

(No Model.)

3 Sheets—Sheet 1.

C. C. SMALL.  
HEEL NAILING MACHINE.

No. 413,973.

Patented Oct. 29, 1889.

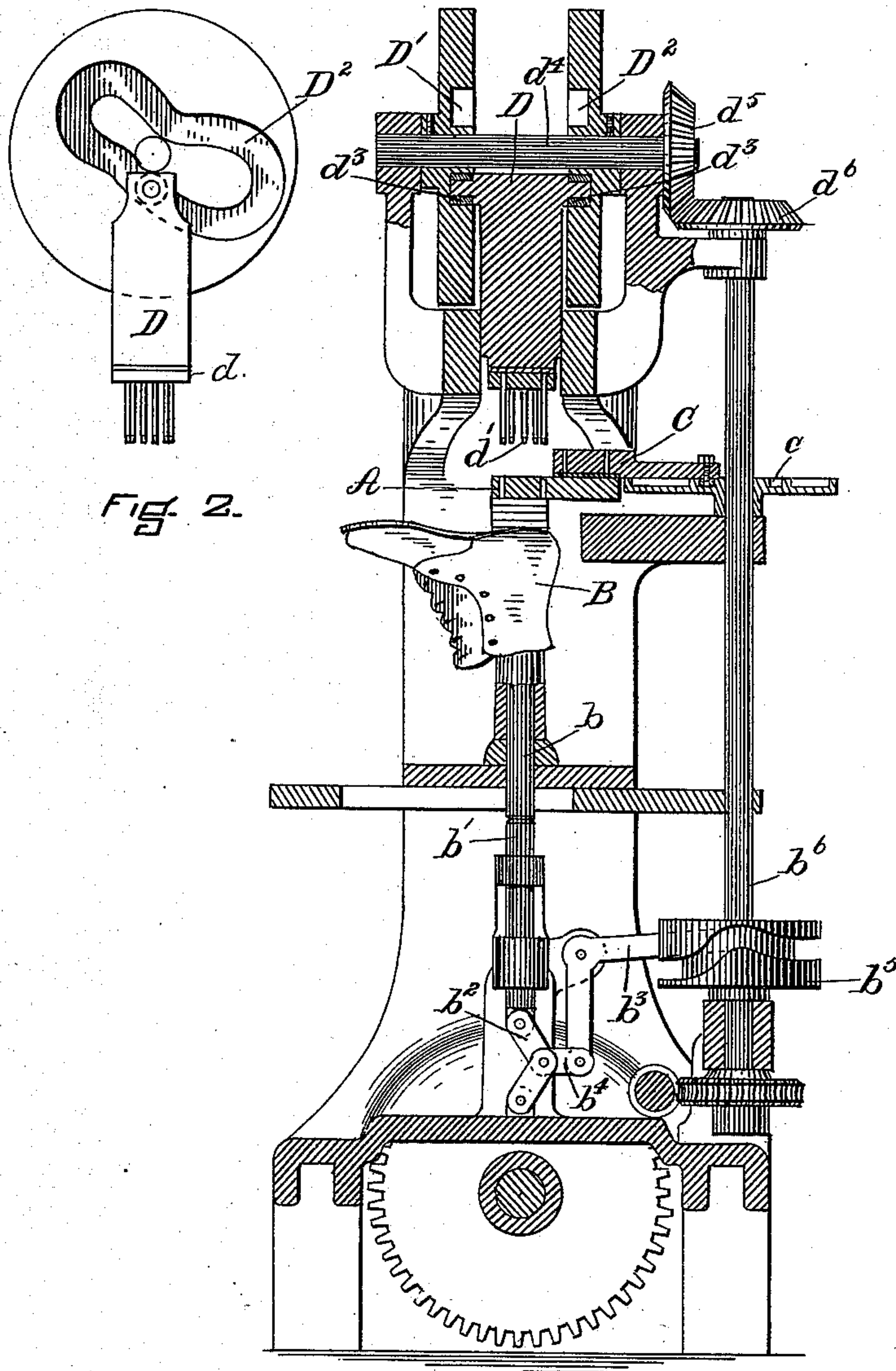


Fig. 2.

Fig. 1.

