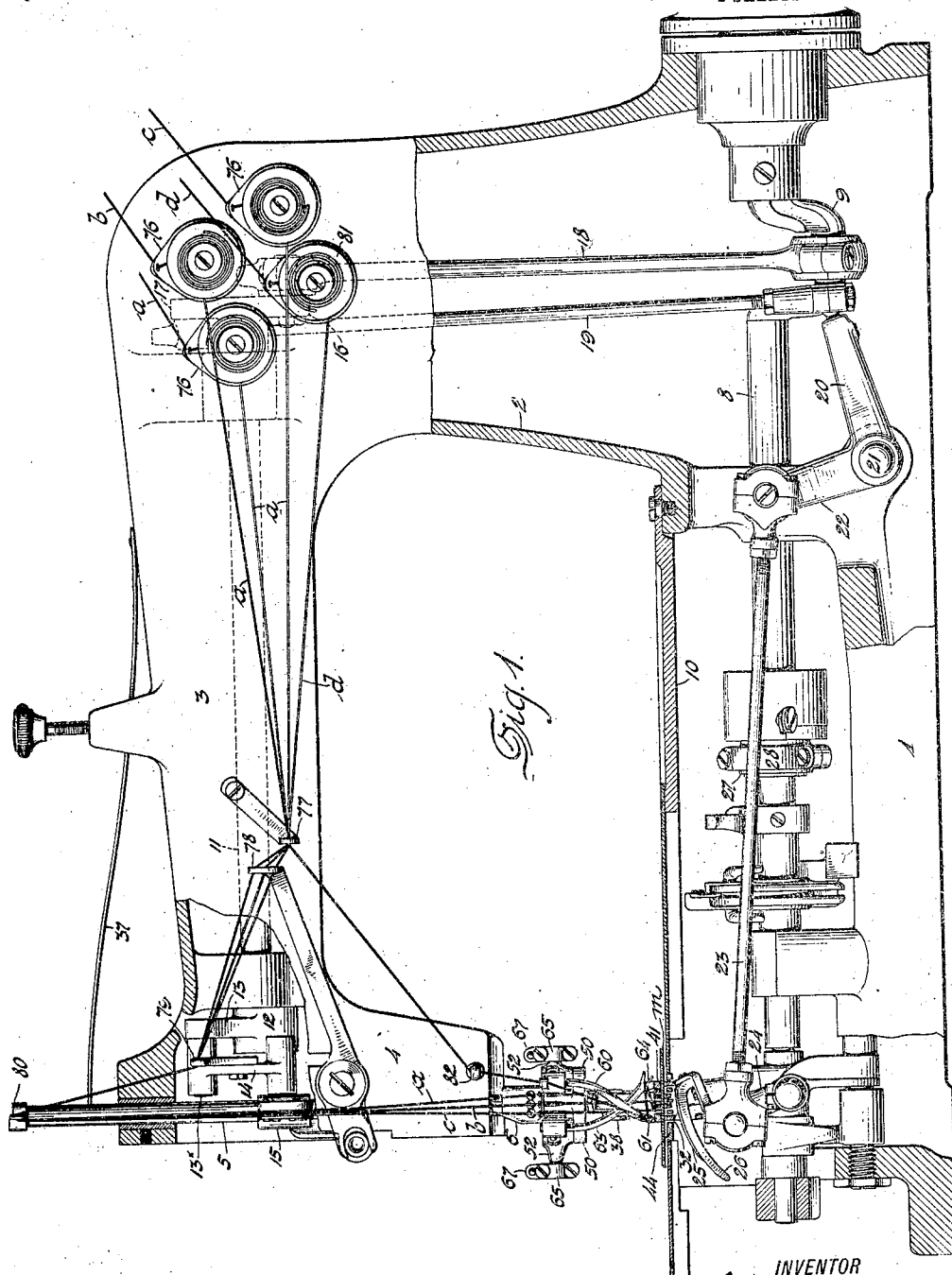


1,060,526.

