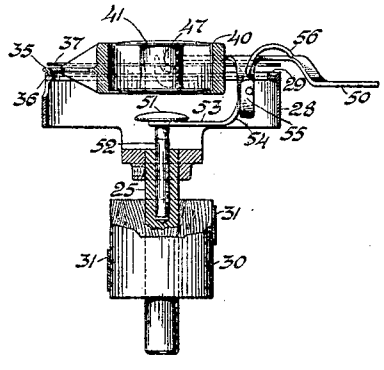

Fig. 4.

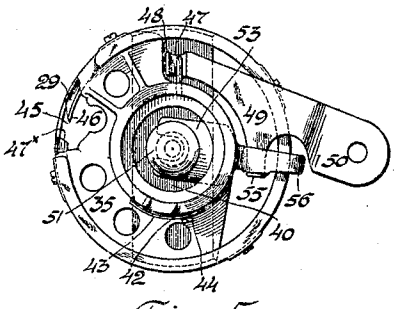

Fig. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

FREDERICK JACOB, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

961,135. Specification of Letters Patent. Patented June 14, 1910.

Application filed July 15, 1908. Serial No. 443,625.

To all whom it may concern:

Be it known that I, FREDERICK JACOB, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in oscillating hook lock-stitch sewing machines of the class exemplified in the United States patent to Philip Diehl and Alfred Grieb, No. 663,696, of December 11, 1900, and it has for its primary object to provide a simple and effective actuating mechanism for the oscillating loop-taker which shall produce an increased arc of oscillation of the latter sufficient to accommodate a thread case with an axially disposed bobbin cavity capable of holding a larger mass of thread than the loop-taking device of the former patent.

In its preferred form, the invention comprises a sewing machine in which the main or needle-driving shaft is mounted in the bracket-arm and is formed with a crank which is embraced by a yoke upon the upper end of a vertical rock-shaft inclosed within its hollow standard and provided at the lower end with a crank-arm connected with one end of a pitman whose opposite end embraces a crank-pin upon an oscillating segment which is in turn connected by means of oppositely extending flexible straps or bands with a drum mounted upon the oscillating hook-shaft journaled in suitable bearings beneath the bed-plate of the machine. The length of the operative face of the oscillating segment is, for convenience in construction, made a complete circumference so as to assume the form of a cylindrical drum, as represented in the drawings.

The present invention will be understood by reference to the accompanying drawings, in which—

Figure 1 is a sectional elevation of a sewing machine embodying the present improvements, and Fig. 2 a bottom plan view of the same. Fig. 3 is a front end elevation of the machine, partly in section; and Figs. 4 and 5 are respectively, a sectional elevation and plan upon a larger scale of the loop-taker.

The machine frame is constructed with the bed-plate 1 and bracket-arm 2 in which latter is journaled the longitudinally extending main-shaft 3 provided with a balance-wheel 4 and grooved belt-pulley 5. The forward end of the main-shaft is provided with the take-up cam-cylinder 6 having a crank-pin 7 embraced by one end of the pitman 8 whose opposite end embraces a lateral pin on the collar 9 fixed upon the vertically reciprocating needle-bar 10 which carries the eye-pointed needle 11. The rearward portion of the main-shaft is provided within the bracket-arm with the inclined crank 12 which is embraced by a yoke 13 extending forwardly from the upper end portion of the vertical rock-shaft 14 mounted upon center screws 15 and 16 in the bracket-arm and bed-plate, respectively, and having at its lower end the lateral crank-arm 17.

Mounted upon a stud-screw 18 tapped into the under side of the bed-plate 1 is an oscillating drum or pulley 19 provided with a hub 20 in the form of a sleeve and provided with a lateral crank-arm 21 carrying a pin 22 embraced by the forward end of a pitman 23 whose rearward end is pivotally connected with the lateral arm 17 of the vertical rock-shaft 14.

Secured to the under side of the bed-plate near the forward end of the same is a depending bearing bracket 24 provided with vertical bearings in which is mounted the loop-taker rock-shaft 25 upon the upper end of which is mounted the hub 26 of the loop-taker body which is provided with lateral arms 27 carrying the integral ring 28 formed upon its upper side with a grooved annular seat 29 to support the thread-case. Upon the lower portion of the loop-taker rock-shaft is fixed the drum 30 to which are affixed the forward ends of the oppositely extending flexible metallic bands 31, whose other ends are extended in opposite directions around the periphery of the drum 19 to which they are secured between the clamp-plates 32 and 33 by the screw 34. The crank-arm 21 is shorter than the actuating crank-arm 17, and the drum 19 is of considerably greater diameter than the drum

30, so that the slight oscillation of the vertical rock-shaft 14 is caused to communicate to the loop-taker through said parts oscillation through a much larger arc than that traversed by the actuating rock-shaft 14.

