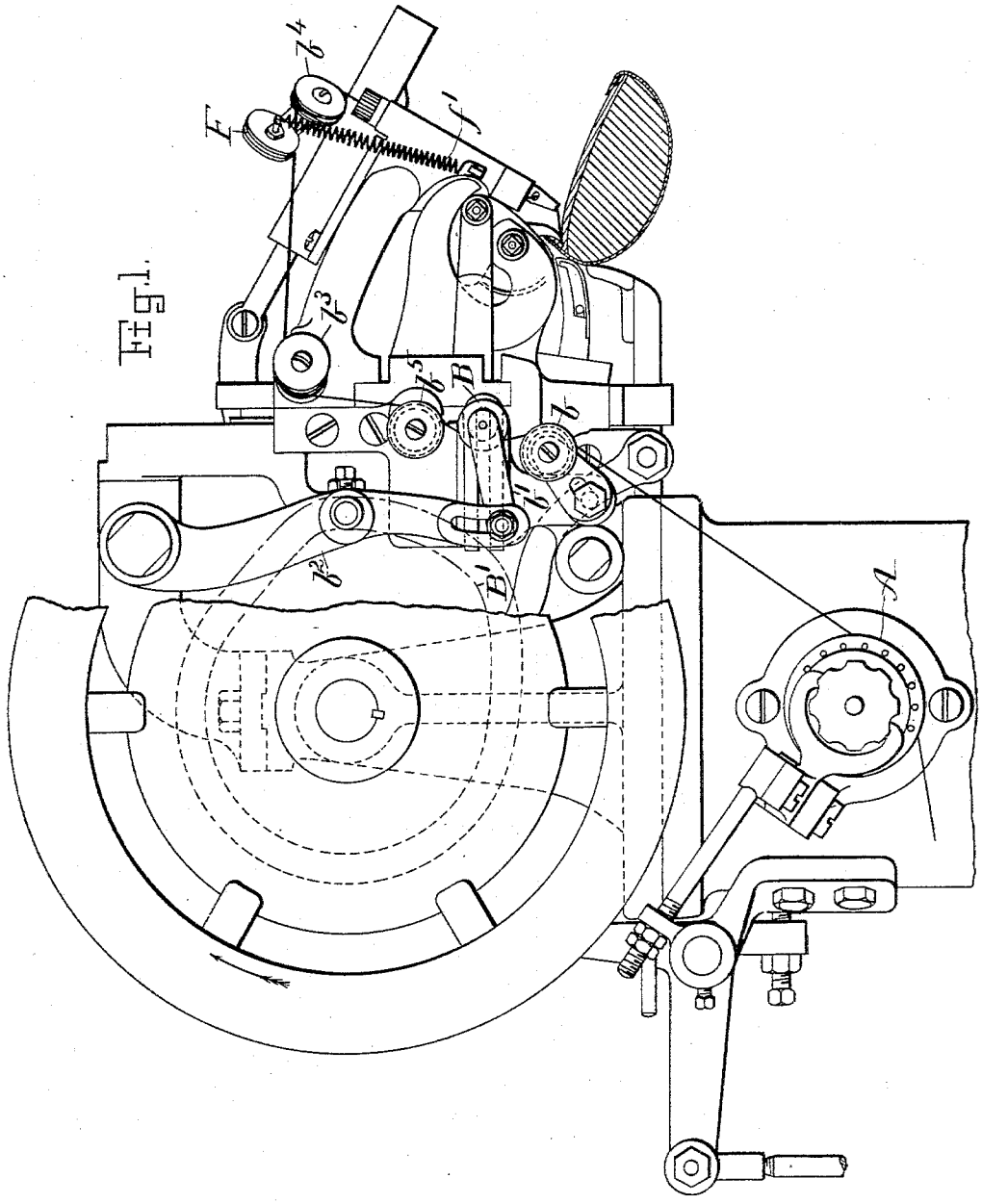
(No Model.) 2 Sheets—Sheet 1.

A. B. FOWLER & G. E. WARREN.

SHOE SEWING MACHINE.

No. 564,986. Patented Aug. 4, 1896.

Fig. 1.



