

No. 637,744.

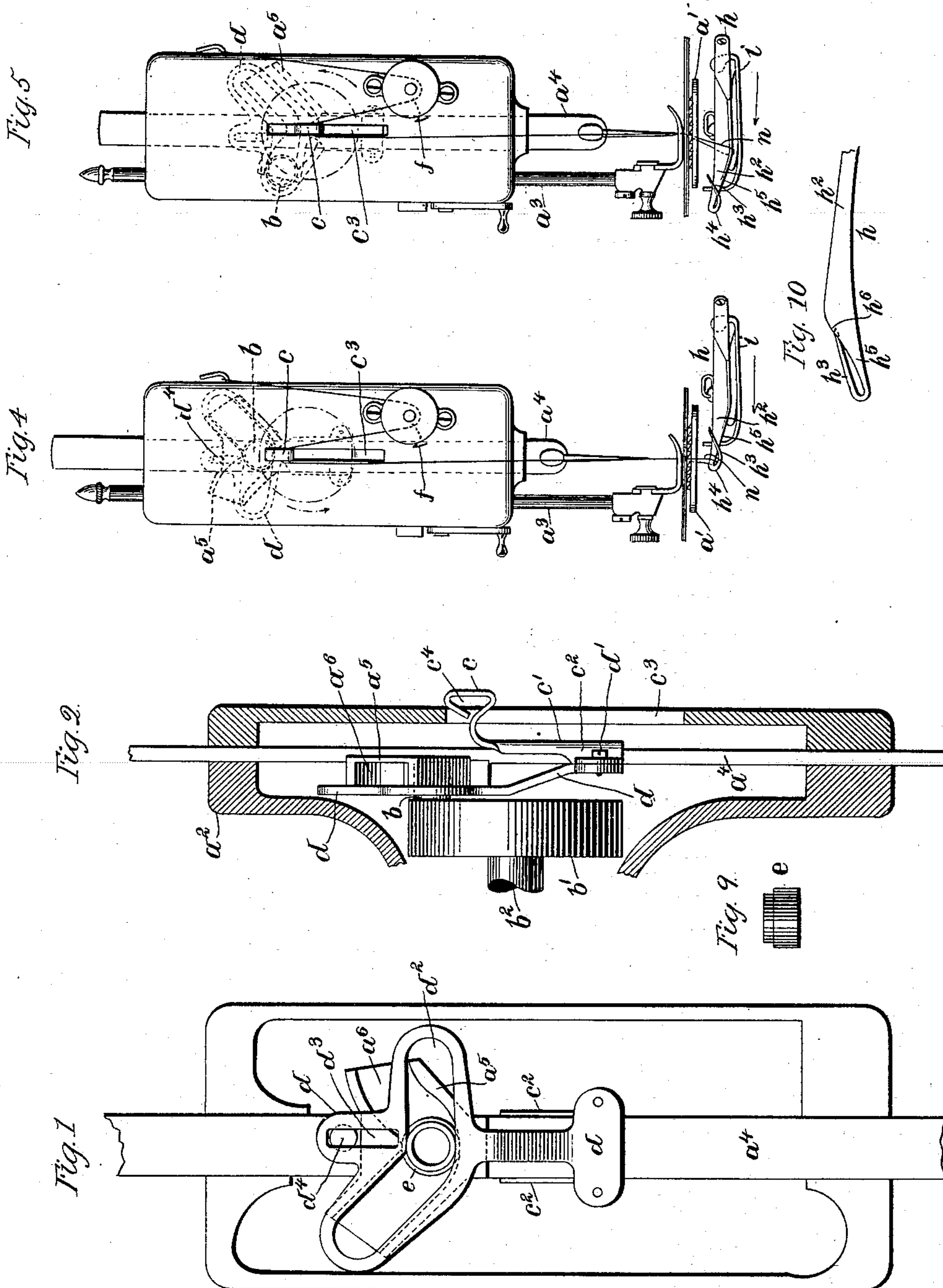
Patented Nov. 21, 1899.

W. M. AMMERMAN.
TAKE-UP FOR SEWING MACHINES.

(Application filed Mar. 28, 1897.)

(No Model.)

