

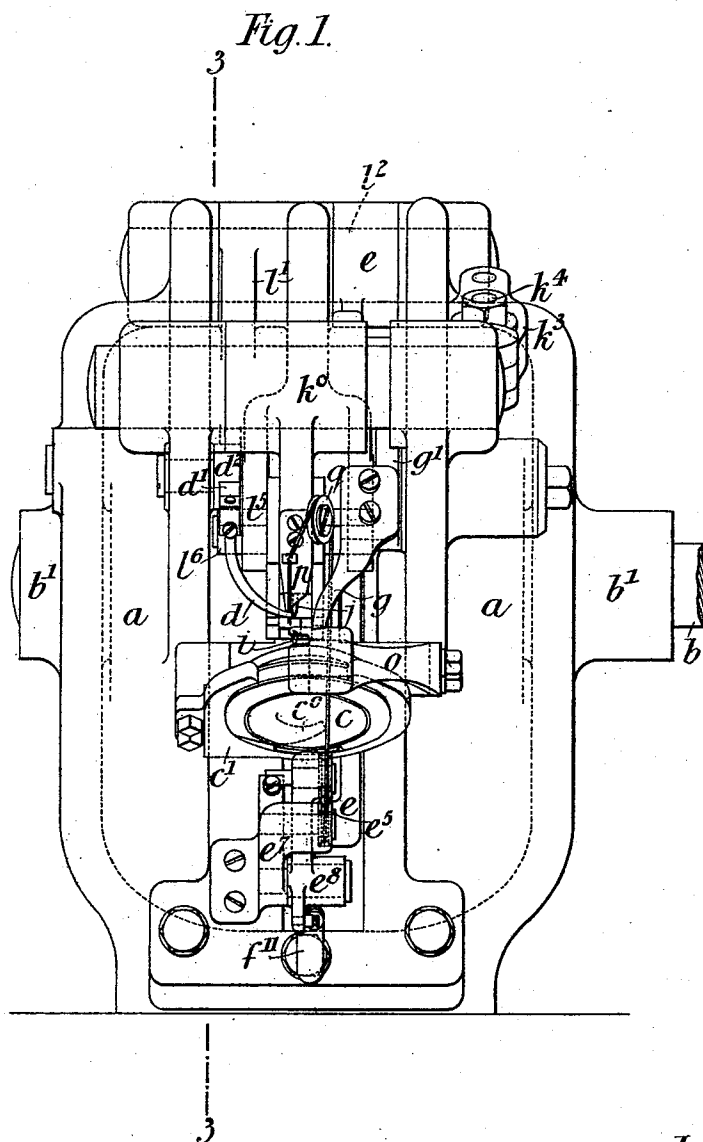
(No Model.)

8 Sheets—Sheet 1.

M. T. DENNE.
SHOE SEWING MACHINE.

No. 527,836.

Patented Oct. 23, 1894.



Witnesses
G. H. Relfern
G. F. Johnson

Inventor
M. T. Denne

(No Model.)

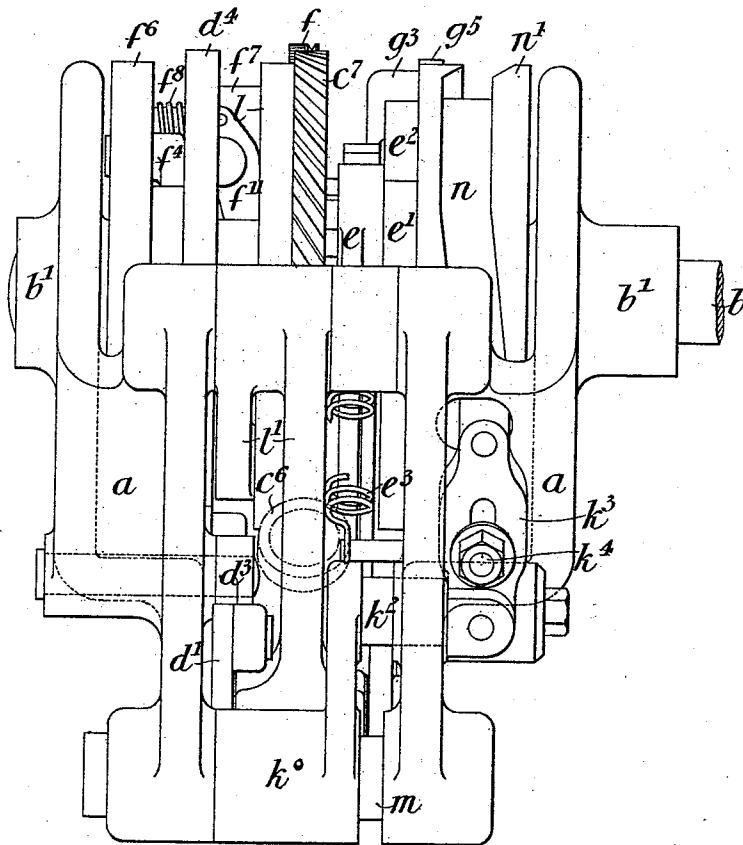
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M. T. DENNE.
SHOE SEWING MACHINE.

