

T. G. PLANT.
SEWING MACHINE.
APPLICATION FILED JUNE 6, 1911.

1,018,130.

Patented Feb. 20, 1912.

5 SHEETS—SHEET 1.

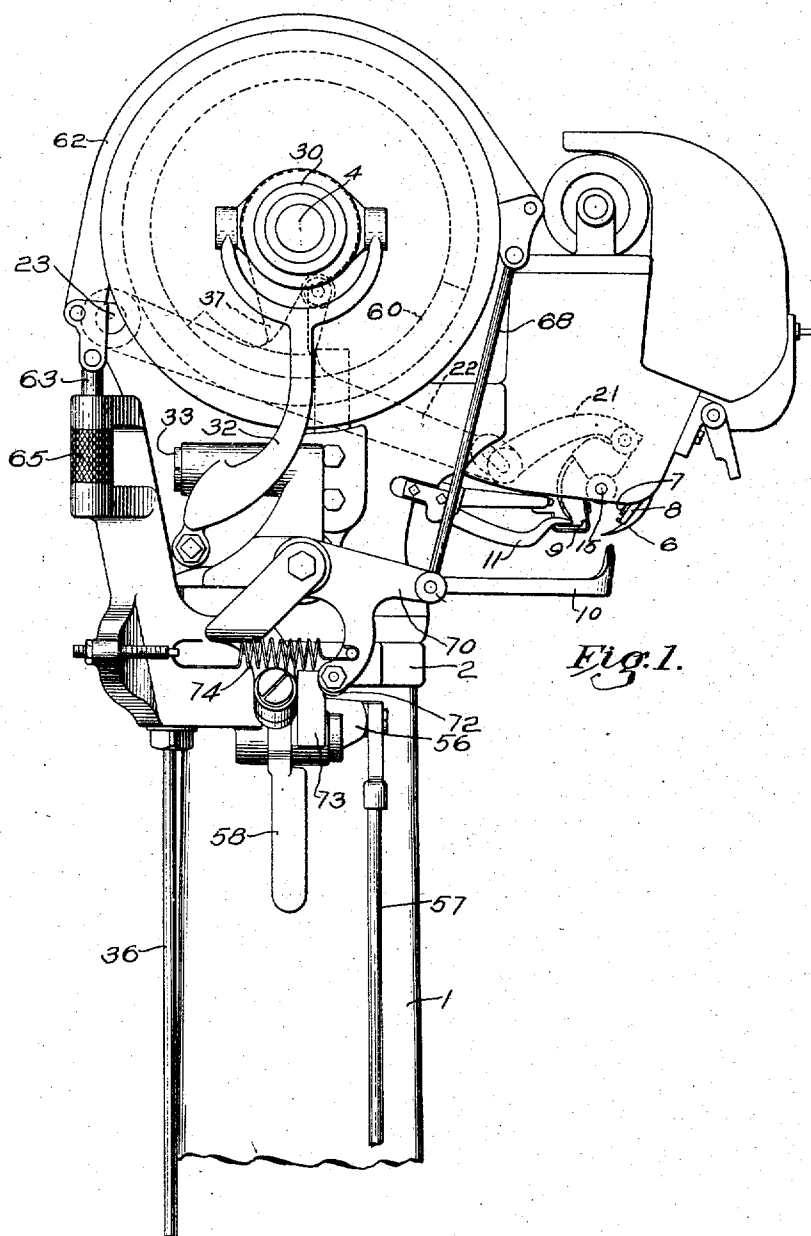


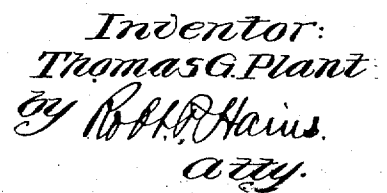
Fig. 1.

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5 SHEETS—SHEET 2.



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5 SHEETS—SHEET 3.

Fig. 4.