WITNESSES.  
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Fred. B. Dolan

INVENTOR.  
C. C. Small  
by his attys  
Charles & Raymond



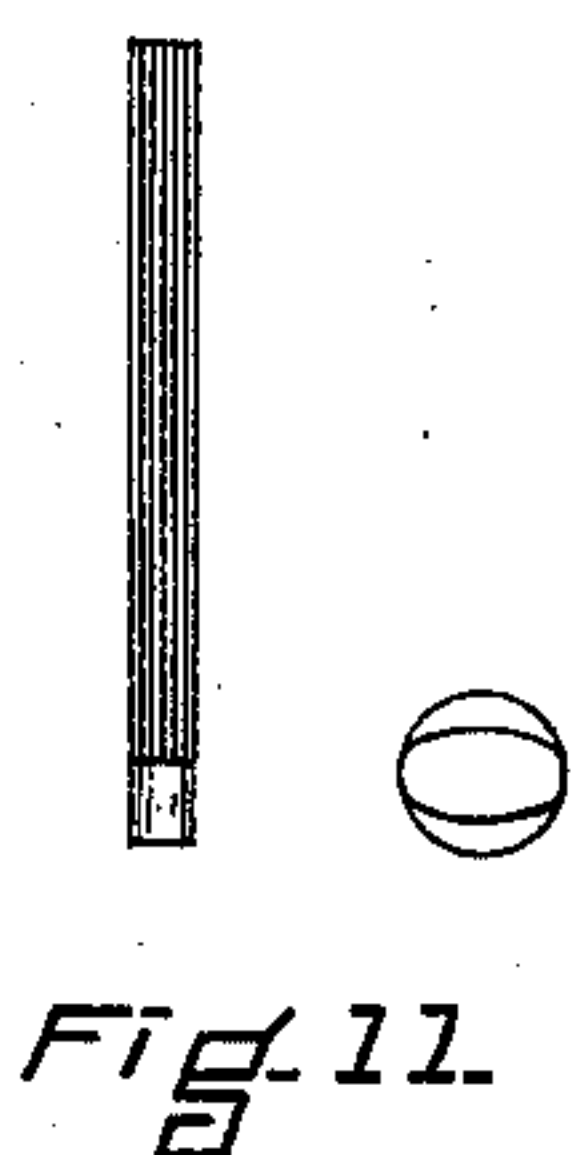
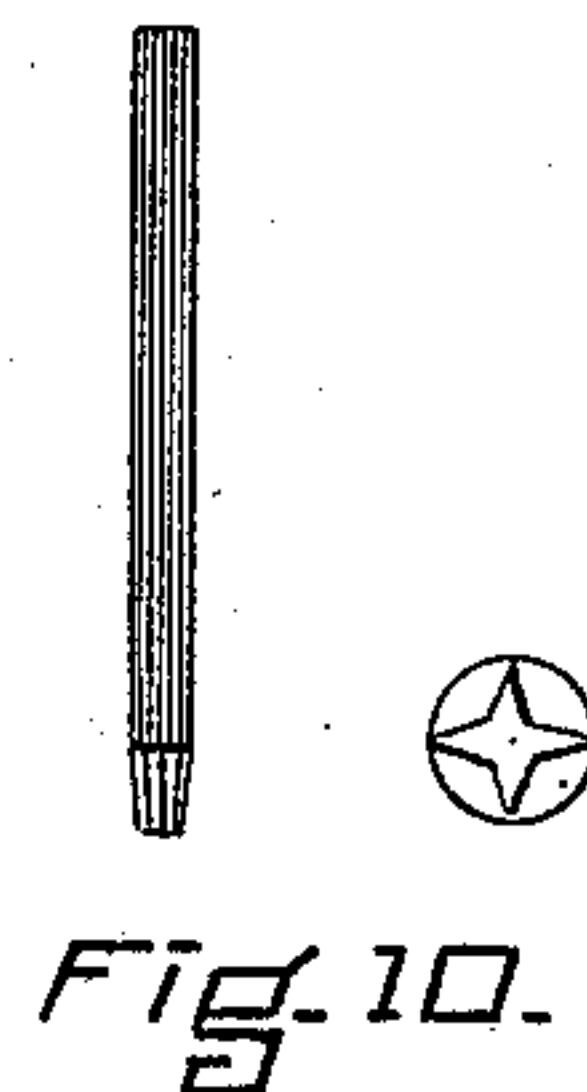
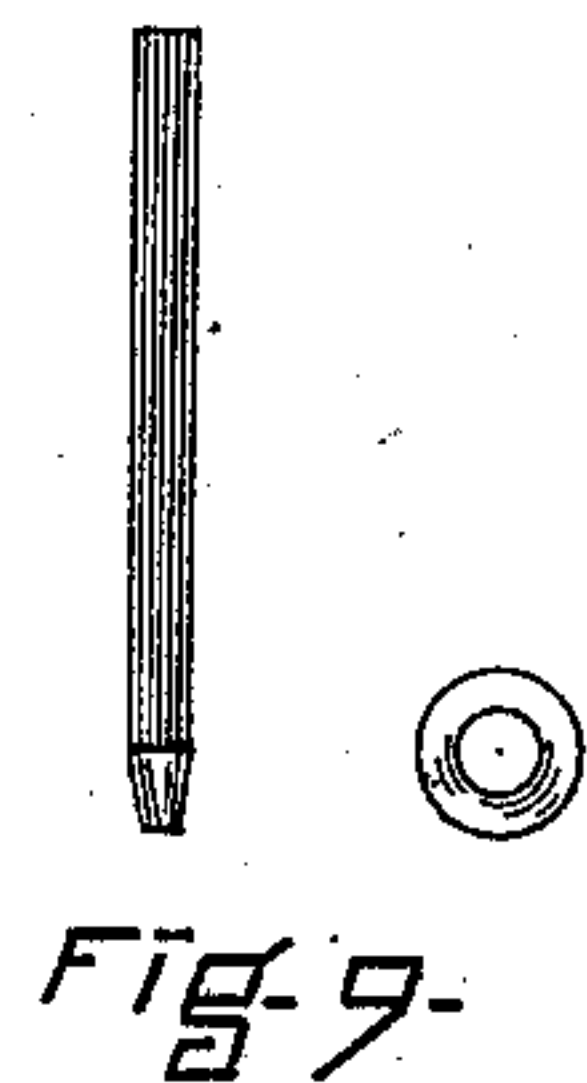
