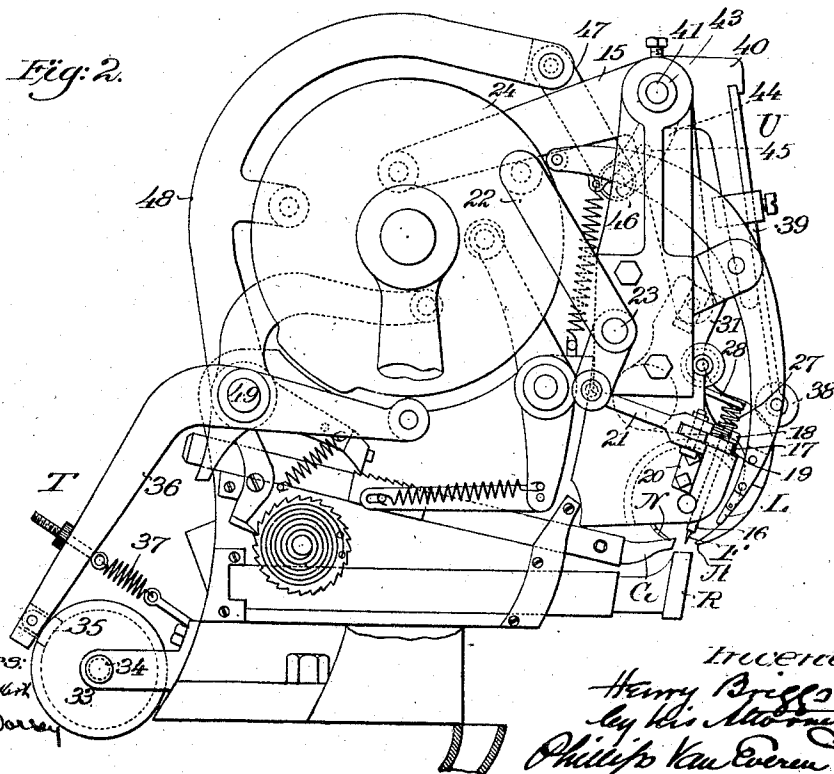
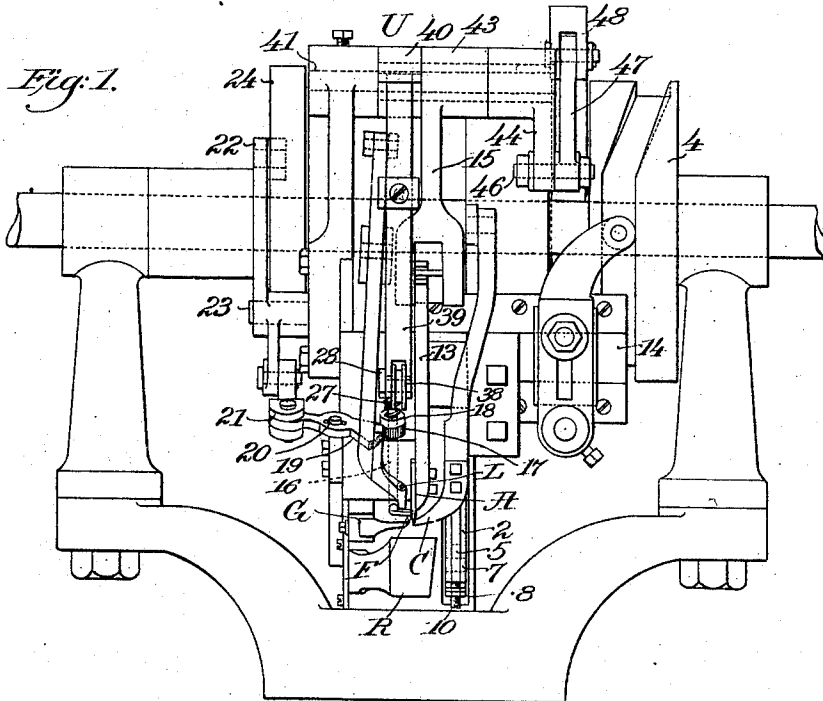


H. BRIGGS.
SEWING MACHINE.
APPLICATION FILED JAN. 20, 1903.

1,030,867.