3 Sheets—Sheet 1.



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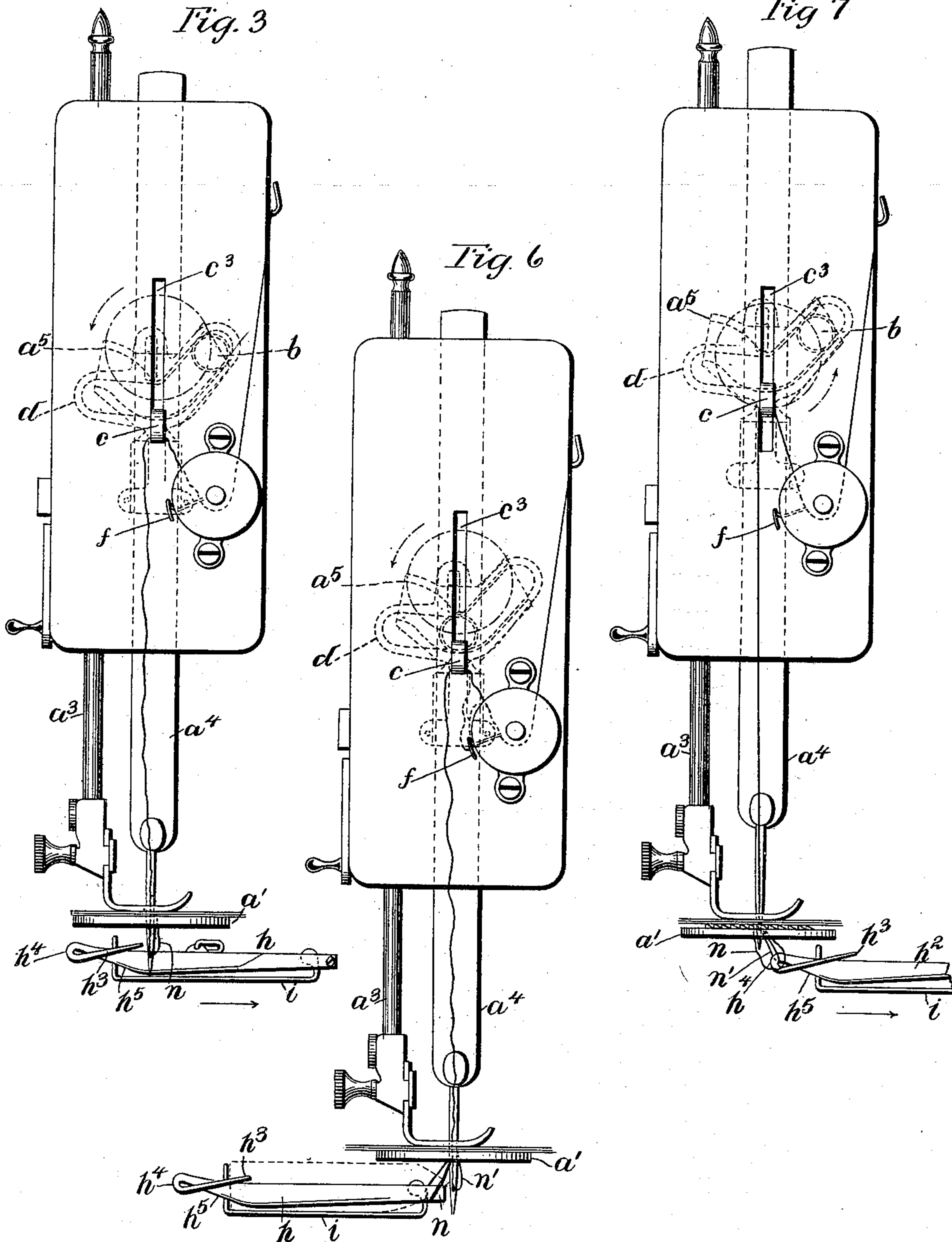
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(Application filed Mar. 26, 1897.)

(No Model.)