As herein shown, the thread-case comprises a segmental plate 35 provided near the outer edge with a depending segmental tongue 36 fitted within and resting upon the grooved seat 29 formed in the loop-taker ring 28, and confined therein by means of the annular plate 37 provided with depending ears 38 secured by means of screws 39 upon the outer periphery of the ring 28. The thread-case is formed with a central bobbin cavity 40 in which is disposed the lower mass of thread wound upon the bobbin 41 and led from the same through a peripheral notch 42 and under a tension spring 43 secured to the exterior of the thread-case cavity by means of a screw 44. The seat 29 of the loop-taker ring is cut away at 45 to form an inwardly extending loop-seizing beak 46 and an opposed heel 47×. At the front side of the thread-case, the flange or supporting plate 35 is cut away tangentially with one side of the bobbin cavity to form a cast-off member to receive and guide the loops of needle-thread carried around the thread-case by the loop-taker beak 46 and released slightly beyond such cast-off member, and the heel of the thread-case flange terminates in a substantially radial shoulder at the rearward side of the bobbin cavity where it forms with a substantially radial pin 47 a slot loosely embracing an upturned finger 48 of the segmental thread-case holding arm 49 encircling that portion of the bobbin cavity intermediate the ends of the plate 35 and having a shank 50 secured to a fixture beneath the bed-plate.

The bobbin cavity of the thread-case is provided with an opening at the top sufficiently large to receive the bobbin, while its bottom upon which the bobbin rests, is provided with a smaller opening through which extends the rounded head 51 of an axial pin 52 inserted in a hole in the hook-shaft 25 and resting upon the forked laterally extending arm 53 of a bobbin ejecting lever 54 whose shank is formed with projecting ears embraced by and pivoted upon a forked lug 55 depending from the thread-case holding arm 49. The tail of the lever 54 extends upwardly and laterally to form a finger-piece 56 by which the lever may be tilted to raise the head 51 of the pin 52 to lift the bobbin 41 partially out of its cavity for convenience in removing the same.

In the operation of the machine, the needle descends and presents its loop adjacent the bobbin-case detaining finger 48, which serves also as a needle-guide, and the loop is seized by the beak 46 of the hook and carried around the bobbin-case to cast-off position, where it is released and drawn up through the throat-plate 57 by the action of the take-up lever 58 mounted upon the fixed fulcrum-screw 59 and provided with the stud 60 entering the peripheral cam-groove 61 in the cam-cylinder 6; the cast off loop being guided between the cast-off side of the bobbin cavity and the bobbin-case holding arm 49 to the finger 47 from which it escapes through the clearance space intermediate the heel of the flange 35, the detaining pin 48 and the pin 47; one limb of the needle-thread loop having been detained by the heel of the flange 35 while the other limb was cast about the thread-case by the action of the loop-taker.

The feeding mechanism of the present improvement is somewhat similar to that of the corresponding mechanism of the United States patent to R. Whitehill, No. 326,821, of September 22, 1885, in that the feed-bar 62, which carries the feed-dog 63, is provided at its outer end with a laterally projecting roller-stud 64 entering a cam-groove 65 formed in the hub 20 of the drum 19, whereby the feed-dog is raised and lowered into and out of operative relation with the material; the feed-bar being provided at its opposite end with a cross member 66 which is pivotally connected to the upright arms 67 of the feed rock-shaft 68 which is provided at its rearward end with a lateral crank-arm 69 pivotally connected to the lower end of a link-bar 70 whose upper end is provided with a yoke 71 embracing the feed-actuating cam 72 upon the main-shaft and which is provided slightly below such yoke with a laterally extending roller-stud 73 entering the inclined guideway 74 in a cam-block 75 pivotally mounted upon a fixed fulcrum-screw 76 and having a lateral arm 77 formed with a stud 78 which enters an annular groove 79 in the feed-adjusting screw 80 entering a suitably threaded aperture in the side of the bracket-arm standard, as shown in the United States patent to P. Diehl No. 388,345, of August 21, 1888.

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

1. In a sewing machine, the combination with the frame comprising a bed-plate and an overhanging bracket-arm and a main-shaft journaled in the bracket-arm, of stitch-forming mechanism comprising a reciprocating needle-bar carrying an eye-pointed needle and operatively connected with the main-shaft, an actuating member upon the main-shaft, a vertical rock-shaft deriving its oscillatory movements from said actuating member, a crank-arm upon said rock-shaft, an oscillatory loop-taker shaft, a loop-taker mounted thereon and coöperating with the

needle in the production of stitches, a drum or pulley fixed upon said loop-taker shaft, an oscillatory member intermediate said drum or pulley and said rock-shaft, a flexible band embracing said drum or pulley and connected with said oscillatory member, and an operative connection between said oscillatory member and the crank-arm of said vertical rock-shaft whereby the loop-taker shaft is oscillated.

