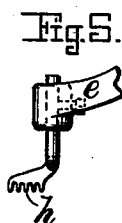
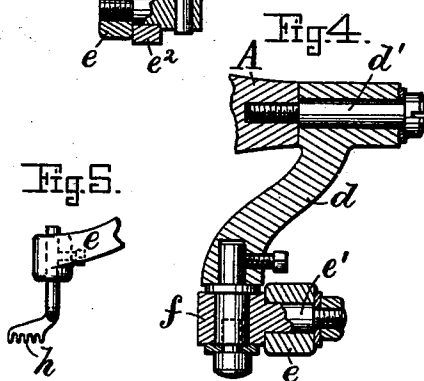
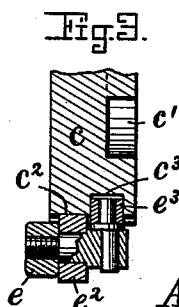
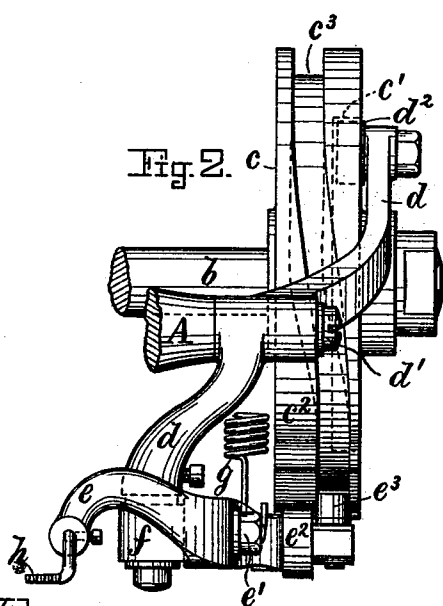
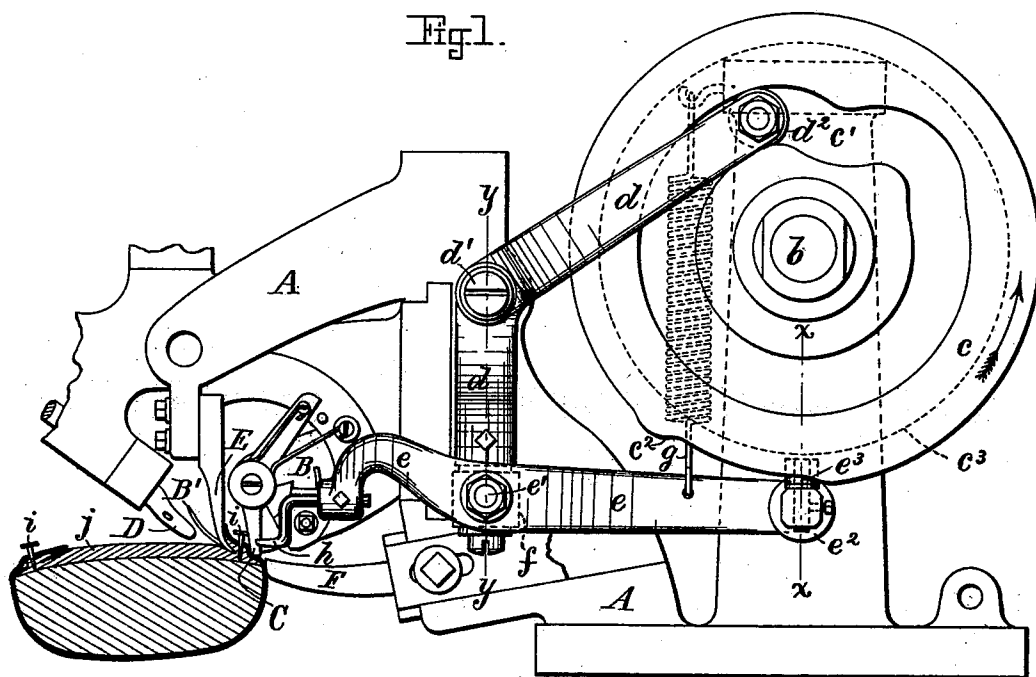


(No Model.)

A. B. FOWLER & G. E. WARREN.
TACK PULLING ATTACHMENT FOR SEWING MACHINES.
No. 520,775. Patented June 5, 1894.



Witnesses

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UNITED STATES PATENT OFFICE.

ALFRED B. FOWLER AND GEORGE E. WARREN, OF EXETER, NEW HAMPSHIRE.

TACK-PULLING ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 520,775, dated June 5, 1894.

Application filed April 3, 1893. Serial No. 468,788. (No model.)

