

M. HEMLEB.
SEWING MACHINE.
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2 SHEETS—SHEET 2.

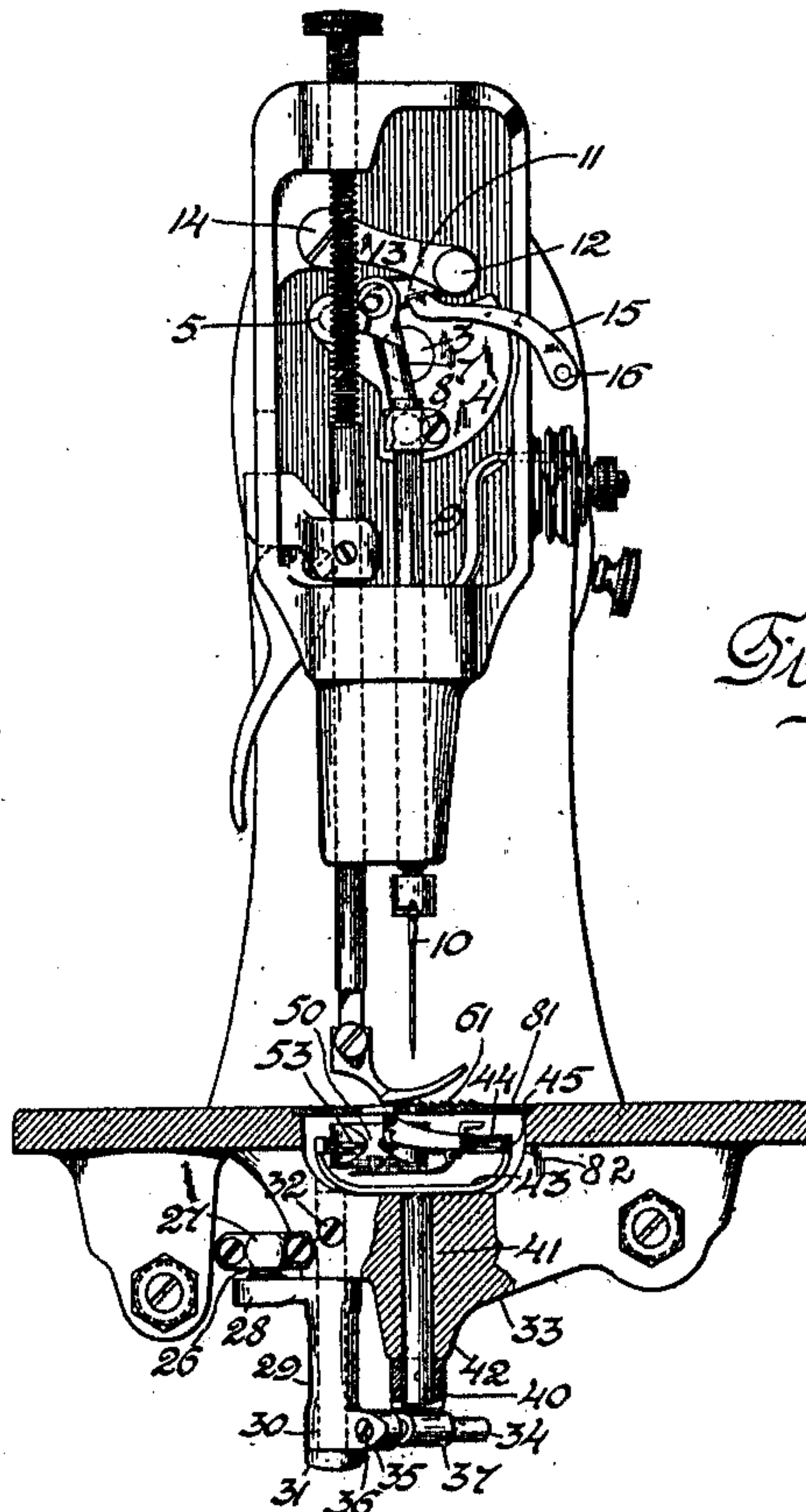


Fig. 4.