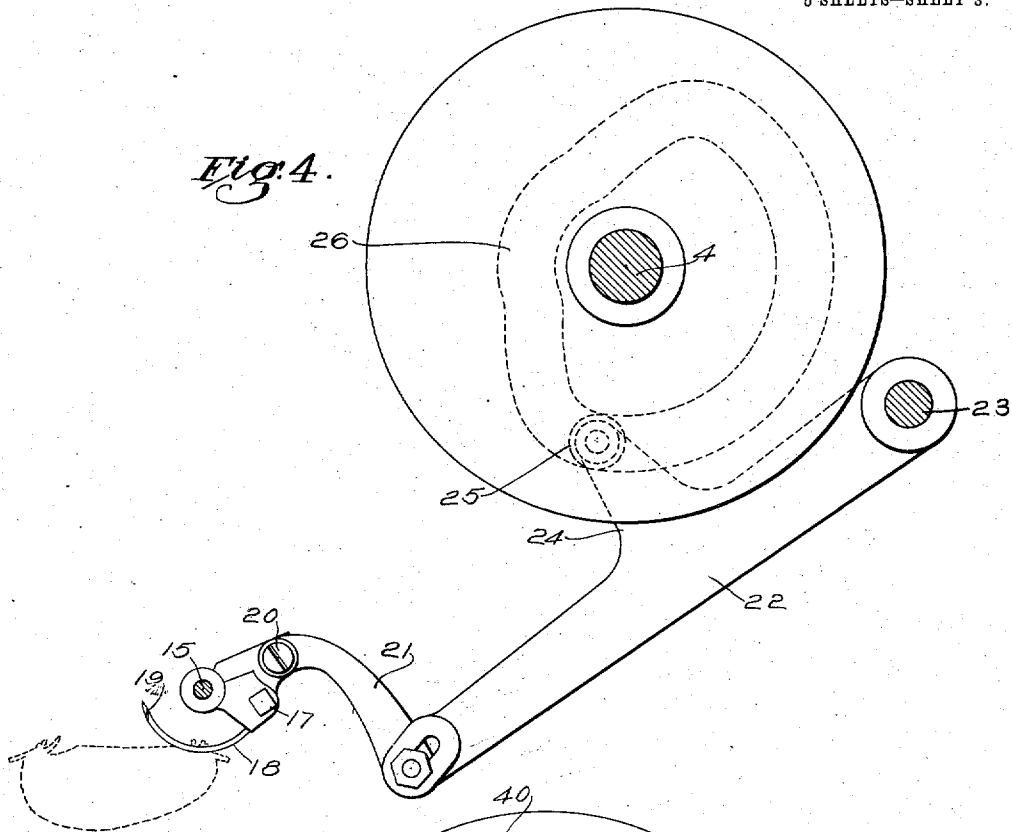
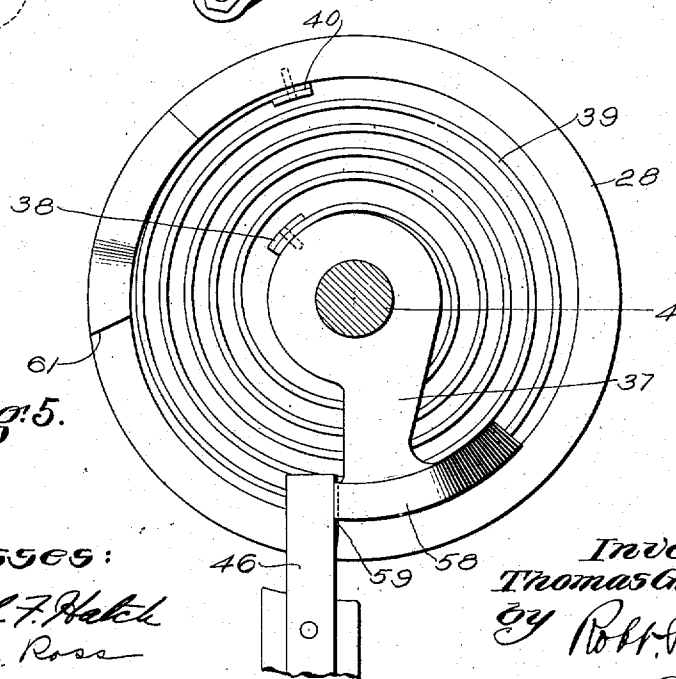


Fig. 5.



