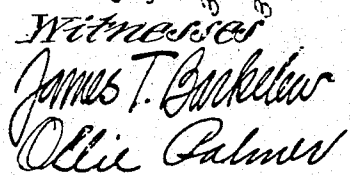


APPLICATION FILED JUNE 2, 1908.

Patented Aug. 23, 1910.

8 SHEETS—SHEET 1.



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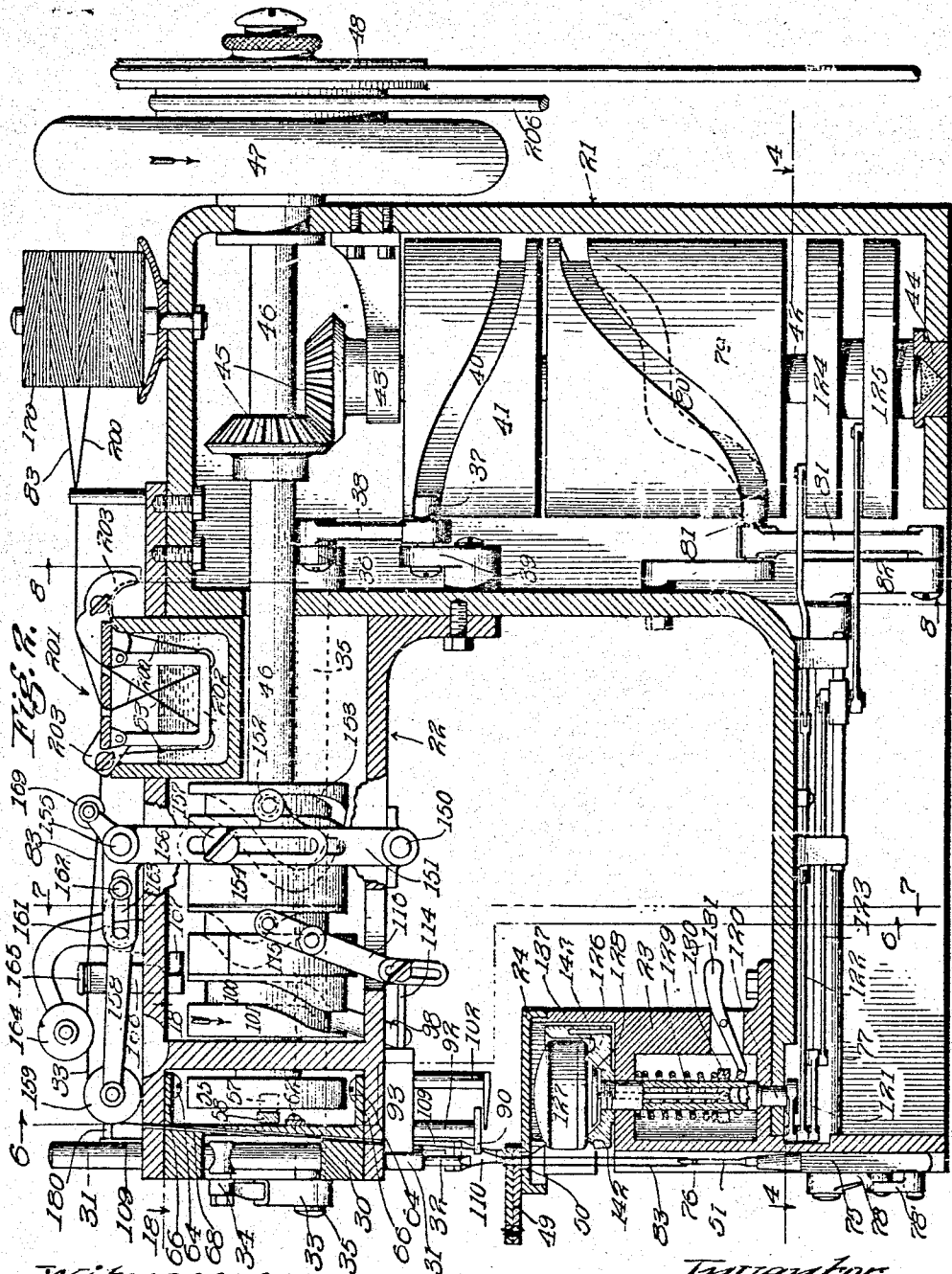
SEWING MACHINE.

APPLICATION FILED JUNE 2, 1908.

968,066.

Patented Aug. 23, 1910.

8 SHEETS—SHEET 2.



Witnesses
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968,066.

Patented Aug. 23, 1910.