To all whom it may concern:

Be it known that we, ALFRED B. FOWLER and GEORGE E. WARREN, citizens of the United States, residing at Exeter, in the county of Rockingham and State of New Hampshire, have jointly invented certain new and useful Improvements in Tack-Pulling Attachments for Sewing-Machines; and we do hereby declare the following to be a full, clear, and exact description of our invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in tack pulling attachments for shoe-sewing machines to remove the lasting tacks from boots or shoes during the process of sewing the uppers to the insoles and to remove them just ahead of the sewing of the same, so as to prevent the breaking of the needles or thread by coming in contact with the tacks.

The invention consists in providing means whereby the tack-puller is given four motions,—a forward motion to insert the puller under the head of the tack, an upward motion to pull the tack, a backward and a downward motion to remove the tack from the puller and return the latter to its normal position, and in some cases where necessary to give the puller two other motions, one side-wise to allow for the feeding of the boot or shoe by the needle or other feeding device, and the other a return motion to bring the puller into the position from whence it started.

The invention is carried out as follows, reference being had to the accompanying drawings, whereon—

Figure 1 represents a side elevation of our improved tack puller attached to a sewing machine, but only such portions of the stitch-forming mechanism of the sewing-machine having been shown as are necessary to illustrate the position of our device on the machine. Fig. 2 represents a detail front elevation of the tack-pulling mechanism detached from the sewing-machine. Figs. 3 and 4 represent respectively detail vertical sections on the lines X—X and Y—Y shown in Fig. 1. Fig. 5 represents a plan view of the tack-pulling tool.

On the drawings we have shown our in-

vention when used in connection with a sewing-machine, and we prefer to so use it, but it is not necessary that it should be used in connection with any other machine, as the several parts thereof might be mounted on a separate frame and used independently if so desired.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

A represents the frame, B the needle-holder and B' the hooked needle, C the needle-guide, D the looper, E the channel guide and F the yielding back-gage of a sewing-machine, which parts form no essential part of our present invention and may be varied by the use of any of the common and well known constructions now in use or may be entirely dispensed with if so desired.

Within the frame A is journaled the driving shaft *b* which is rotated in the usual manner. Upon this shaft is firmly mounted a cam *c* which rotates with the shaft and is provided with the cam groove *c'* on its side, the face cam surface *c²* and the cam groove *c³* on its face. A lever *d* is pivoted at *d'* to the frame A and has a pin and roll *d²* resting in the cam groove *c'* and acted upon by said groove to give an intermittent forward and backward oscillating movement to the lower end of the lever *d* upon its fulcrum *d'*. A second lever *e* is fulcrumed at *e'* to the free lower end of the lever *d* by means of a block *f* interposed between the levers and pivotally connected to both substantially as shown in Fig. 4, so that it is capable of a vertical rocking movement on one lever and a horizontal rocking movement on the other, thereby forming a universal joint between the levers. Said lever *e* is provided with a pin or roll *e²* which is held in contact with the face cam surface *c²* by the influence of a spring *g* attached to the lever *e*, to force it upward. The effect of the cam surface *c²* upon the outer or free end of the lever is to give it an intermittent upward and downward movement upon the fulcrum *e'*. Thus the combined effect of the cam groove *c'* on the lever *d* and the face cam *c²* on the lever *e*, is to cause the free end of the lever *e* to have four motions, a forward, upward, backward and downward

movement. These movements may in many cases be sufficient to accomplish the desired result, but when the tack pulling machine is used in connection with a sewing machine, 5 as shown on the drawings we provide means substantially as follows, whereby the lever *e* will have two other movements. The lever *e* is provided with a second pin or roll *e*³ which rests within and is acted upon by the 10 cam groove *c*³ on the face of the cam *c* in order to give the end of the lever *e* an intermittent, horizontal, oscillating movement.

To the forward end of the lever *e* is attached the tack-pulling tool *h*, which is preferably 15 made in the form of a comb as shown in Fig. 5, and as the tool *h* is rigidly attached to the lever *e* the combined movement of the levers *d* and *e* will cause the tool *h* to be fed horizontally at the same time that the needle and 20 shoe are fed, until it is opposite to the channel guide or nearly so; then to be moved downward and forward until the tool is forced under the head of the tack or tacks *i i* driven into the boot or shoe *j* which comes in its 25 path and until the shank portions of the tacks have entered the recesses between the teeth of the tool *h*; the tool is then moved upward to draw the tack or tacks; then backward and horizontally to the place from 30 whence it started, ready to repeat the same operation. The needle is moved horizontally into position to form the next stitch in the place from which the tack or tacks have just been removed by the tool *h* at the same time 35 that the tool is moved horizontally from such position. This horizontal movement of the tool *h* causes it to pull the tack which would be in the path of the needle when making the next stitch and therefore prevents the loss of 40 any of the effect of the lasting of the upper, as the stitching is kept as close as possible to the tacks without the liability of the needle striking them.

On the drawings in Fig. 1 we have shown 45 the boot or shoe in section and in the position occupied when sewing the same.