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Patented Oct. 23, 1894.

Fig. 2.



Witnesses.

G. H. Nelson
G. F. Tyson

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(No Model.)

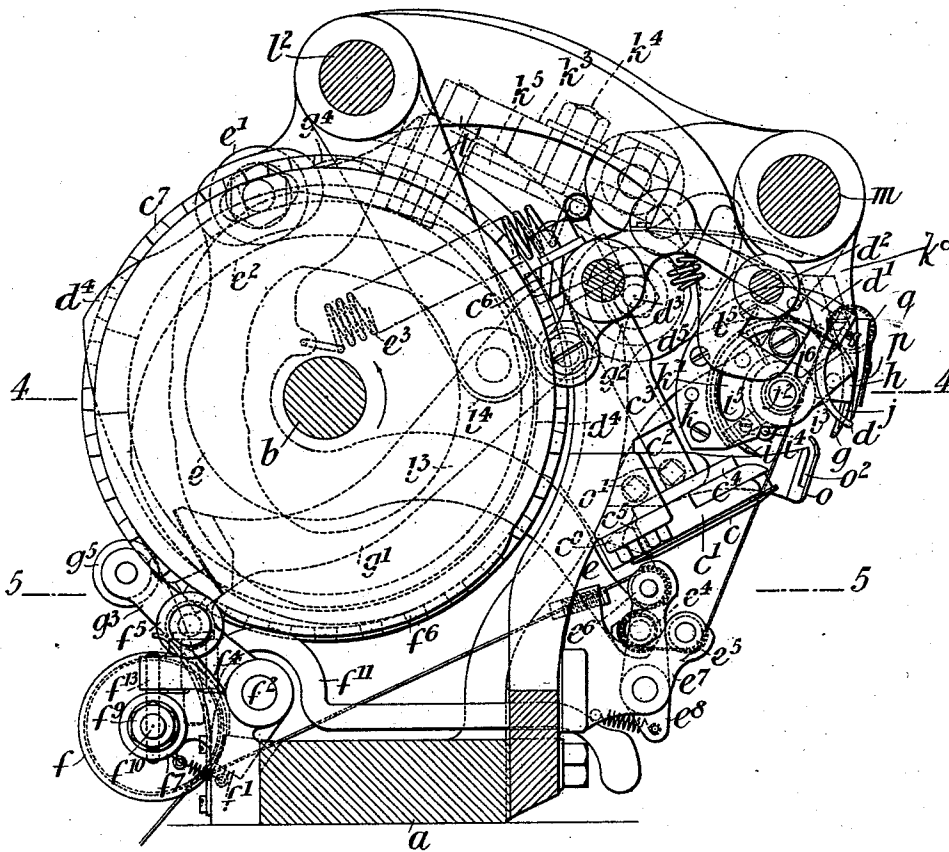
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M. T. DENNE.
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Fig. 3.



Witnesses.

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Fig. 4.