3 Sheets—Sheet 2.



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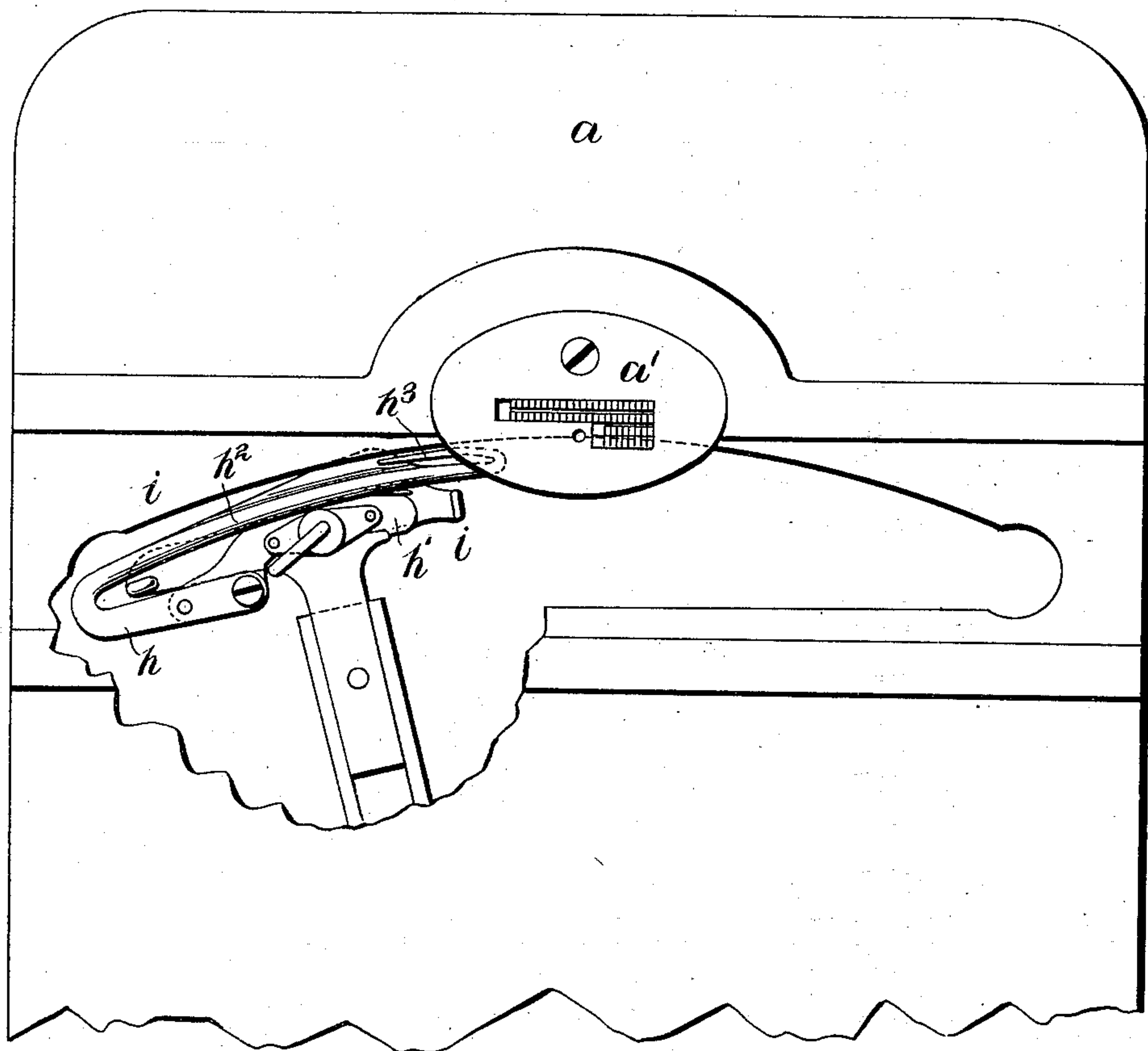
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3 Sheets—Sheet 3.

Fig. 8



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UNITED STATES PATENT OFFICE.

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TAKE-UP FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 637,744, dated November 21, 1899.

Application filed March 26, 1897. Serial No. 629,331. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. AMMERMAN, a citizen of the United States, and a resident of the city and county of New Haven, State of Connecticut, have invented new and useful Improvements in Take-Up and Thread-Controlling Mechanism for Sewing-Machines, of which the following description, taken in connection with the drawings herewith accompanying, is a specification.