Patented Apr. 29, 1913.

2 SHEETS--SHEET 1.



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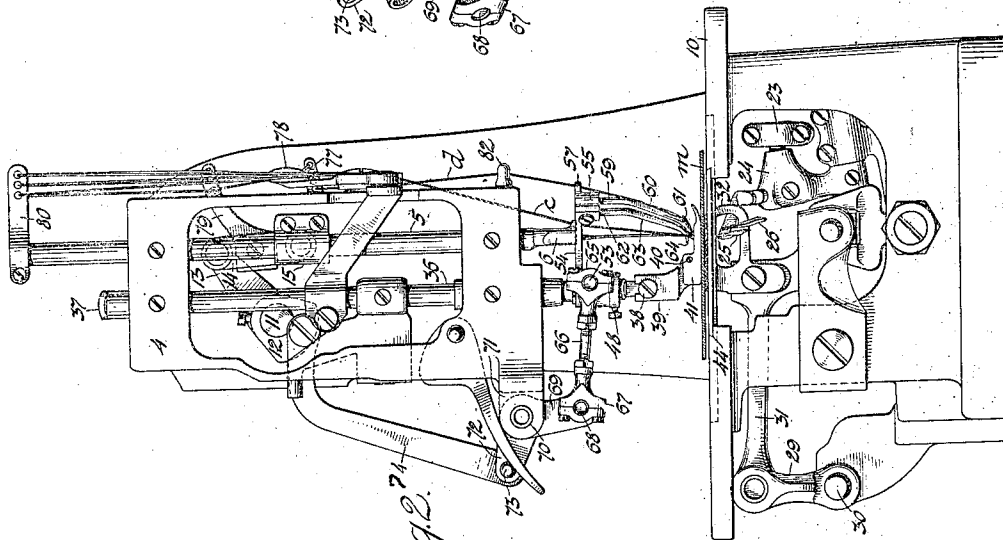
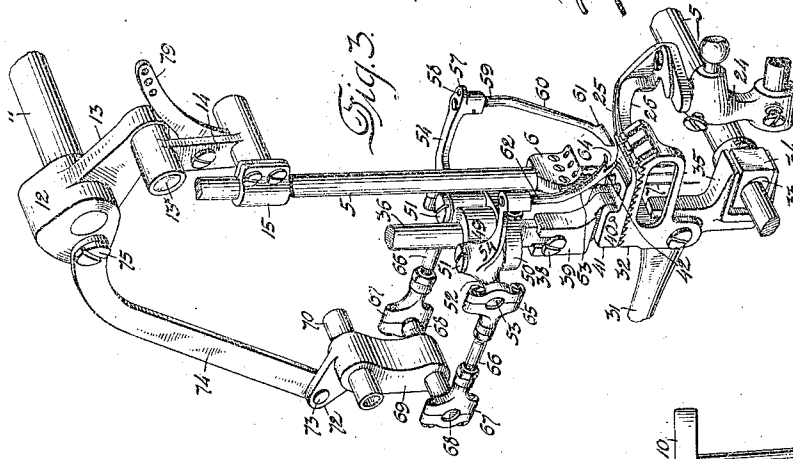
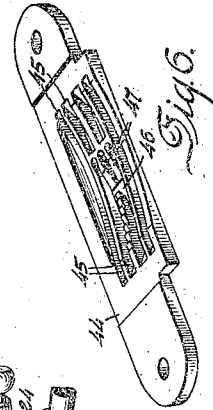
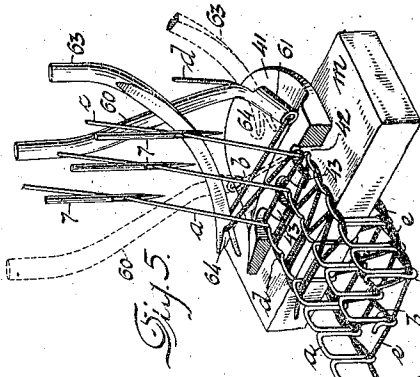
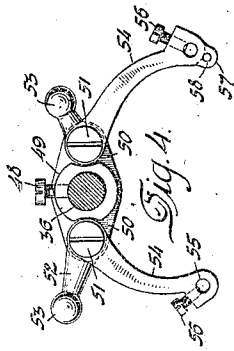
J. BERGER.
SEWING MACHINE.