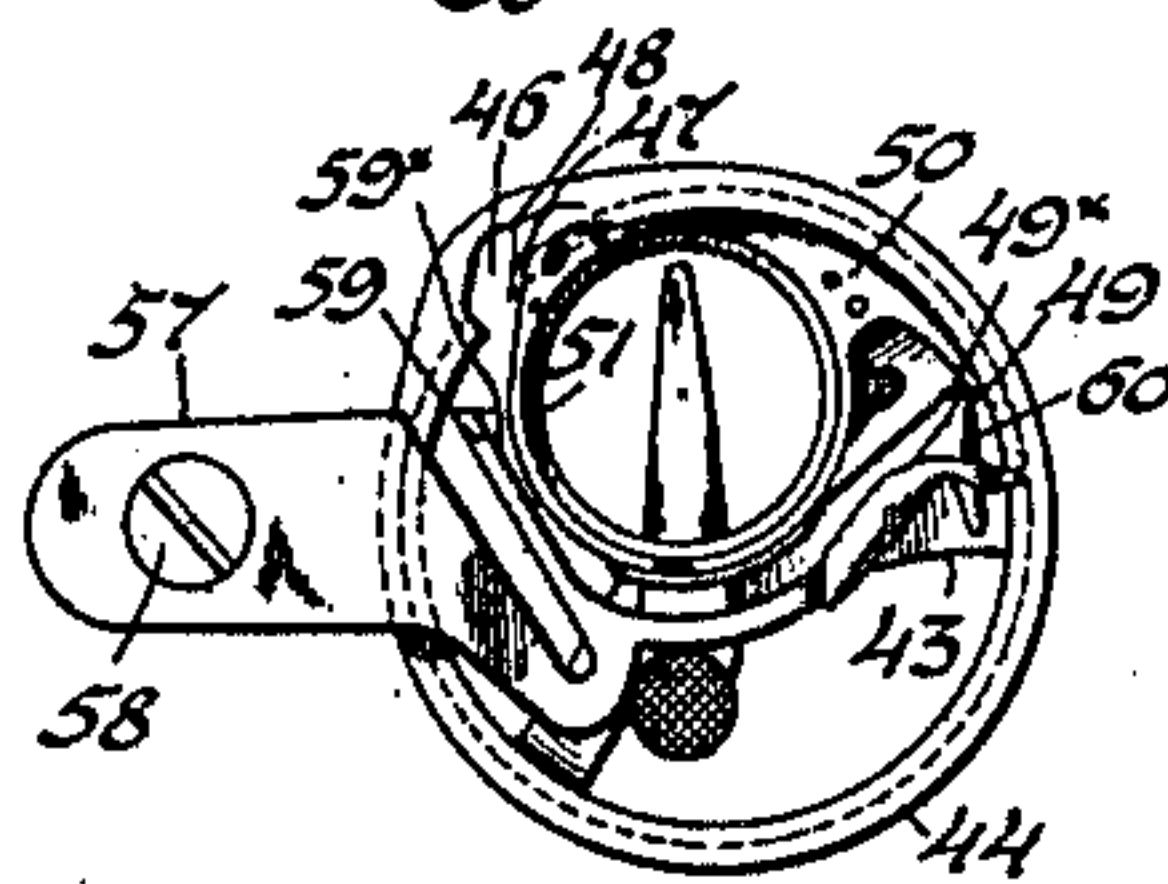


Fig. 5.