As the boot or shoe when being sewed passes by the tool *h* before it reaches the needle it will be seen that it is impossible for a needle 50 to come in contact with a tack, as each tack will be removed by the tool *h* before reaching the needle. This is a great improvement over sewing the boots or shoes while the tacks remain therein, as the needle is liable to come 55 in contact with the tacks, and by being bent to one side either broken or rendered useless, or the thread cut or stranded by coming into contact with the tacks while in the boot or shoe.

We do not wish to confine ourselves to the 60 employment of the exact means shown to impart the desired motions to the tool *h*, as the same may be varied within the scope of mechanical skill, and other and well known 65 equivalent means employed without departing from our invention.

The motions imparted to the tack pulling

tool consist of a forward movement in order to introduce the tool under the head of the tack or tacks to be pulled, or, in other words, 70 to cause the tool to be moved forward to get the tack or tacks, an upward movement in order to pull the tack or tacks, a backward and a downward movement to return the tool 75 to the position from where it started, and, when used in connection with a sewing-machine, an oscillating side movement to allow of the feeding of the work. This forward movement of the tool is in a line substantially 80 at right angles to the line of the feed of the work from which the tacks are to be pulled, so that the tool will move away from and not be liable to come into contact with any of the tacks remaining in the work while it is making its other movements. 85

Having thus fully described the nature, construction, and operation of our invention, we wish to secure by Letters Patent and claim—

1. The combination of a supporting frame, a driving shaft, a tack pulling tool and intermediate mechanism substantially as described, between the driving shaft and said tool, whereby the tool is caused to describe a parallelogram, or has four distinct movements, a forward movement in substantially 95 a straight line, so as to introduce the tool under the head of the tack or tacks which may be in the path of its movement, an upward movement at an angle to its forward movement in substantially a straight line in 100 order to pull the tack; a backward movement at an angle to its upward movement in substantially a straight line to withdraw the tool, and finally a downward movement at an angle to its backward movement in substantially a 105 straight line to return the tool from whence it started, for the purpose set forth.

2. In a machine for sewing the uppers to the insoles of boots and shoes, the combination of the supporting frame, the driving shaft, a 110 tack-pulling tool and intermediate mechanism substantially as described between the driving shaft and said tool, whereby the tool is caused to describe a parallelogram, or has four distinct movements,—a forward movement in substantially a straight line and at 115 substantially a right angle to the line of the feeding of the boot or shoe, so as to introduce the tool under the head of the tack or tacks which may be in the path of its movement, 120 an upward movement at an angle to its forward movement in substantially a straight line in order to pull the tack; a backward movement at an angle to its upward movement in substantially a straight line and at 125 substantially a right angle to the line of the feeding of the boot or shoe to withdraw the tool, and finally a downward movement at an angle to its backward movement in substantially a straight line, to return the tool from 130 whence it started, for the purpose set forth.

3. In a machine for sewing the uppers to the insoles of boots or shoes, the combination with the sewing mechanism, of a tack-pulling tool

and connecting mechanism substantially as described, between the driving shaft for said sewing machine and said tool whereby the tool is caused to make six motions, in pulling
5 tacks, to wit: a forward movement toward the boot or shoe to introduce the tool under the head of the tack to be pulled, a sidewise movement with the stitch forming mechanism while forming the stitches, an upward movement from the boot or shoe to pull the tack,
10 a backward, a downward and a return sidewise movement to return the tool to the position from whence it started, for the purpose set forth.

15 4. The combination with a sewing machine for sewing the uppers or welts to the soles or insoles of boots or shoes of a cam mounted on the driving shaft and driven thereby, a lever fulcrumed to the frame of the sewing machine acted upon by the cam to produce a forward and backward movement to the free end
20 of the said lever, a second lever universally jointed to the free end of the first lever, acted upon by the cam to produce an up and down and a horizontally oscillating movement to the
25 free end of the second lever, a tack pulling tool carried by the free end of the second lever, the combined movements of the two levers causing the tack pulling tool to pull the

tacks from the boot or shoe ahead of the sewing of the same, and to move with the feed of the sewing machine, for the purpose set forth.

5. The combination with a sewing machine for sewing the uppers to the insoles of boots and shoes, of a cam mounted on the driving
35 shaft of the machine and driven thereby, a lever fulcrumed to the frame of the machine and acted upon by the cam to vibrate the free end of said lever, a tack pulling tool and a lever carrying said tool at one end of said
40 lever being fulcrumed to the free end of the first lever and acted upon by said cam to vibrate the free end of the said second lever, the vibrations of the two levers by said cam
45 being so timed as to cause the tool to describe a parallelogram or to have four distinct movements, a forward, upward, backward and downward movement, and thereby to pull the
tacks, substantially as set forth.

In testimony whereof we hereunto affix our
50 signatures in the presence of two subscribing witnesses.

ALFRED B. FOWLER.
GEORGE E. WARREN.

Witnesses:

GEO. W. WESTON,
IDA L. HAYES.