2. In a sewing machine, the combination with the frame comprising a bed-plate and an overhanging bracket-arm and a main-shaft journaled in the bracket-arm, of stitch-forming mechanism comprising a reciprocating needle-bar carrying an eye-pointed needle and operatively connected with the main-shaft, an actuating member upon the main-shaft, a vertical rock-shaft deriving its oscillatory movements from said actuating member, an oscillatory loop-taker shaft, a loop-taker mounted thereon and coöperating with the needle in the production of stitches, a drum or pulley fixed upon said loop-taker shaft, a drum of larger diameter than said drum or pulley and mounted adjacent thereto, a flexible band embracing and operatively connecting said pulleys and provided with means for maintaining it in fixed relation therewith, cranks connected with the second-named drum and the lower end of said vertical rock-shaft, and a pitman connection intermediate said cranks.

3. In a sewing machine, the combination with the frame comprising a bed-plate and an overhanging bracket-arm and a main-shaft journaled in the bracket-arm, of stitch-forming mechanism comprising a reciprocating needle-bar carrying an eye-pointed needle and operatively connected with the main-shaft, an actuating member upon the main-shaft, a vertical rock-shaft deriving its oscillatory movements from said actuating member, an oscillatory loop-taker shaft, a loop-taker mounted thereon and coöperating with the needle in the production of stitches, a drum or pulley fixed upon said loop-taker shaft, a drum of larger diameter than said drum or pulley and mounted adjacent thereto, flexible bands connecting and extending around said pulleys in opposite directions and each having its opposite ends secured to the respective pulleys, cranks connected with the second-named drum and the lower end of said vertical rock-shaft, and a pitman connection intermediate said cranks.

4. In a sewing machine, the combination with the frame comprising a bed-plate and an overhanging bracket-arm and a main-shaft journaled in the bracket-arm, of stitch-forming mechanism comprising a reciprocating needle-bar carrying a needle and operatively connected with the main-shaft, an actuating member upon the main-shaft, a vertical rock-shaft deriving its oscillatory movements from said actuating member, an oscillatory loop-taker shaft, a loop-taker mounted thereon and having in its upper edge an annularly grooved seat and an adjacent inwardly extending loop-seizing beak, a thread-case provided with a central thread-cavity and a concentric annular bearing flange having upon its lower face a tongue entering the grooved seat of said loop-taker, a removable segmental cap-plate secured to said loop-taker and overhanging its grooved seat to confine the margin of the thread-case flange thereon, means for restraining the thread-case from circular movement with said loop-taker, a drum or pulley fixed upon said loop-taker shaft, and an operative connection comprising a flexible band embracing and having a positive connection with said drum or pulley and connected with said vertical rock-shaft whereby the loop-taker shaft is oscillated.

5. In a sewing machine, the combination with the frame comprising a bed-plate and an overhanging bracket-arm and a main-shaft journaled in the bracket-arm, of stitch-forming mechanism comprising a reciprocating needle-bar carrying a needle and operatively connected with the main-shaft, an oscillatory loop-taker shaft, a loop-taker mounted thereon and having in its upper edge an annularly grooved seat and an adjacent inwardly extending loop-seizing beak, a thread-case provided with a central thread-cavity and a concentric annular bearing flange having upon its lower face a tongue entering the grooved seat of said loop-taker and provided at its rearward side adjacent the needle path with a notch or pocket, means applied to the loop-taker for confining said bearing flange to its seat thereon, a thread-case restraining arm rigidly connected with the bed-plate and entering the circular path of movement of said loop-taker and provided with an upturned finger embraced by the notch or pocket in said thread-case, a drum or pulley fixed upon said loop-taker shaft, and means including a flexible band embracing and having a positive connection with said drum or pulley and operatively connected with the main-shaft whereby the loop-taker shaft is oscillated.

6. In a sewing machine, the combination with the frame comprising a bed-plate and an overhanging bracket-arm and a main-shaft journaled in said bracket-arm, of stitch-forming mechanism comprising a needle-bar carrying a needle and operatively connected with the main-shaft, an oscillatory loop-taker shaft, a loop-taker mounted thereon and coöperating with the needle in the production of stitches, a drum or pulley fixed upon said loop-taker shaft, an inter-

mediate oscillating member, means including a flexible band embracing and having a positive connection with said drum or pulley and with the intermediate oscillating member whereby the latter are connected to move simultaneously, feeding mechanism comprising a feed-bar and means connected with the main-shaft for imparting thereto its to-and-fro feeding movements, an operative connection between said intermediate rocking member and the feed-bar for imparting to the latter its rising and falling movements, a rock-shaft operatively connected with and driven by the main-shaft, and a crank-and-pitman connection between said rock-shaft and the intermediate oscillating member whereby the loop-taker is oscillated and the feed-bar is caused to rise and fall.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

FREDERICK JACOB.

Witnesses:

H. A. KORNEMANN, Jr.,

JOHN F. W. SEIDEL.