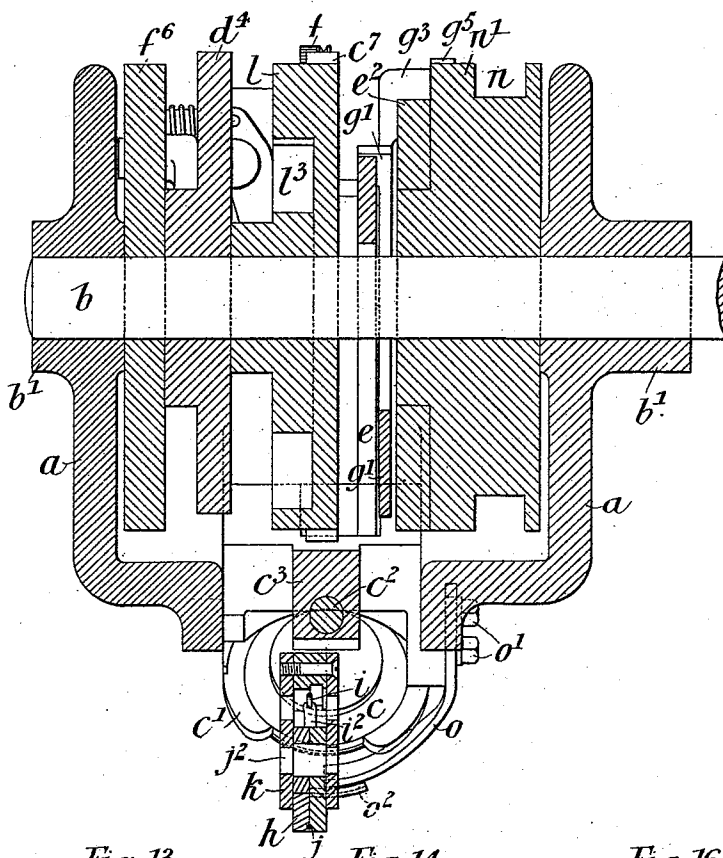


Fig. 13.

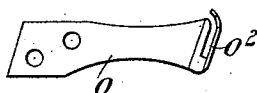


Fig. 14.



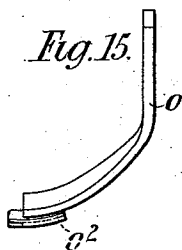
Fig. 16.



Fig. 17.



Fig. 15.



Witnesses

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M. T. Denne

(No Model.)

8 Sheets—Sheet 5.

M. T. DENNE.
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Fig. 5.

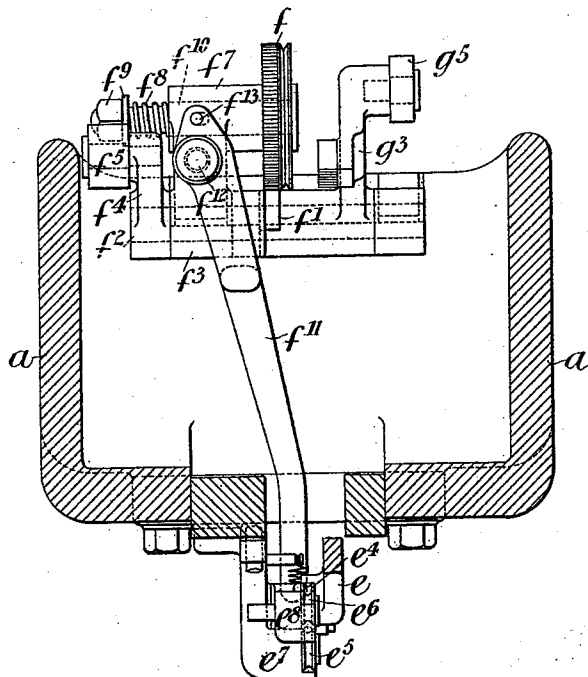
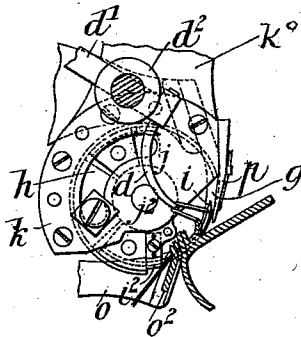


Fig. 6.



Witnesses.