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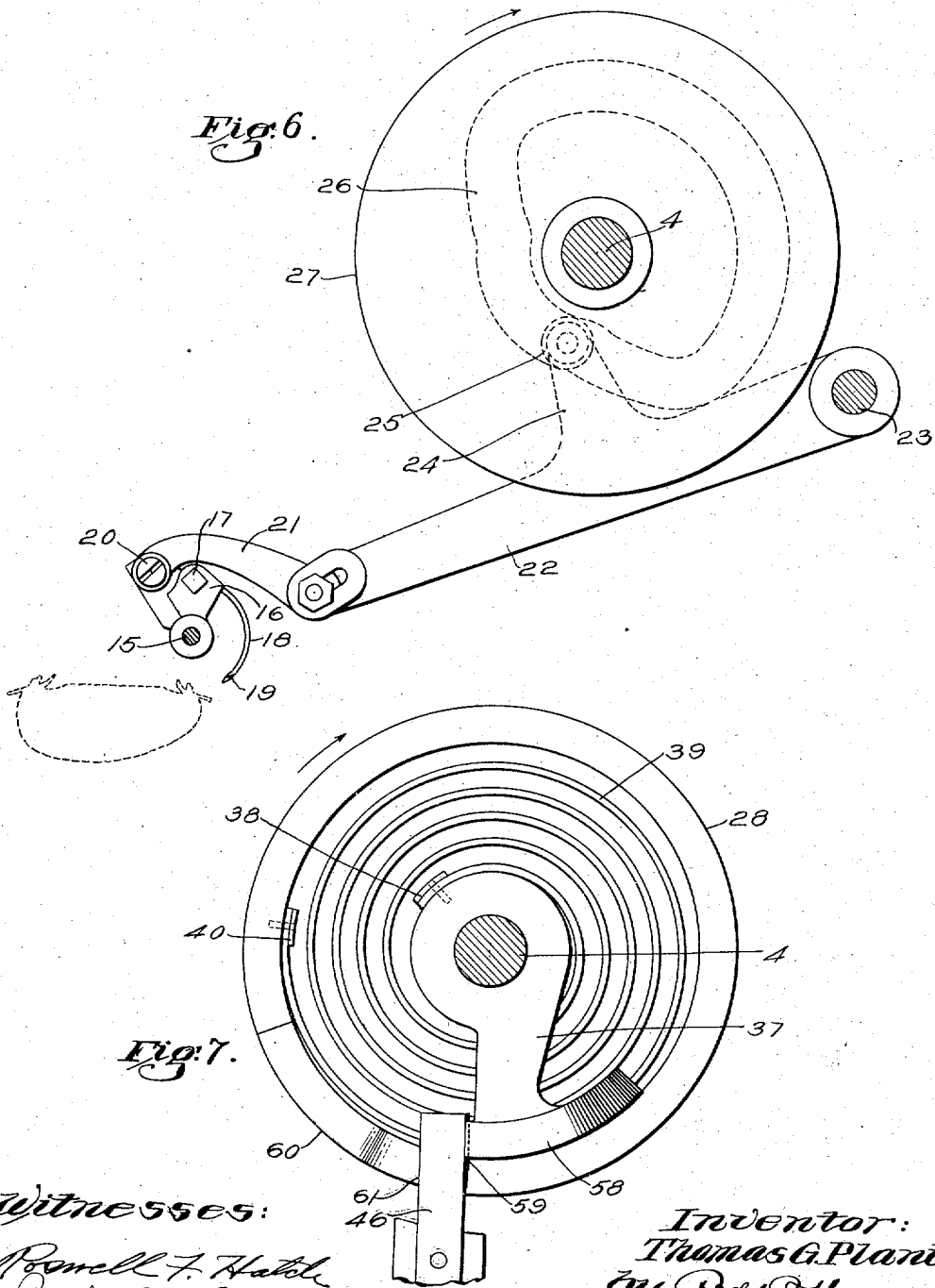
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5 SHEETS—SHEET 4.