This invention relates particularly to a take-up and thread-controlling mechanism for sewing-machines; and it consists, first, in the combination, with the vertically-reciprocating needle-bar of the machine, of a vertically-reciprocating take-up device confined to movement in a path parallel with the path of movement of the needle-bar and means for actuating the needle-bar and take-up whereby the latter is caused to move at a less speed than the needle-bar when giving down the thread and caused to move upward in the same time therewith, said means including a rotary shaft carrying a crank-pin for engaging with said needle-bar and take-up device; secondly, the invention further consists in the combination, with the needle-bar provided with a cam-groove, of a take-up device consisting of a frame supported to slide upon the needle-bar and provided with a cam-slot therein and an antifriction-roll having means whereby it is permanently connected with the needle-bar and take-up device within the said cam-groove and cam-slot with which such parts are provided and holding the parts vertically in position relative to each other when disengaged from their operating means; thirdly, the invention further consists in the combination, with the needle-bar and take-up actuated in the manner described, of a horizontally-reciprocating looper having means for controlling the slack thread given down by the take-up during the descent of the needle, and, fourthly, the invention further consists in various other details of construction and combination of parts, as hereinafter set forth in detail, and pointed out in the claims.

Referring to the drawings, Figure 1 represents a rear view of the sewing-machine face-plate removed from its position upon the arm of the machine, also showing the needle-bar with my improved take-up device connected therewith; Fig. 2, a vertical section through

a portion of the arm of the machine, at the front end thereof, showing the needle-bar, take-up device, and the front end of the upper rotating driving-shaft with its crank-disk for operating the said needle-bar and take-up device; Figs. 3, 4, 5, 6, and 7, a front end elevation of the sewing-machine arm with its supported needle-bar, presser-bar, and take-up device, also a looper and its carrier, showing in full and dotted lines the relative positions of the needle-bar and take-up with their connected operating parts and the looper at different times during the formation of a stitch; Fig. 8, a plan view of the front end of the bed-plate of the machine with the slide-plates removed and a portion of the bed-plate broken away, showing the looper and its carrier; and Figs. 9 and 10, detail views to be hereinafter referred to.

To explain in detail, the bed-plate a , the throat-plate a' , the arm a^2 , the presser-bar a^3 , and the needle-bar a^4 are all of usual form and construction, as found in the ordinary sewing-machine. The needle-bar a^4 is provided with a plate a^5 , secured thereon, having a cam-groove a^6 , into which latter a crank-pin b , carried by the disk b' on the end of the upper rotating driving-shaft b^2 , extends and operates to give the said needle-bar its vertical movement.

According to my present invention, as before stated, I have supported the take-up device (represented at c) to slide upon the needle-bar and receive its movement in common with the latter from the said operating crank-pin b . This take-up device, as more clearly shown in Figs. 1 and 2, consists of a plate c' , which is provided with side flanges c^2 c^2 , adapted for closely embracing the sides of the needle-bar, as shown, and having one end thereof projecting outwardly through a vertically-elongated slot c^3 in the face-plate of the machine, which projecting end is provided with an eye c^4 therein to receive the needle-thread, which is adapted to pass through the same in its passage from the spool or thread-supply to the needle in the usual manner. A second plate or frame d is rigidly secured to the opposite sides of the plate c' in a position at the rear of the needle-bar by suitable fastening screws or rivets d' , as shown. The plates c' and d being thus connected act as though formed in one integral piece, and,