Patented July 2, 1912.

3 SHEETS—SHEET 1.

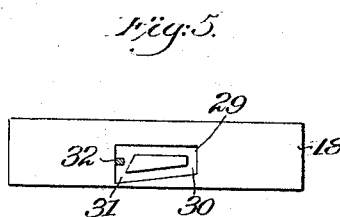
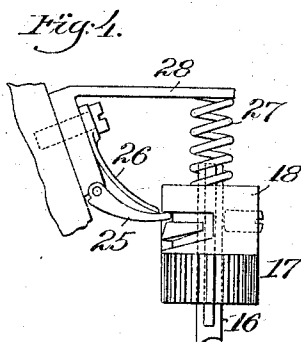
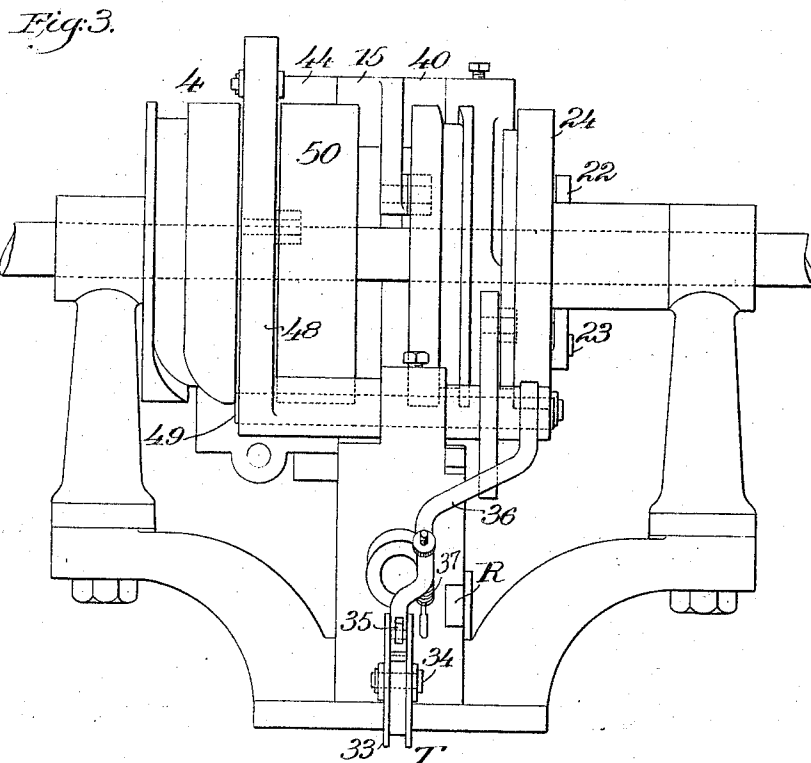


H. BRIGGS.
SEWING MACHINE.
APPLICATION FILED JAN. 20, 1903.

1,030,867.

Patented July 2, 1912.