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Inventor
M. T. Denne

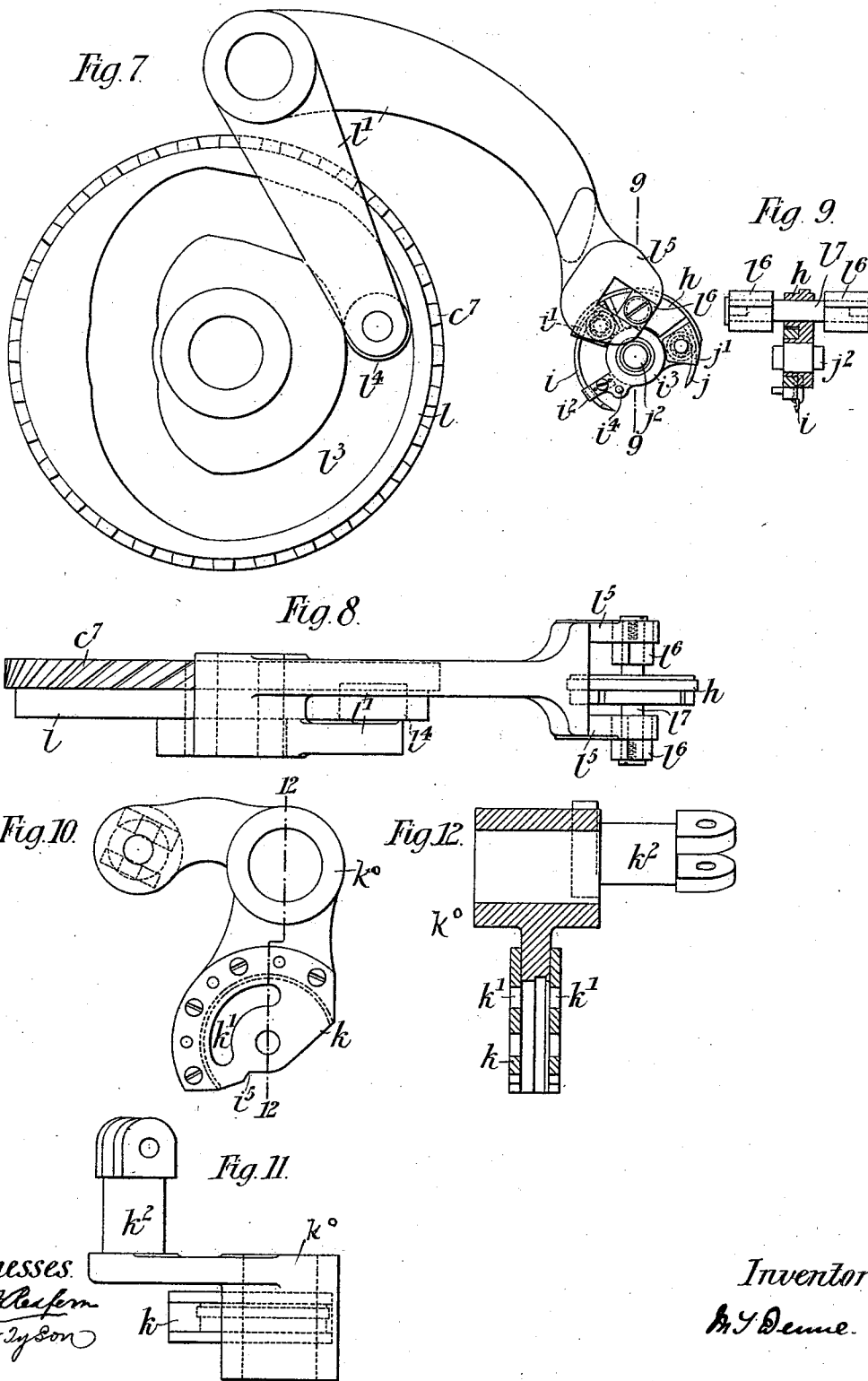
(No Model.)

8 Sheets—Sheet 6.

M. T. DENNE.
SHOE SEWING MACHINE.

No. 527,836.

Patented Oct. 23, 1894.



Witnesses.

G. A. Rees
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(No Model.)

8 Sheets—Sheet 7.

M. T. DENNE.
SHOE SEWING MACHINE.

No. 527,836.

Patented Oct. 23, 1894.