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 closely embracing the four sides of the needle-bar at their point of connection, are supported and guided thereon. The said plate d extends in a position behind the grooved
 5 plate a^5 on the needle-bar and between the same and the disk b' on the driving-shaft and is provided with a cam slot or opening d^2 therein, through which the crank-pin b is
 10 passed when entered into the groove in the plate a^5 on the needle-bar, as shown in Fig. 2, whereby the take-up device will be operated in combination with the needle-bar in a
 manner as will hereinafter be set forth in detail. The plate d , above the said cam-slot
 15 therein, is provided with a vertically-elongated opening d^3 therein, which receives the end of a fixed pin d^4 , located upon the needle-bar. This pin d^4 serves as a partial support and guide for the take-up device as a
 20 whole and holds the plate d thereof from lateral movement relative to the needle-bar when being operated. It will be understood that this said fixed pin d^4 , extending into the opening d^3 in the plate d , as described, will
 25 retain the take-up device in vertical position upon the needle-bar; but in order to support the same so that its cam-slot d^2 will always be in proper operative position relative to the groove a^6 in the needle-bar plate to receive
 30 the crank-pin b therethrough when it is entered into the said groove I have provided an antifriction-roll e , into which the crank-pin is adapted to be fitted, of sufficient width for extending into both the cam-slot d^2 and
 35 cam-groove a^6 , whereby the take-up device will be held in a position with some portion of its slot d^2 opposite the groove a^6 , as shown in Fig. 1. The take-up cam and the needle-bar cam are also held in such described position
 40 relative to each other by means of the fixed pin d^4 on the needle-bar extending into the opening d^3 of the take-up, as will be obvious upon reference to Fig. 1. The take-up being supported and operated in connection
 45 with the needle-bar, as described, receives the same length of throw or movement as the needle-bar, thus reducing to a minimum the amount of slack thread produced. The take-up slot d^2 is made narrower than
 50 the needle-bar groove a^6 , and the roll e is formed with a portion of its periphery of less circumference than the other to accommodate itself to the different widths of the slot and groove, as clearly shown in Fig. 1. In this
 55 manner the roll is locked in connection with the needle-bar and take-up device and enables the latter to be located and adjusted in proper operative position upon the needle-bar before the latter is placed in connection
 60 with the machine, so that when the needle-bar is placed in position and the crank-pin b entered into its groove within the roll e the take-up is thereby also placed in operative connection with the machine. The take-up
 65 device being thus supported wholly upon the needle-bar between the bearings of the latter and independent of permanent connection

with any other part may be readily removed, with the needle-bar, from its position within the arm of the machine for the purpose of
 70 cleaning, repairing, &c., and replaced without change or adjustment of any of the parts, the advantage of which will be obvious.

The take-up device is timed to operate, in combination with the needle-bar and needle,
 75 so that in drawing up the stitch it will move upward with the needle in the same time therewith; but in moving downward from the position shown in Fig. 4 the take-up only
 80 moves about one-half as fast as the needle-bar, so as to give down a correspondingly-less amount of thread than would be given down by the needle-bar in case the latter was used as the take-up. In this manner the amount
 85 of slack thread to be controlled by the usual spring-controller f is greatly reduced, whereby less strain being upon the same it is better enabled to control the thread when the machine is run at a high rate of speed, and
 90 it also enables such spring-controller to be entirely dispensed with when a looper is employed in lieu of the shuttle in a manner as will hereinafter be referred to. The relative
 95 movements of the needle-bar and take-up, as described, are secured by forming the cam-slot in the take-up and the cam-groove in the needle-bar plate parallel with each other at one
 side of the needle-bar, in which parallel portions the crank-pin operates in giving the
 100 parts their upward movement and forming the same at different angles to each other at the opposite side of the needle-bar, in which latter portions the crank-pin operates in giving the differential movement to the parts
 105 when being moved downward. The position taken by the two cams and the operating crank-pin therein at different times during the upward-and-downward movement of the needle-bar and take-up are clearly shown by
 110 dotted lines in Figs. 3, 4, 5, 6, and 7.

As another feature of my present invention I have provided a looper for chain-stitch sewing having means for coacting with the said
 needle-bar and take-up device, as described in controlling the slack thread. This looper
 115 (represented at h) is adapted to be used interchangeably with the ordinary shuttle and be seated and secured within the horizontally-vibrating shuttle-carrier i in a manner as more
 120 clearly shown in Fig. 8. The said looper h consists of a supporting-shank h' for connection with the carrier i , provided with a looper-arm h^2 , arranged substantially parallel with the wall of the raceway, which arm is provided with a loop-engaging hook h^3 at one
 125 end thereof. As the thread-loop n is thrown out by the needle, as shown in Fig. 3, at which time the take-up is also at about its lowest point, the said hook h^3 of the looper is then advanced in the direction indicated by the
 130 arrow to be entered into the said loop. The looper then continues to advance in the same direction until the loop n has reached the crotch between the hook and the arm, at which