3 SHEETS—SHEET 2.



Witnesses:
John F. C. Printz
Darnum F. Dorsey

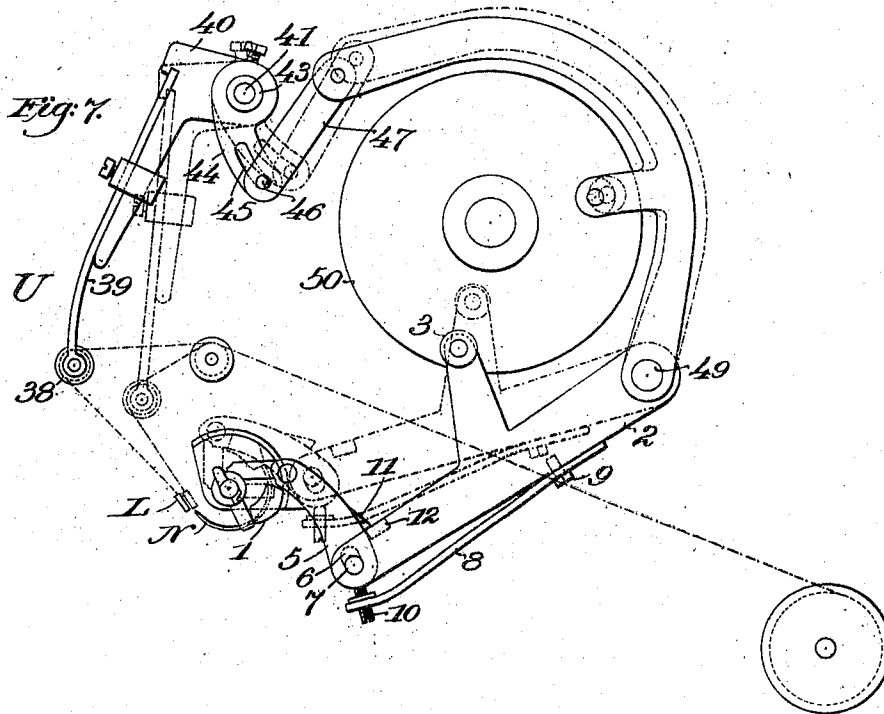
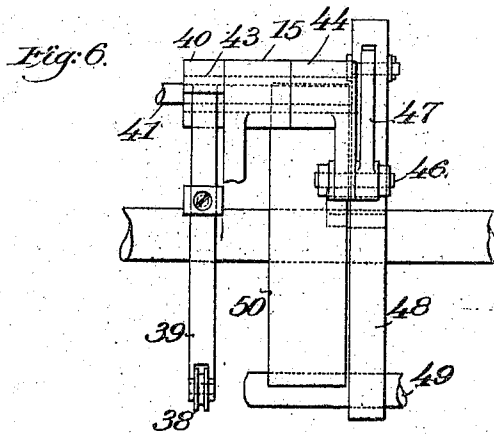
Inventor:
Henry Briggs
by his Attorneys
Phillip Van Eenem & Son

H. BRIGGS.
SEWING MACHINE.
APPLICATION FILED JAN. 20, 1903.

1,030,867.

Patented July 2, 1912.

3 SHEETS—SHEET 3.



Witnesses:
John P. C. Printz
Barnum D. Dorsey

Inventor:
Harry Briggs
by his attorneys
Phillips Van Eenra & Fish

UNITED STATES PATENT OFFICE.

HENRY BRIGGS, OF HASBROUCK HEIGHTS, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY.
A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

1,030,867.

Specification of Letters Patent.

Patented July 2, 1912.

Application filed January 20, 1903. Serial No. 139,844.

To all whom it may concern:

Be it known that I, HENRY BRIGGS, a citizen of the United States, residing at Hasbrouck Heights, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to an improvement in sewing machines and more particularly to chain stitch sewing machines of the curved hook needle wax thread type of which the commercial welt and turn machines are examples.

In the patent granted to the present applicant October 15, 1901, No. 684,538, there is disclosed a sewing machine of this type in which the take-up acts to set the stitch with a yielding and gradually increasing force, while the tightening of the stitch is performed in substantially the same manner as in the machines of the prior art, such, for example, as in the well-known Goodyear welt and turn machines. In this connection it may be stated that the terms "tighten the stitch" and "set the stitch" as used in this specification refer respectively to the taking of slack out of the thread which has been drawn through the materials to form the stitch, and to the drawing of the concatenation of thread which forms the stitch into the position which it assumes in the finished seam. In said Goodyear sewing machine the stitch is set by a take-up which exerts an unyielding inward strain on the thread, that is in the direction toward the median line of the shoe, and by making the take-up act yieldingly and with gradually increasing force the advantages set forth in said patent were obtained. In the machine of said patent, however, as well as in the said Goodyear machine, the stitch tightening strain was exerted outwardly by the needle, that is in the direction outward from the median line of the shoe, and such strain was exerted with a sudden twitch or jerk which when such strain is excessive is liable to cut or tear the between substance or so injure it as to impair the strength or appearance of the shoe. Moreover, such strain was liable to fray or break the thread