Fig. 18

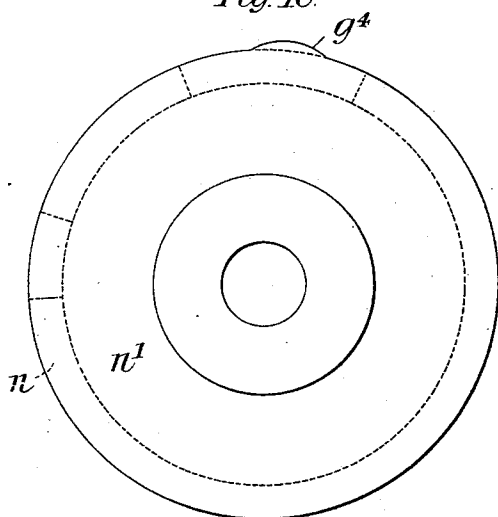


Fig. 20

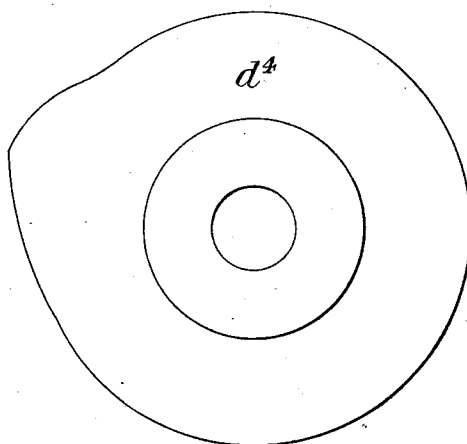


Fig. 19

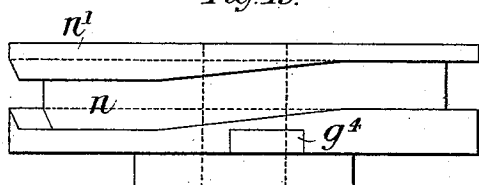


Fig. 22

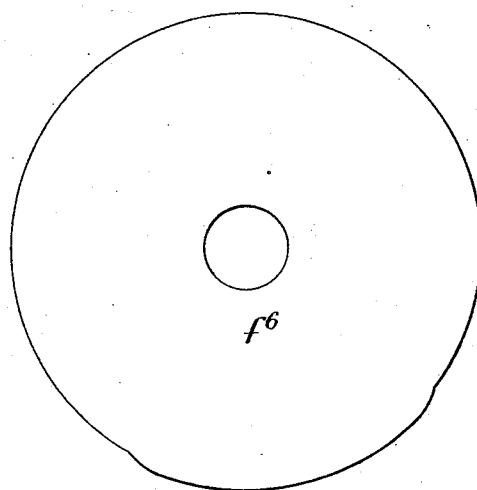
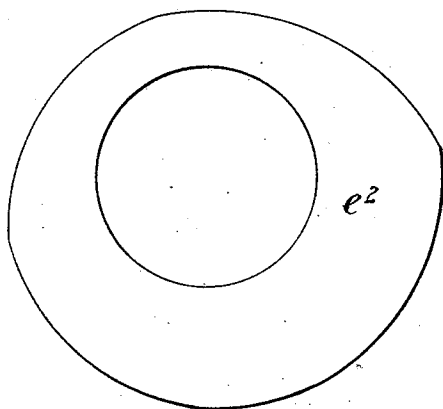


Fig. 21



Witnesses.

L. J. Tyson
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M. T. Denne

(No Model.)

8 Sheets—Sheet 8.

M. T. DENNE.
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Patented Oct. 23, 1894.

Fig. 24—

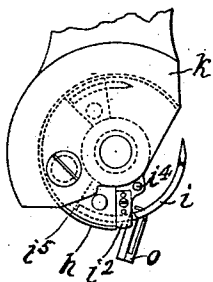


Fig. 23—

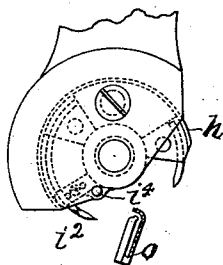
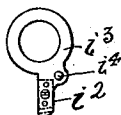


Fig. 25—



WITNESSES

C. L. Hester

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UNITED STATES PATENT OFFICE.

MARK THOMAS DENNE, OF EASTBOURNE, ENGLAND.

SHOE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 527,836, dated October 23, 1894.

Application filed October 6, 1893. Serial No. 487,351. (No model.)

To all whom it may concern:

Be it known that I, MARK THOMAS DENNE, a subject of the Queen of Great Britain, residing at Eastbourne, England, have invented new and useful Improvements in Boot or Shoe Sewing Machines, of which the following is a specification.

My invention relates to lock-stitch sewing machines chiefly designed for attaching the welts of boots or shoes but also applicable for sewing what is known as turn-shoe work.

In carrying out my invention I employ a rotary discoidal shuttle operated by skew-gearing and adapted to take the thread directly from a barbed needle working in a plane at right angles to the shuttle without the intervention of a loop-opener or thread-lifter, the said parts being somewhat similar to those described in the specification filed September 27, 1892, Serial No. 447,046, and in combination with this rotary shuttle I employ a combined needle and awl-carrier oscillating upon its axis in a race-way and carrying the curved barbed needle in opposition to the curved awl used for effecting the feed so that when the needle is in the work the awl will be out of the same and vice versa. This combined needle and awl-carrier is preferably operated from a cam on the driving shaft of the machine through the medium of a bell-cranked bifurcated lever engaging with a pin secured to the carrier and projecting through both sides of the race-way. The welt-guide or gage which forms the table for the work is a fixture and is of such length that the strip of welt before it enters the guide is kept away from the part being sewed, and the said guide is also curved so that it offers no obstruction when welting the waist of a boot or shoe.