Witnesses
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by their attorney,
[illegible]

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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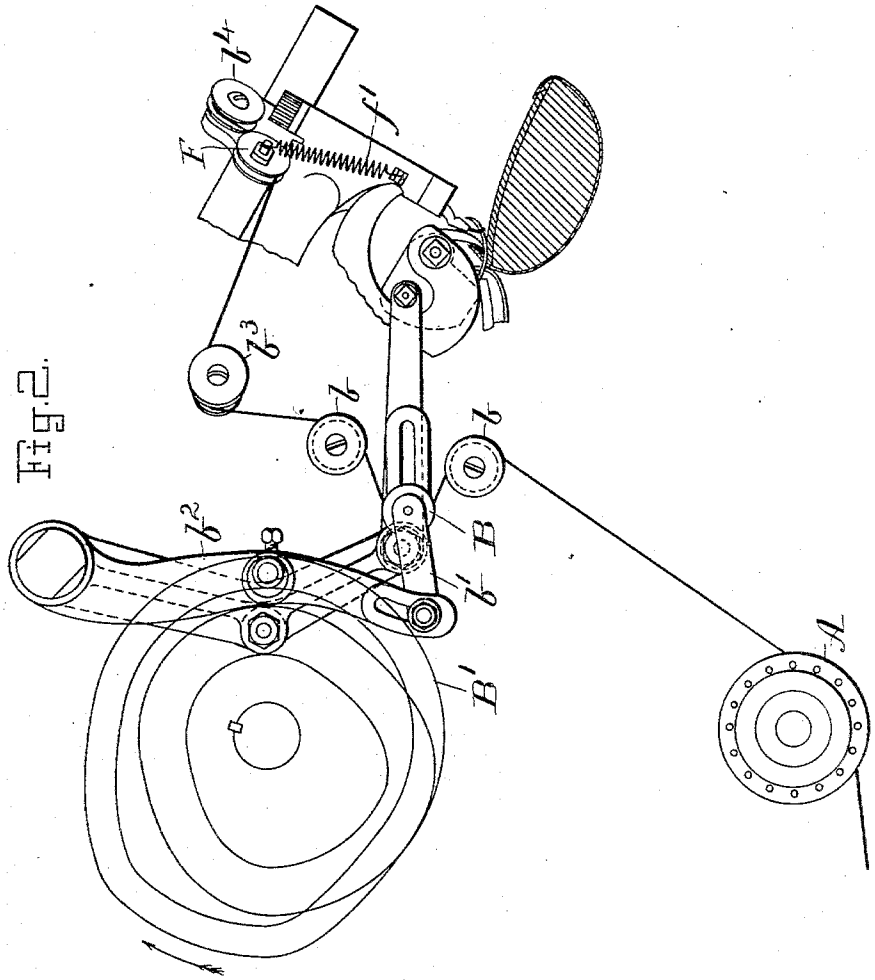
SHOE SEWING MACHINE.

No. 564,986. Patented Aug. 4, 1896.

Fig. 2.



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by their attorney,
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UNITED STATES PATENT OFFICE.

ALFRED B. FOWLER AND GEORGE E. WARREN, OF PAWTUCKET, RHODE ISLAND, ASSIGNORS TO THE LINCOLN SEWING MACHINE COMPANY, OF EXETER, NEW HAMPSHIRE.

SHOE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 564,986, dated August 4, 1896.

Application filed May 1, 1895. Serial No. 547,776. (No model.)

To all whom it may concern:

Be it known that we, ALFRED B. FOWLER and GEORGE E. WARREN, of Pawtucket, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Means for Providing Slack-Thread in Hook-Needle Chain-Stitch Sewing-Machines, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of portions of a sewing-machine, showing the parts in one position. Fig. 2 shows the main parts in another position.

Our invention consists in the combination, with the tension, pull-off, looper, and hook-needle, of mechanism for actuating the pull-off, and mechanism for actuating the needle, organized to pull off thread from the thread-supply through the tension after the needle has completed its loop-drawing stroke and while the needle holds a loop under strain in its hook, and thus supply slack thread for the next stitch, when the pull-off and needle make their forward strokes.

In our application now pending, Serial No. 547,775, filed May 1, 1895, we have described a chain-stitch hook-needle sewing-machine in which the rendering of the thread is reduced to a minimum, by providing slack thread on both sides of the hook of the needle, until the needle has nearly reached the end of its back stroke, the slack thread on the chain or stitch side of the needle being supplied from the preceding loop of thread, and the slack thread on the thread-supply side of the needle being supplied by a pull-off mechanism which pulls the thread from the thread-supply through the tension; and our present invention is an improved machine for doing this, its main novelty being that the pull-off mechanism does its work after the needle has completed its loop-drawing stroke and while the needle holds a loop of thread in its hook under the strain requisite to set the stitch, instead of relying upon a thread-brake to hold the thread against the action of the pull-off truck, as described in our application above referred to.