at the needle hook when the slack had been taken out of the previous loop standing around the thread just drawn through by the needle (which slack exists because of the difference in size between the needle, against which the thread had previously been drawn taut by the take-up, and the strands of thread just drawn through such loop by the needle) and especially if such strain was brought upon the thread with a sudden twitch or jerk. This is in part due to the resistance of the thread to rendering in the hook of the needle, because of the pressure which has been exerted by the materials upon the thread in the needle hook during its passage through them, and in part due to the tension upon the thread which, in the Goodyear machine, is the full tension strain which is necessary in setting the stitch but which is not required in tightening the stitch as a comparatively small tension is required for this purpose. But where, as in said Goodyear machine, the pull-off movement of the take-up is necessarily made less than the average amount consumed in each stitch in order to compensate for variations of thickness of the materials being sewed, it is necessary for the needle at the latter part of its retracting stroke and after it has tightened the preceding stitch to pull off a slight compensatory amount of thread which causes the thread to reeve to a slight degree under tension in the hook of the needle. It is desirable therefore, it will be apparent to those skilled in the art, to reduce the outward strain to a minimum, because of the cutting action of the thread on the materials, and to reduce the reeving of the thread in the hook of the needle to a minimum in order to avoid as far as possible the injurious action of the needle on the thread.

It has been found by the applicant that the outward strain and the reeving of the thread are susceptible of being reduced by yieldingly controlling the needle or other stitch tightening instrumentality during the latter part of the loop drawing stroke of the needle. During the forward movement of the needle and during the first portion of its retracting movement it is preferable that the needle should be positively actuated, because, among other reasons, of the necessity for timing its movements at this

time accurately with relation to the movements of other stitch forming instrumentalities.

The object of the present invention is to produce a sewing machine of the curved-needle chain-stitch class in which are embodied yielding means on the needle side of the work acting during the tightening of the stitch to exert a yielding strain on the thread to reduce the sudden outward strain above described to a minimum and to relieve as far as practicable the between substance and the thread therefrom.

Other objects of the invention are to reorganize and improve sewing machines of this class by combining the yielding take-up with the yielding action of the stitch tightening devices and to improve the machine in other respects hereinafter pointed out.

To the above ends the present invention consists in the devices and combinations of devices hereinafter described and particularly defined in the claims.

Figure 1 is a front elevation of the machine; Fig. 2 is a side elevation looking from the left hand side of Fig. 1; Fig. 3 is a rear elevation; Fig. 4 is an enlarged detail of a portion of the thread finger actuating mechanism; Fig. 5 is a development of the cam for the thread finger; Fig. 6 is a front elevation of the take-up and its actuating mechanisms; and Fig. 7 is a side elevation illustrating the cooperating relations of the needle and take-up and of the actuating mechanisms at different positions during their operation.

The needle N is the usual curved hook needle supported in the usual needle segment 1, and actuated by the needle lever 2, which carries a cam roll 3, which runs in a cam groove in the side of the cam disk 4. The needle segment is connected to the needle lever by means of a connecting link 5, which is pivotally attached to the needle segment at one end and yieldingly connected to the needle lever 2, at the other end, said link being provided with a slot 6, which receives a pin 7, secured in the front end of the needle lever 2. A spring 8, secured to the needle lever 2, by means of the bolt 9, is provided at its front end with an adjusting screw 10, which engages the lower end of the connecting link 5, and normally tends to hold it in the position illustrated in full lines in Fig. 7. Upon the rear side of the connecting link 5, there is provided a projection 11, which is adapted to engage a cooperating projection 12, on the side of the front end of the needle lever 2. The projection 11, is in engagement with projection 12, during the first part of the retracting movement of the needle but separated therefrom during the latter part of the retracting stroke of the needle operating in a manner about to be described. The above-de-