8 SHEETS—SHEET 3.

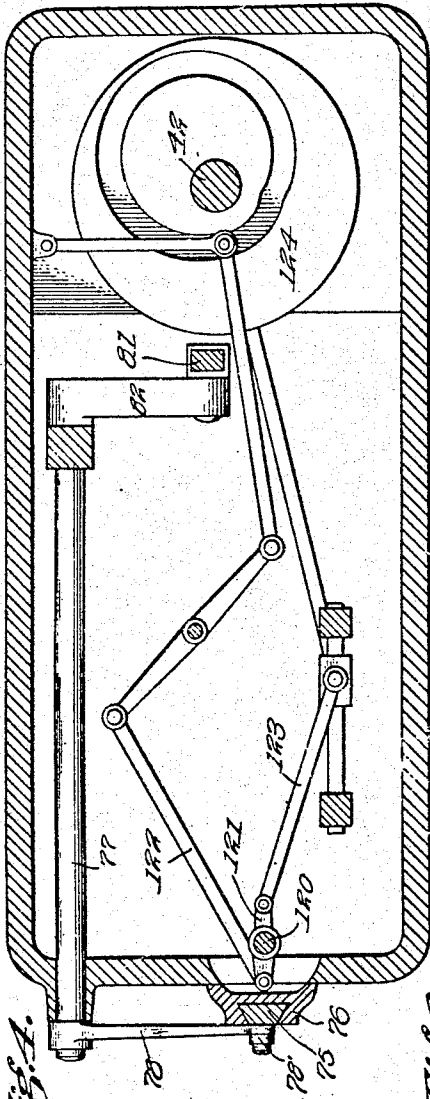
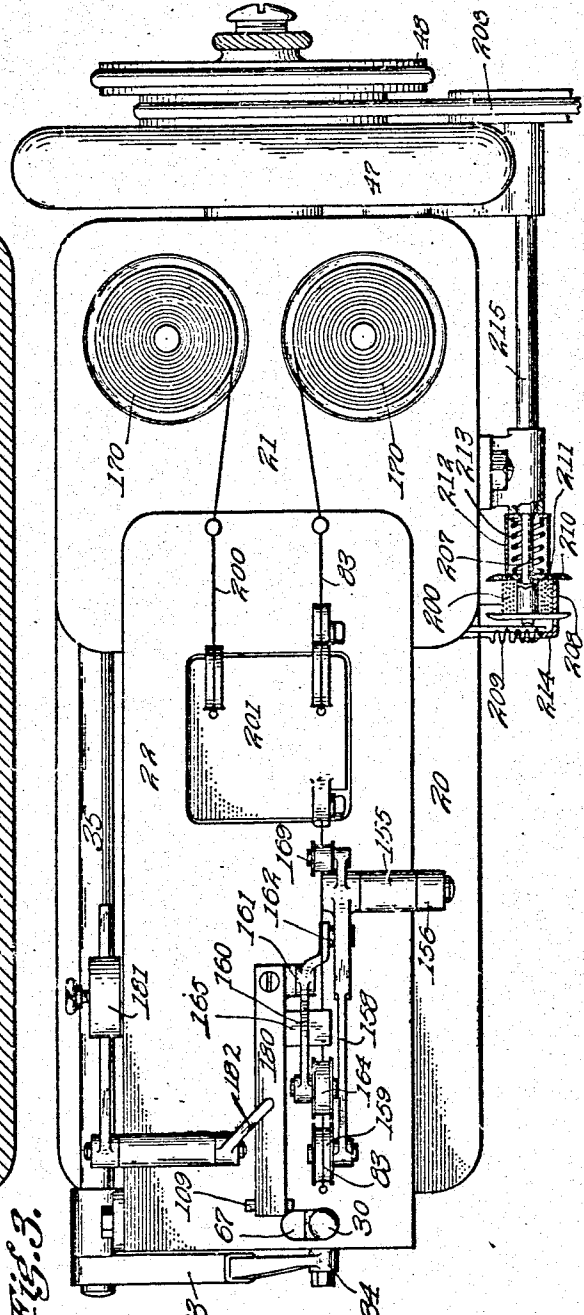


Fig. A.

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Fig. B.



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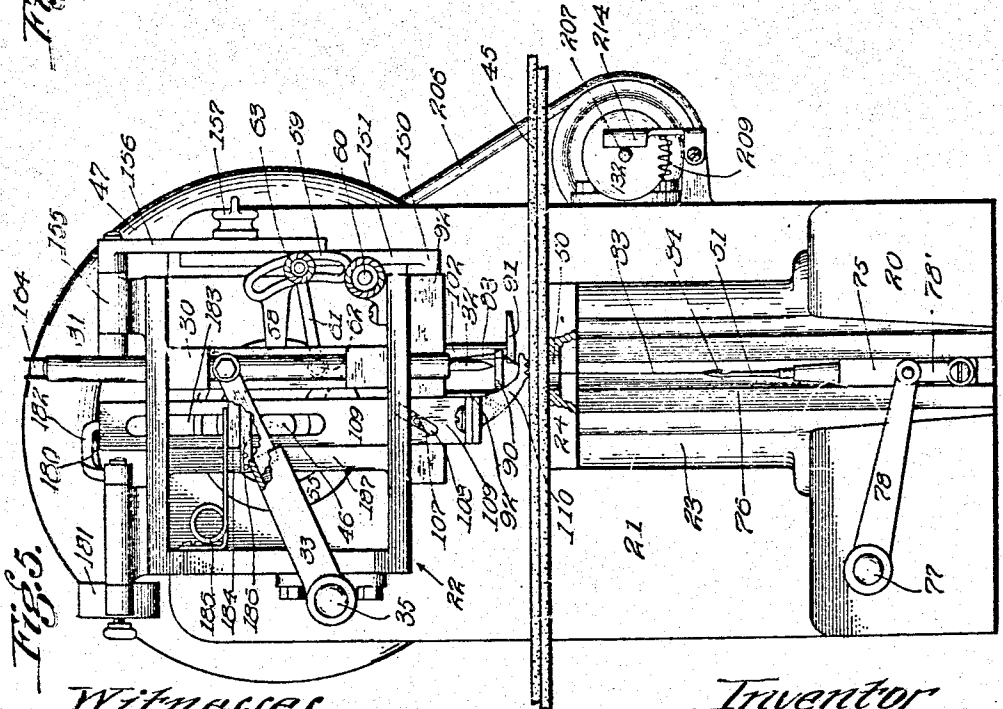
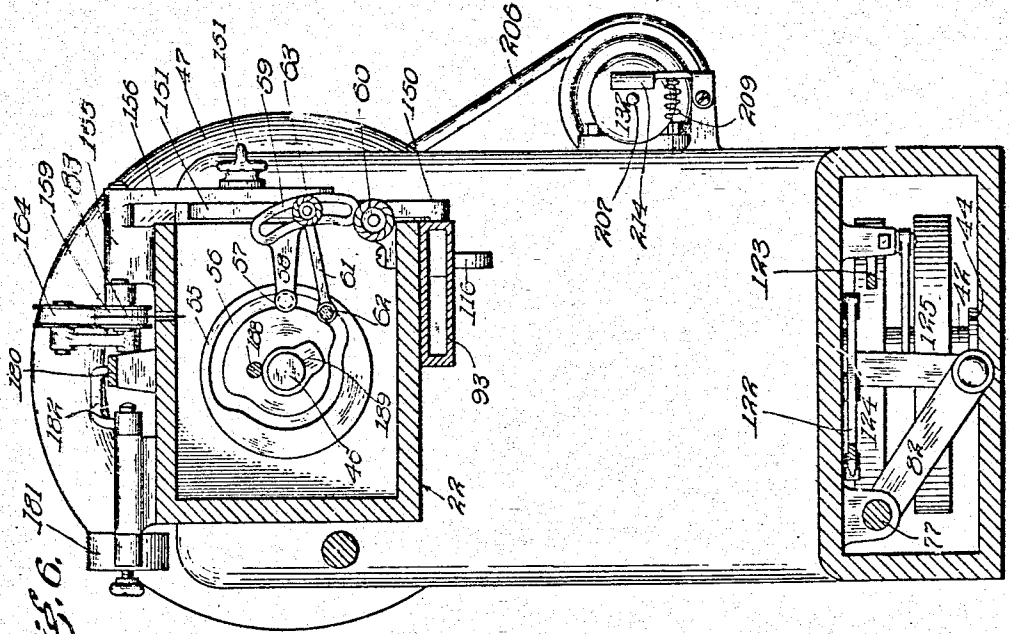
H. F. MOORE.
SEWING MACHINE.