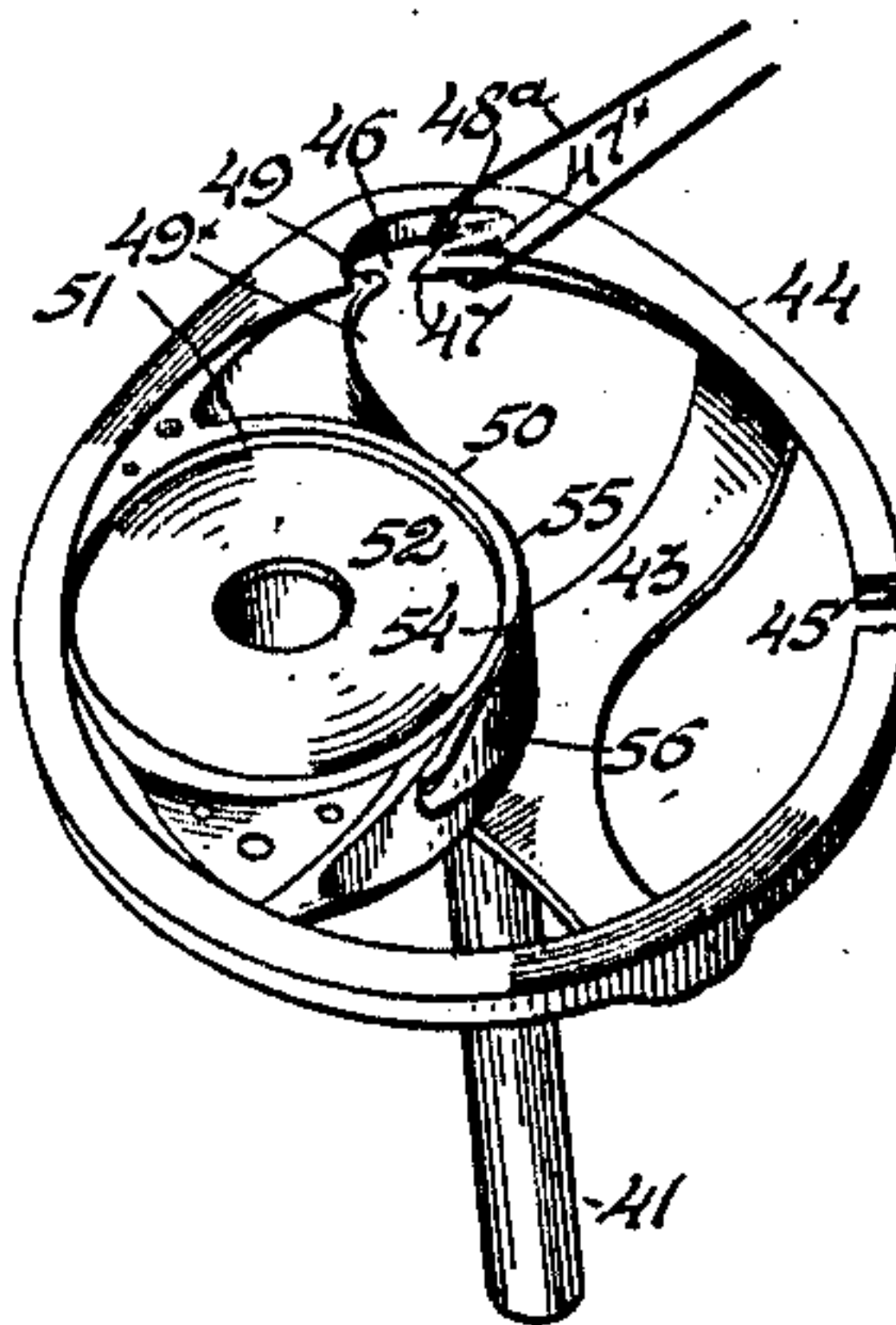


Fig. 6.

WITNESSES

G. F. Tamm
J. L. Dimer

INVENTOR

Martin Hemleb.
BY *Henry J. Miller*
ATTORNEY

UNITED STATES PATENT OFFICE.

MARTIN HEMLEB, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

990,131.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, MARTIN HEMLEB, a citizen of the United States, residing at Elizabeth, in the county of Union 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 has for its object to provide a simple and effective stitch-forming mechanism for producing a lock-stitch seam, and it consists in the several constructive features herein shown and described and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a sectional front elevation, and Fig. 2 a bottom plan of a sewing machine embodying the present improvements. Fig. 3 is a detached top plan view of the loop-taker with the beak of the hook in loop-seizing position. Fig. 4 represents the machine in front end elevation, partly in section, and with the face plate removed. Fig. 5 is a plan view of the loop-taker with the beak of the hook in approximately cast-off position. Fig. 6 is an enlarged perspective view of the loop-taker with the parts represented in the position shown in Fig. 3.