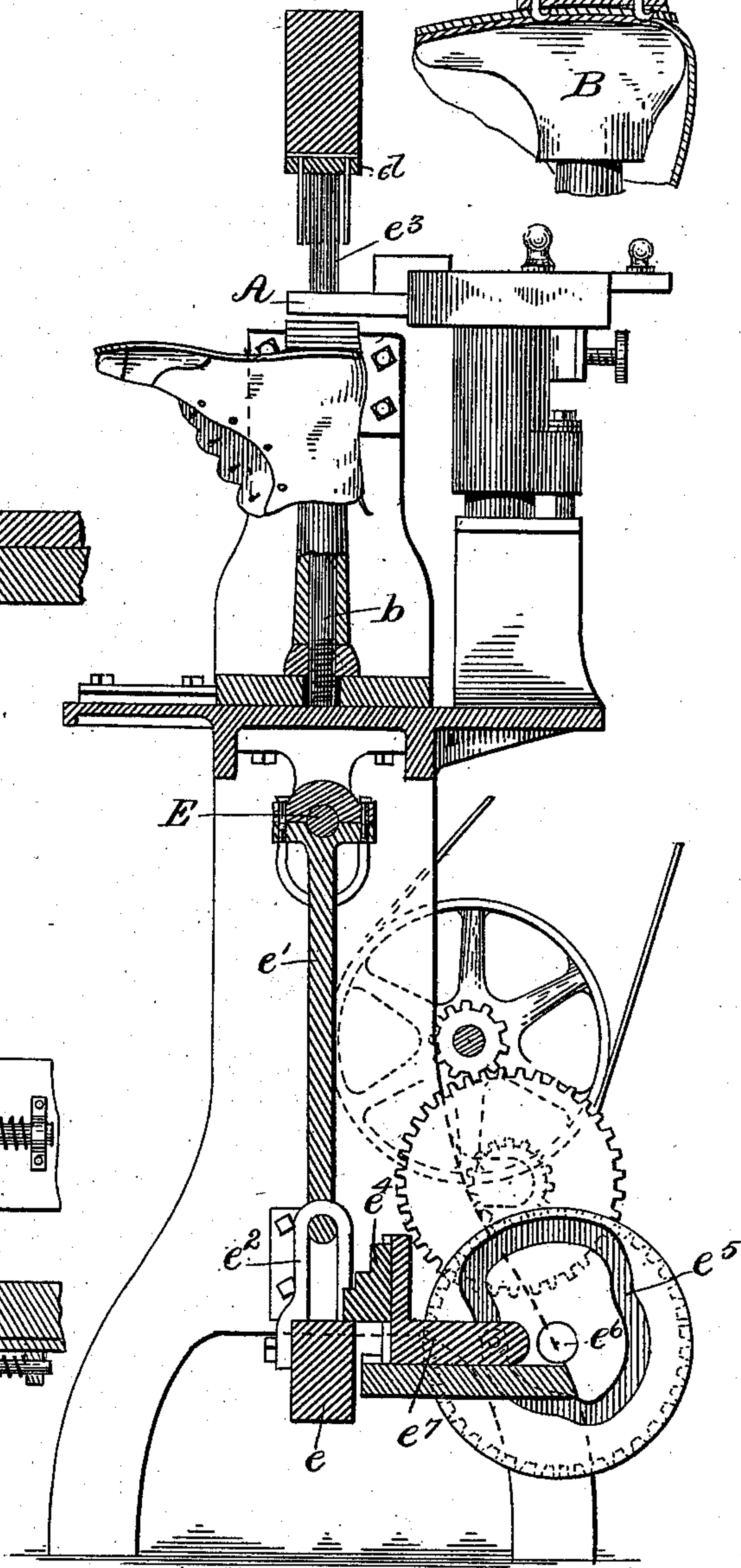
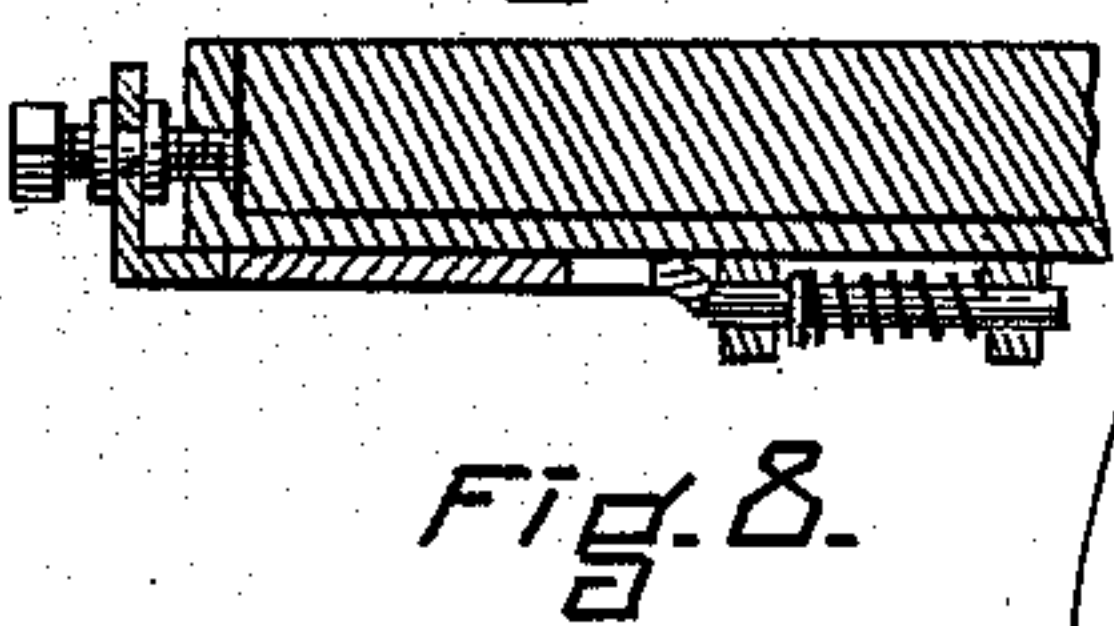
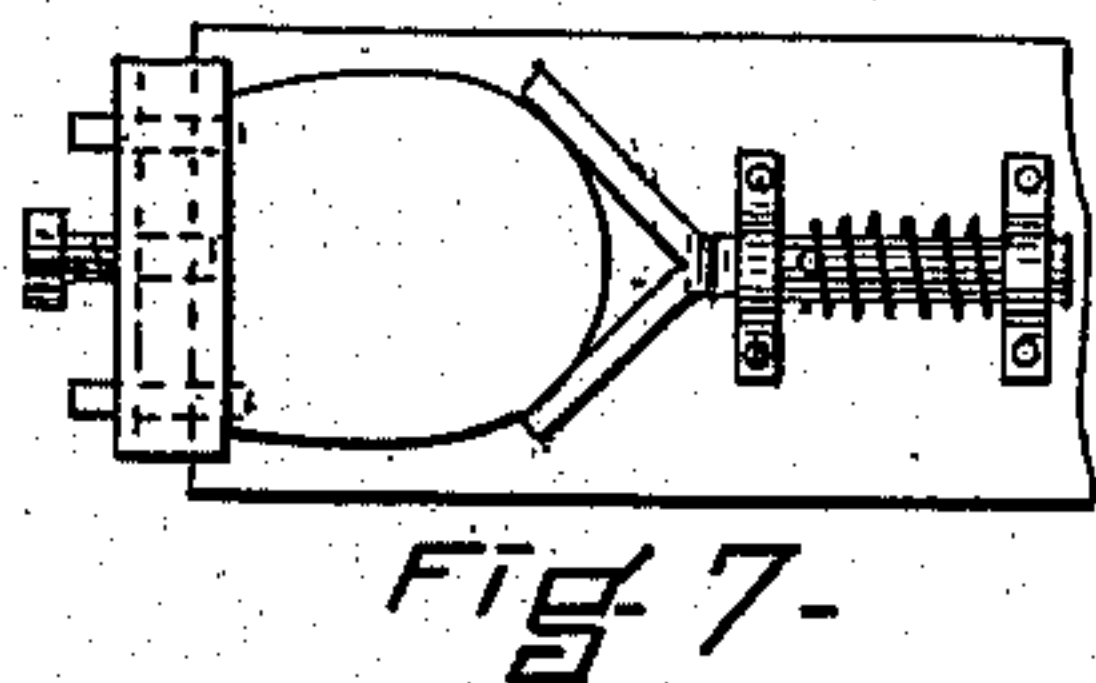
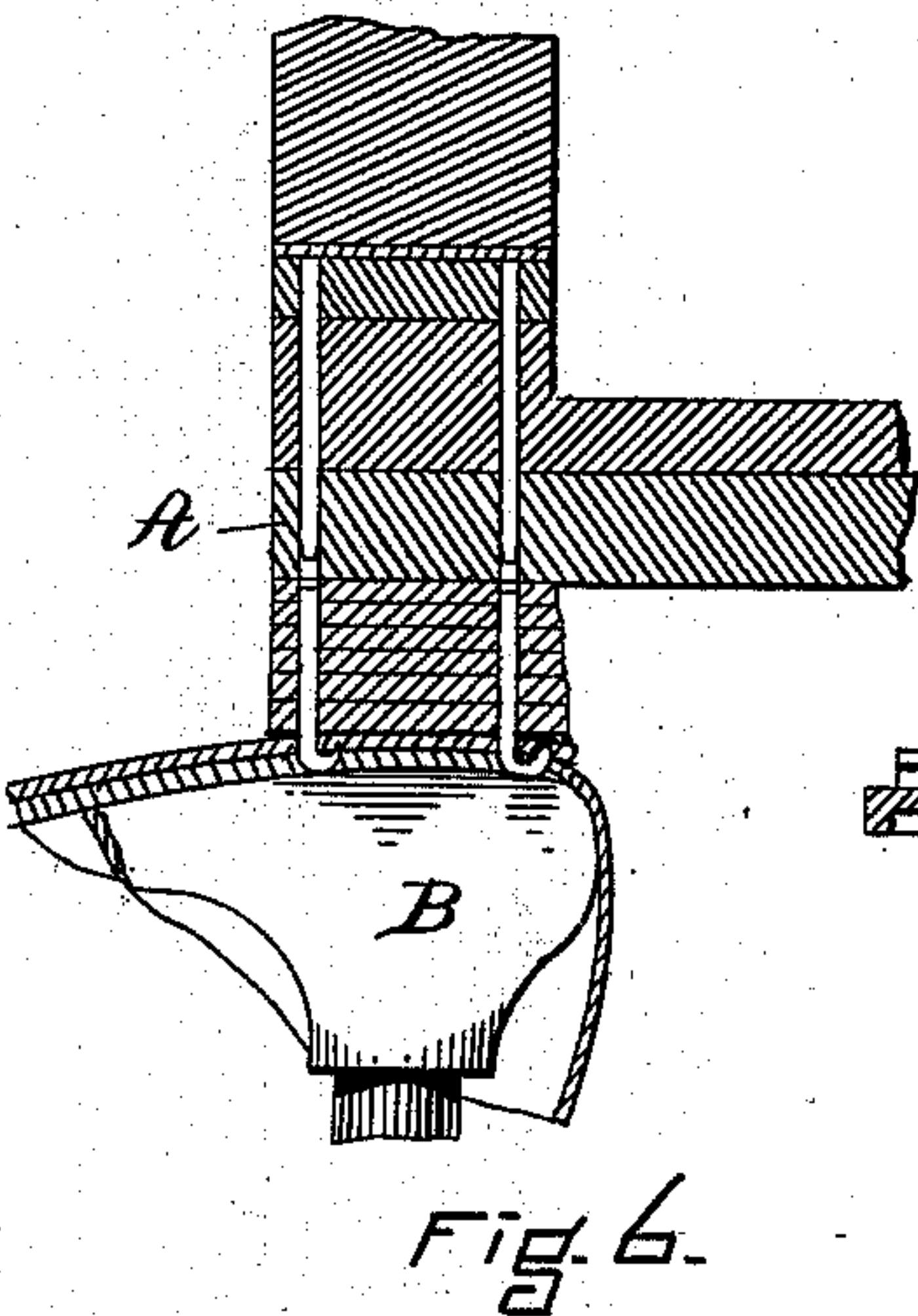