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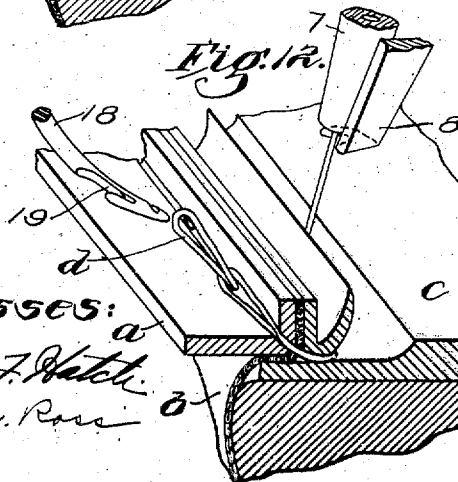
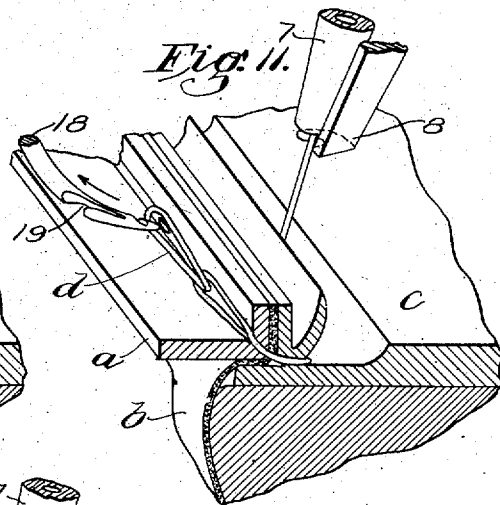
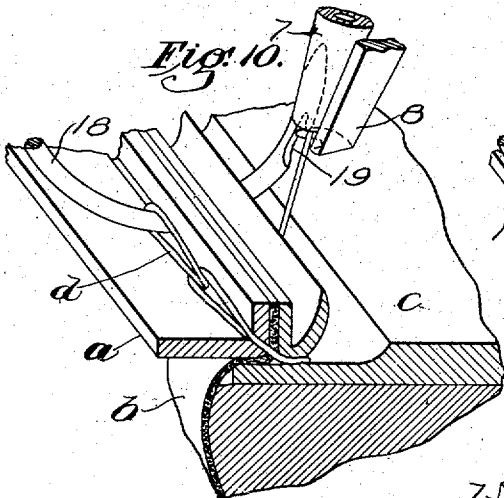
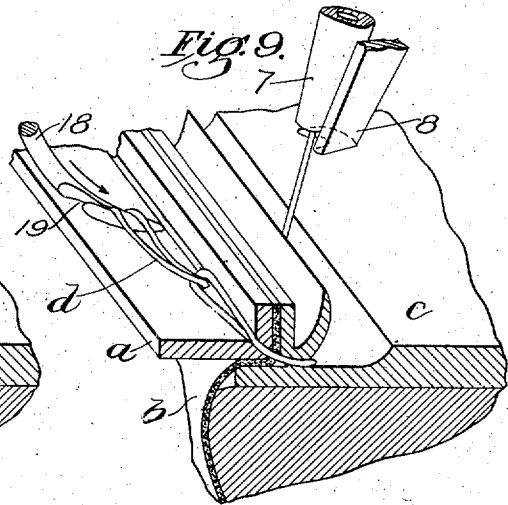
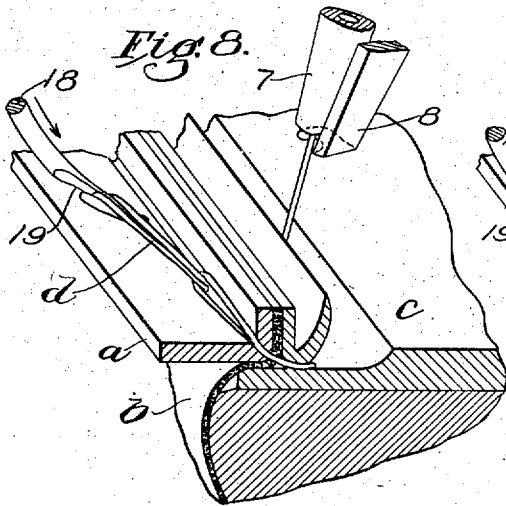
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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SEWING-MACHINE.

1,018,130.

Specification of Letters Patent.

Patented Feb. 20, 1912.

Application filed June 6, 1911. Serial No. 631,646.