The machine is constructed with a frame composed of the usual bed-plate 1 and overhanging bracket-arm 2 in which latter is journaled the main-shaft 3 carrying at its forward end the crank-disk 4 provided with the take-up actuating crank-pin 5 and offset needle-actuating crank-pin 6 which latter is embraced by the upper end of a pitman 7 whose lower end embraces a lateral pin upon the collar 8 fixed upon the needle-bar 9 carrying the eye-pointed needle 10.

The crank-pin 5 is embraced by one end of a link-member 11 pivotally connected at its opposite end by means of a pin 12 with the free end of a swinging arm 13 fulcrumed at the opposite end upon the fixed stud-screw 14 and having an angularly disposed take-up arm 15 with thread-eye 16.

The main-shaft is provided rearward of the bracket-arm with the usual belt-wheel 17 and hand-wheel 18, and adjacent the same within the upright portion of the bracket-arm with a loop-taker actuating ball-crank 19 embraced by the upper end of a rod 20 whose lower end embraces a ball-crank-pin 21 at the outer end of the lateral arm 22 of

an angle lever mounted upon a fixed fulcrum 23 within the bracket-arm and having a depending arm 24 provided with a ball-crank-pin 25 embraced by one end of a pitman-rod 26 whose opposite end embraces a similar crank-pin 27 upon the radial arm 28 of a rocking sleeve 29 mounted upon the vertical bearing pin 30 formed with a head 31 and having its upper end secured by means of a set-screw 32 within a suitable socket in a bearing bracket 33 depending from the bed-plate. The sleeve 29 is provided with a lateral arm comprising a cylindrical pin 34 fitted within a socket in the lateral boss 35 of the sleeve 29 and secured therein by means of a set-screw 36. Fitted to the pin 34 is a slide-block 37 having a lateral pin 38 loosely fitted within a boss 39 at the end of a crank-arm 40 fixed upon the lower end of the loop-taker rock-shaft 41 which is mounted within the bearing boss 42 of the bracket 33 and carries at its upper end the three-armed spider 43 to which is attached the hook-ring 44.

As will be observed, the rotation of the crank 19 with the main-shaft serves to rock the angle-lever 22 24 which imparts by means of the pitman 26 rocking movements to the sleeve 29 fulcrumed parallel with but eccentric to the loop-taker shaft 41 which it serves to oscillate through an increased arc by means of the sliding connection between the respective crank-arms 34 and 40.

The hook-ring 44 is formed in its inner edge with an annular groove 45, and with a lateral notch or recess 46 so as to form at the lower face of the ring an inwardly extending loop-seizing point or beak 47 the upper side of which is inclined upwardly across the groove 45 and merges into the upper face of the ring. Thus, from the forward edge of the beak the upper side is inclined gradually upward so as to intersect the bottom or inner side of the groove from the lower to the upper edge of the same from which latter point the overhanging lip or member begins and widens out, as represented by the line 47* in Fig. 6, to full width in which its inner edge is even with the lower lip or wall of the groove. By thus shaping the hook, the loop of needle-thread (Fig. 6) is first caught upon the point 47 of the beak whose continued advance throws one limb of the same into the throat 48 while the other limb moves

along the inner periphery of the beak and rides over its inclined upper surface to a point beyond the beginning of the upper lip at 47°, so as to be wholly expanded over the forward end of the groove 45 before the thread-engaging point 49 of the stationary thread-case enters the same.

The thread-case is formed with a body 50 having an eccentric thread-cavity 51 for the bobbin 52 carrying the mass of lower thread, and is formed on one side with a segmental rib 53 entering and loosely fitted within the groove 45 of the hook-ring 44, and terminating at one end in the loop-engaging point 49 before mentioned. The thread-case is provided with the usual threading slit 54 covered by the external tension spring 55 secured in position by the screw 56.