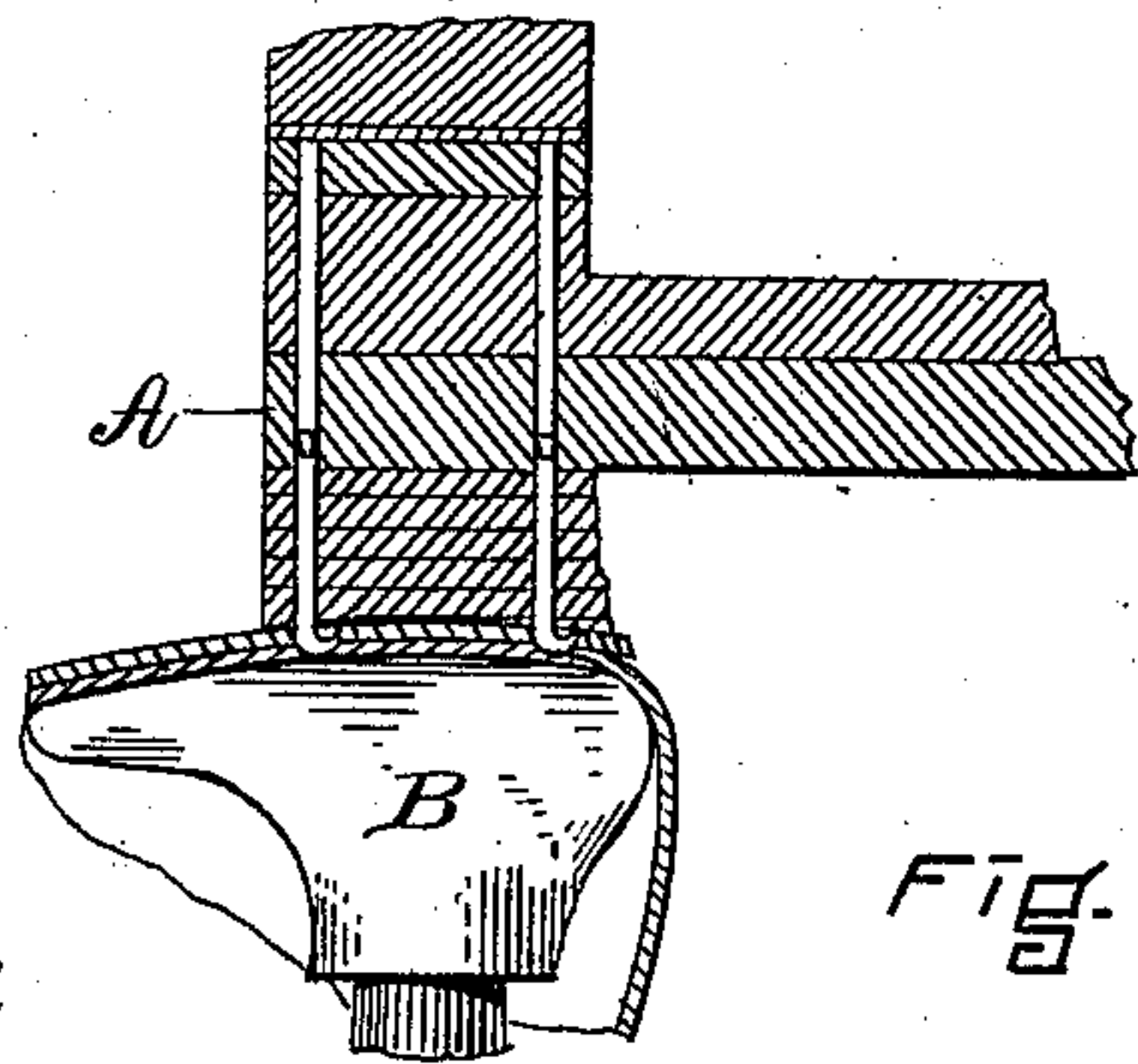
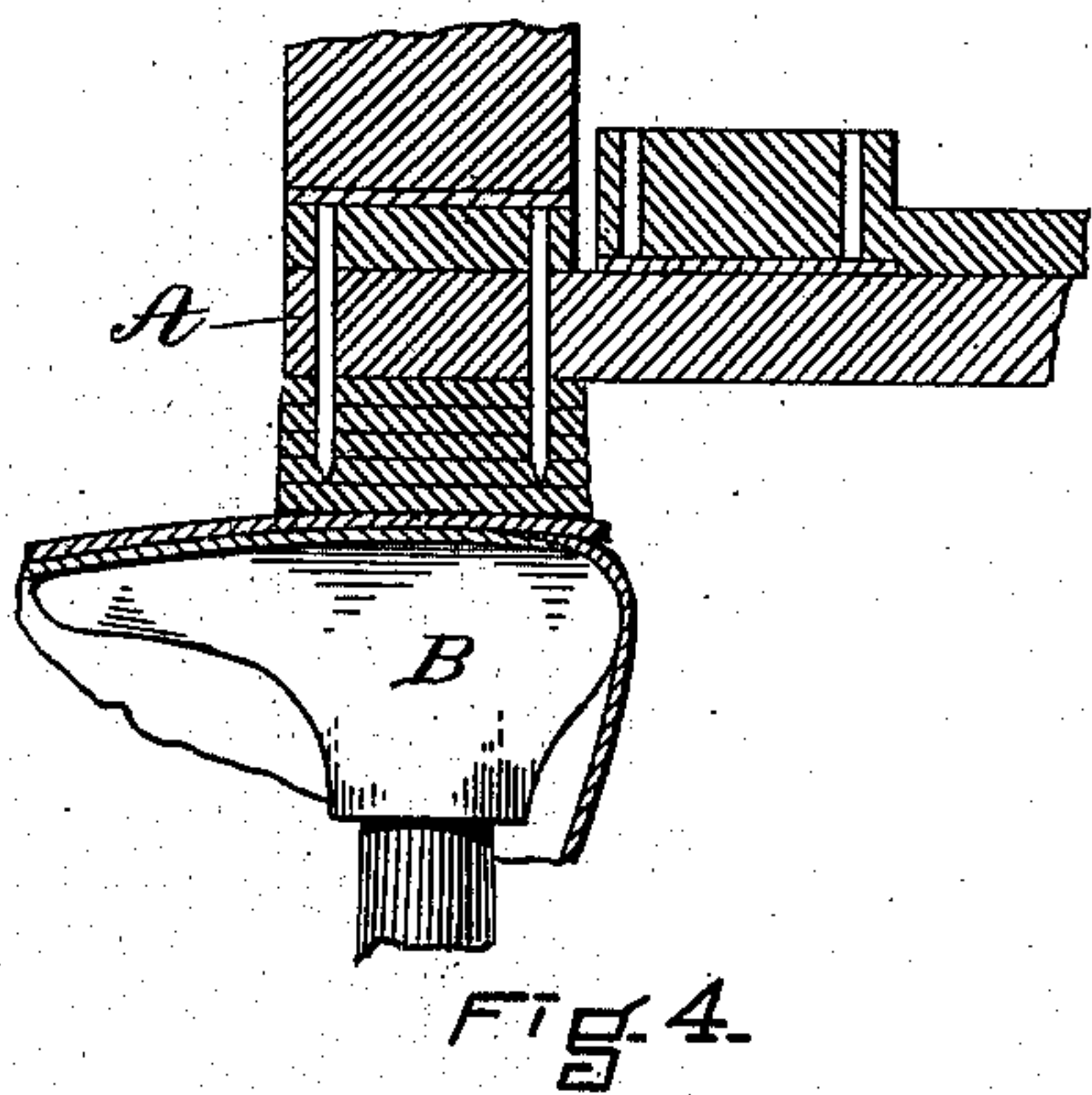
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Fig. 3.

