No. 859,423. PATENTED JULY 9, 1907.

W. M. AMMERMAN.

LOOPER MECHANISM FOR SEWING MACHINES.

APPLICATION FILED MAR. 15, 1904.

2 SHEETS—SHEET 1.

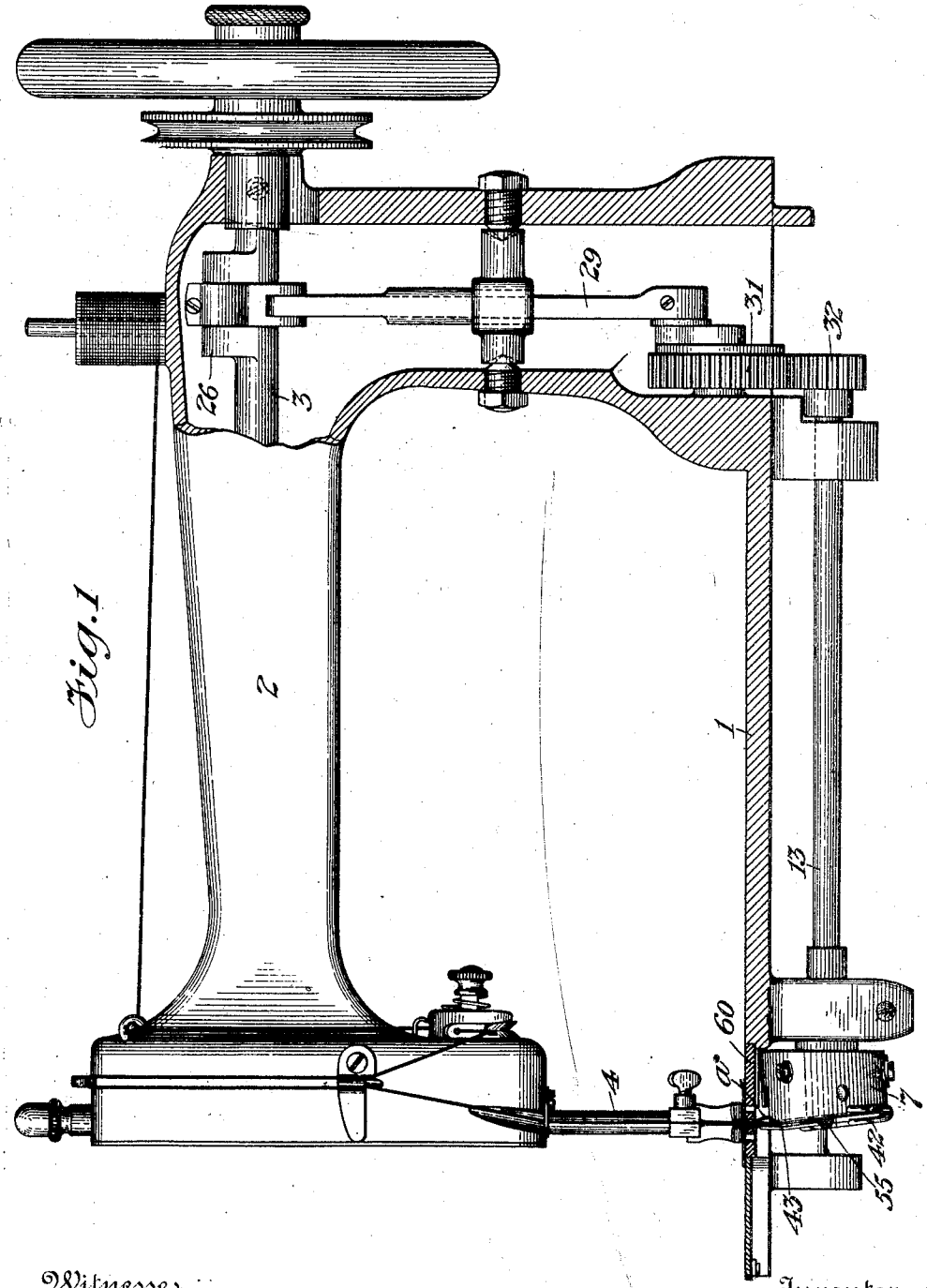


Fig. 1

Witnesses
Chas. F. Clagett
E. W. Faith

Inventor
Wm. M. Ammerman
By his Attorney
Chas. F. Dane

No. 859,423. PATENTED JULY 9, 1907.