As in other machines of this general type, as for instance that represented in the United States Patent to P. Diehl and A. Grieb, No. 663,696, dated December 11, 1900, the thread-case is supported by means of its rib-and-groove connection with the horizontally arranged loop-taking hook, and it is restrained from oscillation with the latter by means of a two-armed holder comprising a shank 57 secured by means of a fastening screw 58 within a depression in the top of the bed-plate 1 entering the field of the hook-ring 44 from the upper side and having the portion within said ring forked to form the divergent arms 59 and 60, the former of which is provided with a conical contact point 59* adapted to rest against the heel portion of the thread-case, while the former enters and engages the throat 49* of the thread-case adjacent its loop-engaging point, the usual clearance being provided for movement of the thread-case to permit the free passage of the needle-thread loops cast about the same by the loop-taking hook.

Heretofore it has been proposed to provide a thread-case holder entering the field of the loop-taking member from beneath, thus making it necessary to provide a clear space beneath the path of the loop-taking beak as clearance for the shank of the holder and making it necessary to dispose the connection between the loop-taker ring and its supporting shaft upon one side only. By providing a holding member entering the field of the loop-taker from above, it is practicable to provide radial arms 43 of the supporting spider of the ring 44 at equal distances apart, thereby materially stiffening and strengthening the support for the circularly moving loop-taking member.

The feeding mechanism comprises the usual feed-dog 61 fixed upon the feed-bar 62 formed at one end with a tubular cross-piece 63 pivotally connected by a pin 64 to the spaced upright arms 65 of the feed rock-shaft 66 having at its rearward end a lateral arm 67 pivotally connected with the lower

end of the bar 68 formed with forked upper end 69 to embrace the actuating cam 70 upon the main-shaft, and provided with a lateral roller-stud 71 entering a guideway in the sustaining tilting block 72 fulcrumed upon the bracket-arm and provided with the thumb-screw 73 for adjusting the position of the block to control the degree of end-wise movement of the bar 68 in determining the throw of the feed-bar, as shown and described more fully in the United States Patent to P. Diehl No. 388,345, dated Aug. 21, 1888.

The feed-bar 62 is provided with a forked end 74 entered by the roller-stud 75 upon the lateral arm 76 of the feed-lifting rock-shaft 77 having at its rearward end the lateral arm 78 pivotally connected with the lower end of the pitman 79 whose upper end embraces the eccentric 80 upon the main-shaft.

It will thus be seen that the stitch-forming and feeding mechanisms derive their operative movements from the main-shaft but independently of each other, whereby the timing of the loop-taker movements is effected independently of the feeding mechanism in contrast to the construction represented in the United States Patent No. 663,696, before mentioned, wherein the lift of the feed-bar is produced by a connection with the loop-taker actuating mechanism.

As will be seen by reference more particularly to Figs. 2 and 4, the bed-plate is provided with a substantially circular aperture 82 concentric with the loop-taker shaft 41 and having an inward extension to accommodate the feed-dog, this aperture being arranged immediately above the hook-ring and normally closed by the slide-plate 83, and the shank 57 of the thread-case holder is secured in position at one side of the aperture 82 and beneath the slide-plate 83, the body of the holder extending through said aperture and over the rim of the ring 44. By this means, convenient access is given to the thread-case by withdrawal of the slide-plate, while the disposition of the holder entirely above the bottom of the hook-ring enables the latter to be constructed with the radial arms 43 symmetrically arranged so as to insure the requisite stiffness and strength of the loop-taker.

In the operation of the machine, after the needle has accomplished a part of its descent the take-up arm commences its downward movement to slacken the needle-thread, while the beak of the hook is retracted and starts its forward or operative movement, thereby frictionally carrying the thread-case with it to bring the heel of the same into engagement with the contact-point 59* of the holding arm 59 and open the clearance passage intermediate the other holding arm 60 and the throat of the thread-case point,

as represented in Fig. 3. As the needle commences to rise to throw out its loop, the loop-taker beak enters the latter and in carrying it toward the point of the thread-case spreads the same as before described so as to insure the free passage of the point of the thread-case into the loop-taker groove without liability to catch the thread and jam the same within said groove. As the loop-taker approaches cast-off position, represented approximately in Fig. 5, the take-up begins to rise to draw up the slack of the distended needle-thread loop, while the loop-taker beak reaches the end of its forward movement and starts its retrograde movement, carrying with it by friction the thread-case which it supports so as to produce a thread clearance opening between the heel of the thread-case and the contact point of the holding arm 59; the continued rise of the take-up arm drawing the thread-loop between the inner side of the thread-case and the holding arms 59 and 60 through the needle-hole in the throat-plate 81 into the work.