time it is carried onto the arm h^2 , as shown in Fig. 4, by reason of a short upward bend h^4 being formed at the point of union between the parts, which serves to guide the loop from the hook to the said arm, as will be obvious. 5 The looper now begins its return movement, and when it has reached the position, as shown in Fig. 4, with its crotch in line below the path of the needle the take-up has reached 10 its highest point, as shown. Now, as the looper continues in its said return movement and the take-up begins to descend, in order to control such slack thread as is given down by the take-up to keep the same away from 15 the point of the needle until the latter has entered the goods I have provided the looper-arm h^3 with an inclined surface h^5 , extending downwardly from the end thereof, and with a lateral swell h^6 , as more clearly shown 20 in Fig. 10, which act upon the loop at such time to draw the thread down below the cloth-plate and prevent the forming of any slack thread until the point of the needle has reached the goods, as shown in Fig. 5. In this 25 manner the usual spring or other device for controlling the slack thread may be dispensed with. After the slack thread given down by the take-up device has been thus controlled by the peculiar formation of the looper and 30 the needle has entered the goods the looper then continues in its said return movement from the position shown in Fig. 5 to that shown in Fig. 6, in which latter position the loop has reached the rear end of the looper-arm and the needle has reached its first "dip," 35 so called, to throw out another loop n' , at which time the shuttle (shown in dotted lines) would, if used, enter the same. From the position shown in Fig. 6 the looper now moves 40 forward to enter its hook h^3 into the loop n' as it is thrown out at the second dip of the needle and cast off the first loop n , as shown in Fig. 7. The said loop n , as it is thus cast off the looper, encircles the loop n' , just en- 45 gaged by the latter, and is drawn up by the take-up to form a chain-stitch in the usual manner, as well understood by those skilled in the art.

Having thus set forth my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a sewing-machine, the combination, with a vertically-reciprocating needle-bar provided with a cam-groove, and a driving-shaft 55 carrying a crank-pin which operates within said cam-groove, of a take-up device, consisting of a frame provided with a thread-engaging arm and having a part thereof extending adjacent to said cam-groove to pre- 60 sent a surface for the engagement of said crank-pin, means, independent of said crank-pin, movably connecting the take-up device with the needle-bar to permit the same to have a vertical movement independent of the 65 latter and limiting its downward movement relative to the needle-bar, the said pin-engaging surface of the take-up extending at an

angle relative to the cam-groove whereby the descent of the take-up is rendered slower than that of the needle-bar. 70

2. In a sewing-machine, the combination, of a vertically-reciprocating needle-bar, a vertically-reciprocating take-up device confined to movement in a path parallel with the path of movement of the needle-bar, and means for 75 actuating said needle-bar and take-up whereby the latter is caused to move at a less speed than the needle-bar when giving down the thread and caused to move upward in the same time therewith, said means including a 80 rotary shaft carrying a crank-pin for engaging with said needle-bar and take-up device.

3. In a sewing-machine, the combination, with the needle-bar provided with a cam-groove, of a take-up device, consisting of a 85 frame supported to slide upon the needle-bar and provided with a cam-slot therein, an anti-friction-roll having means whereby it is permanently connected with the needle-bar and take-up device within the said cam-groove 90 and cam-slot with which such parts are provided and holding the parts vertically in position relative to each other when disengaged from their operating means, and means for 95 operating the take-up and needle-bar.

4. In a sewing-machine, the combination, with the needle-bar provided with a cam-groove, of a take-up device, consisting of a frame supported to slide upon the needle-bar and provided with a cam-slot therein, the lat- 100 ter being of less width than the cam-groove of the needle-bar, an anti-friction-roll supported within both the said cam-groove and cam-slot to support the take-up in vertical position upon the needle-bar and having 105 a portion of its periphery of less circumference than the other to accommodate itself to the difference in width of the cam-groove and cam-slot and be retained from displacement within the same, and an operating-crank hav- 110 ing a pin thereon extending into an opening within said anti-friction-roll, for the purpose set forth.

5. In a sewing-machine, the combination, with a vertically-reciprocating needle-bar, a 115 vertically-reciprocating take-up device confined to movement in a path parallel with the path of movement of the needle-bar, and means for actuating said needle-bar and take-up whereby the latter is caused to move at a 120 less speed than the needle-bar when giving down the thread and caused to move upward in the same time therewith, said means including a rotary shaft carrying a crank-pin for engaging with the needle-bar and take- 125 up, of a horizontally-reciprocating looper having means for controlling the slack thread given down by the take-up during the descent of the needle, for the purpose set forth.

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