APPLICATION FILED SEPT. 13, 1911.

Patented Apr. 29, 1913.

2 SHEETS-SHEET 2.

1,060,526.



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SEWING-MACHINE.

1,060,526.

Specification of Letters Patent.

Patented Apr. 29, 1913.

Application filed September 13, 1911. Serial No. 649,146.

To all whom it may concern:

Be it known that I, JOSEPH BERGER, a citizen of the United States, residing at Bayonne, in the county of Hudson 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 mechanism for laying a covering-thread transversely in advance of a plurality of reciprocating needles constituting members of a multiple stitch-forming mechanism.

While the present invention is susceptible of embodiment in different ways, in its preferred form it is applied to a multiple needle chain-stitch machine comprising a plurality of thread-carrying needles actuated by means of a rock-shaft journaled in the bracket-arm of the machine-frame in conjunction with a single reciprocating thread-carrying looper operating beneath the work-plate. The covering-thread mechanism comprises an apertured and a forked covering-thread member adapted for reciprocal movement transversely of the direction of feed and in advance of the needles and having an operative connection with the needle-actuating rock-shaft including a toggle device adapted to be straightened when the needles are withdrawn from the work.

In the accompanying drawings, Figure 1 is a sectional front elevation of a machine embodying the present improvement, and Fig. 2 a front end elevation of the same with the face-plate of the bracket-arm removed. Fig. 3 is a perspective view showing the stitch-forming and covering-thread laying mechanisms. Fig. 4 is a sectional plan view representing a portion of the thread-laying mechanism. Fig. 5 is a perspective view illustrating the method of cooperation of the thread-laying devices with the needles. Fig. 6 is a perspective view showing the under side of the throat-plate.

As represented in the drawings, the machine is constructed substantially in accordance with the patent of William H. Hugg, No. 1,005,645, dated October 10, 1911. It is constructed with the usual base 1 and bracket-arm comprising the hollow standard 2 and tubular overhanging member 3 in the head 4 of which is journaled the vertically

reciprocating needle-bar 5 provided, in the present instance, with the triple needle-clamp 6 carrying the three eye-pointed needles 7.

The longitudinally arranged main or driving shaft 8 is journaled in suitable bearings in the base 1 beneath the work-plate 10 and is provided near its rearward end with an actuating crank 9, and in practice receives its motion from the usual pulley mounted upon its rearward end.

The needle-actuating rock-shaft 11 is journaled in suitable bearings within and longitudinally of the overhanging bracket-arm and carries at its forward end a collar 12 formed with the crank-arm 13 provided with the crank-pin 13* connected by means of the usual link 14 with a rearwardly projecting stud carried by the collar 15 fixed upon the needle-bar 5, through which connections the needles receive their operative movements from the rock-shaft 11. The needle-actuating rock-shaft has fixed upon its rearward end a collar with oppositely extending crank-arms 16 and 17, the former of which is connected by means of the pitman-rod 18 with the crank 9 of the driving shaft from which the needle-actuating rock-shaft derives its rocking movements. The second crank-arm 17 is connected by means of the pitman 19 with the rearwardly extending arm 20 of an elbow-lever mounted upon the transverse fulcrum-pin 21 and having an upwardly extending arm 22 connected by means of the pitman 23 with the rocking looper-carrier 24, upon which are secured the lower-thread carrying looper 25 and adjacent needle-guard 26.