To all whom it may concern:

Be it known that I, THOMAS G. PLANT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to chain stitch shoe sewing machines of that class which employ a curved hooked needle and which are used to sew the inseam of turned and welted shoes.

In the operation of machines of the class referred to, in sewing a seam, the hooked needle passes forward through the loop of thread previously drawn out by the needle and through the work so as to present its empty hook in position to receive a new supply of thread. The thread is then laid in the hook of the needle by means of a looper and the needle retracts, drawing with it a new loop of thread through the work and through the previous loop. These movements of the needle and looper are repeated in regular sequence during each cycle of operations of the machine. At the completion of the sewing operation it is necessary that the needle be brought to rest out of engagement with the shoe to enable the shoe which has been sewed to be removed from the machine and another shoe to be placed in the machine in the proper position with relation to the needle and the other operating parts of the machine. Before the shoe can be removed, it is also necessary that the loop of thread last drawn through the work by the needle be freed from the hook of the needle and from the other thread handling devices, if any, which act upon the needle loop. During the normal operation of the machine in sewing a seam the thread lies in the hook of the needle during the entire retracting stroke of the needle so that when the needle is brought to rest at or near the limit of its backward stroke sufficiently removed from the shoe as not to interfere with its ready removal, the thread still lies in the hook of the needle. In machines as at present constructed, manipulation of the shoe or of the machine by the operator is required in order to free the needle from the thread

and leave the needle at rest in retracted position out of engagement with the shoe.

The object of the present invention is to provide a machine of the class above referred to with automatic means for putting the needle and thread in such condition with relation to each other and to the work as to offer no obstacle to the immediate removal of the shoe from the machine when the machine is stopped or any obstacle to the insertion of another shoe in the machine in the proper position with relation to the needle and other operating parts of the machine.

With the above object in view, the present invention contemplates the provision in a chain stitch inseam shoe sewing machine provided with a hooked needle and a looper, of means whereby at the conclusion of the sewing operation when the machine is stopped, the last needle loop will be freed from the needle and other stitch forming devices, if any, which act on the needle loop, and the needle will be brought to rest out of engagement with the work.

Broadly considered, the invention contemplates the provision of any suitable means to cause the desired manipulation of the needle loop and needle at the conclusion of the sewing operation to free the needle loop from the stitch forming devices and bring the needle to rest so that neither the thread nor the needle will offer any obstacle to the immediate removal of the shoe from the machine. To avoid the use of additional devices to act on the needle loop, the preferred form of the invention contemplates the provision of means whereby the needle can be retracted while its hook is empty. By retracting the needle without any thread engaged in its hook, the empty needle can be brought to rest out of engagement with the work and with its hook free from the last needle loop so that neither the needle nor the thread will offer any obstacle to the immediate removal of the shoe. To still further simplify the construction and avoid the use of devices or mechanism tending to increase the complexity of the operating parts of the machine, the preferred form of the invention further contemplates securing the retraction of the needle while its hook is empty by a reversal in the cycle of operations of the machine. Also, to insure the

freeing of the last needle loop from the hook of the needle, which is apt to stick therein by reason of the wax on the thread, the preferred form of the invention contemplates reversing the cycle of operations of the machine after the needle in its forward movement has pierced the work and the last needle loop has been pushed out of the barb of the needle by the contact of the loop with the work.

The drawings accompanying this description show a chain stitch machine for attaching welts to welt shoes as a convenient mechanical embodiment of the invention, and will be referred to, as the description proceeds, to make clear the broad features that characterize the invention without, however, limiting the invention to the means shown except in so far as announced by the claims.

In said drawings:—Figure 1 is a side elevation of a welter embodying one form of the present invention, so much only of said machine being illustrated as seems desirable to make clear the association of parts pertaining to said invention; Fig. 2 is a front elevation of the upper or head portion of the machine with some of the parts omitted or broken away; Fig. 3 is a detached detail on an enlarged scale showing the operating connections between the stop finger slide and its actuating lever; Fig. 4 is a detached side view partly in section, showing the hooked or barbed needle, its operating means, and the position of the needle with relation to the work when the cycle of operations of the machine is reversed; Fig. 5 is a sectional side elevation on the line 5—5, Fig. 2, showing the relation of the parts of the reversing mechanism when the needle is in the position indicated in Fig. 4. Fig. 6 is a view similar to that of Fig. 4, with the needle in retracted position; Fig. 7 is a view similar to that of Fig. 5, showing the relation of the parts of the reversing mechanism when the needle has been brought to rest in the position indicated in Fig. 6; Figs. 8, 9, 10, 11 and 12 are detail views illustrating somewhat diagrammatically the operations which are performed at the conclusion of the sewing operation to free the thread from the needle and bring the needle to rest out of engagement with the shoe.