APPLICATION FILED JUNE 2, 1908.

Patented Aug. 23, 1910.

8 SHEETS—SHEET 4.

968,066.



Witnesses
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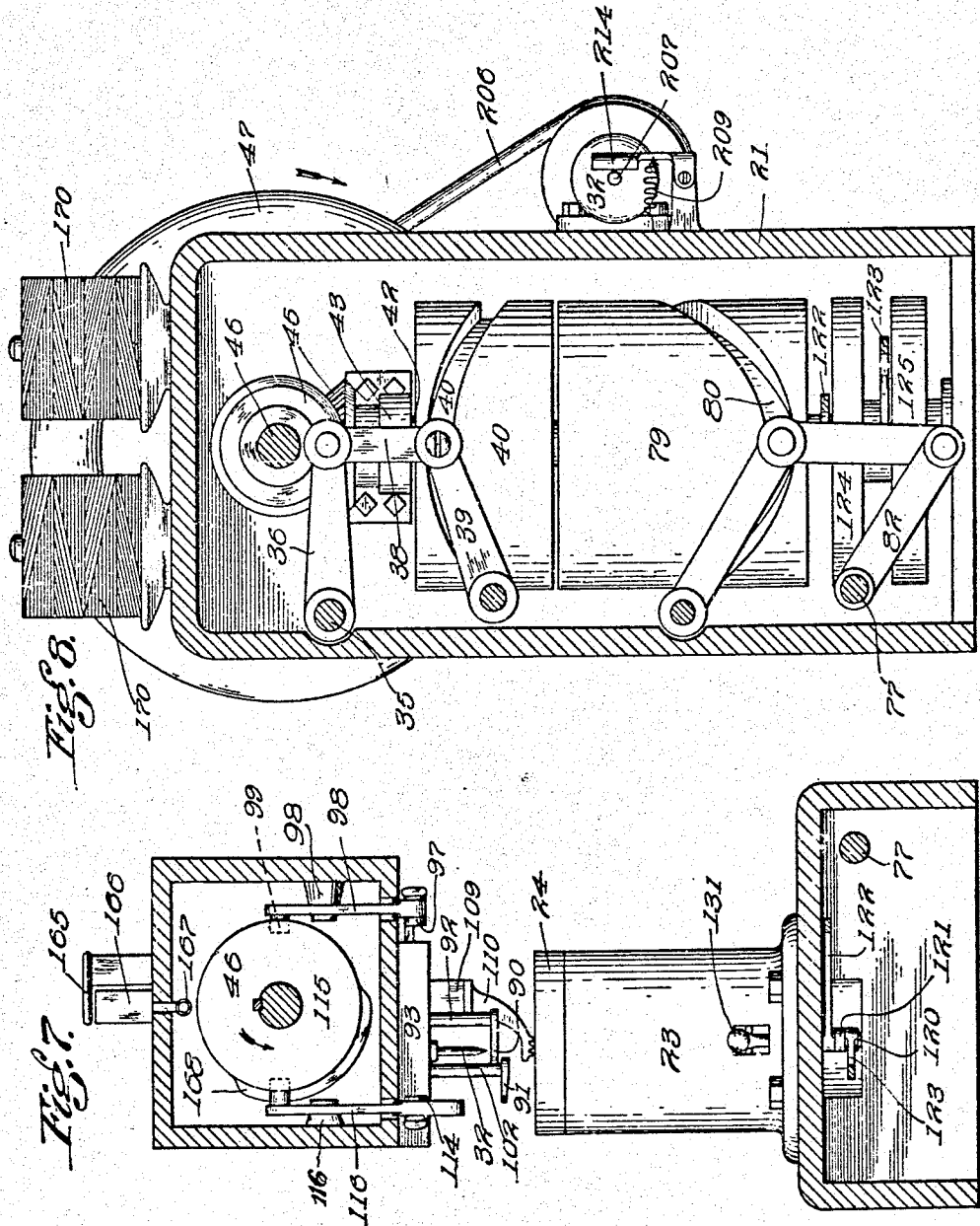
H. F. MOORE.
SEWING MACHINE.

APPLICATION FILED JUNE 2, 1908.

Patented Aug. 23, 1910.

8 SHEETS—SHEET 5.

968,066.