To enable my invention to be fully understood I will describe how it can be carried into practice by reference to the accompanying drawings, in which—

Figure 1 is a front elevation of a boot or shoe sewing machine constructed according to my invention. Fig. 2 is a plan of the same. Fig. 3 is a vertical section on the line 3—3, Fig. 1. Figs. 4 and 5 are respectively horizontal sections on the lines 4—4 and 5—5, Fig. 3. Fig. 6 is a side view of part of the mechanism shown in Fig. 3 showing the parts

in a different position. Figs. 7 and 8 are an elevation and plan respectively of the combined needle and awl and their carrier and operating mechanism. Fig. 9 is a section on the line 9—9, Fig. 7. Figs. 10 and 11 are respectively an elevation and a plan of the feed head with the race-way for containing the carrier for the combined needle and awl. Fig. 12 is a section on the line 12—12, Fig. 10. Figs. 13, 14 and 15 are respectively a side elevation, a front elevation and a plan of the welt-guide detached; and, Figs. 16 and 17 are an elevation and a plan of a packing-piece to be used in connection with the said guide. Figs. 18 and 19 are an elevation and a plan and Figs. 20, 21 and 22 are elevations of cams hereinafter described; Figs. 23, and 24, details, showing the needle-guard, welt guide, and barbed needle in different relative positions; and Fig. 25, the needle guard and its ring, detached.

Similar letters of reference indicate corresponding parts in the several figures.

a indicates the framing of the machine, and *b* the driving shaft supported in bearings *b'* in the said frame and carrying the cams and gearing for imparting movement to the various parts as hereinafter more fully described.

c, *d*, *e*, *f*, and *g* are respectively the shuttle, the thread-puller, the take-up lever, the thread locking wheel and the channel-guide, all of which, together with their connecting mechanism, are somewhat similar to those described in the specification of my former application, Serial No. 447,046, filed September 27, 1892, but arranged and adapted to work in the manner hereinafter fully set forth.

h is my combined needle and awl-carrier, and *i*, *j* are the curved barbed needle and awl respectively carried thereby and clamped by means of plates *i'*, *j'* in the usual manner. *j*² is the axis pin of the said carrier upon which the same oscillates in a race-way *k* upon the feed head *k*⁰ Figs. 10, 11, and 12. The needle and awl are curved so as to work in the same path and are arranged in opposition in the manner shown clearly in Fig. 7 so that when the needle is in work the awl will be out of the same and vice versa.

*i*² is the needle-guard which embraces the needle *i* and is provided with a ring *i*³ arranged to turn on a boss on the carrier, the

said guard being provided with a stud or pin i^4 which comes in contact with a stop formed by a recess i^5 on the race-way k and is thus prevented from rising too high with the needle even if the latter be foul and the guard is stuck thereon, thus dispensing with the aid of springs as has hitherto been found necessary. On the forward stroke of the needle the guard is carried by friction with the said needle until it comes in contact with the welt-guide or gage o (hereinafter described) thus supporting the needle while penetrating the work. Or to be more explicit, the needle guard carrier or ring i^3 is mounted upon a boss or projection from the needle and awl-carrying segment h . There is no spring or any other connection between the guard-carrier and needle-carrier, the action being effected by friction on the needle and boss and stop pin i^4 , coming into contact with plate k , at i^5 . The needle being in the position shown in Figs. 23, and the needle guard being near the barb, on the forward movement of the needle, the guard is carried with it by friction on the needle and boss, until it comes into contact with the welt gage o . The needle then penetrating the welt, &c., slips through the guard. On the return movement, the guard is carried backward until the pin i^4 comes into contact with i^5 , when, being prevented from moving further, the needle, not having completed its stroke, draws through until the parts are in the position shown in Fig. 23.

l is the cam serving to oscillate the carrier h through the medium of the bell-cranked bifurcated lever l' fulcrumed on a shaft b^2 in the frame a , the said cam having a cam-groove l^3 engaging a roller l^4 on the said lever, said cam l being arranged on the shaft b . The said lever l' is provided with jaws l^5 which engage with blocks l^6 loose on a pin l^7 supported by the carrier, the said pin projecting through a slot k' in each side of the race-way k . The blocks l^6 are wider than the jaws l^5 so that they can move laterally with the head k^0 when moving as hereinafter described without becoming disengaged from the said jaws.