Fixed upon the main-shaft is the feed-actuating eccentric 27 embraced by the strap 28 of an eccentric-rod connected with the feed-rocker 29 which is journaled upon the fulcrum-pin 30 and has pivotally connected thereto the rearward end of the feed-bar 31 carrying the feed-dog 32. The main-shaft has fixed thereon the feed-lifting eccentric 33 upon which is fitted the slide-block 34 embraced by the depending yoke 35 of the feed-bar 31 by means of which rising and falling movements are imparted to the feed-dog 32.

Journaled in the bracket-arm head 4 is the presser-bar 36 normally pressed downwardly by means of the pressure spring 37 and having secured to its reduced lower end

by means of the fastening screw 38 the shank portion 39 of the presser-foot to whose reduced lower extremity is pivotally attached by means of the transverse pin 40 the tilting foot-plate 41 opposed to the serrated operative face of the feed-dog and formed with the transverse needle-aperture 42 at the forward edge of which are disposed the spaced backwardly projecting thread-fingers 43. As represented in Fig. 6, the throat-plate 44 is formed with the spaced feed apertures 45 corresponding in number and arrangement with the operative portions of the feed-dog, and having the needle aperture 46 divided in its forward portion into separate needle-slots by means of the backwardly extending tongues 47 which correspond in position with those of the presser-foot.

The machine, as thus far described, is adapted for producing a multiple chain-stitch seam with spaced parallel lines of stitching upon the upper face of the work but connected on the lower face by transverse loops of looper-thread.

The presser-bar 36 has secured thereon slightly above the presser-foot shank 39 by means of the set-screw 48 the collar 49 formed with laterally extending ears 50 each carrying a fulcrum stud-screw 51. Upon each of the fulcrum-studs 51 is mounted an angular rock-lever comprising a lateral arm 52 having a spherical extremity 53 and a second forwardly extending arm 54 having a vertical socket 55 and a transverse set-screw 56 whose point is adapted to enter the same. As seen in Figs. 1, 3 and 4, the right-hand lever-arm 54 is provided adjacent its socket with an ear 57 having a thread-eye 58, and the adjacent socket has secured therein by means of the set-screw 56 the shank 59 of the depending covering-thread arm 60 which is formed with the tubular thread-guiding lower extremity 61. The other lever-arm 54 has secured in its socket the shank 62 of the depending non-threaded covering-thread arm 63 terminating at its lower end in the fork 64.

The spherical extremity 53 of the lateral arm 52 of each angle-lever is embraced by a strap 65 at one end of a pitman 66 having a similar strap 67 at its opposite end embracing the ball-stud 68 extending laterally from the depending arm 69 of a rocker fulcrumed upon the pin 70 between rearwardly extending bearing lugs 71 of the bracket-arm head 4 and having a rearwardly extending arm 72. The rocker-arm 72 is connected by means of the pivotal pin 73 with the lower end of a bent link 74 whose apertured upper end embraces a crank-pin in the form of a stud-screw 75 tapped into the outer face of the collar 12 upon the needle-actuating rock-shaft 11. The stud-pin 75 is so positioned relatively to the crank-pin 13* and the piv-

otal connection 73 of the link 74 with the rocker-arm 72 that it moves into substantial alinement with the rock-shaft 11 and pivotal pin 72 while the needles are in their upper positions, and thus retracted from the work, thereby giving to the thread-arms 60 and 63 a dwell sufficiently long, in such stage of the stitch-forming cycle, to enable the points of the needles to enter the work before the thread-arms perform any substantial portion of their succeeding operative movements.