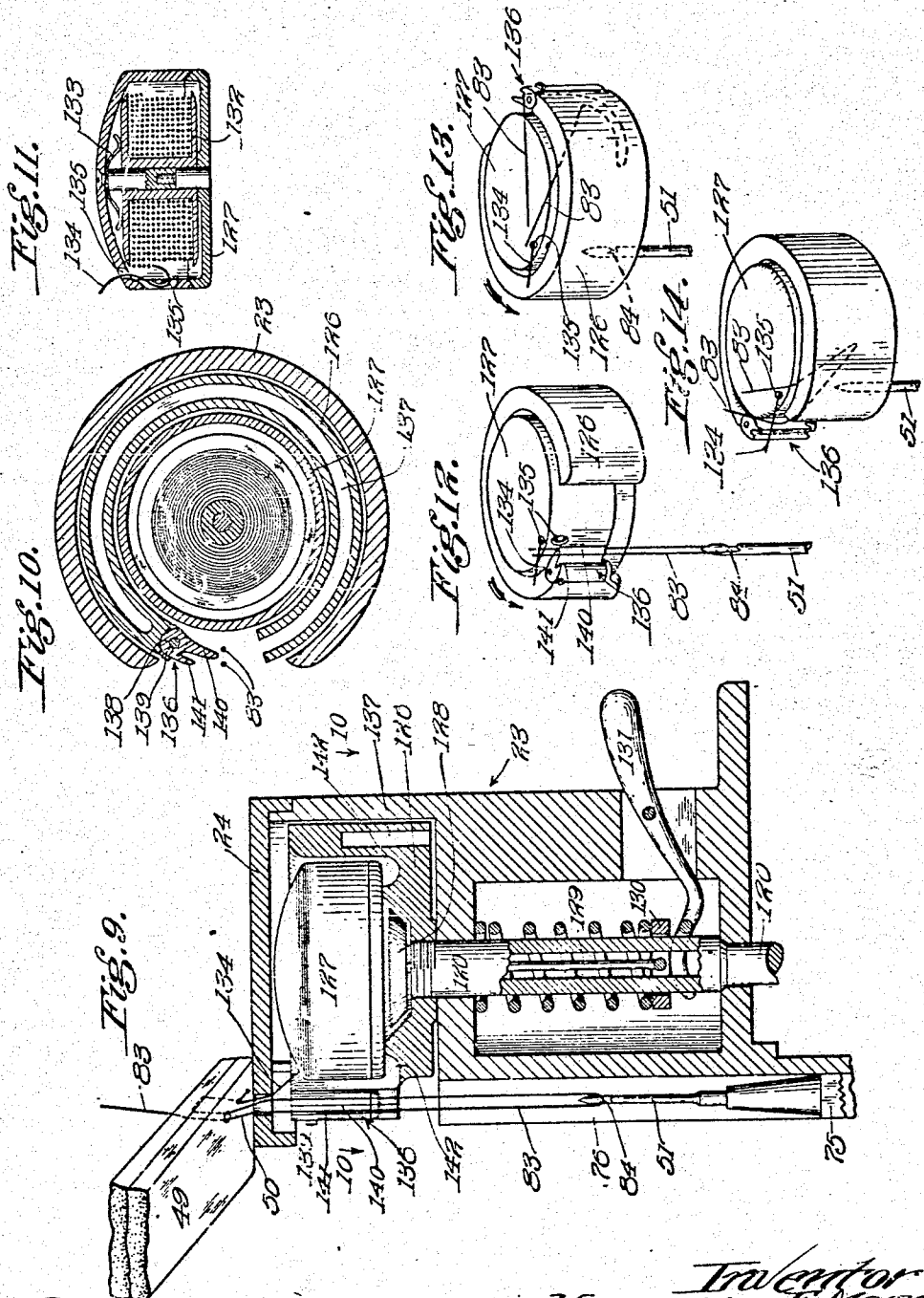
Witnesses
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968,066.

Patented Aug. 23, 1910.

2 SHEETS—SHEET 6.



Witnesses
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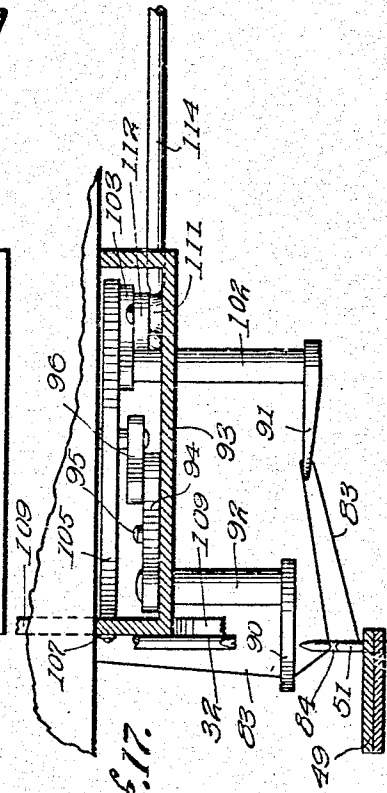
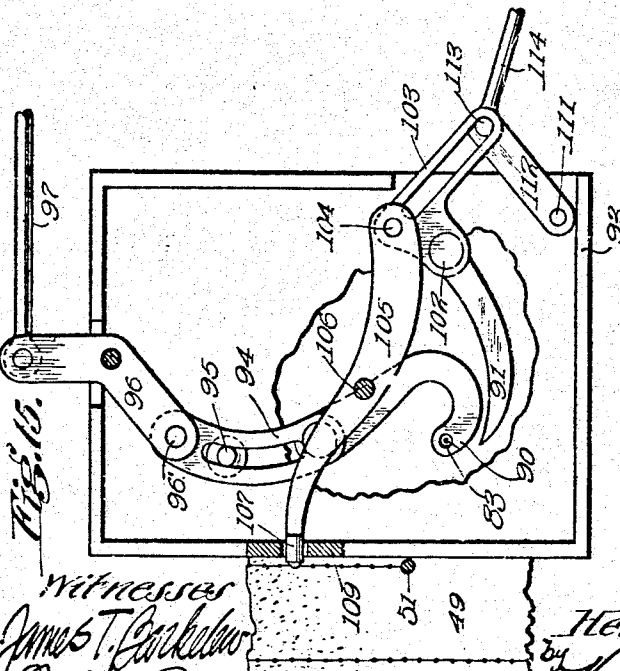
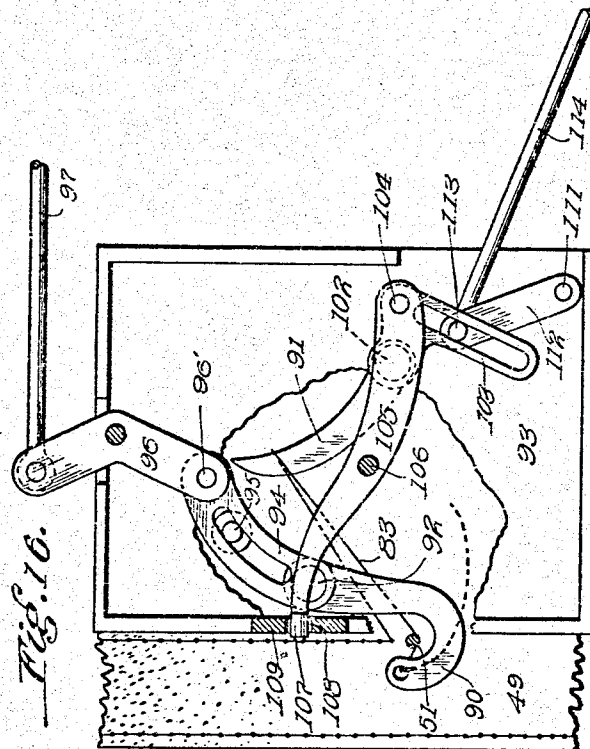
H. F. MOORE.
SEWING MACHINE.