scribed arrangement is such that the needle is positively actuated to force it through the materials and during the first part of the retracting stroke of the needle, the projection 11 of the link 5 being in contact with the projection 12 of the needle lever 2, the needle is positively actuated during the first part of its retracting movement; but after the needle has withdrawn far enough to remove its hook from the embrace of the materials the projections separate and the further rearward movement of the needle is yieldingly controlled under the influence of the spring 8. Thus during the time the needle is overcoming the resistance of penetrating materials and during the time the needle is drawing the loop of thread through the materials it is positively controlled but during the latter part of its retracting stroke it is yieldingly controlled so that the rearward motion of the needle may cease before the needle lever 2 reaches the limit of its motion tending to withdraw the needle, so that during the last part of the retracting stroke of the needle it exerts an uninterrupted yielding pull upon the thread thereby tightening the stitch under yielding pressure.

To insure a sufficient retraction of the needle to avoid interference with the welt guide and to provide a sufficient length of loop to reach to the next needle hole, the pin 7 is designed to engage the upper end of the slot 6 in the link 5 and thus retract the needle positively in the event that the loop drawn back by the needle tends to hold the needle in too low a position.

The back gage G, the back rest R, the looper L, the channel guide C, all are constructed and operate substantially as in said Goodyear machine. The awl A, is mounted on the awl lever 13, which is supported in the usual manner upon the feed slide 14. The means of actuating the awl to make its work-feeding stroke are substantially the same as in said Goodyear machine and the means for actuating the awl to make its work-piercing stroke are also substantially the same as in said Goodyear machine, except in the respect that the bell crank lever 15, which actuates the awl lever is mounted upon a sleeve, which carries the take-up lever as hereinafter described.

The thread finger F, is mounted upon a shank 16, which is supported in the bearing in the frame of the machine so that it oscillates and reciprocates therein. Upon the upper end of the shank 16 is mounted a pinion 17, and a cam 18, which are secured to said shank 16. The pinion 17, is engaged by a segmental gear 19, which is pivoted upon the stud 20, and operated by means of the link 21, from the bent lever 22, pivoted at 23 upon the frame of the machine, which bent lever carries upon its upper end a cam

roll, which engages a cam groove in the side of the cam disk 24. The thread finger cam 18, is engaged by a spring finger 25, which is supported upon the frame of the machine and normally acted upon by the spring 26, which tends to move the free end of the finger 25 downward. The spring 27 which is supported between the said cam 18 and a projection 28 upon the frame of the machine acts upon the upper side of the cam 18 and tends to hold the shank of the thread finger in its lowermost position. The above-described arrangement and the shape of the cam paths are such that when the thread finger is thrown forward to engage and draw out its bight of thread, the spring finger 25 passes through the upper part of the cam groove from left to right until it reaches the point 29, at which spring 26 forces the finger 25 downward through the vertical portion of the cam groove to the position 30; then as the thread finger is rotated in the opposite direction the finger 25 having reached the limit of its downward movement, engages the inclined portion of the cam groove and thereby lifts the cam and with it the shank 16 of the thread finger and compresses the spring 27, thus as the thread finger is moved forward to give up its thread to the needle it is lifted. This action continues until the end of the finger 25 reaches the position 31 in the cam path, whereupon the compressed spring 27 forces the cam 18, and with it the thread finger shank 16 downward thereby causing the end of the finger 25 to occupy a position in the cam path indicated at 32. The operations above described are repeated for each stitch.