W. M. AMMERMAN.

LOOPER MECHANISM FOR SEWING MACHINES.

APPLICATION FILED MAR. 15, 1904.

2 SHEETS—SHEET 2.

Fig. 2

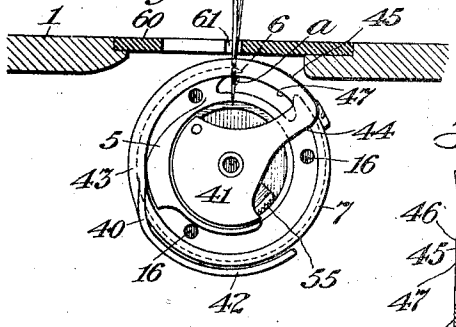


Fig. 3

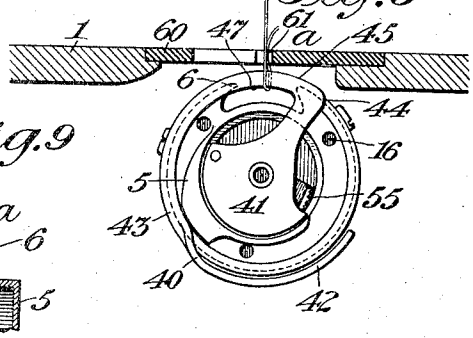


Fig. 9

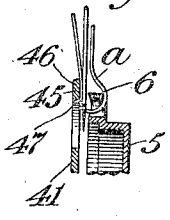


Fig. 4

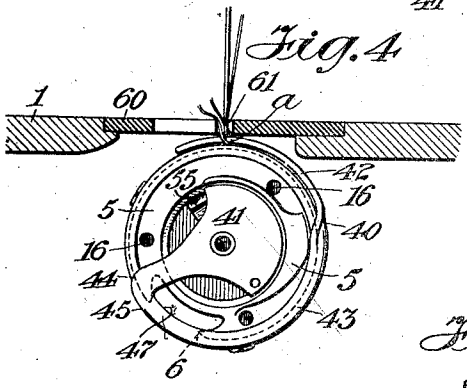


Fig. 5

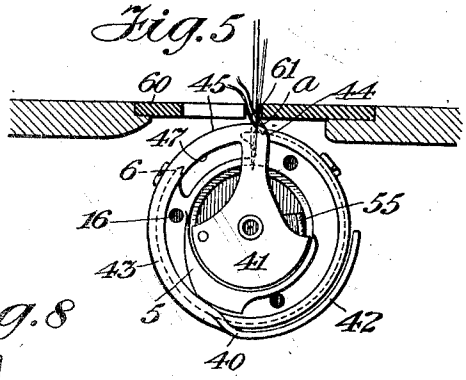


Fig. 8

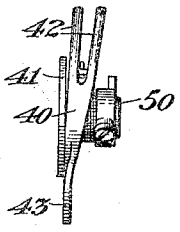


Fig. 6

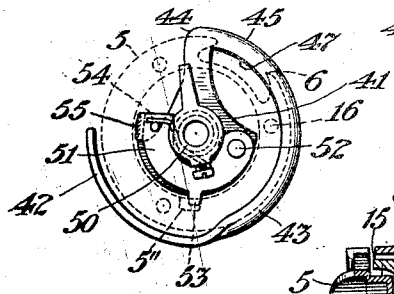


Fig. 7

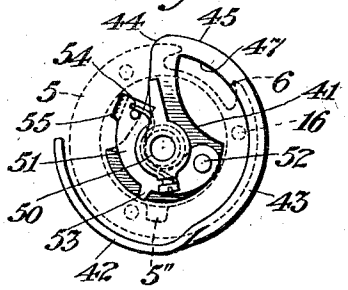
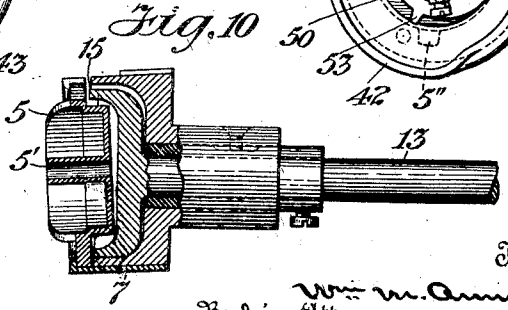


Fig. 10



Witnesses
Chas. J. Clagett
E. W. Faith

Inventor
Wm. M. Ammerman
By his Attorney
Chas. F. Dane

UNITED STATES PATENT OFFICE.