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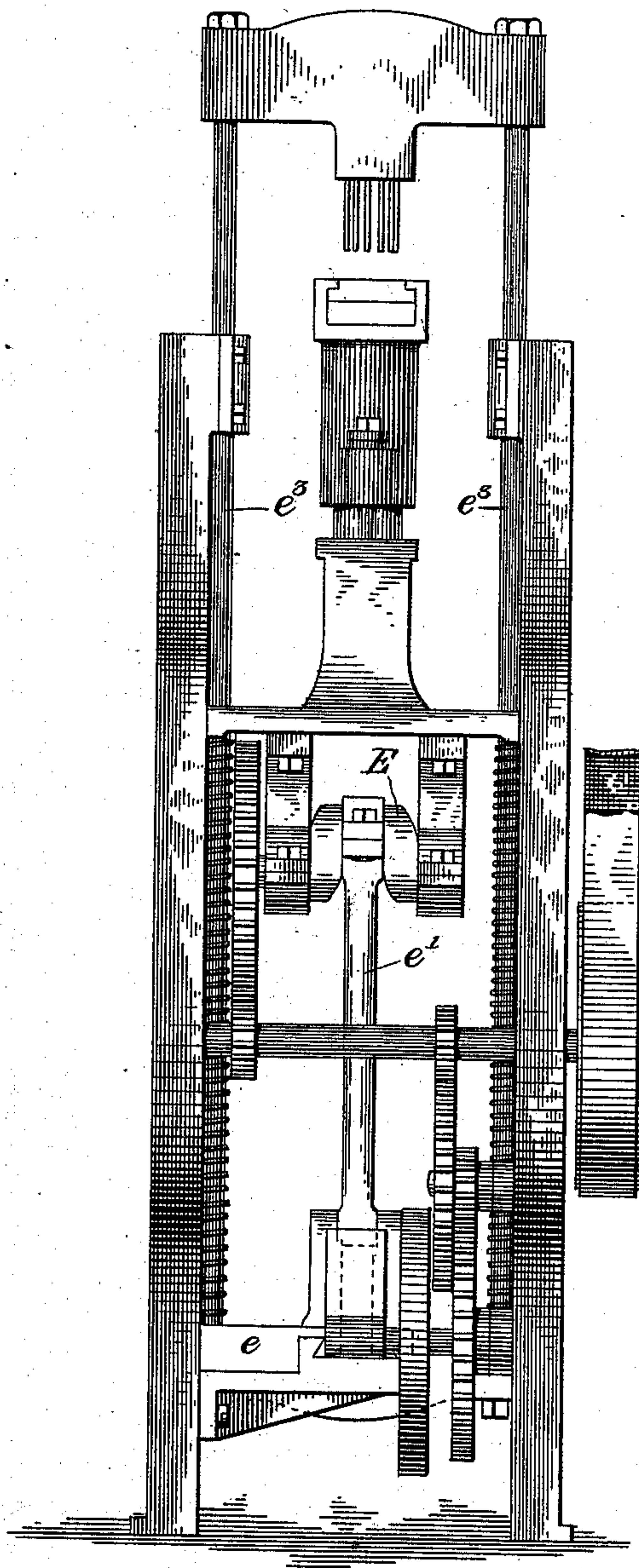
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3 Sheets—Sheet 3.