While our improved machine has the tension, the pull-off truck, the mechanism for taking up slack, the looper, and the hook-needle, not differing substantially from the like parts in the machine described in our application, Serial No. 547,775, filed May 1, 1895, the mechanism for actuating the needle and the mechanism for actuating the pull-off truck so coöperate that the needle acts to hold the thread against the action of the pull-off truck, thereby making a much better and simpler machine and a machine which is especially advantageous in the manufacture of welted shoes and turned shoes.

The position of the parts when the stitch is set is shown in Fig. 1; that is, the needle is at the end of its back stroke and the last stitch has been set and the thread drawn taut from the hook of the needle through the last needle-hole in the work, through the looper, over truck b^4, under the slack-taking truck F, over truck b^3, in front of trucks b^5 and b, and in rear of pull-off truck B, to tension A. The needle is thus holding the thread, so that when the pull-off truck B is moved back by its cam B′, acting through lever b^2 and arm b', the thread will be pulled off from the thread-supply through tension A, and cam B′ is about to cause pull-off truck B to make its pull-off stroke, while the needle holds the thread under strain in its hook.

In Fig. 2 the pull-off truck B has made its back stroke, the looper has acted to shorten the loop which is then about the shank of the needle, for the thread is then taut between the tension and the stock, and when the looper moves, to lay the thread in the hook of the needle, the thread required for that motion of the looper is drawn from that loop. After the looper has thus shortened the loop and laid the thread in the hook of the needle the needle is drawn back, the pull-off truck B also moving to give up thread as the needle is drawn back, the slack-truck F taking up the slack, but its spring f' is so light that the slack is taken up only sufficiently to insure the proper operation of the looper in laying the thread in the hook of the needle. After the needle makes its back stroke, drawing a new loop of thread through the stock and the preceding loop, the pull-off

truck moves and slackens the thread between the needle-hook and the tension, the preceding loop furnishing slack thread between the needle-hook and the preceding stitch; but when the needle has nearly reached the end of its back stroke the thread becomes taut on both sides of the needle, so that the needle sets the stitch just as it reaches the end of its back stroke, and the thread then renders slightly through the hook of the needle and under the strain of the tension, this rendering under strain being reduced to the minimum by the proper adjustment of pull-off truck B.

All the parts not lettered in the drawings are too well known to require description.

We are aware of the patent to Gooding and Keith, No. 484,958, dated October 25, 1892, in which the looper is described as so timed that it will draw thread from the take-up while the needle is drawing the loop through the stock and setting the previous stitch, and we disclaim all that is shown in that patent, as our invention requires a pull-off which is separate and distinct from the looper. Moreover, in our invention it is essential that the pull-off shall not operate while the needle is drawing the loop through the stock, for in that case the pull-off would act as a take-up and cause the thread to render through the hook of the needle and would not pull off the proper length of thread from the tension; but when the pull-off draws thread from the tension after the needle has completed its loop-drawing stroke and while the needle holds the loop of thread under the strain due to the tension, the full length of thread is drawn from the tension, and the rendering of the thread while under strain through the hook of the needle is reduced to the minimum, and this without need of any thread-brake or the like, to prevent the pull-off from acting as a take-up.

The advantage derived from holding the thread while the pull-off truck makes its back stroke is fully set forth in our application above referred to, but in the machine described in that application a thread-brake is shown as the means for so holding the thread, and the substantive advantage of holding the thread in the hook of the needle, as in the machine described in this application, is that the construction is simplified by the omission of a thread-brake or its equivalent, and greater certainty of action is secured, while the advantage derived from holding the thread in the hook of the needle when the pull-off is operated, rather than holding such thread by the needle-shank, (for example as in Patent No. 412,704, dated October 8, 1889, to French and Meyer,) is that a supply of thread for the loop about to be drawn is maintained in the preceding loop, which is impossible if the shank of the needle is relied upon to hold the thread, for in the latter case the pull-off truck on its back stroke operates first as a take-up, drawing back the thread until the loop is tightened about the shank of the needle, and thereby necessitating the use of an additional mechanism to form a bight of thread between the stock and the throat of the needle.

What we claim as our invention is—

In a chain-stitch hook-needle sewing-machine the combination of tension; looper; hook-needle; a pull-off mechanism between the needle and the tension; and actuating mechanism timed to cause the pull-off mechanism to make its pulling-stroke after the hook-needle has completed its loop-drawing stroke and while the loop is held under strain by the hook of the needle; substantially as described.

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GEORGE E. WARREN.

Witnesses:
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A. L. GOODING.