WILLIAM M. AMMERMAN, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE EDWIN J. TOOF COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF NEW JERSEY.

LOOPER MECHANISM FOR SEWING-MACHINES.

No. 859,423. Specification of Letters Patent. Patented July 9, 1907.

Application filed March 15, 1904. Serial No. 198,185.

To all whom it may concern:

Be it known that I, WILLIAM M. AMMERMAN, a citizen of the United States, and a resident of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Looper Mechanism for Sewing-Machines, of which the following is a specification.

This invention relates to sewing machines of the class employing a rotary loop-taker, and more particularly to sewing machines included in said class in which the loop-taker is operated to have a plurality of revolutions to each reciprocation of the needle, a type of this class of machine being illustrated and described in a co-pending application of mine, Serial No. 198,184; filed March 15, 1904.

The main object of the present invention is to render a lock-stitch sewing machine of the class referred to capable of making a chain-stitch without other change than the mere substitution in the machine for the usual bobbin-case and bobbin of a chain-stitch attachment r so-called "looper." One form of looper for thus rendering a lock-stitch sewing machine capable of making a chain-stitch is disclosed in Letters Patent No. 629,735, granted to me July 25, 1899. In the sewing machine disclosed in said Patent, however, the shuttle or loop-taker is operated to have but one revolution to each reciprocation of the needle, whereas in the machine forming the subject-matter of my present application, the loop-taker is operated to have two revolutions to each reciprocation of the needle, which difference of time in the relative movements of said parts renders necessary certain changes in the construction of the looper and in its arrangement relative to the loop-taker in order that it may properly control the thread in coöperation with the other parts of the stitch-forming mechanism in the formation of a chain-stitch; and it is in such construction of the looper and arrangement of the same relatively to the coöperating parts of the stitch-forming mechanism as will adapt a machine of the class referred to for making a chain-stitch that my present invention more particularly resides, although certain features of the invention may be embodied in chain-stitch loopers for use in connection with other classes of sewing machines.

Referring to the accompanying drawings forming a part of this specification, Figure 1 is a front elevation, partly in section, of a sewing machine embodying my invention. Figs. 2, 3, 4 and 5 are detail views showing the loop-taker and attached looper in front elevation and the work-plate in section and illustrate the operation of the parts at different times during the formation of the stitch. Figs. 6 and 7 are rear views of the looper in operative position relatively to the loop-taker, the latter being shown in dotted lines, and illustrates the locking device for securing connection between the parts in locking and unlocking positions respectively. Fig. 8 is an edge view of the looper removed from connection with the loop-taker. Fig. 9 is an enlarged detail to be hereinafter referred to. Fig. 10 is a central vertical section through the loop-taker, its driver, and its supporting race-way frame.

Similar reference characters designate like parts in the several figures of the drawings.

The sewing machine herein shown in connection with which I have illustrated my invention is, aside from the chain-stitch looper, of the same construction and operation as that more fully illustrated and described in my said pending application Serial No. 198,184, the same comprising the bed-plate 1; the overhanging bracket arm 2; the upper driving-shaft 3 journaled in bearings in said bracket arm; the vertically reciprocating needle-bar 4 actuated from the driving shaft 3; the rotary shuttle or loop-taker 5 supported in position at the under side of the bed-plate in the circular race-way frame 7; the loop-taker driver 13 having at its forward end a plurality of fingers 15 for engaging the loop-taker within openings 16 therein, the said loop-taker being arranged with its axis at an angle to the axis of the driver whereby the driver fingers during the rotation of the parts will alternately enter and withdraw from the openings in the loop-taker so as to permit of the free passage of the loop-taker through the needle-thread loop in the usual manner; and the means for transmitting motion from the driving shaft to the loop-taker driver so as to impart two revolutions to the loop-taker to each reciprocation of the needle, comprising the pitman-lever 29 connecting at its upper end with the crank 26 in the driving shaft and at its lower end with the driver 13 through the gearing 31 and 32.