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WITNESSES.

J. M. Dolan

Fred. B. Dolan

FIG. 12.

INVENTOR.

Charles C. Small  
by his attys

Clark & Raymond & Co.



# UNITED STATES PATENT OFFICE.

CHESTER C. SMALL, OF MALDEN, ASSIGNOR TO FREEBORN F. RAYMOND, 2D,  
OF NEWTON, MASSACHUSETTS.

## HEEL-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 413,973, dated October 29, 1889.

Application filed April 19, 1887. Serial No. 235,317. (No model.)

*To all whom it may concern:*

Be it known that I, CHESTER C. SMALL, of Malden, in the county of Middlesex and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Heel-Nailing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to a heel-nailing machine having a gang or group of implements which are used first as awls for puncturing or forming the nail-receiving holes in the heel-blank, and then as drivers for driving a gang or group of nails fed to these holes into the heel and soles of a boot or shoe to which the heel is attached. To accomplish this result it is necessary to employ a templet, and also a mechanism for moving the gang or group of implements to two levels—first, to the lower level necessary in forming the holes in the heel-blank, and, second, to the higher level, when they are reciprocated to drive the fastening-nails. This of course is upon the supposition that the boot or shoe is presented to the nailing devices with the sole uppermost. Of course if it were presented with its sole lowermost these movements of the implements would be reversed.

The invention further relates to the combination of a gang or group of instruments adapted to be used first as awls and then as drivers with devices for compressing the heel-blank, and with devices for feeding nails to the templet-holes or to a position to be driven by the implements when they act as drivers. I would further say that these devices may be automatic in their action—that is, that the compression of the heel-blank, feed of the nails, and the two reciprocations of the head carrying the gang or group of implements may be automatic—or the nail-carrier may be moved by hand. I have represented the machine as automatic. I would further say that when a top lift is to be spanked it will be necessary to provide the head carrying the gang or group of combined awls and drivers, preferably, with a period of rest. These movements, however, preferably

are governed by a cam, and therefore can take place when desired and be of any required length.

The invention further relates to various details of organization and construction, all of which will hereinafter be described.

In the drawings, Figure 1 is a view in vertical central section of a machine having the features of my invention. Fig. 2 is a view in elevation of the reciprocating head carrying the gang or group of implements and one of the cams for operating the same. Fig. 3 is a view in vertical central section illustrating a modified form of the invention. Figs. 4, 5, and 6 illustrate various positions of the puncturing and driving instruments in relation to the heel. Figs. 7 and 8 represent in plan, inverted, and in vertical section the construction of the top-lift-holding devices. Fig. 9 illustrates in elevation and in plan, inverted, one of the forms of the combined awl and driver. Fig. 10 in similar views illustrates another form of the combined awl and driver. Fig. 11 shows in like views still another form thereof. Fig. 12 is a view of the machine as represented in Fig. 2 in rear elevation.

A is the templet, which is represented as stationary.

B is a last or work-support. It is mounted upon the jack-spindle *b*, which is adapted to be moved upward by means of the toggle-head *b'*, toggle *b<sup>2</sup>*, and lever *b<sup>3</sup>*, one end of which is connected with the toggle by a link *b<sup>4</sup>* and the other end of which is connected with a cam *b<sup>5</sup>* on the cam-shaft *b<sup>6</sup>*.

C is a nail-carrier. It is moved upon the templet by the cam *c* into and out of operative position, and is adapted to receive nails supplied to it automatically from a nail-making device.

The construction thus far described is well known in the art and will be readily understood, and my improved construction is as follows:

D is a head carrying or supporting a plate *d*, which holds the puncturing and driving implements *d'*. These puncturing and driving instruments have an end *d<sup>2</sup>* somewhat reduced in size, and which may be conical, as represented in Fig. 9, or oval-shaped, as represented in Fig. 10.



sented in Fig. 11, or star-shaped, as represented in Fig. 10, or of any other form or shape to enable the implement to be forced into the stock of the heel; but of course the points  
5 cannot be sharp, like those of the ordinary awl. They must be of a size sufficient to enable them to penetrate and at the same time have a head or surface for driving the fastenings.