As will be observed from Figs. 4 and 5, which represent the positions of the several parts of the stitch-forming mechanism immediately after the production of the clearance opening at the heel of the thread-case before referred to, the clearance opening is provided in the early stage of operative movement of the take-up arm and before it traverses the first half of its downward movement, so as to provide a free passage through which the needle-thread loop may be drawn from the beak of the loop-taker around the inner side of the thread-case in encompassing the mass of lower-thread carried by the bobbin 52. It will also be seen that as the outer limb of the needle-thread loop is drawn into the throat 48 of the hook, the inner limb is carried through the clearance aperture into the throat adjacent the point of the thread-case past the extremity of the holding arm 60 where it remains until after such clearance passage is closed by the reversal of movement of the hook, so that in the ascent of the take-up in setting the stitch the thread-loop is entirely free and does not require to force an opening between relatively movable parts as in many loop-takers heretofore constructed.

By employing the train of pivotally and slidably connected members for establishing operative relation between the horizontally arranged main-shaft and vertically disposed hook-shaft, I am able to secure the necessary oscillation of the loop-taker with easy movements of all the component parts of the same while insuring close fitting joints and thus durability and freedom from noise in the mechanism.

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 having an aperture therein for access to the loop-taker, of a reciprocating needle-bar, a needle carried thereby, a loop-taker shaft mounted substantially parallel with said needle-bar, a loop-taking hook-ring mounted upon said shaft beneath the aperture of said bed-plate and provided with a beak extending inwardly from the circumference, a thread-case supported by said ring beneath the aperture in the bed-plate and having a rib-and-groove connection with said ring and formed with a thread-engaging point opposed to said beak and an adjacent throat, a holder for restraining said thread-case from movement with said ring and entering the field of said ring over the top of the same and provided with a shank secured to the bed-plate at one side of said opening, and means connected with said shaft for imparting circular operative movements to said ring.

2. In a sewing machine, the combination with the main-shaft, of a reciprocating needle-bar operatively connected therewith and carrying a needle, a loop-taker shaft mounted transversely of said main-shaft, a loop-taking hook mounted upon said shaft, a thread-case disposed within said loop-taking hook, means for restraining said thread-case from movement with said hook, a plural-armed rock-lever, an operative connection intermediate an arm of said rock-lever and the main-shaft, a rocking sleeve having a fulcrum parallel with the loop-taker shaft and provided with a lateral crank-arm, a pitman connection intermediate the crank-arm of said rocking sleeve and a second arm of said rock-lever, a second lateral arm upon said rocking sleeve, a crank-arm upon the loop-taker rock-shaft, and a sliding and pivotal connection intermediate the last-named crank-arms.

3. In a sewing machine, the combination with the main-shaft provided with a ball-crank, of a reciprocating needle-bar operatively connected with said main-shaft and carrying a needle, a loop-taker shaft mounted transversely of said main-shaft, a loop-taking hook mounted upon said shaft, a thread-case disposed within said loop-taking hook, means for restraining said thread-case from movement with said hook, a rock-lever having lateral and depending arms each provided with a ball-crank pin or stud, a fulcrum-pin disposed transversely of both the main-shaft and the loop-taker shaft upon which said rock-lever is mounted, a pitman connection intermediate the ball-crank of said main-shaft and the ball-crank pin of the lateral arm of said rock-lever, a rocking sleeve having a fulcrum parallel with the loop-taker shaft and provided with a lateral crank-arm carrying a ball-pin or stud, a

pitman connection intermediate the ball-pins
or studs of said crank-arm of the rocking
sleeve and the depending arm of said rock-
lever, a second lateral arm upon said rock-
5 ing sleeve, a crank-arm upon the loop-taker
rock-shaft, and a sliding and pivotal connec-
tion intermediate the last-named crank-arms.

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

MARTIN HEMLEB.

Witnesses:

D. P. BIRNIE,
H. J. MILLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