APPLICATION FILED JUNE 2, 1908.

968,066.

Patented Aug. 23, 1910.

8 SHEETS—SHEET 7.



Witnesses
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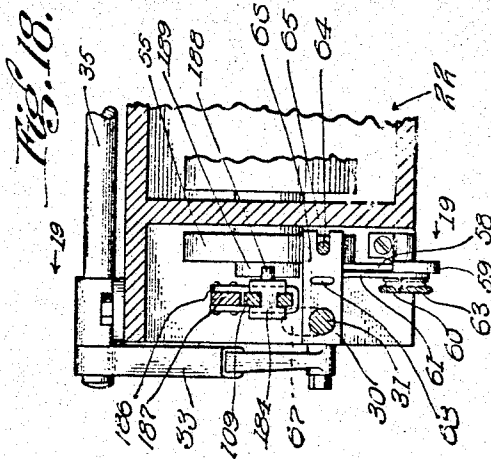
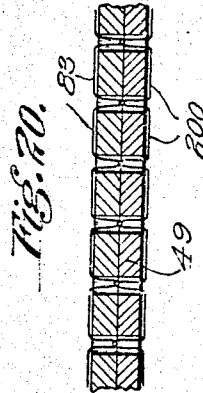
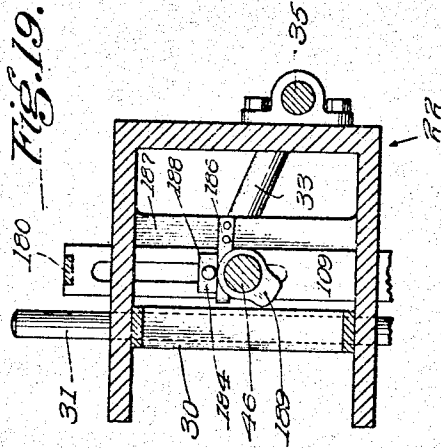
H. F. MOORE.
SEWING MACHINE.

APPLICATION FILED JUNE 2, 1908.

968,066.

Patented Aug. 23, 1910.

8 SHEETS—SHEET 8.



Witnesses
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UNITED STATES PATENT OFFICE.

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SEWING-MACHINE.

968,066.

Specification of Letters Patent.

Patented Aug. 23, 1910.

Application filed June 2, 1908. Serial No. 436,247.

To all whom it may concern:

Be it known that I, HERMAN F. MOORE, a citizen of the United States, residing at Ventura, in the county of Ventura and State of California, have invented new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates to a stitch forming mechanism for sewing machine especially adapted for sewing leather or other heavy material in which it is necessary to punch holes for the passage of the needle, and it consists particularly in a novel mechanism for drawing the upper thread through the punch holes in the leather and interlocking the threads to form a stitch. For a clear understanding of the operation of the various parts of the stitch forming mechanism in relation to the other parts of the complete machine enough of the machine mechanism is illustrated to convey a complete understanding of its operation.

In the accompanying drawings, forming a part of this specification,—Figure 1,— is a side elevation of the machine. Fig. 2,— is a longitudinal vertical section of the same. Fig. 3,— is a plan view of the same. Fig. 4,— is a horizontal longitudinal section taken on line 4—4 of Fig. 2. Fig. 5,— is an end elevation of the machine. Fig. 6,— is a vertical cross-section taken on line 6—6 of Fig. 2. Fig. 7,— is a vertical cross-section taken on line 7—7 of Fig. 2. Fig. 8,— is a vertical cross-section taken on line 8—8 of Fig. 2. Fig. 9,— is an enlarged vertical longitudinal section of the shuttle mechanism. Fig. 10,— is a horizontal section taken on line 10—10 of Fig. 9. Fig. 11,— is a sectional view of the bobbin. Figs. 12, 13 and 14,— are perspective views illustrating the different positions of the bobbin and the thread in forming the lock stitch. Fig. 15,— is an enlarged plan view of the thread manipulating mechanism in its normal position. Fig. 16,— is a view of the same in its moved position. Fig. 17,— is an enlarged side view of the mechanism of Fig. 16. Fig. 18,— is a horizontal section taken on line 18—18 of Fig. 2. Fig. 19,— is a vertical cross-section taken on line

19—19 of Fig. 18. Fig. 20,— is an exaggerated view showing the character of the finished stitch.

The complete machine consists broadly of,— First:—a mechanism to punch spaced holes in the leather or other article to be sewn. Second:—a needle and operating mechanism adapted to pass the needle through the perforations and to draw one of the threads through the leather in re-turning. Third:—a mechanism to engage the thread with the needle when it has passed through the leather. Fourth:—a shuttle mechanism to form the thread on the needle and a second thread carried by a bobbin within the shuttle into a lock stitch. Fifth:—a mechanism to tighten the stitch in place. Sixth:—a foot mechanism. Seventh:—auxiliary mechanism. These mechanisms are first to be explained individually in the above order and their cooperation will subsequently be set forth. In the drawings 20 designates a base or table preferably constructed hollow and open underneath. At one end this table carries a post 21 which is also hollow to contain the mechanism placed therein. At the upper end of post 21 a horizontal arm 22 is bolted and extends out over table 20 in the manner common to sewing machines. Table 20 carries an upright cylindrical shuttle case provided with a circular sewing table 24 on its upper end, this sewing table being directly below the outer end of arm 22.

Perforating mechanism.—Mounted on the outer end of arm 22 is a horizontally oscillating awl frame 30 carrying a vertical awl standard 31 provided at its lower end with a perforating awl 32. An operating arm 33 of the usual telescoping type is pivoted at 34 to the awl standard and is mounted on and operated from an oscillating shaft 35 which extends along the back side of the arm and into the post as illustrated. Inside the post an arm 36 is mounted on the shaft and a cam follower 37 is connected to the end of this arm by means of a connecting rod 38. The cam follower is supported by pivoted lever 39 and is adapted to follow groove 40 in cam 41 mounted on vertical shaft 42 inside post 21.