The feed for obtaining the length of stitch is effected by means of the awl j when in the work, and for this purpose the feed head k^0 is arranged to slide laterally upon a slide or shaft m at the front of the machine, it being provided with the extension k^2 sliding through the side of the frame a and connected to one end of a slotted lever k^3 adjustably fulcrumed by a pin k^4 to the said frame a . The other end of the lever k^3 is provided with a roller working in a cam-groove n in a disk n' arranged on the shaft b , the said groove being so formed as to impart the feeding movement to the feed head k^0 when the awl is in work. By adjusting the position of the fulcrum pin k^4 in the slot of the lever k^3 and in a slot k^5 in the frame a the length of the feed and consequently of the stitches formed can be varied.

o is my welt-guide or gage which forms the table for the work and is fixed to the front of the machine by screws o' , o' as shown. The said guide, as clearly shown in Figs. 13, 14 and 15, consists of a bar having a groove o^2 for the reception of the welt, the said grooved part being so curved that the strip of welt, which enters it at the right hand end (looking at the front of the machine) is kept away from the part of the boot or shoe being sewed. The guide o is curved so that it offers no obstruction when welting the waist of the boot or shoe. The depth of the groove o^2 can be varied by the use of packing pieces o^3 (Figs. 16 and 17) of various thicknesses placed therein. The dotted lines in Fig. 14 indicate one of the said packing pieces applied to the welt-guide o .

The shuttle c is arranged in a race-way c' and is driven by skew gearing in a similar manner to that described in the said former specification, that is to say, a shaft c^2 is arranged in a bearing c^3 and provided with a disk c^4 carrying a projection c^5 engaging with a recess in the shuttle so as to rotate the latter, the said shaft having a worm-wheel c^6 operated by a wheel c^7 provided with spiral or helical teeth, the said wheels being so proportioned that the shuttle rotates twice for one revolution of the shaft b . The shuttle instead of being arranged above the needle and awl as in the said former specification is arranged below the same, but it operates in a similar manner, that is to say, it takes the thread directly from the barbed needle without the intervention of a loop-opener or thread-lifter. The wheel c^7 is advantageously formed integral with the cam l .

The thread-puller described in the present invention is arranged so as to move backward and forward only, the latter movement described in the said former specification to enable the said thread-puller to engage with the needle thread being dispensed with, the feeding movement of the head k^0 enabling the said thread to be placed in the path of the hook of the thread-puller so as to be engaged thereby when moved backward by reason of the fact that as the thread extends from the last stitch made in the work to the pulley q on the movable head k^0 , the lateral feeding movement of the said head causes the angle of the thread relatively with the work to be altered to such an extent as to place it directly behind the thread puller d in the position shown in Fig. 1. In order to effect this backward and forward movement, the said thread-puller is mounted in a bar d' designed to slide in a pivoted guide d^2 , the said bar being connected to one end of a lever d^3 pivoted to the frame a while the other end of the lever carries a roller bearing against the cam d^4 , the said roller being caused to press against the cam by means of a spring d^5 . The guide d^2 is pivoted so as to allow of the oscillations of the bar d' due to its connection with the lever d^3 .

The take-up lever e is pivoted on the shaft l^2 and is provided with the adjustable roller e' running upon the cam e^2 , a spring e^3 serving to keep the said roller in contact with the cam.

e^4 is a pulley at the end of the take-up lever e , around which pulley the thread for the needle passes.

e^5 , e^6 are additional pulleys for the passage of the needle thread, the pulley e^5 being pivoted to a bracket e^7 while the pulley e^6 is pivoted to the end of a spring-lever e^8 fulcrumed to the said bracket e^7 , the said pulley e^6 serving to maintain in tension the thread passing around it.

The thread-locking wheel f around which the thread passes in its passage to the take-up lever is arranged as in the said former specification to be held against movement except when it is necessary to take sufficient thread to form a stitch, that is to say, it is provided with a series of ratchet teeth on its periphery with which a spring-block f' having corresponding teeth engages, the said block, as shown in Figs. 3 and 5 being connected to a shaft f^2 arranged in a bearing f^3 and having connected thereto a lever f^4 carrying a roller f^5 bearing against a cam f^6 .