10 The head D is reciprocated by means of the cams  $D'$   $D^2$ , which are connected with the head D by means of the cam-pins  $d^3$ . The cams are carried by the shaft  $d^4$ , which is rotated by the shaft  $b^6$ , with which it is connected by the bevel-gear  $d^5$   $d^6$ . The cams are  
15 timed to move the block D downward sufficiently to cause the implements  $d'$  to be forced through the holes of the templet into the stock of the heel any desired distance to form the necessary holes for the reception of the nails. The head is then lifted and held  
20 lifted while the nail-carrier is moved into position to convey nails to the templet-holes. It is then again moved downward by its cams, but not to so great a distance as before,  
25 the cams being arranged to move the lower ends of the implements either flush with or slightly above the under surface of the templet. The block is then raised, and, if the  
30 heel is to be blind-nailed, is held lifted while the cam for moving the last and presenting the top lift operates to lower the last to permit the insertion of the top lift and an imperforate plate beneath the templet-plate,  
35 when the last is immediately lifted by the cam and toggle and the top lift spanked on.

In lieu of cams for reciprocating the head carrying the gang or group of combined awls and drivers, I may use the construction shown  
40 in Figs. 3 and 12, which comprises a crank E, connected with a lower cross-head  $e$  by means of a pitman  $e'$ , the end of which is connected with the cross-head by the slotted straps  $e^2$ , and the lower cross-head is connected by rods  
45  $e^3$  with the upper head carrying a gang or group of implements. To obtain the longer reciprocation necessary for causing the implements to prick the holes in the heel-blank, I insert between the end of the pitman and  
50 the upper surface of the lower cross-head a block  $e^4$ . This block may be moved by hand into position, as described in the Henderson patent, No. 316,894, or it may be automatically moved into position by a cam, as represented in Fig. 3. This mechanism varies  
55 from that described in the Henderson patent, in that the pitman is adapted to come in contact with the lower cross-head and move it downward when the block is not interposed,  
60 so that the upper head is then moved downward sufficiently to cause the implements to then act as drivers in driving the nails, as the awls are reciprocated first. Upon the starting of the machine, when the pitman is in its  
65 highest position, the cam  $e^5$  upon the shaft  $e^6$  moves the block  $e^4$  between the end of the pitman and the upper surface of the cross-

head, and upon the first reciprocation the combined awls and drivers are moved downward sufficiently far to form or prick the  
70 holes in the heel-blank. When the pitman reaches its highest position, the block is moved from between its under surface and the upper surface of the cross-head by the  
75 cam  $e^5$ , and upon the next downward movement of the pitman its lower end comes in contact with the upper surface of the cross-head, and consequently the throw of both cross-heads is reduced in extent a distance  
80 equivalent to the height of the withdrawn block. The block is connected with the slide-bar  $e^7$ , so as to have a vertical movement thereon during the downward and upward  
85 movements of the lower cross-head. I would not, however, be understood as confining myself to the especial mechanism described for providing the head supporting this gang or group of combined awls and drivers with the  
90 variable throw needed for causing the same gang of implements to act successively as awls and drivers, but may use any equivalent mechanism to that herein described for accomplishing this purpose.

When the form of the invention represented in Fig. 3 is employed and it is desired  
95 to attach a top lift without lowering the jack-post after the driving of the nails, the slide-block  $e^4$  is constructed substantially as therein represented—that is, instead of being shaped  
100 to provide the gang or group of implements with two ranges of movement it provides it with three—first, to the lower limit necessary for pricking the holes in the heel, or to the  
105 position represented in Fig. 4; second, to the position represented in Fig. 5, or that to which it is moved to drive the attaching-nails for blind-nailing, and, third, to the position represented in Fig. 6—that is, to a position not  
110 quite so low as that represented in Fig. 5. This result is obtained by providing the block  $e^4$  with a series of surfaces of different heights and by constructing the cam  $e^5$  so as to move the block in relation to the pitman, first, to  
115 present the highest surface, then the next lower, and then the lowest surface.

In operation the boot or shoe is placed upon the last or work-support, which is moved into position beneath the templet. The machine  
120 is then set in operation, and if it is automatic in its operation the last or work-support is moved upward against the templet to compress the heel-blank. This is immediately followed by the downward movement of the  
125 head carrying the gang or group of combined awls and drivers, which then act as awls, and are consequently moved sufficiently to cause their ends to enter the heel-blank to any desired extent to prick it or the holes therein. The gang or group of implements having thus  
130 acted as awls are withdrawn, the nail-carrier is moved forward to deliver nails to the templet, and the gang or group of instruments are moved downward again, but not so great a distance as before. They then act as drivers, and



are moved to the lower surface of the templet if the heel is to be flush-nailed, and if blind-nailed not quite to the lower surface of the templet. If the heel is to be blind-nailed, the templet is then fed by an imperforate plate below the templet-plate, the last or work-support having been moved downward by the toggle sufficiently to permit this to be done, and it is then moved upward to cause the heel to be moved against the top lift and the top lift to be spanked on.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a heel-nailing machine, the combination of a templet with a head suspended from and operated by cams to have a variable reciprocation in relation to the templet, and a gang or group of implements to be used as awls or as drivers mounted on the one end

thereof, adapted to be moved alternately or successively to operate in their two capacities, substantially as described.

2. In a heel-nailing machine, the combination, with a templet and a last or work-support, between which and the templet the heel-blank is compressed, of a head suspended from cams, and thereby provided with a variable throw or vertical reciprocation in relation to the templet, and a gang or group of implements to be used as awls and as drivers mounted on the one end thereof, adapted to be moved alternately or successively to operate in their two capacities, substantially as described.

CHESTER C. SMALL.

Witnesses:

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