Shaft 42 is supported in bearings 43 and 44 and is operated by means of beveled gears 45 from longitudinal shaft 46. Longitudinal shaft 46 constitutes the main shaft of the machine and extends longitudinally through arm 22 and through the upper part of post 21, balance wheel 47 and drive wheel 48 being mounted on its outer end. Beveled gears 45 are of the same size and hence the awl is reciprocated once for each revolution of shaft 46. The reciprocation is so determined that upon its downward movement awl 32 punches through the leather 49, or other article upon sewing table 24, passing clear through the leather and into elongated slot 50 in the outer edge of the sewing table. As indicated in Fig. 5 the awl passes down into the slot at one end thereof. It is moved toward the other end of the slot to a position directly over needle 51 by the following mechanism, this movement serving to move leather 49 through the machine as the sewing progresses. Mounted on longitudinal shaft 46 at a point near awl frame 30 is a cam 55 having a cam groove 56 in its outer face as shown in Fig. 5. A cam follower 57 engages this groove and is mounted on an arm 58 connected to a sector 59 pivoted at 60 to the frame of the arm. A connecting bar 61 pivoted to frame 30 at 62 is adjustably connected as at 63 to sector 59. Upon the rotation of main shaft 46 sector 59 is oscillated and awl frame 30 is oscillated back and forth. The position of cam 55 upon shaft 46 is so arranged that the awl is moved toward the left in Fig. 5 immediately after its passage through leather 49 and the leather is thereby moved the distance of the length of one stitch through the machine. To allow for its oscillation the awl frame is mounted on the arm through the medium of two screws 64 in slots 65 in rearward extensions 66 on the awl frame. Elongated slots 67 are cut in the arm to allow the desired movement of the awl standard and, in following these slots, the awl standard oscillates the awl frame around screws 64 as sliding pivots. An elongated slot 68 is provided in a vertical direction through the awl frame to allow the passage of the thread downwardly therethrough.

Needle mechanism.—Needle 51 is secured in any suitable manner in a needle bar 75 which reciprocates vertically in ways 76 formed in the front part of the cylindrical casing 23 of the shuttle mechanism. The needle is reciprocated by an oscillating shaft 77 mounted in the base of the machine, being connected thereto by lever 78 and link 78'. Shaft 77 is oscillated by cam 79 having a groove 80 of suitable configuration, cam follower 81 being mounted similarly to cam follower 37 and connected to shaft 77 by connecting rod 81 and arm 82. As shaft 42, upon which cam 79 is mounted, rotates syn-

chronously with shaft 46 it will be seen that needle 51 is reciprocated once for every revolution of shaft 46. The position of cam 79 upon shaft 42 is so arranged that needle 51 passes upwardly through the perforation in leather 49 immediately after punch 32 has been pulled out of the perforation. The upper end of the needle passes to a point considerably above the upper face of the leather and thread 83 is engaged with needle hook 84 by a mechanism to be hereinafter described. When this engaging operation has been completed the needle again moves downwardly carrying the thread with it into the position shown in the drawings. The needle again moves upwardly and the thread is removed by the shuttle mechanism while the needle is stationary about midway between its extreme positions. This intermittent movement upwardly of the needle is accomplished by the shape of groove 80 in cam 79 as shown in dotted lines. The needle then again moves upwardly to repeat the operation for the subsequent stitch.

Mechanism for engaging the thread with the needle.—This mechanism is shown in detail in Figs. 15, 16 and 17 and consists primarily of a thread eye 90 and a thread hook 91 with mechanisms for manipulating them to throw the thread around the needle in the path of its hook when the needle passes above leather 49. Thread eye 90 is mounted upon vertical oscillating shaft 92 which passes upwardly into mechanism enclosing case 93 and is mounted upon a slotted lever 94 within the case. Lever 94 oscillates upon a stationary pin 95 in its slot and is actuated by a pivoted lever 96 connected to its end at 96. Lever 96 is connected by a rod 97 to cam follower arm 98 pivoted at 98', follower 99 on this arm engaging with groove 100 in cam 101 on main shaft 46.

Thread hook 91 is mounted upon vertical oscillating shaft 102 which is mounted at its upper end on a slotted lever 103 pivoted at 104 to adjusting lever 105. Adjusting lever 105 is pivoted at 106 to case 93 and its outer end extends toward the end of the machine arm and is provided with a small roller 107 which engages with a diagonal slot 108 in foot bar 109, foot 110 normally resting upon the leather upon table 24. Slot 108 is disposed as shown in Fig. 5 so that roller 107 is thrown toward the left in Fig. 5 upon any upward movement of the foot on account of the increase in thickness of the leather. This movement of roller 107 moves pivot 104 toward pivot 111. Pivoted at 111 to case 93 is an arm 112 having pin 113 in its free end engaging with the slot in arm 103. Arm 112 is actuated through the medium of connecting rod 114 from a cam 115 mounted on main shaft 46. Cam follower arm 116, pivoted at 116' to the overhauling arm 22, is provided with a slotted

connection in its lower end so that connecting rod 114 may be adjusted therein and its longitudinal movements thereby changed when necessary. The movement of pivot 104 toward pivot 111 upon the increase in thickness of leather 49 is seen to automatically increase the amount of oscillation of hook 91 by bringing pivot 104 closer to pin 113 and pivot 111. In case this automatic adjustment does not suffice the amount of movement may be regulated manually by regulating the position of connection of connecting rod 114 to cam follower arm 116.

Thread 83 passes through thread eye 90 as shown, the normal position of the mechanism being that illustrated in Fig. 15. The operating cams for this mechanism are so arranged in relation to each other and in relation to the operating mechanism of the needle that the following motions take place. When the needle is reaching its highest position thread hook 91 is operated toward its position shown in Fig. 16 by cam 115, thread 83 being caught and pulled toward the position shown in Fig. 16. In the meantime the movement of thread eye 90 has been started from its position shown in Fig. 15 to that shown in Fig. 16, the line of its travel being shown approximately by the dotted line in Fig. 16. This peculiar curved line of travel is caused by the sliding pivot of lever 94 on pin 95. Thread 83 is thereby passed around the needle and held against it below its hook 84, the needle having meanwhile reached its highest position. The needle then begins to descend as shown in Fig. 17 and the thread is caught in its hook. As soon as this has been accomplished the thread eye and hook 91 move back to their positions of Fig. 15, and the thread is carried downwardly by the needle. The movement of hook 91 is so timed that the thread is kept fairly tight during this downward movement of the needle and the amount of thread pulled out by the hook is sufficient to allow the needle to pass to its lowermost position as shown in Fig. 9. The reason for increasing or decreasing the amount of movement of the hook is now apparent. With a thick piece of leather the amount of thread required for a stitch is more than with a thin piece and it is therefore desirable to pull out a slightly larger amount of thread. This is accomplished automatically and manually as above described.