When this machine is provided with the usual bobbin and bobbin-case, it will operate to form the ordinary lock-stitch. In order, however, to adapt the machine for making what is termed a chain-stitch, the bobbin and bobbin-case are removed from the loop-taker and my improved looper is removably attached thereto. This looper comprises a forked tail 40 extending from a supporting plate or body portion 41 which is provided with means for detachable connection with the loop-taker within the usual central bobbin containing chamber thereof whereby the looper may be held in fixed relation with the loop-taker so as to be movable therewith when in operation, the said forked tail being formed in substantially the arc of a circle corresponding to that of the loop-taker periphery so as to occupy a position adjacent to the latter when the looper is placed in operative connection with the loop-taker. When the looper is placed in operative connection with the loop-taker it will be arranged with both prongs 42, 42, thereof terminating

at a point some distance in advance of the loop-taker beak 6 and with its shank 43 extending rearwardly from said prongs past the loop-taker beak to a point intermediate of the latter and the said looper prongs as shown; this relative arrangement of the said parts, which is materially different from that of the corresponding parts in my said prior patent No. 629,735, and also from that in my later patent No. 687,511, being necessary in a machine of the class herein shown in which the loop-taker has two revolutions to each reciprocation of the needle.

The operation of so much of the invention as described is as follows: The usual bobbin-case and bobbin being removed from the loop-taker and my improved looper connected therewith, the machine is set in motion so as to operate the several parts of the stitch-forming mechanism and impart two revolutions to the loop-taker with its connected looper to each reciprocation of the needle; then, as the needle descends and rises, it throws out a loop *a* of the thread which is seized by the beak 6 of the loop-taker, as shown in Fig. 2, and as said loop-taker continues its rotation and the needle continues to rise the said loop is carried around the body of the loop-taker in the usual manner until said loop-taker reaches the position shown in Fig. 3, when the loop, having been partially drawn up by the take-up, will be engaged and detained by the under wall 47 of the looper shank 43, which said wall for the performance of such function may be termed a loop-detainer. At this time the loop-taker has almost completed its first revolution but the needle has not begun its descent to throw out the succeeding loop, therefore, the first loop will continue to be detained by the said loop-detainer as the loop-taker enters upon its second revolution, the said detainer being arranged in a position at one side of the path of movement of the loop-taker beak whereby the detained loop will not be seized or entered by the latter in its passage past the same. After the loop-taker has entered upon its second or idle revolution and before the needle has descended below the highest point in the path of movement of the looper, the latter will have moved through the detained loop to a position where its prongs will hold said loop in an open or distended position across the vertical path of movement of the needle to be entered by the latter and its thread, as shown in Fig. 4. As the loop-taker now continues its rotation, the first loop is cast off by the looper and the second loop thrown out by the needle is seized by the loop-taker beak and drawn through the first loop, which latter is subsequently drawn up and tightened in the work in the usual manner. After the first loop has been cast off by the looper as described, it is not drawn up or tightened until the second loop is drawn up by the take-up into engagement with the looper shank during the succeeding rotation of the loop-taker; therefore, in order that the said first or cast-off loop *a* may not be seized or engaged by the loop-taker beak during the passage of the latter past the same, the forked end of the looper is arranged in a position radially beyond the path of movement of said beak and preferably in a position outside of its raceway frame, as shown, whereby the loop will be cast off by the forked end of the looper in a position above or beyond the path of movement of the said loop-taker beak. When the loop is thus cast off by the looper, however, it is in an open or distended position which permits of the possibility of its sagging into the path of movement of the loop-taker beak. In the event of such sagging of the loop, however, its engagement by the loop-taker beak is prevented by the looper shank 43, the heel 44 of which, being located intermediate of the tail of the looper and the loop-taker beak, engages with the said loop, as shown in Fig. 5, and causes it to ride upward onto the periphery 45 of the looper shank, which, being in a position radially beyond the path of movement of the loop-taker beak, holds the loop in a corresponding position relatively to the latter and so prevents possibility of its engagement thereby. The heel 44 and connecting peripheral edge 45 of the looper shank in thus deflecting and holding the cast-off loop in a position away from the path of movement of the loop-taker beak during the passage of the latter past said loop constitutes what I term a loop-deflector.