The frame of the machine illustrated in the drawings comprises a column 1, provided at its upper portion with a plate or support 2, from which rise arms or standards 3, which arms or standards furnish bearings for the driving or main shaft 4 from which the stitch forming devices are actuated.

The channel guide 5 of the machine, the awl 6, the looper 7, the thread finger 8, the welt guide 9, the back rest 10, the back gage 11, the feed slide actuating lever 13 and its operating cam 14 may all be of any pre-

ferred construction and assembled in operative relation suitable to the purposes intended; and as these features of the machine and their operative connection with the main shaft 4 are well understood by those skilled in the art, a detailed description thereof and their manner of operation is unnecessary herein.

The mechanism for supporting and actuating the needle during the normal operation of the machine in sewing a seam is the same as is commonly used in this class of machines and comprises a support 15 and a needle carrier 16 mounted to oscillate thereon and having secured thereto by a clamp 17 a curved needle 18 having a hook or barb 19. Connected to the needle carrier at 20 is the link 21 which connects the needle carrier to the cam actuated lever 22 pivoted at 23 and having an arm 24 carrying a roller 25 engaging with a cam groove 26 in the cam disk 27 secured to the main shaft 4.

Secured to the driving shaft 4 is one member 28, (Figs. 1 and 2) of a clutch, the loose member 29 whereof may be driven from any suitable source of power. The hub 30 of the clutch member 29 is loosely engaged by a collar 31 connected to the bifurcated arm 32 of a clutch actuating lever pivotally mounted at 33 and having an arm 34 connected at 35 to a treadle rod 36 which is connected to the starting and stopping treadle of the machine.

As so far described, the machine illustrated in the drawings does not differ essentially from welt sewing machines of the prior art, the stitch forming devices being actuated in regular sequence in the usual manner so long as the starting and stopping treadle is held depressed and the clutch member 29 in engagement with the member 28. To enable the needle and thread to be put into such condition with relation to each other and to the work as to offer no obstacle to the immediate removal of the shoe from the machine when the machine is stopped, the machine illustrated in the drawings is provided with means which act automatically upon stopping the machine to reverse the cycle of operations after the needle has pierced the work and cause the needle to be retracted while its hook is empty and to be brought to rest out of engagement with the work. The manner in which the last needle loop is freed from the needle and the needle brought to rest out of engagement with the shoe, will be clearly understood from an inspection of Figs. 8 to 12 inclusive. In Fig. 8 the needle is shown as just starting on its forward stroke, at which time, as is clearly shown in the figure, the last needle loop *d* is held snugly in the hook of the needle. Fig. 9 shows the needle as having advanced nearly into engagement with the work, the last needle loop *d* still

remaining in the hook of the needle on account of the tendency of the waxed thread to stick to the needle. In Fig. 10 the needle has completed its forward movement and has passed through the last needle loop *d*, the welt *a*, the upper *b* and the between substance of the insole *c*. In case the needle loop *d* sticks in the hook of the needle, the loop is brought into engagement with the surface of the welt *a* as the needle pierces the work and thus pushed out of the hook, so that by no possibility can the last needle loop be caught by the hook of the needle during its retracting stroke. After the needle reaches the position indicated in Fig. 10 the cycle of operations of the machine is reversed so that the needle is retracted with its hook empty, the retraction taking place either before the thread has been laid about the needle by the looper, or after the looper has removed the thread from around the needle in case the cycle of operations has not been reversed before the looper has encircled the needle. During its retracting stroke the empty needle withdraws from the last needle loop as indicated in Fig. 11 and finally comes to rest out of engagement with the work as indicated in Fig. 12. From an inspection of this figure it will readily be seen that the needle and thread are in such condition with relation to each other and to the work as to offer no obstacle to the immediate removal of the shoe from the machine.