Shuttle mechanism.—The shuttle mechanism is illustrated in detail in Figs. 9 to 14, its operating mechanism being shown in Fig. 4. Cylindrical case 23 incloses the shuttle mechanism and carries sewing table 24, this sewing table being provided with elongated slot 50 through which the thread is drawn downwardly as before explained and as shown in Fig. 9. Vertically journaled in casing 23 is a shuttle shaft 120

which extends downwardly through the base of the machine and is provided with a double opposed crank 121 upon its lower end. This crank is operated through the medium of connecting rods 122 and 123 which are appropriately connected, in such a manner as shown in Fig. 4, to be operated by cams 124 and 125 respectively, both cams being mounted upon shaft 42. The configurations of the grooves in these cams are such as to give the shuttle an intermittent rotation back and forth as will be directly explained. Shaft 120 carries upon its upper end a revolving hook 126 in the form of a cylindrical holder adapted to contain loosely a circular bobbin case 127. As a convenient means for removing the bobbin case a small plunger head 128 is arranged directly below it having a plunger rod 129 passing downwardly through the hollow portion of shaft 120 and connecting with a downwardly pressed ring 130 which is adapted to be raised by means of a hand lever 131.

Bobbin case 127 is shown in sectional detail in Fig. 11 and is formed in two separable parts so that bobbin 132 may be placed therein. Friction means 133 are provided within the bobbin case to put a proper tension upon thread 134, the thread also passing out of the bobbin case through a series of apertures 135 designed to provide a constant frictional tension. This thread passes upwardly through slot 50 and into leather 49, or, at the beginning of the operation of sewing, is merely pulled upwardly through the slot. When needle 51 is in the position shown in Fig. 9 hook or shuttle 126 begins to revolve in a direction indicated by the arrows, the bobbin case being held stationary by means of thread 134. Hook 126 has a portion removed from its cylindrical wall forming a gap as shown in Fig. 12 and a thread engaging member 136 is pivotally mounted on the bobbin case holder or spindle 138, being adjustably secured thereon by a set screw 139 which clamps the side of spindle 138. This member is provided with a tongue 140, adapted to pass between the two portions of thread 83, and a groove 141 at the outside of the tongue to catch the outer thread. On account of its adjustability the tongue may be placed to pass accurately between the portions of the thread. At the time of engagement of the thread needle 51 again moves upwardly and moves directly into circular slot 137 in revolving hook 126, and, as the thread is pulled off horizontally, when the needle has reached a position such as shown in Fig. 13 the thread is disengaged from hook 84 of the needle. The thread is then in such a position as shown in Fig. 13, one part being pulled around bobbin case 127 on the inside of the revolving hook and the other part

being still engaged and pulled around by member 136. Thread 83 is thus carried around and underneath bobbin case 127 and finally comes to such a position as shown in Fig. 14, when it will be noted that it has been looped entirely around the bobbin case and therefore around thread 134. A groove 142 under the edge of the bobbin case in the interior of the revolving hook facilitates the passage of the thread beneath by forming a seat of reduced diameter for the bobbin-case, the edge of the case overhanging the seat as shown. When the revolving hook comes back to its normal position the thread is hanging from slot 50 and is looped around thread 134. The needle is still in its position as shown in Fig. 13 and it remains in that position until the thread 83 has been drawn into the leather by the stitch tightening mechanism and a stitch is formed as illustrated in Fig. 20.

Stitch tightening mechanism.—Pivoted at 150 to the lower part and one side of arm 22 as shown in Fig. 2 is a cam follower arm 151 carrying a cam follower 152 actuated by groove 153 in cam 154. Pivoted on shaft 155 on the upper part of arm 22 and directly above pivot 150 is a lever 156 which extends downwardly and has a slotted adjustable pivot connection 157 with arm 151. A horizontal arm 158 is rigidly attached to shaft 155 with lever 156 and carries on its extreme outer end a pulley 159 over which thread 83 passes. A bent lever 160 pivoted at 161 on the upper part of the arm is operated by means of connecting bolt 162 in slot 163 of arm 158. Bent lever 160 carries a pulley 164 on its outer end under which thread 83 passes. Upon the actuation of cam follower 152 toward the left in Fig. 2 pulley 159 will be moved upwardly and pulley 164 downwardly so that the amount of thread between them is greatly increased. The thread necessary for this increase is drawn from the loose loop previously formed by the needle and shuttle mechanism, the thread being tightly clamped between stationary head 165 and a movable member 166 carrying on its lower end a roller 167 with which lug 168 on the face of cam 115 engages. At the same time that this operation of tightening the stitch takes place a small pulley 169 mounted on an extension of lever 156 pulls downwardly upon thread 83 and draws a sufficient supply from one of spools 170 for the next stitch. Adjustable connection 157 provides means for regulating the amount of thread pulled up by the tightening mechanism, this amount being suited to the length of loose thread below.

Foot mechanism.—Foot bar 109 is vertically slidably mounted in the end of arm 22. The foot bar is normally pressed down by a flat horizontal spring 180 assisted by

the action of the adjustable weight 181 bearing upon the spring at a small distance from its free end through the medium of an arm 182. The strength of the spring is comparatively small so that most of the downward pressure upon the foot is supplied by weight 181. This provides that the foot pressure is fairly constant and does not grow excessively stronger as leather 49 increases in thickness. A vertical slot 183 is provided in foot bar 109 and a small slide-clutch or nipper 184 is adapted to reciprocate in this slot, a spring 185 normally keeping the nipper down against a stop 186 mounted on an upright bar 187 alongside the foot bar. Nipper 184 carries a lug 188 on one side which is adapted to be actuated upwardly by a cam 189 mounted on the end of shaft 46, this cam being of the general configuration shown in Fig. 19. Slot 183 allows the foot to be raised or lowered for different thicknesses of material without changing the position of clutch 184 with relation to cam 189. Upon the engagement of lug 188 by cam 189 nipper 184 binds upon the foot bar and the foot bar is raised with it. Cam 189 is so placed upon shaft 46 that the foot is raised to allow the awl to move the leather the distance of one stitch through the machine without any hindrance by the foot. The foot is quickly dropped by cam 189 just after the awl has moved the leather and is just at the point of being pulled upwardly.