The tension indicated in a general way by the reference letter T consists of a thread truck 33, mounted upon a stud 34 at the rear of the frame of the machine in position to receive the thread as it passes up from the wax pot. A brake-shoe 35 carried in the lower end of a brake lever 36 is arranged to engage the groove in the thread truck 33, and a spring 37 normally tends to hold the brake-shoe 35 in engagement with the surface of the thread truck. Adjusting means are provided for regulating the pressure of the brake-shoe upon the thread truck 33. The forward end of the brake lever 36 is provided with a cam roll, which engages a cam surface on the cam disk 24. The above-described arrangement and the shape of the cam surface are such that intermittently during the operation of forming each stitch the brake-shoe is raised so as to relieve the tension on the thread.

The take-up indicated in a general way by the reference letter U, consists of a thread truck 38, revolvably mounted upon the end of the resilient arm or spring 39, adjustably secured to the arm 40, pivotally mounted upon stud 41, secured on a sta-

tionary part of the machine. The spring 39 is adapted to yield during the operation of the take-up so as to cause its action to be exerted upon the thread with elastic pressure, thereby cushioning the take-up action. The arm 40 is secured to a sleeve 43, which embraces the stud or pin 41, and passes through the hole in the awl bell-crank lever 15, thereby affording a convenient support for said bell-crank lever. Upon the opposite end of the sleeve 43 is secured the arm 44 which is slotted at its lower end at 45 to receive a pin 46 in the end of the link 47, which connects said arm 44 with the cam lever 48 pivoted at 49 upon the frame of the machine. Intermediate its ends the lever 48 carries a cam roll which engages a cam path in the side of the cam disk 50. The above-described arrangement is such that after the needle has penetrated the material, the take-up is moved to exert an uninterrupted yielding and gradually increasing strain upon the thread in order to set the stitch of which the loop around the needle forms a part.

The forms of the various cams which actuate the several parts of the machine are not illustrated in the drawings as from the description of the construction, organization and mode of operation of the machine such cams could be laid out by any machine designer familiar with the designing of shoe sewing machines.

In general the operation of the machine is similar to the operation of the machine of my said patent, except where its operation is similar to the operation of the parts of the said Goodyear machine as herein stated. The action of the take-up is similar in all substantial respects to the action of the take-up in the machine of my said patent. The needle, however, is different in operation from the needle of the Goodyear machine in this, that while the needle is making its retracting stroke it is controlled by the spring 8, so that the stitch tightening pull upon the thread instead of being rigidly applied thereto is yieldingly applied, thereby relieving the thread and between substance of the sudden twitch or jerk which occurs in said Goodyear machine. When the needle lever 2 is depressed to advance the needle, the pin 7 engages the lower end of the slot 6 in the link 5 and the needle will be positively forced forward thus insuring certainty in the puncturing of the materials and accuracy of presentation to the looper. During the first part of the retracting stroke of the needle the projection 11 will be in engagement with projection 12 and the needle will be positively drawn back through the stock but during the last part of the retracting stroke of the needle it will be under the control of the spring 8 and operated to act yieldingly upon the thread.

It is considered that the feature of yield-

ingly controlling the needle during the last part of its retracting stroke is advantageous particularly in sewing around the toe, where the thickness of the between substance is increased and the amount of thread in the formation of each stitch is still further increased. By this means the excessive strain of the needle upon the thread during the sewing around the toe is avoided and at this time the needle instead of retreating its full stroke may retreat only so much thereof as is necessary.

While the invention is described as embodied in a machine employing a yielding take-up it is to be understood that the invention, so far as the feature thereof relating to the yielding control of the needle is concerned, may be embodied in a machine in which the take-up is positively actuated throughout its entire stroke, although it is considered that in order to obtain the best results from my invention it is desirable to employ this feature thereof in connection with a yielding take-up. While it is believed that this feature of the present invention can be used to the best advantage and will yield the best results when it is embodied in a machine in which the stitch is tightened by the needle and set by the take-up, such for example as the Goodyear machine or the machine of said patent, this feature of the invention is not limited to an embodiment in such machine as it is applicable to machines not employing a take-up and to machines in which the stitch is tightened by some other instrumentality than the needle.