In the use of the machine, the looper is threaded in the usual manner and the needle-threads *a*, *b* and *c* are led through their respective tensions 76, and thence through their thread-eyes in the fixed thread-guide 77 from which they are led through guide-eyes of the thread-controller arm 78 and through apertures of the take-up arm 79 carried by the link 14 from which they pass through the apertures of the rigid arm 80 secured upon the upper end of the needle-bar and thence downwardly to the eyes of their respective needles. The covering thread *d* is led from the source of supply through the tension 81 and through its respective aperture of the thread-guide 77 and thence passes through the fixed thread-guide 82 upon the bracket-arm head 4 and the aperture 58 of the guide-lug 59 on the vibratory lever-arm 54 from which it is led through the delivery aperture 61 of the thread-carrying arm 60 to the work. The material *m* having been introduced between the presser-foot and the throat-plate, the machine is set in operation. As the needles descend the thread-arms 60 and 63 remain in their extreme thread-presenting positions represented in Figs. 1 and 5, the end of the covering-thread being threaded through the needle aperture 42 of the presser-foot and being held beneath the latter. As the points of the needles pass below the delivery aperture of the thread-arm 60, the thread-arms perform their retractive movements to the dotted line positions represented in Fig. 5, which they attain as the needles reach their extreme lower positions. In beginning their ascent, the needles present their loops which are entered by the looper and simultaneously with the rise of the needles the thread-arms 60 and 63 accomplish their return to operative position, during which the fork 64 of the thread-arm 63, which passes between the delivery eye 61 of the thread-carrying arm 60 and the needles, seizes and spreads the covering-thread *d* for passage of the needles in their succeeding descent. The thread-arm 60 is so sustained and operated that when in thread-laying position its delivery orifice is disposed slightly rearward of the adjacent needle, while the fork of the non-threaded

arm 62 in its corresponding stage of movement presents one limb of the covering-thread loop rearward of and the other limb in front of the path of reciprocation of the adjacent needle. When three needles are used, the intermediate needle is preferably disposed slightly out of alinement with the other two, so that in the succeeding descent of the needles the middle and right-hand needles descend between the distended limbs of the covering-thread loop and the left-hand needle descends in front of the forward limb of such loop leading from the thread-arm 60. As the stitching continues, the thread-arms continue to perform their reciprocations transversely of the direction of feed and in front of the needles, each receiving a to-and-fro movement for every reciprocation of the needles, so that loops of covering-thread are laid intermediate the needle-apertures crosswise of the direction of feed similarly with that of the looper-thread upon the lower face of the fabric, the looper receiving the usual endwise and sidewise movements in inter-looping its thread with the needle-threads. When the covering seam is applied to very thin or elastic material such as knit goods, to insure the proper laying of the threads and prevent puckering, the presser-foot and throat-plate are provided with the supporting tongues 43 and 47 each extending from the forward end of the needle aperture in the direction of feed and having its farther face inclined toward the material, whereby the looper and upper covering-threads are supported by such tongues during the formation and setting of the stitches, to be thereafter drawn from the same in the succeeding feeding action. In the finished seam, as represented in Fig. 5, loops of covering-thread *d* are laid alternately at opposite sides of the stitch line and each is entered by a thread-loop of the adjacent needle through both of which needle-thread loops is passed a loop of looper-thread *e* which embraces the succeeding loop of the needle adjacent the member 61 of the thread-arm 60. By the slight staggering of the needles as before described, the thread-loops of two of them are caused to pass through the covering-thread loops extending from the member 61 to the member 64 and back to the material, while loops of the third needle pass through the material upon opposite sides of such thread-loop.

As will be observed, each of the looper-thread loops passing through the corresponding needle-thread loops is distended for passage of the succeeding needle-thread loops. In case a covering seam having only the outer lines of stitching is required, the middle needle may be omitted, in which case the covering-thread loops upon the

upper face of the fabric will be laid symmetrically, and the loops of looper-thread will be correspondingly disposed upon the lower face of the fabric. It is thus evident that the employment of the intermediate needle is entirely optional in the use of the present improvement, and that it has no important function in the laying and securing in position of the covering-thread.