Auxiliary mechanism.—There are two spools of thread 170 mounted upon the machine, thread 83 being drawn from the front spool as before described and thread 200 from the rear one. Both of these threads pass through a wax pot 201 before passing into their respective mechanisms. A frame 202 is mounted in the wax pot and the threads pass over these and into the wax in some such manner as shown in Fig. 2, passing through adjustable strippers 203 where the superfluous wax is removed from their surfaces. Thread 200 is for the purpose of winding bobbins, one of which is shown in place on the bobbin winder. This bobbin winder provides means for automatically filling the bobbins full of thread and is operated through the medium of shaft 205 rotated by belt 206 from balance wheel 47. Shaft 205 is reduced as at 207 so that bobbin 132 may be slipped over the reduced portion, the bobbin being held thereon by means of a pivoted plate 208 normally pulled inwardly by means of a spring 209, against the thread in the bobbin. One disk of the bobbin is provided with apertures 210 into which prongs 211 on sleeve 212 engage. Sleeve 212 is rigidly mounted on shaft 205 and carries within it a coiled spring 213 adapted to normally press the bobbin out of engagement with prongs 211. The bobbin

is normally held in engagement by plate 208 but when the bobbin is filled with thread plate 208 is forced outwardly until it no longer prevents the bobbin from being moved longitudinally by spring 213 and the bobbin is thereupon pushed out of engagement with prongs 211 and its rotation and the winding of the thread ceases. A small inwardly projecting stop 214 formed integrally with plate 208 prevents the bobbin from being forced entirely off shaft 207.

The individual operation of the parts in detail having been explained, the broad co-operation is as follows:—Awl 32 is first moved downwardly to punch a hole in the leather, foot 110 being removed from the leather just as the awl passes through it. The awl then moves the leather through the machine the distance of one stitch. The foot then moves downwardly and holds the leather while the awl is withdrawn. As the awl is withdrawn needle 51 passes up through the perforation and thread 83 is then looped around the needle, the hook in the upper end of the needle catching the thread as the needle passes downwardly. The loop in the thread is drawn through the leather by the downwardly moving needle. Next, the shuttle mechanism operates to loop thread 83 around thread 134, thread 83 being meanwhile disengaged from the hook of the needle. Thread 83 is then drawn up tightly into the leather, drawing thread 134 in after it to the position shown in Fig. 20, thus forming a completed stitch. In the meantime enough thread has been drawn from the spool through the wax pot for the next stitch and the whole operation is repeated.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In mechanism of the class described, an arcuate shuttle having a gap in the wall thereof, an elevated sewing table, a needle adapted to pass up and down through said sewing table and affording means for drawing a loop of thread down through said gap, means for rotating said shuttle back and forth on a vertical axis, said needle being adapted to release the thread under the action of said shuttle, a bobbin case within said shuttle and having a thread passing therefrom, said shuttle affording means for passing a part of said loop around said bobbin case, said shuttle having a vertically disposed tongue adapted to engage said loop, and means for adjusting said tongue on a vertical axis.

2. In mechanism of the class described, an elevated sewing table, a shuttle mounted to rotate back and forth on a vertical axis disposed below said table, said shuttle being of arcuate form and having a gap in the wall thereof, a needle, means for reciprocating said needle through said sewing table,

said needle having a notch in the side thereof adapted to form a loop at said gap with said needle disposed at a depressed point, a bobbin case mounted within said shuttle, said shuttle affording means for engaging a part of said loop to pass the same around said bobbin case, and means for elevating said needle so as to enable said notch to release the loop while the thread is being passed around said bobbin case by said shuttle.

3. In mechanism of the class described, an elevated sewing table, a shuttle mounted to rotate back and forth on a vertical axis disposed below said table, said shuttle being of arcuate form and having a gap in the wall thereof, a needle, means for reciprocating said needle through said sewing table, said needle having a notch in the side thereof adapted to form a loop at said gap with said needle disposed at a depressed point, a bobbin case mounted within said shuttle, said shuttle affording means for engaging a part of said loop to pass the same around said bobbin case, and means for elevating said needle so as to enable said notch to release the loop while the thread is being passed around said bobbin case by said shuttle, said shuttle having a slot in the under side thereof adapted to receive said needle when said needle is elevated to disengage the loop from said notch.

4. In mechanism of the class described, an elevated sewing table, a needle having a notch in the side thereof, means for passing said needle up and down through said table, means for holding the thread against the side of said needle so as to be caught in said notch and drawn down through said table by said needle, a shuttle of arcuate form mounted to rotate back and forth on a substantially vertical axis and having a gap in the wall thereof, a bobbin case within said shuttle, said needle affording means for forming a loop of the thread drawn down from said table at said gap, said shuttle having means for engaging a part of said loop and passing the same around said bobbin case, and means for elevating said needle to enable the thread to be detached from said notch when the thread is being passed around said bobbin case by said shuttle.

5. A stitch forming mechanism, comprising a revolving circular hook member, a deep circular groove in the under surface of said hook, a thread bobbin supported within the hook, frictional engaging means for the thread thereon, a needle hook mechanism adapted to pull a loop of thread through material being sewed and to be projected into said groove.

6. A stitch forming mechanism, comprising a circular hook member, a deep circular groove in the under surface of said hook, a thread bobbin supported within the hook,

frictional engaging means for the thread
thereon, means to intermittently revolve the
circular hook, a needle hook mechanism
adapted to pull a loop of thread through
5 material being sewed and to be projected
into said groove during the rotation of said
circular hook.

In witness that I claim the foregoing I
have hereunto subscribed my name this 14th
day of May, 1908.

HERMAN F. MOORE.

Witnesses:

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JAMES T. BARKELEW.