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

1. A chain-stitch shoe sewing machine, having, in combination, a looper, a curved hook needle, a spring acting during the tightening of the stitch to exert a yielding strain on the thread on the needle side of the work, a stitch setting take-up and a spring on the supply side of the work which determines the tightness to which the stitch is set, substantially as described.

2. A chain-stitch shoe sewing machine, having, in combination, a looper, a curved hook needle, a spring acting during the tightening of the stitch to exert a yielding strain on the thread on the needle side of the work and a yielding take-up, substantially as described.

3. A chain-stitch shoe sewing machine, having, in combination, a looper, a curved hook needle, actuating mechanism for the needle including a spring which determines the tightness to which the stitch is tightened, a yielding take-up, and an intermittently acting tension, substantially as described.

4. A chain-stitch shoe sewing machine,

having, in combination, a looper, a curved hook needle, and means for positively actuating the needle at all times except during the latter part of its loop drawing stroke, substantially as described.

5. A chain-stitch shoe sewing machine, having, in combination, the needle N, the needle segment 1, the link 5 having the projection 11, the needle lever 2 having the projection 12, and the spring 8.

6. A chain stitch sewing machine, having, in combination, a looper, a hook needle, and actuating mechanism for the needle having provision for positively actuating it during the first portion of its loop-drawing stroke, and yieldingly during the latter portion of its loop-drawing stroke.

7. A chain stitch shoe sewing machine, having, in combination, a looper, a take-up, a curved hook needle, and actuating mechanism for the needle having provision for positively actuating it during the first portion of its loop-drawing stroke, and yieldingly during the latter portion of its loop-drawing stroke.

8. A chain stitch sewing machine, having, in combination, a looper, a hook needle and actuating mechanism for the needle, including means for positively actuating it during the first part of its loop drawing stroke, means for yieldingly actuating it during the latter part of its loop-drawing stroke, and positive means for actuating the needle during the latter part of its loop drawing stroke acting only in case of failure of the yielding means to secure a predetermined minimum length of loop.

9. A chain stitch sewing machine, having, in combination, a looper, a hook needle, actuating mechanism for the needle having provision for positively actuating it during the first portion of its loop drawing stroke, and yieldingly during the latter portion of its loop-drawing stroke, and means independent of the needle for setting the stitch.

10. A chain stitch sewing machine, having, in combination, a looper, a curved hook needle, and actuating mechanism for the needle having provision for positively actuating it during the first portion of its loop drawing stroke, and yieldingly during the latter portion of its loop drawing stroke.

11. A chain stitch sewing machine, having, in combination, a looper, a hook needle and actuating mechanism for the needle including a link having a projection, and a cam lever having a cam surface arranged to engage said projection to positively actuate the needle during a portion only of its loop drawing stroke and means for yieldingly actuating the needle during a portion of its stroke.

12. A chain stitch sewing machine, having, in combination, sewing instrumentali-

ties including a hook needle, and actuating mechanism for the needle operating in the normal operation of the machine to move the needle positively during a part of its loop drawing stroke and yieldingly during another portion of said stroke.

13. A chain stitch sewing machine, having, in combination, instrumentalities including a hook-needle, and actuating mechanism for the needle having provision for moving the needle positively through a distance sufficient to secure a predetermined minimum length of loop, and for yieldingly moving it through an additional distance.

14. A chain stitch sewing machine, having, in combination, sewing instrumentalities including a hook needle, and mechanism for actuating the needle including connections arranged to positively retract and then release the needle and a spring to sustain

the needle after its release by said connections.

15. A chain stitch shoe sewing machine having in combination, a needle segment with a needle thereon, a link with a projection thereon connecting the needle segment with a lever, a lever having a projection thereon and engaging the projection on the link during a portion of the loop drawing stroke of the needle and a spring operatively connecting the lever and link after the disconnection of the projections and during the latter portion of the loop drawing stroke of the needle.

In testimony whereof I affix my signature, in presence of two witnesses.

HENRY BRIGGS.

Witnesses:

HORACE VAN EVEREN,
FRED O. FISH.

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