It is evidently not essential that the covering-thread laying members 61 and 64 should have reciprocal movements transverse to the direction of feed, as they would coöperate effectively if given movements in angularly disposed paths, such as those of the corresponding members of the mechanism forming the subject of the pending application of Martin Hemleb, Ser. No. 582,162, filed Sept. 15, 1910.

From the foregoing description, it will be seen that the covering-thread laying members of the present improvement derive their respective operative movements from an operative connection including a toggle device formed by the collar 12 and link 74 through the crank-pin 75 with the needle-actuating rock-shaft, and that the accelerated reciprocatory movements of these members are therefore secured without resort to the usual actuating cam. By this means, and by reason of its simplicity of construction, the mechanism is capable of being operated at a high rate of speed and with little noise and wear of the parts, thereby insuring a materially increased rate of production over machines of the same class heretofore constructed.

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

1. The combination with stitch-forming mechanism comprising a plurality of reciprocating needles and coöperating loop-taking means, and feeding mechanism, of needle-actuating means including a rock-shaft, a covering-thread laying member movable transversely of the direction of feed, a coöperating covering-thread laying member, and means including a crank-and-pitman connection with said rock-shaft for imparting operative movements to said thread-laying members.

2. The combination with stitch-forming mechanism comprising a plurality of reciprocating needles and coöperating loop-taking means, and feeding mechanism, of needle-actuating means including a rock-shaft, a plurality of covering-thread laying members movable transversely of the direction of feed, and means including a crank-and-pitman connection with said rock-shaft for imparting reciprocal operative movements to said thread-laying members.

3. The combination with stitch-forming mechanism comprising a plurality of reciprocating needles and coöperating loop-tak-

ing means, and feeding mechanism, of needle-actuating means including a rock-shaft, a covering-thread laying member movable transversely of the direction of feed, a co-operating covering-thread laying member, and an operative connection between the thread-laying members and said rock-shaft and including a toggle device adapted to be straightened to produce a dwell of said thread-laying members while the needles are in retracted position.

4. The combination with stitch-forming mechanism comprising a plurality of reciprocating needles and coöperating loop-taking means, and feeding mechanism, of needle-actuating means including a rock-shaft, a covering-thread laying member movable transversely of the direction of feed, a co-operating covering-thread laying member, a plural-armed rocker, a crank-and-pitman connection between one arm of the same and the needle-actuating rock-shaft, and an operative connection between another arm of said rocker and the first-named thread-laying member.

5. The combination with stitch-forming mechanism comprising a plurality of reciprocating needles and coöperating loop-taking means, and feeding mechanism, of needle-actuating means including a rock-shaft, a covering-thread laying member movable transversely of the direction of feed, a co-operating reciprocatory covering-thread laying member, a plural-armed rocker, an operative connection comprising a toggle de-

vice between one arm of said rocker and the needle-actuating rock-shaft, and independent operative connections between another arm of said rocker and said thread-laying members.

6. The combination with stitch-forming mechanism comprising a needle-bar carrying a plurality of reciprocating needles, a loop-taker coöperating with said needles, and feeding mechanism, of a needle-actuating rock shaft provided with a crank-arm, a pitman connection between said crank-arm and the needle-bar, a plural-armed rocker mounted upon a fixed fulcrum, a pivotal pin carried by an arm of said rocker, a crank-pin carried by the needle-actuating rock-shaft and movable into and out of alinement with the latter and said pivotal pin of the rocker arm, a link connection between said crank-pin and said pivotal pin, two independently movable rock-levers, coöperating covering-thread laying arms each carried by one of said rock-levers and reciprocally movable therewith transversely to the direction of feed and in front of the needles, and independent operative connections between said rock-levers and said rocker.

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

JOSEPH BERGER.

Witnesses:

HENRY J. MILLER,

HENRY A. KORNEIMANN, Jr.