In order to maintain a proper tension on the needle thread passing around the thread-locking wheel f , I cause the said wheel to bear against one face of its bearing f^7 (so as to set up a certain amount of friction between them) by means of a spring f^8 arranged between the other face and a nut and washer f^9 on its pivoting shaft f^{10} . In order that this tension can be relieved when removing work from the machine, I provide for moving the thread-locking wheel f away from the face of the bearing f^7 by means of a lever f^{11} fulcrumed at f^{12} and connected by a pin f^{13} to the shaft f^{10} , a slot being provided in the bearing f^7 to allow of movement of the said pin f^{13} .

The channel-guide g bears in the channel formed in the insole for the stitching, as shown in Fig. 6, and is normally locked so as to be rigid but at the point of operation of the machine at which the work is placed therein it is arranged to be unlocked. In order to effect this locking and unlocking the said channel-guide is fixed to one end of a lever g' pivoted at g^2 to the frame a , the other end of the lever being provided with teeth or serrations with which engage corresponding teeth or serrations on a spring-lever g^3 whereby the locking is effected, and in order to unlock the channel-guide the teeth on the lever g^3 are caused to disengage from those on the lever g' by means of a cam-projection g^4 formed on the periphery of the disk n acting on a roller g^5 on the lever g^3 .

p is a thread-guide similar to that described in the specification filed September 27, 1892, Serial No. 447,046, and serves when the thread is pulled against its inclined edge by the thread-puller to guide the same into the barb of the needle.

q is a pulley arranged for the passage of

the thread from the pulley e^5 to the thread-guide p .

The operation of the machine is as follows: 70
The shaft b must be turned so as to move the carrier h into the position in which the channel-guide is unlocked, in which position neither the needle nor the awl are in the way. The welt to be attached is then placed 75
in the groove o^2 of the welt-guide and the boot or shoe to be welted is brought to bear against the said guide, as shown in Fig. 6, the channel-guide being caused to rest upon the bottom of the channel in the insole. The 80
shaft b being now driven in the direction of the arrow, Fig. 3, the needle moving upward penetrates first the welt and then the upper and insole and when it has arrived at its highest point the thread is thrown into the 85
barb of the needle by the thread-puller d actuated by its cam d^3 , the position of the parts at this point being indicated clearly in Fig. 6. The needle then recedes drawing down the thread while the take-up lever e rises and 90
gives up as much thread as is required. At the same time the thread-locking wheel f is released to give up as much thread as has been used in the previous stitch. In its backward movement directly the point of the 95
needle leaves the welt the head k^0 is given a movement from left to right which places the awl in a position to puncture the work the distance from the plane of the movement of the needle when penetrating the work, 100
such distance corresponding to the length of the stitch to be formed. When the needle has arrived at the end of its down stroke the hook c^0 of the shuttle engages with the loop formed by the needle, and the needle dipping 105
behind the said hook as it rotates releases the said loop which is passed by the movement of the hook c^0 over both faces of the shuttle thus inclosing the spool thread in a similar manner to that described in the before mentioned specification, Serial No. 447,046. The 110
take-up lever when the thread has passed over the center of the shuttle moves down so as to take up the thread as it comes slack and pull it up into the work. While these 115
operations just described are being performed and when the needle reaches its backward position the awl is then in the work and the head k^0 having a lateral movement imparted to it by the cam-groove n from right to left 120
carries with it the boot or shoe and at the same time the welt is pulled out of the guide sufficiently by the said movement. This feeding movement of the head k^0 also acts to place the needle thread in engagement with 125
the thread-puller. While the needle is rising through the work and is having the thread placed in its barb, the shuttle which revolves twice to once of the main shaft b as hereinbefore described, is rotating without engag- 130
ing with the needle thread, the shuttle hook c^0 being so timed as to be in the position to take off the thread from the needle as the latter finishes its downward movement.

For turn-shoe work in place of the welt-guide *o* I employ a support consisting of a plain bar of the same shape as the welt-guide against which the work is held.

5 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

10 The combination with the feeding devices, of a thread puller moving in a plane parallel with the plane of movement of the needle and awl, the laterally movable head *h*^o, the curved needle and the curved awl carried by

said head, the pulley *q*, pivoted to said head above the needle and awl, and said head 15 needle and awl being in operation directly behind the thread puller when the said head is at the end of its feed movement, substantially as described.

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Witnesses:

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