In the machine illustrated in the drawings, the reversal in the cycle of operations of the machine after the needle has penetrated the work is produced by means of a coiled spring 39, one end of which is attached to the inner surface of the fast clutch member 28 at 40 and the other end of which is attached at 38 to the hub of an arm 37 loosely mounted upon the driving shaft 4. During the normal operation of the machine in sewing a seam the arm 37 rotates with the fast clutch member 28 and shaft 4. During the last cycle of operations of the machine, however, at the completion of the sewing operation, and after the clutch member 29 has been separated from the member 28, the movement of the arm 37 is arrested. Arresting the arm 37 causes the spring 39 to be wound up by the continued rotation of the clutch member 28 under the influence of the machine momentum. As soon as the momentum of the machine is overcome the spring 39 unwinds thereby rotating the main shaft 4 of the machine backward and reversing the cycle of operations of the machine. The means for arresting the rotation of the arm 37 consists of a stop arm 46 connected to the starting and stopping treadle and arranged to be moved thereby into and out of the path of a shoulder 59 at the outer enlarged end 58 of the arm 37. As indicated

in Figs. 4, 5, 6 and 7, the stop arm 46 and the arm 37 are so arranged that the reversal in the cycle of operations of the machine takes place after the needle has pierced the work in its forward movement. To stop the needle out of engagement with the work after it has been retracted with its hook empty, a shoulder 61 is provided upon the clutch member 28 adapted to engage the opposite side of the arm 46 to that engaged by the arm 37.

To enable the stop arm 46 to be moved into and out of the path of the projection 59 at the outer end of the arm 37, the stop arm is carried by a slide 45 mounted to move longitudinally on a stud 43, the slide 45 is actuated from the starting and stopping treadle by means of a connecting rod 57 and a lever 51, the vertical arm 50 of which is provided with a stud 49 engaging lugs 48 projecting downwardly from the slide 45 and the horizontal arm 56 of which has a pin-and-slot connection with the connecting rod 57. This pin-and-slot connection permits the lever 51 to be moved by means of its projecting handle 58 to move the stop finger 46 without actuating the clutch member 29.

To assist in bringing the machine to rest after the separation of the clutch members 29 and 28, the machine illustrated in the drawings is provided with a suitable brake in the form of a brake band 62, encircling the fast clutch member 28. One end of this band is connected to a rod 63 adjustably secured to the machine frame by the adjusting and holding nut 65 and the other end of the band is connected by means of a link 68 to one arm of an elbow lever 70. The other arm of this elbow lever is provided with a roll 72 projecting into the path of a cam surface 73 on the lever 51, the arrangement being such that when the lever 51 is actuated in starting the machine, the elbow lever 70 is rocked in a direction to release the pressure of the brake band 62. A spring 74 connected to the elbow lever 70 moves the lever in a direction to apply the brake band to the clutch member 28.

The nature and scope of the present invention having been indicated, and a machine embodying the present invention in its preferred form having been specifically described, what is claimed is:—

1. A chain stitch inseam shoe sewing machine, having, in combination, stitch forming devices including a curved hooked needle and a looper and means, acting automatically upon stopping the machine, to free the last needle loop from the stitch forming devices and bring the needle to rest out of engagement with the work.

2. A chain stitch inseam shoe sewing machine, having, in combination, stitch forming devices including a curved hooked needle

and a looper and means, acting automatically upon stopping the machine, to retract the needle while its hook is empty and bring the needle to rest out of engagement with the work.

3. A chain stitch inseam shoe sewing machine, having, in combination, stitch forming devices including a curved hooked needle and a looper and means, acting automatically upon stopping the machine, to reverse the cycle of operations and cause the needle to retract while its hook is empty and come to rest out of engagement with the work.

4. A chain stitch inseam shoe sewing machine, having, in combination, stitch form-

ing devices including a curved hooked needle and a looper and means, operating automatically upon stopping the machine, to reverse the cycle of operations after the needle has penetrated the work and cause the needle to retract while its hook is empty and come to rest out of engagement with the work.

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

THOMAS GUSTAVE PLANT.

Witnesses:

DEAN B. MASON,
JOHN BAKER.

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