In the usual operation of the machine, the needle descends in a position at the forward side of the path of the loop-taker beak and in rising throws out a loop to be entered by the latter. In this operation, the loop is liable to be thrown out at either side of the needle and, in the event of being thrown out at the wrong side thereof, cause the machine to skip stitches. Possibility of this is prevented in the present machine, however, by reason of the looper shank 43 being arranged at its rear end in a position at one side and in advance of the loop-taker beak so that its inner wall 46 will move in a path adjacent to the path of the needle at the forward side thereof, as shown in Fig. 9, and operate as a guard to prevent the loop being thrown out at such side of the needle, or in other words, operate to insure the loop being thrown out at the inner side of the needle and in position to be seized by the loop-taker beak, the said inner wall 46 of the looper shank 43 thus forming what I term a loop-guard.

As hereinbefore described, the cast-off loop is not drawn up into the work until the succeeding loop thrown out by the needle is drawn up into engagement with the detainer 47. It therefore becomes desirable that the detained loop should be so held by the said detainer 47 that its sides will not draw against the edges of the needle-opening 61 in the throat-plate 60 and interfere with the preceding or cast-off loop being readily drawn upward through the said needle-opening, as such interference would have a tendency to prevent even or uniform stitching. Therefore, in order to insure the detained loop being held in the manner referred to, the shank 43 of the looper is contracted with respect to the forked end thereof, as most clearly shown in Fig. 8, so as not to unduly spread the loop detained thereby, the width of the shank being preferably less than the diameter of the needle-opening.

The looper may be connected with the loop-taker in any suitable manner, the same as herein shown being provided with means for detachable connection therewith, comprising a hollow stem 50 projecting from the inner side of the looper body 41 to fit over the usual centrally located bobbin-supporting spindle 5′ of the loop-taker, and a locking-lever 51 pivoted at one end to the looper body at 52 and having a laterally projecting arm 53 which, under the action of a spring 54

pressing against the lever, is movably held in a position to engage with the loop-taker within an opening 5″ in one wall thereof, as shown in Fig. 6, and retain the looper in operative connection therewith, the said locking-lever being arranged with its free end 55 projecting beyond one edge of the looper-body 41 in a convenient position to be reached by the operator to move the lever into unlocking position with its arm 53 withdrawn from the opening 5″ in the loop-taker, as shown in Fig. 7, when it is desired to remove the looper from connection with the loop-taker.

What I claim is:

1. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a loop-taker and a forked looper both having a plurality of revolutions to each reciprocation of the needle, the loop-taker being operative during one revolution to seize the thread-loop thrown out by the needle and the forked looper being operative to receive the said thread-loop subsequent to its engagement by the loop-taker and hold the same during another revolution in an open or distended position across the path of the needle to be entered thereby, and actuating means for the said needle, loop-taker, and looper.

2. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a loop-taker and a forked looper both having two revolutions to each reciprocation of the needle, the loop-taker being operative during the first revolution to seize the thread-loop thrown out by the needle and the forked looper being operative to receive the said thread-loop subsequent to its engagement by the loop-taker and hold the same during the second revolution in an open or distended position across the path of the needle to be entered thereby, and actuating means for the said needle, loop-taker, and needle.

3. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a loop-taker provided with a forked looper and having a plurality of revolutions to each reciprocation of the needle, the said loop-taker being operative during one revolution to seize the thread-loop thrown out by the needle and the forked looper being operative to receive the said thread-loop subsequent to its engagement by the loop-taker and hold the same during another revolution in an open or distended position across the path of the needle to be entered thereby, and actuating means for the said needle and the loop-taker.

4. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a loop-taker provided with a forked looper and having two revolutions to each reciprocation of the needle, the said loop-taker being operative during the first revolution to seize the thread-loop thrown out by the needle and the forked looper being operative to receive the said thread-loop subsequent to its engagement by the loop-taker and hold the same during the second revolution in an open or distended position across the path of the needle to be entered thereby, and actuating means for the said needle and the loop-taker.

5. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a rotary loop-taker, a forked looper for receiving the thread-loop subsequent to its engagement by the loop-taker and having a cast-off end terminating in advance of the loop-taker beak and in a position radially beyond its path of movement, and means for imparting a plurality of revolutions to said loop-taker and looper to each reciprocation of the needle.

6. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a rotary loop-taker, a forked looper for receiving the thread-loop subsequent to its engagement by the loop-taker and having a cast-off end terminating in advance of the loop-taker beak, a loop-detainer extending past the loop-taker beak from a point at its rear to a point in advance thereof, and means for imparting a plurality of revolutions to said loop-taker, looper, and loop-detainer to each reciprocation of the needle.

7. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a rotary loop-taker, a forked looper for receiving the thread-loop subsequent to its engagement by the loop-taker and having a cast-off end terminating in advance of the loop-taker beak, a loop-detainer of less width than the forked looper extending past the loop-taker beak from a point at the rear to a point in advance thereof, and means for imparting a plurality of revolutions to said loop-taker, looper and loop-detainer to each reciprocation of the needle.

8. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a rotary loop-taker, a forked looper for receiving the thread-loop subsequent to its engagement by the loop-taker and having a cast-off end terminating in advance of the loop-taker beak, a loop-deflector located intermediate of the said cast-off end of the looper and the loop-taker beak, and means for imparting a plurality of revolutions to said loop-taker, looper, and loop-deflector to each reciprocation of the needle.

9. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a rotary loop-taker, a forked looper for receiving the thread-loop subsequent to its engagement by the loop-taker and having a cast-off end terminating in advance of the loop-taker beak, a loop-deflector located intermediate of the said cast-off end of the looper and the loop-taker beak and having a portion of its loop-deflecting surface extended radially beyond the path of movement of the loop-taker beak, and means for imparting a plurality of revolutions to said loop-taker, looper and loop-deflector to each reciprocation of the needle.

10. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a rotary loop-taker, a forked looper for receiving the thread-loop subsequent to its engagement by the loop-taker and having a cast-off end terminating in advance of the loop-taker beak, a loop-deflector located intermediate of the cast-off end of the looper and the loop-taker beak and having a portion of its loop-deflecting surface extending rearwardly past the said beak in a position radially beyond the same, and means for imparting a plurality of revolutions to said loop-taker, looper, and loop-deflector to each reciprocation of the needle.

11. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a rotary loop-taker, a forked looper for receiving the thread-loop subsequent to its engagement by the loop-taker and having a cast-off end terminating in advance of the loop-taker beak, a loop-deflector located intermediate of the said cast-off end of the looper and the loop-taker beak, a loop-guard located at one side of the loop-taker beak with a needle-receiving space therebetween, and means for imparting a plurality of revolutions to said loop-taker, looper, loop-deflector and loop-guard to each reciprocation of the needle.

12. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle, a rotary loop-taker, a forked looper for receiving the thread-loop subsequent to its engagement by the loop-taker and having a cast-off end, terminating in advance of the loop-taker beak, a combined loop-deflector and loop-guard extending past the loop-taker beak in a position at one side thereof and with a needle-receiving space therebetween, and means for imparting a plurality of revolutions to said loop-taker, looper, and combined loop-deflector and loop-guard to each reciprocation of the needle.

13. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle and a rotary loop-taker having a plurality of revolutions to each reciprocation of the needle, the said loop-taker being provided with a forked tail or looper terminating in advance of the loop-taker beak and in a position radially beyond its path of movement, and means for operating the needle and the loop-taker.

14. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle and a rotary loop-taker having a plurality of revolutions to each reciprocation of the needle, the said loop-taker being provided with a forked tail or looper arranged with both prongs thereof

terminating in advance of the loop-taker beak and having a loop-detainer extending past the loop-taker beak from a point at its rear to a point in advance thereof, and means for operating the needle and the loop-taker.

15. In a sewing machine, a stitch-forming mechanism comprising a reciprocatory needle and a rotary loop-taker having a plurality of revolutions to each reciprocation of the needle, the said loop-taker being provided with a forked tail or looper arranged with both prongs thereof terminating in advance of the loop-taker beak and having a contracted loop-detainer shank extending past the loop-taker beak from a point at the rear to a point in advance thereof, and means for operating the needle and the loop-taker.

16. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle and a rotary loop-taker having a plurality of revolutions to each reciprocation of the needle, the said loop-taker being provided with a forked tail or looper terminating in advance of the loop-taker beak, and with a loop-deflector intermediate of the said forked tail and the loop-taker beak, and means for operating the needle and the loop-taker.

17. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle and a rotary loop-taker having a plurality of revolutions to each reciprocation of the needle, the said loop-taker being provided with a forked tail or looper terminating in advance of the loop-taker beak, with a loop-deflector intermediate of the said forked tail and the loop-taker beak having a portion of its loop-deflecting wall extended radially beyond the path of movement of the said beak, and means for operating the needle and the loop-taker.

18. In a sewing machine, a stitch-forming mechanism comprising a reciprocating needle and a rotary loop-taker having a plurality of revolutions to each reciprocation of the needle, the said loop-taker being provided with a forked tail or looper terminating in advance of the loop-taker beak, and with a loop-deflector intermediate of the said forked tail and the loop-taker beak having a portion of its loop-deflecting wall extended rearwardly past the said beak in a position radially beyond its path of movement, and means for operating the needle and the loop-taker.

19. In a sewing machine, a stitch forming mechanism comprising a coöperating needle and loop-taker, the said loop-taker being provided with a forked tail or looper terminating in advance of the loop-taker beak and having a portion thereof arranged in a position at one side and in advance of the loop-taker beak for coöperation with the needle at that side thereof opposite the path of movement of the loop-taker beak.

20. A rotary loop-taker provided with a forked tail or looper terminating in advance of the loop-taker beak and operative to receive a thread-loop cast off from the beak, and a loop-deflector intermediate of said forked tail and beak operative to engage a thread-loop cast off from the forked tail.

21. A rotary loop-taker provided with a forked tail or looper terminating in advance of the loop-taker beak, and with a loop-deflector intermediate of the said forked tail and the loop-taker beak having a portion of its loop-deflecting wall extended radially beyond the said beak.

22. A rotary loop-taker provided with a forked tail or looper terminating in advance of the loop-taker beak, and with a loop-deflector intermediate of the said forked tail and the loop-taker beak having a portion of its loop-deflecting wall extended rearwardly passed and radially beyond the said beak.

23. A rotary loop-taker provided with a forked tail or looper arranged with both prongs thereof terminating in advance of the loop-taker beak, and with a removably attached loop-deflector intermediate of the said forked tail and the loop-taker beak.

24. A rotary loop-taker provided with a forked tail or looper arranged with both prongs thereof terminating in advance of the loop-taker beak, and with a loop-deflector intermediate of the said forked tail and the loop-taker beak, the said forked tail and the loop-deflector being connected together and removably attached to the loop-taker.

25. A rotary loop-taker provided with a forked tail or looper arranged with both prongs thereof terminating in advance of the loop-taker beak, and with a loop-deflector intermediate of the said forked tail and the loop-taker beak, the said forked tail and the loop-deflector being formed in one integral part and removably attached to the loop-taker.

26. A rotary loop-taker provided with a forked tail or looper, a loop-deflector and a loop-guard, the said forked tail terminating in advance of the loop-taker beak and the loop-deflector and the loop-guard being both arranged in advance of the loop-taker beak.

27. A rotary loop-taker provided with a forked tail or looper, a loop-deflector and a loop-guard, the said forked tail terminating in advance of the loop-taker beak and the loop-deflector and the loop-guard being both arranged in advance of the loop-taker beak and the said forked tail, loop-deflector, and loop-guard all being formed in one part and removably attached to the loop-taker.

28. A rotary loop-taker provided with a forked tail or looper arranged with both prongs thereof terminating in advance of the loop-taker beak and having a shank portion extended past the said beak to a point in advance thereof, the said shank portion having one wall thereof serving as a loop-deflector.

29. A rotary loop-taker provided with a forked tail or looper terminating in advance of the loop-taker beak and having a shank portion extended past the said beak to a point in advance thereof, the said shank portion having one wall thereof serving as a loop-guard.

30. A rotary loop-taker provided with a forked tail or looper extending in advance of the loop-taker beak and having a shank portion extended past the said beak to a point in advance thereof, the said shank portion having one wall thereof serving as a loop-deflector and another wall thereof serving as a loop-guard.

31. A rotary loop-taker provided with a forked tail or looper arranged with both prongs thereof terminating in advance of the loop-taker beak and having a contracted shank portion extended past the said beak to a point in advance thereof and serving as a loop-detainer.

Signed at New York in the county of New York and State of New York this 10th day of March A. D. 1904.

WILLIAM M. AMMERMAN.

Witnesses:
CHAS. F. DANE,
E. M. FAITH.